

A SPATIAL ANALYSIS OF OFFENDER RESIDENCE AND NEIGHBORHOOD
CRIME RATE: AN EXPLORATORY STUDY OF GANG MEMBERSHIP

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The social ecology of gang activity has been one of the most controversial topics in the social sciences. Early research on gang territory (Thrasher 1927) found gang members to be concentrated in “interstitial” areas of the city and almost non-existent in residential and commercial districts. Whyte (1942) advances this notion of territory when research found gang members to live in areas smaller than a neighborhood, in a more defined areas. However, contemporary work on Chicano gangs (Moore et al. 1983) found gang members to live in neighborhoods away from their gang affiliated “turf” in low income housing. Gang members would then travel by automobile or public transportation to get to their gang’s neighborhood.

The location of residence and neighborhood crime rate is examined from a social disorganization perspective. Social disorganization posits neighborhoods that are characterized as highly impoverished, ethnically heterogenic, and residentially mobile experience higher than normal crime rates (Sampson and Groves 1989; Sampson et al. 1997). A study of homicide patterns from a social disorganization perspective (Ye and Wu 2010) found that homicide is more common in census blocks that had higher levels of poverty, immigrant concentration, and residential mobility.

This study is spatial in nature and is focused on the differences in location of residence and neighborhood crime rate between non-gang affiliated offenders and gang members. There are three data sources for this study: arrest records from Albuquerque, New Mexico Police Department and Bernalillo County Sheriff's Department, United States Census Estimates from the year 2000, and GangNet. The arrest records were used to obtain location data on offenders who committed crime between 1996 and 2006. Census data were compiled to create structural variables for analysis. GangNet was used to identify known gang members in the sample.

Traditional non-spatial techniques such as descriptive measures of central tendency and t-tests to determine the differences between non-gang and gang offender location of residence and neighborhood crime rate were used. Also, spatial techniques such as Moran's I, Local Indicators of Spatial Association (LISA) maps, and spatial regression were used to eliminate spatial autocorrelation within the variables for analysis.

Results show that the residential patterns of non-gang and gang offenders are different. Although both offender groups were more likely to live in socially disadvantaged neighborhoods, gang offenders tended to reside in neighborhoods that were stable. Also gang offenders lived in areas that had a significantly higher proportion of youthful residents.

Neighborhood crime rates were similar between gang and non-gang offender groups. However, gang offenders are more likely to commit crimes further away from their residence, and in areas that are less likely to have other gang residents. The

findings of this study suggest the need to differentiate between various indicators of social disorganization when determining the influence of neighborhoods on both residential concentrations of serious criminal offenders, and crime rates in those areas. Further, they suggest that gang membership mediates the association between neighborhood characteristics, offender residential concentrations, and neighborhood crime rates.

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CHAPTER 1: INTRODUCTION

Gang-related criminal activity is one of the most studied social problems in America. There is vast gang literature: defining gangs (i.e., Thrasher 1927; Klein 1971; Decker 1996), describing the personal attributes of gang members (i.e., Curry 1994; Huff 2008), determining their propensity to commit violent crimes (i.e., Thornberry et. al. 2004; Battin, et al. 2006), and many other topics. One of the most controversial areas of gang research has to do with the social ecology of gang residence and activity, and the territory which they attempt to control. Early studies of gang territory suggested that gang members live and commit crime in fixed areas, and that gang members identify a territory or neighborhood as their own “turf” (Thrasher 1927; Whyte 1943). More recent research contends that in some cities, the residences of gang members are no longer concentrated in the territory that their gang claims, but rather are scattered around the city in low-income housing. In these cities, some gang members routinely travel by personal or public transportation to the territory claimed by the gang (Moore, Vigil and Garcia 1983; Tita, Cohen, and Engberg 2005). This thesis is a further empirical exploration into the relationship between neighborhood characteristics and gang presence, focusing on where gang members reside and commit crimes. Specifically, it investigates spatial differences between gang members and offenders not affiliated with a gang concerning their residential and criminal patterns.

Defining a Gang

There is very little consensus on the issue defining gangs, and gang members (see, for example, Klein 1969; Miller 1975; Esbensen et al. 2001). Some of the lack of consistency could be the result of the methods used to study gangs. For example, some ethnographic research studies rely on the strategy of letting youths self-identify as gang members, an approach that is termed “claiming” in “gang talk” (Klein, 1971; Esbensen and Huizinga 1993; Maxson and Klein 1995; Esbensen et al. 2001; Decker 1996; Decker and Van Winkle 1996).

Thrasher (1927: 37) recognized the need to be more objective when identifying a gang, emphasizing the empirical characteristics that made the gang unique and different from other collective groups, such as delinquent groups, and delinquent peers. Thrasher asserts that gangs are unique social groups, in that they are spontaneous and unplanned in origin; engage in intimate face-to-face relations; exhibit a sense of organization, solidarity, and morale that is superior to other delinquent groups (i.e. the mob); have a tendency to move through space and meet a hostile element; and have a propensity for some geographic area or territory (Thrasher 1927: 36-46). Thrasher does not mention the criminality of a gang, but he does state that the “criminal gang” was one of the many different groups he studied: apparently he considered some gangs to be more deviant than others (P. 47-62). Ball and Curry (1995) conclude that a gang is “any denotable adolescent group of youngsters who are generally perceived as a distinct aggregation by others in a neighborhood,

recognize themselves as a denoted group, and have been involved in a number of delinquent incidents that bring about a negative view of themselves from neighborhood residents and law enforcement (225).” Later, Curry and Decker (1998) expanded upon the components of Thrasher’s (1927), Klein’s (1971), and Ball and Curry’s (1995) definitions and include “being in a social group, using symbols, engaging in verbal and nonverbal communications to declare their “gang-ness,” having a sense of permanence, having gang identified territory or turf, and, lastly, engaging in crime (P. 2-6). Curry and Decker (2002) identify two common definitional criteria for gang membership: involvement in crime and the affiliation of membership and cultural aspects that make the gang feel like a close knit family. Particularly, Hispanic/Latino gangs emphasized the importance of cultural aspects (P. 9-14).

Administrative agencies that target gang crimes necessarily use a more concrete definition. For example, GangNet (a proprietorial database of information shared between criminal justice agencies, identifies gang members and their personal characteristics and gang affiliation) asserts that: “There is no uniform definition of the term ‘gang.’ For at least the initial testing phase of GangNet, the term “gang” means a group or association of three or more persons who share a common identifying sign, symbol, or name and who individually or collectively engage in, or have engaged in, criminal activity falling within the investigative jurisdiction of the

ATF [Alcohol, Tobacco, and Firearms] (Burrows 2006).” Since the current study uses information from the GangNet database, it adopts GangNet’s definition of a gang.

Gang Membership

More law enforcement agencies are indicating a gang problem in their cities. Curry et al. (1994) found that the number of cities reporting gang problems significantly increased: from six in 1975, to 282 in 1994. They estimated that there were 8,625 gangs, 378,807 gang members, and 437,088 gang related crimes in 1993. In 2007, there were a reported 788,000 gang members, and 27,000 gangs covering over 3,550 jurisdictions (Egley and O’Donnell 2009). Huff (2008) found that there were almost one million gang members responsible for over 600,000 crimes a year. While estimating procedures and results vary, there is general agreement that gangs are growing at an alarming rate. With these rates increasing every year, by the year 2020 there will be close to 1.5 million gang members with over 30,000 gangs (Huff 2008).

Gang membership is influenced by family, community, peer group, and individual factors (Howell 1998). Families that lack of conforming adult role models or have other family members in gangs (Howell, 1989), and that exercise inappropriate parental discipline (Miller 1958; Moore, Vigil, and Garcia 1983; Moore 1991; Curry and Spergel 1992; Dhungana 2009) are more likely to have male children who join gangs. Community influences range from a lack of social capital

(Virgil 1988; Sullivan 1989; Moore 1990; Klein 1995), to the availability of firearms in their neighborhood (Miller 1992; Lizotte 1994; Bjerregaard and Lizotte 1995). Peer group influences include meeting established gang members in school, and having neighborhood friends who are in gangs (Curry and Spergel 1992). Other interactions with delinquent peers also influence young adults to become gang members. Social interactions with gang members has been found the most significant predictor in a youth joining a gang (Kosterman et al. 1996). These include prior delinquency (Esbensen and Huizinga 1993; Kosterman et al. 1996), deviant attitudes (Fagen 1990), and the use of alcohol or drug (Bjerregaard and Smith 1993).

PURPOSE OF CURRENT STUDY

This study employs social disorganization theory to explore the ecology of gang presence in Albuquerque, New Mexico. Social disorganization theory predicts high crime neighborhoods are characterized by a concentration of criminal offenders, economic disadvantage, immigrant concentration, and residential instability (Shaw and McKay 1942). However, recent applications of social disorganization theory conclude that, even in impoverished areas, neighborhood social disorganization and rates of crime might be quite low. The work of Sampson and others (1997) indicates that while poverty and crime are generally related to social disorganization, social cohesion can promote a sense of collective efficacy which neutralizes the effects of poverty and reduces social disorganization in impoverished neighborhoods. The degree of residential stability and homogeneity among residents can be taken as social

indicators of collective efficacy, or a low level of social disorganization within a neighborhood.

Specifically, I compare the nature and degree of social disorganization in four types of impoverished neighborhoods: those with high levels of crime committed by gang members, those with high levels of crime committed by non-gang offenders, those with high levels of gang residents, and those with high levels of non-gang offender residents. I use Geographic Information Systems (GIS) to map and statistically analyze these four pairs of neighborhood categories and to compare their geographic distributions. Spatial analysis enables the determination of (1) the differences in crime rates among low-income neighborhoods that can be attributed to indicators of collective efficacy, and (2) the influence of these indicators for gang and non-gang offenders.

RESEARCH QUESTIONS

To guide this study, I rely on two research questions:

Is social disorganization positively associated with the residence of offenders, and does this relationship vary among offenders according to gang membership?

Is social disorganization positively associated with the crime rate of the neighborhood, and does this relationship vary among offenders according to gang membership?

To answer these questions, I address a series of exploratory topics. First, I construct indices of social disorganization for Albuquerque. Second, I determine concentrations of these indices and their components for the entire city, and specify

neighborhood differences for indices and components of social disorganization and by offender gang membership.

The next chapter presents a review of the literature related to social disorganization and gang activity as these relate to urban space. This is followed in Chapter 3 by a detailed description of the research methodology, with particular emphasis on spatial techniques and description of neighborhoods and offenders in Albuquerque Chapter 4 presents the results of the research, while Chapter 5 provides an interpretation and discussion of the findings. I conclude in Chapter 6 with a summary and policy implications, and limitations of the research.

CHAPTER 2 GANG ACTIVITY SPACE EXPLAINED BY SOCIAL DISORGANIZATION THEORY

This chapter provides a foundation for the current study by describing early and more contemporary conceptualizations and research concerning the ecology of crime, and selected research concerning gangs that is particularly relevant to the current study. It first outlines ecological literature that focuses on social disorganization, and then explores the concept of *gang activity space* (Tita et al. 2005).

THE ECOLOGY OF CRIME

Conceptual Foundations

Park and Burgess (1925) use a zonal model to explain land value in Chicago. To form their theory of human ecology, they borrow two concepts from the field of plant ecology. The first concept posits that each plant community is similar to a single organism. Park viewed the city in similar terms, describing the city as a super-organism, and that each area of the city has its own organic unity and its own divisions. He realized that divisions existed in each city and that the divisions in the city include racial and ethnic divisions, income and occupational divisions, industrial and business divisions, and physical divisions separated by architectural and natural structures (1952:118). The second concept borrowed from the field of plant ecology involves the nature of ecological balance in specific areas. Park declared the primary mechanisms for shifting balances in human organisms are invasion, domination, and

succession. Figlio et al. (1986: xi) note that, “Park viewed communities as functionally specialized areas within an industrial economy. The patterning of communities was determined by competition, and changes were determined by invasion and social succession.”

With these two concepts in mind, Park and Burgess created a concentric zone model that had five distinct zones. The first was known as “the loop,” or the central business district (CBD). The CBD is accessible to the largest number of people. Also, this is where multi-storied buildings are located. Next, the zone in transition enclosed the loop, and was the oldest residential section of the city. It had a higher immigrant concentration, living in deteriorated multi-unit housing. The third zone, beyond the zone of transition, was a residential area occupied by working class residents who were able to escape the zone in transition. The fourth zone was also a residential area of predominately single-family housing units and luxury apartments. Finally, the fifth zone was the commuters’ zone, which was expanding outward as a response to the ecological process of invasion, domination, and succession (Robinson 1997). The zonal hypothesis was originally intended for use by businesses looking for profitable locations. Shaw and McKay (1942) adapted the zonal model to explain juvenile delinquency and other forms of social deviance, leading them to further develop social disorganization theory.

Emergence of social disorganization theory. “Social disorganization theory attributes variations in crime and delinquent behavior over time and among territories

or neighborhoods to the absence or breakdown of institutions and relationships among common neighborhood residents.... (T)he concept of social disorganization was applied to the explanation of crime, delinquency, and other social problems by sociologists at the University of Chicago in the early 1900s” (Jensen 2003: 1).

Clifford Shaw and Henry McKay suggest that disorganized neighborhoods that are experiencing high levels of poverty, population heterogeneity, and residential mobility have weak informal social controls (Shaw and McKay 1942). Weakened formal and informal social controls hamper communities in their efforts to resolve social problems, which, in turn, usually lead to crime (Sampson and Groves 1989).

Critique of classical social disorganization theory. Although Shaw and McKay pioneered social disorganization theory, much scholarly criticism has plagued their work. Lotz (2005: 122-127) proclaims that “this theory also overlooks middle class crime as it only focuses on disorganized areas, and does not explain how delinquent standards and values are conveyed. Robinson also suggests that Shaw and McKay commit an ecological fallacy when using concentric zones to explain juvenile crime rates in the city (Robinson 1950). He explains, “An ecological fallacy occurs when group rates are used to describe individual behaviors.... (A)ggregate statistics are not consistent estimates if the unit of analysis is the behavior of individuals (P. 156).”¹

Finally, recent research suggests that not everyone who resides in disorganized

¹ However, other research (Brantingham and Brantingham 1984) suggests Shaw and McKay did not commit an ecological fallacy because they use case studies to back up their statistical findings.

communities is involved in criminal acts, and social disorganization does not predict criminal activity in areas characterized by disorganization (Sampson et al. 1997; Taylor 2001).

Contemporary research in social disorganization. Sampson and Groves (1989) use British Crime Survey data to measure self-reported criminal offending and criminal victimization. They build upon earlier versions of social disorganization theory by exploring the importance of informal and formal social networks in a community and the collective supervision of local problems (P. 777). They use a hybrid approach by combining Shaw and McKay's (1942) zonal model with Kasarda and Janowitz's (1974) systemic model to create a modern social disorganization theory that takes into account both neighborhood contextual factors (i.e., poverty, racial heterogeneity, and ethnic concentration) and compositional factors including formal and informal social controls (Sampson 1988; Jensen 2003). Sun et al. find in their test of Sampson and Groves work that "the key internal mechanisms that influence social disorganization in a community are sparse local friendship networks, unsupervised teenage peer groups and low organizational participation (2004: 2)." Several research studies have concluded that the work of Sampson and Groves is consistent with Shaw and McKay's assertion that residential stability has a large direct effect on local friendship networks and that urbanization and ethnic heterogeneity have significant positive effects on the community's inability to control youth (e.g., Lowenkamp et al. 2003; Sun et al. 2004).

Levels of social control. Social control is a term used to explain the social mechanisms of regulating individual or group behavior (Gault and Silver 2008). Informal social control occurs when a group of community members apply informal sanctions for violating a community norm. When considering neighborhood studies, most research tests informal social controls that mediate between community disorder and crime. To elaborate, research has expanded our understanding of institutional and personal community networks as a mediating factor in neighborhood disorder. Robert Bursik and Harold Grasmick (1993) suggest that there are three levels of neighborhood social order which are the private, parochial, and public levels (Hunter 1985). First, the private level refers to the interpersonal relationships in a group or community. Control in this level is achieved through the granting or withholding of social support or sentiment (Bursik and Grasmick 1993). Second, the parochial level evaluates the non-intimate relationships between neighbors and acquaintances met at schools, church functions, and voluntary organizations. At this level, the community exhibits a regulatory capacity to supervise activities and integrate local institutions. Third, the public level tends to, “focus on a community’s ability to secure the public goods and services allocated by agencies located outside the neighborhood that are necessary for the development of an effective regulatory capacity (Bursik and Grasmick 1993: 278).” The public level of control refers to a community’s ability to connect with agencies outside of the neighborhood that are also interested in a common goal (i.e. crime prevention). The assumption here is that neighborhoods that experience high crime rates have low public social control and do not have the proper

resources to combat their crime problem. Bursik and Grasmick found that the simultaneous consideration of all three levels could account for crime patterns in a consistent manner (1993).

Carr (2003) uses the three levels of social control to evaluate the effectiveness of the model on a stable white neighborhood with low levels of crime. He finds that social ties, along with interpersonal networks were not effective in explaining the development and maintenance of social control. Residents in this neighborhood “Beltway” did not want to get involved in the surveillance of youth in the neighborhood. The residents were also unwilling to intervene when there was a dispute in their community. This can be attributed to the community as a whole in that the beltway neighborhood housed affluent dual earning families that were not home often, and were not able to survey the community. To handle disorder in their community the residents relied on outside institutions and organizations with direct ties to public officials and resources to help resolve community problems (Carr 2003). This circumstance has been deemed the “new parochialism” combining the parochial and public levels of social control. More specifically, “the new parochialism is a set of practices that creates solutions at the parochial level but owes its existence and its efficacy to the intervention of institutions and groups from outside the neighborhood (P. 1252).” Carr’s work implies that strong social ties and traditional models of social control are useless in controlling crime; however, the

ability of a neighborhood to rely on organizations and institutions to effectively curb crime is a step forward in evolving social disorganization theory.

Collective efficacy. Pioneers in the study of collective efficacy have concluded that the social and organizational characteristics of neighborhoods which explain variation in crime rates are not reducible to the aggregate demographic characteristics of individual neighborhood residents (Sampson et al. 1997: 918). Sampson and colleagues' notion of social control refers simply to the ability of a social group to control its members and to realize its collective goals. Several examples of informal control are highlighted in their work: monitoring of spontaneous groups among children, a willingness to intervene to prevent acts such as truancy and street corner "hanging" by teenage peer groups, and confronting persons who are exploiting or disturbing public space (P. 919). Informal control is enhanced in a neighborhood when neighbors have a sense of mutual trust and solidarity among residents (Browning et al. 2000). Communities that lack informal social control, usually those neighborhoods that experience concentrated disadvantage, immigrant concentration, and residential mobility, are less likely to have close neighborly ties or trust. However, neighborhoods with strong collective efficacy may be more resistant to youths hanging out on the corner or deviant peer groups forming, and as a result not experience higher crime rates (Sampson et al. 1997; Sampson and Raudenbush 1999). In affluent neighborhoods, however, residents don't lack opportunity or social structure in the sense that they are able to attend summer camps, music lessons, or

sports training events (Kingston et al. 2009). On the other hand impoverished neighborhoods do not have these opportunities and usually do not have access to public recreational facilities or areas such as parks, sports complexes, or resource centers. This also occurs because neighborhoods with low collective efficacy do not have the resources or social support to allow for healthy development in their neighborhood.

Youths in disadvantaged neighborhoods develop weakened social bonds in their community, low social control, and are often surrounded by or incorporated in delinquent peer groups (Kingston et al. 2009). Kingston and colleagues (2009: 57) assert that cohesion and trust among neighbors is important, “these structural conditions affect the ability of neighbor residents to form social relationships essential for developing mutual trust and solidarity, which are prerequisites for the activation of collective efficacy. Although an extensive amount of research is devoted in claiming that social ties and collective efficacy promote lower crime rates (Sampson et al. 1997; Sampson and Raudenbush 1999; Browning et al 2000; Kingston et al. 2009) other research asserts that increased social ties in the absence of informal social controls could actually lead to increased crime experienced in a neighborhood (Browning et al. 2004). This assertion is based on the notion that increasing social ties and solidarity among offenders that are embedded in similar neighborhoods would increase the likelihood that those offenders would create a deviant subculture of crime.

To be more specific, variables included in social disorganization literature such as, concentrated disadvantage, residential mobility, and immigrant concentration should affect collective efficacy differently (Sampson et al. 1997). Concentrated disadvantage should negatively affect collective efficacy in a neighborhood because poverty enhances a sense of powerlessness. Resource deprivation and lack of legitimate opportunities promote alienation and dependency that hinders the development of collective efficacy (Sampson et al. 1997). Immigrant concentration should also negatively affect collective efficacy insofar as ethnic heterogeneity in a neighborhood leads to confusion and reduces mutual trust among neighbors (Sampson and Raudenbush 1999). Residential stability should positively affect collective efficacy due to long-standing neighbors that are familiar with other residents in the community and concern themselves with a collective and agreed upon goal, controlling crime (Morenoff et al. 2001).

Disorder and crime. Literature on disorder and crime is abundant (Wilson and Kelling 1982; Sampson and Raudenbush 1999; Giacopassi and Forde 2000; Golub et al. 2003), but not always interpreted similarly. The “broken windows theory” is just one example of the link between disorder and crime (Wilson and Kelling 1982). This theory doesn’t explicitly express a direct relationship between disorder and crime, instead Wilson and Kelling interpreted disorder as the first sign of a chain of events that produced crime (Gault and Silver 2008). They posit that all communities that experience physical disorder are not all doomed to high crime rates; however, the

community in itself is more vulnerable to criminal activity. It is then inferred that the lack of informal social controls in the neighborhood lead to the rise of criminal activity. More specifically, public disorder in the form of broken windows, abandoned buildings, and vacant lots leads hard working law-abiding citizens of the community to extract themselves from public spaces or move out of the neighborhood altogether (Golub et al. 2003). Another study agrees with the notion of ordinary citizens vacating public spaces (Herbert 2001) and finds that the absence of informal social controls leads criminals to take part in petty crimes. If there are no sanctions brought upon them by the residents of the neighborhood, more serious crime will ensue.

Although the measurement of physical disorder is sufficient, other structural characteristics need to be examined in communities experiencing higher than normal crime rates. Sampson and Raudenbush (1999) elaborate on the broken windows thesis by examining structural variables such as poverty, land use patterns, and collective efficacy. In their study the authors attempted to measure two types of disorder experienced in a neighborhood, social disorder and physical disorder. Social disorder is measured by unruly youths or verbal harassment or misconduct by strangers. Physical disorder generally referred to visible signs of decay such as abandon housing units, vacant lots, and graffiti (Sampson and Raudenbush 1999). The results of their analysis show concentrated disadvantage and mixed land use patterns were significant predictors of crime. Most importantly, collective efficacy was significant and

negative when tested against social and physical disorder. In concluding their research, Sampson and Raudenbush (1999) found that collective efficacy mediated structural characteristics of the neighborhood and produced lower crime rates.

The work of Wilson and Kelling (1982) and Sampson and Raudenbush (1999) helped define and understand the relationship between neighborhood structural characteristics and how collective efficacy mediates social and physical disorder. Although other research found a negative correlation between public disorder and crime (Markowitz et al. 2001) disorder in a neighborhood leads to weaken informal social control mechanisms that inevitably led to higher crime rates (Bellair 2000).

Informal social control, social ties, and social processes are inherently different than demographics, ethnicity, poverty, heterogeneous populations, and neighborhood mobility. Research has looked at the difference between each category of variables as factors that are either predisposed or factors that enable or impede (Kirby 2008). In his work on health care access, Kirby defines predisposed factors as compositional and factors that enable or impede as contextual. In regards to health care access, Kirby (2008: 327) finds, “there may be lower levels of health care access in impoverished communities simply because poor communities are composed of poor individuals who would have inadequate access regardless of the characteristics of the community they live in.” Kirby also explains contextual factors, “There is something about living in a poor area that negatively affects access to care regardless of individual-level resources.” As far as criminal activity in neighborhoods is

concerned, compositional (predisposing) factors are poverty, immigrant concentration, and residential mobility and contextual (impeding) factors are informal social control, social ties, and mutual trust.

Routine activities theory. Although social disorganization theory is the framework for the analysis, other theoretical perspectives should be discussed. Routine activities theory (Cohen and Felson 1979) looks beyond personal histories of criminals and considers the routine activities of everyday life. The convergence in space and time of three elements, (1) motivated offenders, (2) suitable targets, and (3) the absence of capable guardians against a violation (Cohen and Felson 1979). Gang crime can be facilitated by daily routine activities that a member experiences each day, hanging around high crime areas with people that are highly delinquent (Vigil 2003). More specifically, “the potential for violence is a product of opportunity where one spends more time with criminal offenders who are more likely to participate in offending activities” (Vigil 2003: 229). Originally, routine activities took the offenders as they came. Contemporary research considers informal social control of the offender (Cohen). This concept was extended by Eck (1994) in his study of spatial structure of drug markets. Eck found that the people who control or monitor places have the ability to deter crime (1994). Therefore, the informal social control of the individual has more influence on crime than just considering the offender alone.

CRIMINAL GANGS

This section reviews relevant gang literature concerning gang territory, gang member characteristics, their propensity to commit violent crime, use of firearms, and co-offending.

Gang Territory

The territorial nature of gang members has been a controversial topic in criminological research. Fredrick Thrasher first identified that gangs formed from areas that exhibited low levels of social control (Tita et al. 2005). Thrasher found that gangs were formed when unsupervised youth hung out on street corners (Thrasher 1927). A more global conclusion from Thrasher's work found that gang membership occurred in areas identified as "gangland" and interstitial areas of the city. Interstitial areas are areas "in between" residential and commercial areas, in middle grounds such as vacant lots, alleys, and hid-a-ways. William Foote White (1943) concurred in finding that gang members hung out in areas that were within their neighborhoods, in a more defined, smaller social space. Block and Block (1993) found that there are three different types of "turf"; turf hotspots, drug hotspots, and turf and drug hotspots. This study also finds extremes when it comes to census blocks and criminal activity (Block and Block 1993), noting the rate of gang-motivated street crime in the two most dangerous blocks was 76 times higher than the two least dangerous blocks.

In a related study, Shaw (1938) followed a group of five brothers during their criminal careers. He found that the brothers were implicated in thefts with over 103 other delinquents. Of the 103 delinquents implicated with the brothers, most of them lived within seven-tenths of a mile from the brother's home (Reiss 1988). Shaw's 1938 study gives credibility to the territorial assumption of criminal activity. When it comes to gang members, they concentrate in neighborhoods that are usually denser in population and have a higher proportion of female-headed households (Reiss 1988). Reiss concludes by saying that territorial studies (Thrasher 1927; Shaw 1938; White 1943), "lend support to the hypothesis that it is the territorial concentration of youth males who lack firm controls of parental authority that leads them into a peer-controlled system that supports co-offending and simplifies the search for accomplices (Reiss 1988: 139)."

More recently, studies measuring the territorial nature of gang members reached different findings than early research. Contemporary research on territory (Moore et al. 1983; Moore and Vigil 1985; Tita et al. 2005) shows that territory is less clear than prior research has established. In Chicano gangs (Moore et al. 1983; Moore and Vigil 1985) for example, gave two different answers to similar questions, "where are you from?" and "where do you live?" When asked "where are you from?" gang members responded with the name of their gang neighborhood and when asked "where do you live?" gang members gave their address. Accordingly, Tita et al. (2005: 273) concur that gangs are, "spatially concentrated among disadvantaged

neighborhoods, but gang set space represents a sub-neighborhood phenomenon, with gang members hanging out in relatively small, geographically defined areas within a neighborhood.” Although gang members claim certain neighborhoods, their territory lines are much more ambiguous.

Distance decay. The term distance decay is used to describe the fact that the likelihood that an offender will commit a crime in a particular location decreases the further that location is from their home (Lundrigan and Canter 2001; Canter and Youngs 2008). Although this relationship tends to vary based on the type crime, (Daele and Beken 2009) offenses are less likely to occur more than seven miles away from the home of the criminal. An exception to this pattern are itinerant, or travelling, crime groups (Daele and Beken 2009), who commit the majority of their offenses at a great distance from their residence.

Community context. Gang communities are likely to form in areas that are characterized as highly disadvantaged and associated with high levels of crime (Tita and Ridgeway 2007). Areas prone to high crime rates could include those with concentrations of bars, transit stations or drug markets (Brantingham and Brantingham 1995; Block and Block 2000). Gangs have been found to help the community by protecting its residents from strangers, rival gangs, and other undesirable groups that are inadequately supervised by law enforcement. Gangs can also serve their community by preventing loan sharks or other financial prospectors from taking advantage of the residents (Tita and Ridgeway 2007). An informal

“social contract” emerges between gang members and neighborhood residents that enable a gang to protect the neighborhood and achieve their mutual goal of a stable living area free of crime and disorder (Tita and Ridgeway 2007). Other researchers dispute this notion, concluding that gang members are not vigilantes protecting citizens from crime and disorder (Decker and Van Winkle 1996). Decker and Van Winkle do assert that gang members protect specific people in the community, such as family members, but dismiss the idea that gang members are protecting the community as a whole (1996: 124).

CHARACTERISTICS OF GANG MEMBERS

Ethnicity

Public perceptions of gangs and their members are not consistently supported by research. First, the typical image of a gang member is that they are of African-American or Hispanic heritage, leading to the assumption that gang activity is a minority problem (Esbensen and Winfree 1998). In fact, most ethnographic studies of gangs (e.g., Moore 1978; Hagedorn 1987; Curry 1994) support this assumption. Esbensen and Huizinga (1993) assert that 80 percent of all gang members are African-American or Hispanic. (However, in a survey study explicitly measuring racial composition of gang members, Esbensen and Winfree (1998) found that whites accounted for the majority of the sample (40%), followed by African-Americans (27%), Hispanics (19%), and Asians (6%). They do not conclude that white gang

members are more prevalent in society, but there are more white gang members than official records suggest.

Second, it is widely presumed that gangs are ethnically homogeneous in their composition (Lynskey et al. 2009). In fact, the National Youth Gang Survey (2000) reports that approximately only one-third of the known gangs are intra-racial. The ethnic makeup of gangs reflects the ethnic composition of the communities in which they reside: In “Pocatello and Will County, which are predominately white communities, the majority of the gang members are white; in Kansas City, Milwaukee, and Philadelphia, the sample is primarily African-American, as are the self-identified gang members; in Las Cruces and Phoenix, the majority of the sample is Hispanic, and the majority of gang members report being Hispanic (Esbensen et al. 2010).”

Economic disadvantage. Economic disadvantage is the foundation for many criminal theories and is well supported in most studies of crime (Pratt and Cullen 2005). Economic research generally posits that when the affluence of a neighborhood increases, the crime rate decreases. Pyrooz et al. (2010) suggest that the manner in which economic conditions influence crime is that when the neighborhood’s poverty level increases, so does the neighborhood’s residential mobility rate and residential heterogeneity. Thus, for them, poverty does not directly cause crime, but rather its relationship to crime is mediated by mobility and ethnic heterogeneity, both correlates of high community crime rates (Burgess 1928; Shaw and McKay 1942). Other

research tends to agree and state that the poverty, residential mobility and ethnic heterogeneity interact to limit informal social controls within a neighborhood (Sampson and Groves 1989; Bursik and Grasmick 1993; Sampson et al. 1997). City-specific studies suggest that these three indicators of social disorganization, and the resulting loss of informal social control, contribute to the growth of gangs and gang activities (e.g., Hagedorn 1988; Sanchez-Jankowski 1991; Venkatesh 1997).

Thornberry and colleagues (2004) find that gang member clustering occurs in economically disadvantaged neighborhoods that have deteriorating social institutions. Moore and Terret (1998) conclude that four community conditions cause this transition to occur. First, families and schools are largely ineffective and estranged, making adult supervision non-existent. Next, pro-social roles are not taken advantage of and youth have a great amount of free time. Third, for a gang to be established gang members must have little access to legitimate career paths that are appealing. Finally, there must be a place for adolescents and young adults to come together, to hang out in order to facilitate gang clustering.

Linking ethnicity and disadvantage. Throughout the history of the United States, neighborhoods have developed in a particular ecological area along racial, ethnic, and socioeconomic lines (Pyrooz et al. 2010). This pattern is also apparent in gangs (Thrasher 1927; Sanchez-Jankowski 1991; Knox 2000). In particular, Thrasher (1927) found race and ethnicity to be important elements for gang formation in that adolescents perceive that structural factors influence African American and White

ethnic groups differently within the context of the neighborhood (Pyrooz et al. 2010). Vigil (2002) points out that Black and Hispanic gangs emerge when social and economic institutions break down at the neighborhood level. In minority areas, the gangs become an alternative socializing mechanism for youth. However, this pattern is not apparent in predominately White neighborhoods, and White gangs do not serve the same socializing function.

THE CRIMINALITY OF GANG MEMBERS

Violence

Survey research has demonstrated an increased level of crime in individuals during active periods of gang membership (Thornberry et al. 2003). Gang members are also more violent than other offenders (Vigil 1988; Fagan 1989, Taylor 1990; Spergel and Curry 1993; Klein 1995; Thornberry and Burch II 1997; Battin-Pearson et al. 1998; Huff 1998; Gatti et. al 2005; Battin 2006; Bellair 2009). Gang membership is a better predictor for violence than being a deviant youth (Battin et al. 1998). Gang membership has been evaluated as a strong predictor of individual violence in young adults, and is more significant than hanging out with delinquent peers and prior violence (Thornberry 1998).

National studies of crime in urban areas suggest that gang members are responsible for a large proportion of violent crime during their adolescent years (National Gang Center 2010). Three city-specific studies, conducted in Rochester,

Seattle, and Denver, also confirmed that gang members contribute to a small proportion of the population, but commit the majority of the crime. More specifically, in Rochester, gang members represented 30 percent of the population and committed 68 percent of all youth violent crime (Thornberry 1996). In Seattle, gang members represented 15 percent of the sample but self-reported committing 85 percent of adolescent robberies (Battin et al. 2006). Finally, gang members in Denver committed six times as many crimes as members, 14% of the gang population reported committing 79 percent of all serious violent adolescent offenses (Thornberry et al. 2004). Although research studies consistently demonstrate that gang violence makes up a disproportionate portion of violent crime in socially and economically disadvantaged neighborhoods, this relationship has not been confirmed through research in more affluent neighborhoods enjoying lower levels of social disorganization.

Egley and Howell (2009) identify factors that influence local gang crime. These factors are drug-related, inter-gang related and returning inmates. Gang members are more likely to take part in illegal drug usage when they are a gang member and less likely after they have left the gang (Egley and Howell 2009). Although it is unlikely that local gang members are controlling the distribution and sale of drugs in the community due to lack of organizational structure, the gangs, drugs, and violence connection is overwhelmingly prevalent. Inter-gang violence is another reason why gang members part-take in violent activities. Usually this sort of

violence is more common when defending territory, interpersonal scuffles, and drug-turf disputes (Egley and Howell 2009). Finally, violent crime is more common when inmates return to the community in which their gang is affiliated. When returning, most inmates have a criminal network that can propel violent crime, drug trafficking, and access to illegal weapons.

Research on violent collective violence (Thrasher 1927; Reiss 1988; Decker 1996) has established that collective violence is present in gang behavior. Decker (1996) uses McPhail's (1991) definition of collective behavior which emphasizes three elements; the group, behavior, and common action (P. 247). McPhail contended that gang violence was a form of collective behavior insofar as the behavior emerged from group processes that involved common purpose (Decker 1996: 247).

Use of firearms. The main differences among modern-day gangs and traditional gangs of the past are their greater use of firearms (National Gang Center 2010). Street gangs tend to recruit youths who possess firearms, and joining a gang promotes gun use (Sheley and Wright 1995). Thornberry and colleagues (2003) found in Rochester, New York that the rate of gang members carrying a gun was ten times higher than that of non-gang offenders. They also found that gang members that owned and carried guns were more violent than other offenders (Thornberry et. al. 2003). Egley and Ritz (2006) explored the differences between New York jurisdictions reporting gang violence and those that did not report gang violence. They found that almost half (47%) of the jurisdictions reporting gang violence also reported that offenders

were more likely to use a gun during assault crimes. In jurisdictions reporting no gang violence, only 4% of assaults involved the use of a firearm.

Other researchers have also asserted that gang members are more likely than non-gang offenders to engage in serious crimes while carrying a firearm. Bjerregaard and Lizotte (1995) found that gang members are twice as likely as non-gang offenders to use a gun during a violent crime (Bjerregaard and Lizotte 1995). They conclude that gang members are more likely to use firearms because of the increasing access to guns. Circumstantial evidence suggests this might be the case: gang membership increased in the 1990s at the time that the use of guns in homicides became 30% more prevalent (Dighton 1996). The most common gun used was a .38 or smaller caliber gun. During the decade of the 1990s crimes committed by gang members involving the use of semiautomatic and automatic guns increased, and in many instances these were large caliber weapons (Dighton 1996). Previous research has found that gang membership is increasing in the United States (Curry et al. 1994; Huff 2008; Egley and O'Donnell 2009), and that it facilitates the commission of violent crimes (Hagedorn 1998; Huff 1998; Thornberry et al. 1998; Battin 2006; Bellair 2009). Guns are being used more by gang members than ever before due to the ease by which gang members can obtain them ((Bjerregaard and Lizotte 1995).

SUMMARY

An extensive body of research shows that the neighborhood plays a role in the nature of crime for offenders, regardless of their gang member status (e.g., Shaw and McKay 1942; Sampson and Groves 1989). Our knowledge of the relationship between neighborhood characteristics and gang crime behavior is limited and inconsistent, however, suggesting the need for further research considering contextual factors related to crime, and contextual differences between neighborhoods with high rates of gang member and non-gang offender residents and offenses.

CHAPTER 3 METHODS

In this chapter, I describe the study area, research population, independent and dependent variables, data, and analytical techniques used to study neighborhoods and criminal offender activity between 1996 and 2006. I give special attention to a description of the spatial analytical approach used to address each of the research questions identified in Chapter 1.

SUBJECT GROUPS, DATA SOURCES, AND DATA COLLECTION

Study Area

Albuquerque is a city in the northern portion of New Mexico (Figure 3.1). Albuquerque is operationally defined as the area within the boundaries of Bernalillo County. County boundaries were used because the city of Albuquerque encompasses 90 percent of the land area of the county and there seems to be no dramatic shift in population or neighborhood characteristics when travelling outside of Albuquerque into the unincorporated areas of the county. Albuquerque is land-locked, with Indian Reservations to the North and South, open space to the West, and a national forest to the East (Laurin et al. 2010). As of 2000, Albuquerque had a population of 448,607 people, slightly more female (51%) than male (49%). The median age of residents was 34.9 years. The city was predominantly white (71.6%) followed by American Indian (3.9%), and African American (3.1%). However, persons of Hispanic origin,

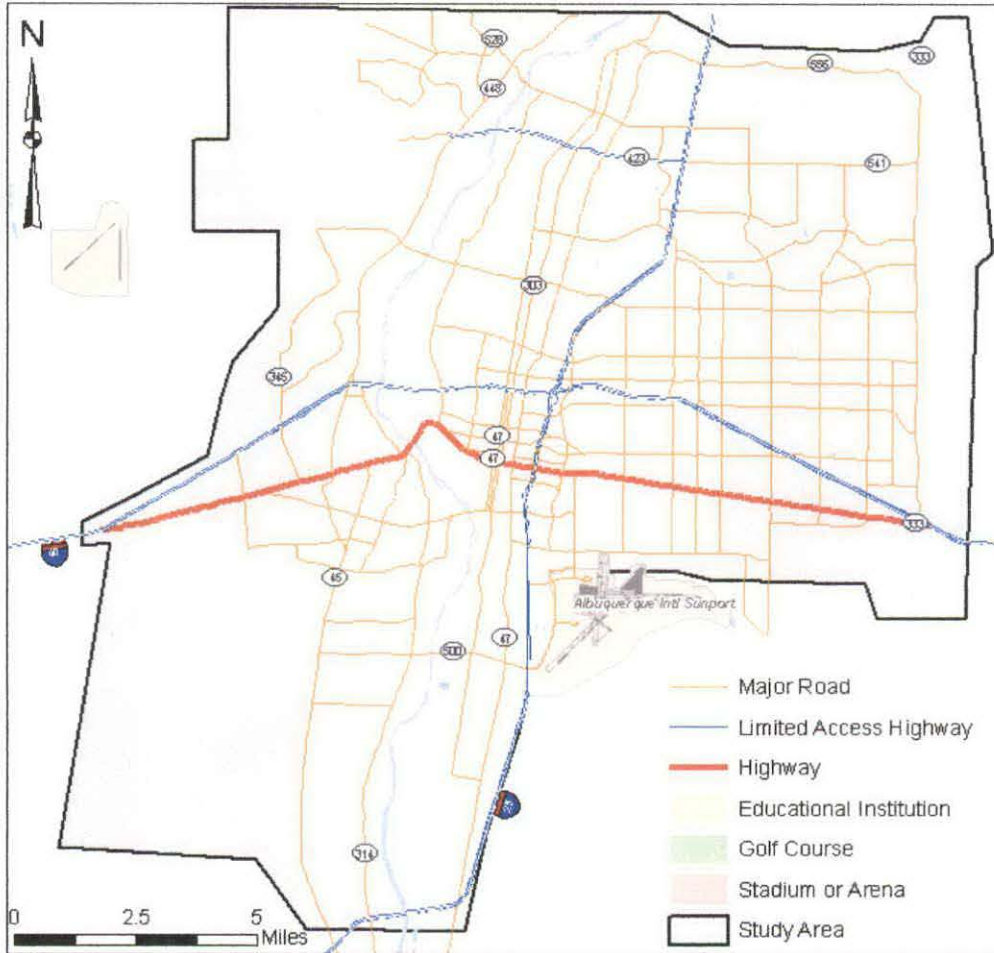


Figure 3.1: Albuquerque NM Base Map

regardless of race made up more than a third (39.9%) of the city's population, quite a bit higher than the proportion of Hispanics in the United States in that year (12.5%). Also, 8.9% of residents in Albuquerque were foreign born (U.S. Bureau of Census 2000).

With respect to educational attainment, 85% of the population over 25 graduated with their high school degree and 32% graduated with a bachelor's degree. The per capita income (\$20,884) was slightly lower than the national average (\$21,587). Albuquerque also had a higher rate of individuals under the poverty line (13.5%) compared to the national average (12.4%) (U.S. Bureau of Census 2000). Univariate LISA maps illustrate the distribution of Albuquerque's population, concentrations of youthful residents, ethnic groups, and educational attainment characteristics (Figure 3.2). As shown in the legend of each LISA map, different levels of concentration for the particular variable in question are noted by five color gradations. For example, when a census block or neighborhood is categorized as high/high in population, this means that the neighborhood is highly populated, and the neighborhoods around it are also highly populated. In contrast, when a neighborhood is depicted as low/high in population, it means that the neighborhood in question has low number of residents but the blocks around it have a higher than average number.

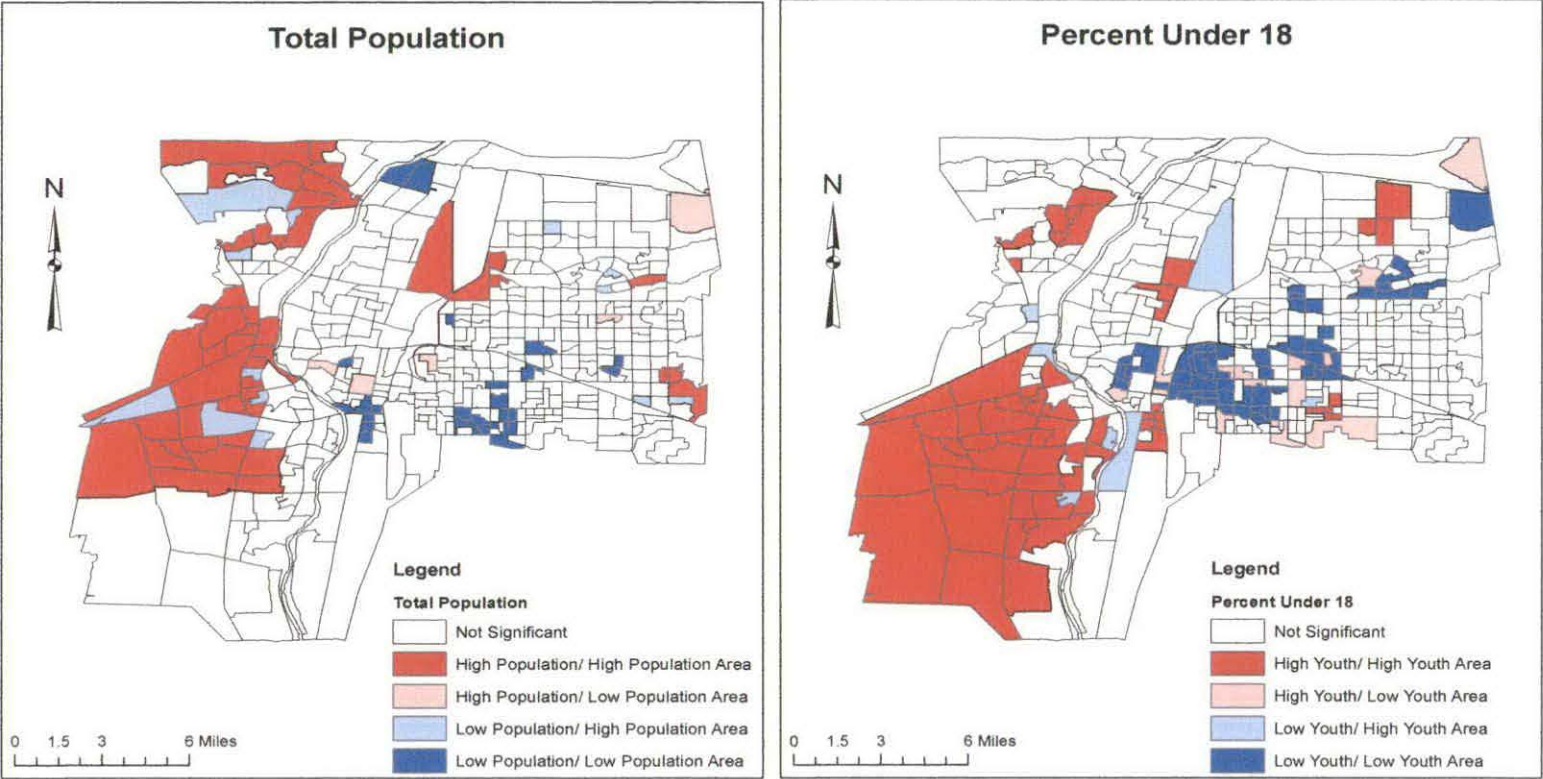


Figure 3.2: Demographic Composition of Albuquerque, New Mexico

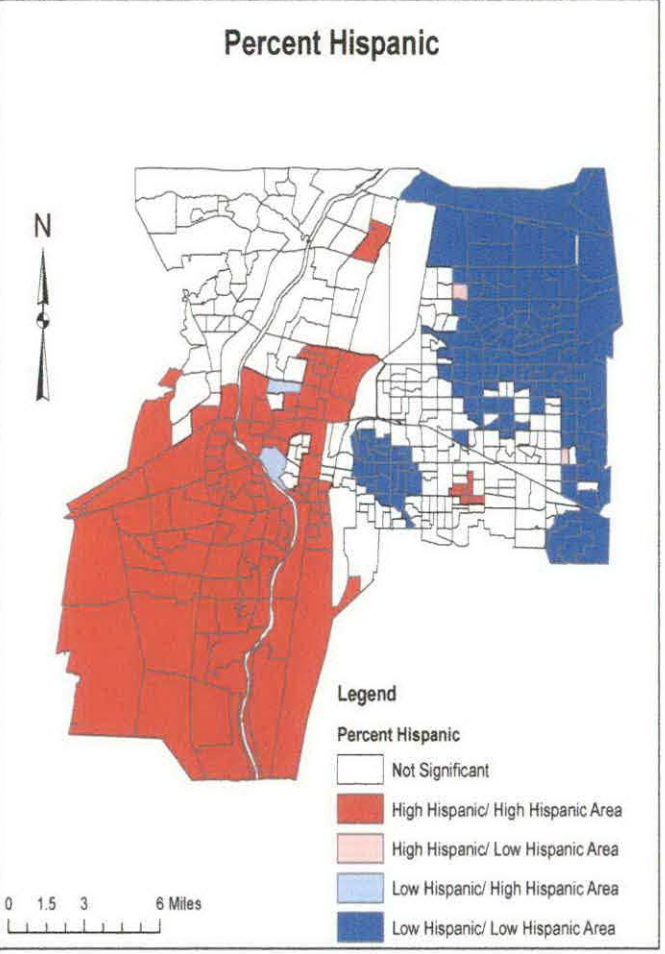
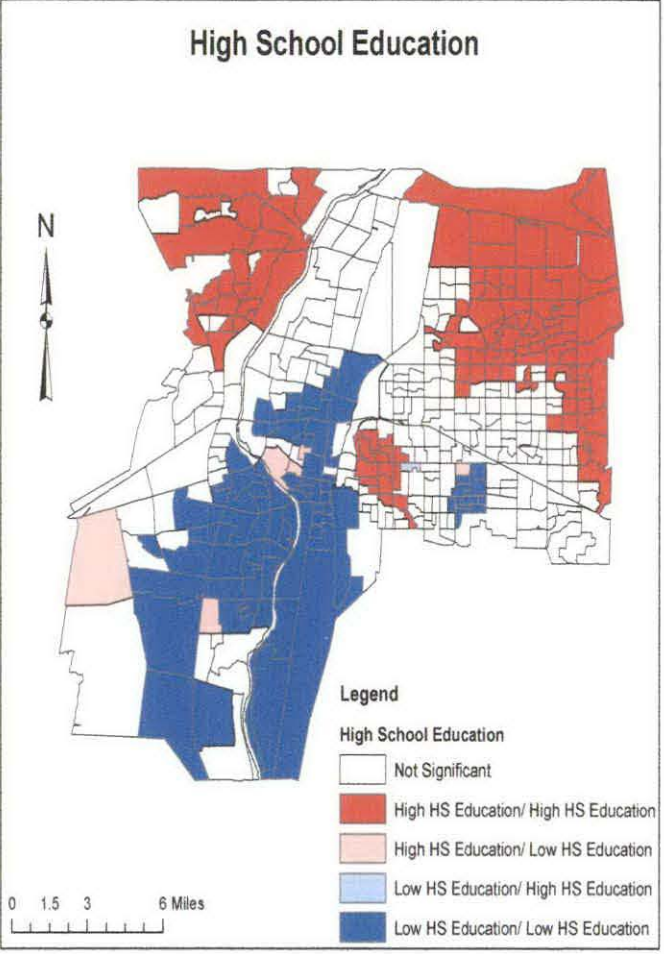


Figure 3.2: Demographic Composition of Albuquerque, New Mexico

As you can see by the maps, Albuquerque's demographic characteristics are concentrated into different areas. More populated areas are found on the west side of the city, away from the downtown area. Neighborhoods with high concentrations of youthful residents are found mostly in the southwest portion of the city. Educated citizens are more concentrated in the north-east and north-west quadrants that do not experience high levels of poverty. The Hispanic population is concentrated in the central and south-west portions of the city, in areas also experiencing high levels of neighborhood stability.

Study population The research relies on information concerning criminal offenders who have been arrested for a violent crime (i.e. homicide, arson, aggravated assault, rape, and gun use). Crime data is derived from the arrest records of the Albuquerque, New Mexico Police Department and Bernalillo County Sheriff's Department for the years of 1996 to 2006. Overall, the study population consists of 15,334 criminal arrestees. This population is divided into two study groups: gang offenders and non-gang offenders. Identification of gang affiliation is made from GangNet, a proprietary data base which compiles law enforcement intelligence information in several States. Of all serious violent offenders in the study population (15,334), 2140 were identified as being affiliated with a gang, comprising 14.0% of offenders in the study population. As seen in Table 3.1 gang members are predominately Hispanics (55.2%), followed by whites (34.6%), and African Americans (8.2%). Non-gang offenders had a different demographic makeup consisting of a higher rate of whites

3.1: Characteristics of Offenders Arrested for Violent Crime

	Gang	Non-Gang	Albuquerque
Total number	2140	13194	448607
	14.0%	86.0%	100.0%
Sex			
Male	97.2%	82.7%	49.0%
Female	2.8%	17.3%	51.0%
Race			
White	34.6%	43.0%	71.6%
Hispanic (Any Race)	55.2%	41.7%	39.9%
African American	8.2%	9.0%	3.1%
Indian American	1.9%	5.8%	3.9%
Mean Age	22.5	28.9	34.9

(43.0%), followed by Hispanics (41.7%), and African Americans (9.0%). Gang members were overwhelmingly male (97.2%), as were other criminals (82.7%). There was also a significant difference in the age of the arrestees. Gang members were younger (mean age 22.5 years) compared to non-gang criminals (28.9 years).

Comparatively, offenders in general are more male, more minority, and younger than the general population of Albuquerque. Gang members are significantly different than the general population in that almost all gang offenders are male, the majority is of minority descent, and they are younger, on average, by more than twelve years.

Crime by group. Table 3.2 illustrates the types of criminal offenses committed by gang and non-gang identified offenders. A high proportion of members of both groups have an arrest history of aggravated assaults, but firearm use during a crime, burglary, and robbery were committed by a significantly larger proportion of gang members in the study. Also, gang members were more likely to commit larceny and motor vehicle theft compared to the non-gang offender group. Non-gang offenders were more likely to have committed a homicide.

MESUREMENT OF VARIABLES

Unit of Analysis

The definition of a neighborhood is complicated and has been the topic of research for quite some time (Sampson and Groves 1989; Taylor 2001; Yu and Wu 2010).

3.2: Percentage of Gang and Non-Gang Offenders Arrested for Serious Criminal Offenses, 1996-2006**

Offense	Gang	Non-gang
Aggravated Assault*	39.5	49.0
Use of Firearm*	38.0	21.5
Burglary*	23.2	20.6
Robbery*	21.9	10.0
Larceny*	4.0	2.6
MV Theft*	2.1	0.9
Homicide	1.8	2.1
Rape	0.2	0.3
Arson	0.5	0.7

* Differences in crime between gang and non-gang is significant

**Column percentages do not add up to 100% because some offenders have been charged for multiple offenses.

In this study, the unit of analysis is the neighborhood, which is defined as a collection of sociodemographically similar census blocks. Data pertinent to several important variables used in this study are only available at the block group level or larger units. Census block groups are created by grouping sets of census blocks with similar sociodemographic characteristics to approximate a meaningful neighborhood or community unit. For the purpose of this study census block groups are referred to as neighborhoods. In total, there are 418 block-groups, or neighborhoods, in Albuquerque.

Dependent Variables

The rate of violent crime is the first dependent variable used in this study. It is measured by taking the number of arrests for violent crimes for each neighborhood and dividing it into the total number of residents by multiplying by 1,000. The second dependent variable is residential location of offenders. Similar to the crime rate, the rate of serious violent offender residents is calculated by dividing the total number of serious violent offenders within a neighborhood by the overall population and multiplying by 1,000. The resulting dependent variable measures were found to have unacceptably positive skewing and high kurtosis values. To resolve these departures from a normal distribution and thereby avoid biasing the results, the dependent variables were log transformed .

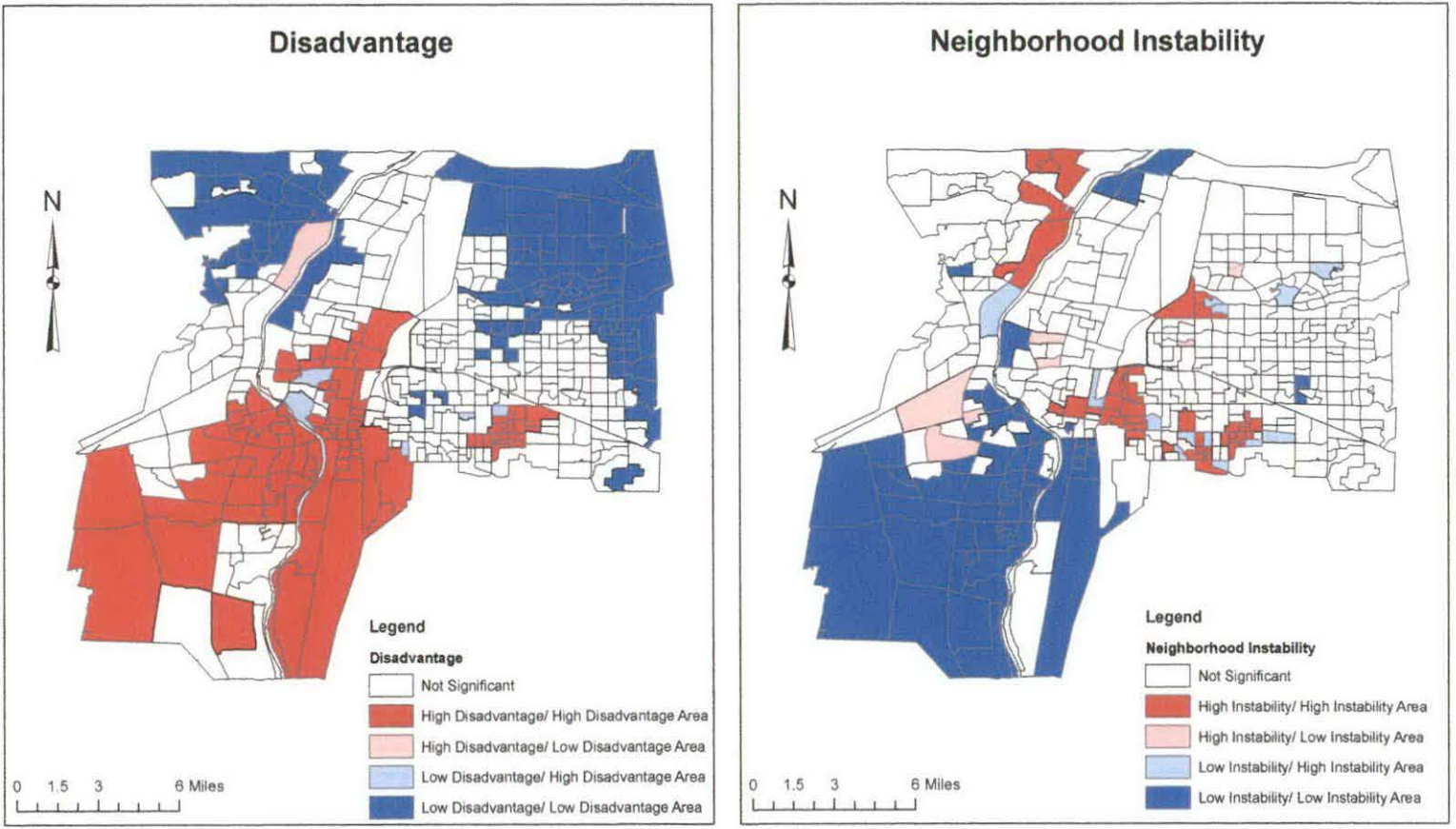
Independent Variables

Independent variables used for this analysis are several neighborhood characteristics derived from U.S. Census data. Specifically these include resident rates of educational attainment, unemployment, poverty, public assistance, Hispanic origin, length of time in the same residence; and household measures of proportion of female-headed households and median household income. I used varimax rotation to consolidate the neighborhood variables into two factors (see Table 3.3). The factor analysis results identify two variables: resident disadvantage and neighborhood instability. Together, these two latent variables explain nearly 68% of the total variance in the observed variables of neighborhood characteristics. An important variable that of the concentration of youthful residents was removed from the factor analysis since it was not closely correlated with either social disadvantage or neighborhood instability. It was retained in the analyses presented in the next chapter, however, since the mean age of gang offenders was significantly lower than that for other offenders, and since young residents of Albuquerque were not evenly distributed spatially throughout the city. Finally, the total population of neighborhoods was also considered in the analysis of the next chapter, as the social disorganization literature suggests that crime is more prevalent in highly populated areas of the city. The spatial clustering of social disadvantage and neighborhood instability is shown in the two LISA maps in Figure 3.3.

3.3: Varimax Factor Analysis Results

<u>Variable</u>	<u>Disadvantage</u>	<u>Instability</u>
% Less Than High School Diploma	0.906	-0.114
Unemployed	0.539	0.305
% Poverty	0.828	0.325
Median Household Income	-0.773	-0.278
% Public Assistance	0.782	0.116
% Hispanic	0.847	-0.286
% Same House 1995	-0.020	-0.817
% Vacant Housing	0.383	0.668
% Renter-Occupied Housing	0.365	0.845
% Female Headed Household	0.346	0.683
Eigenvalue	4.435 (44.35%)	2.368 (23.68%)

Figure 3.3: Distribution of Social Disadvantage and Neighborhood Instability



Social disorganization, crime, and youthfulness of neighborhoods. As indicated above, two multivariate indices of neighborhood characteristics were constructed. These were normalized so that each index has a mean equal to zero and a standard deviation equal to one. Degree of population concentration and proportion of youthful residents in neighborhoods were also calculated. Finally, rates of gang and non-gang offenders residing in a neighborhood were calculated, as were the rates of serious violent offenses resulting in arrest for gang members and other offenders (Table 3.4).

APPLICATION OF GIS SOFTWARE

GIS software is used in many fields, including health care (Phillips et al. 2000; McLafferty 2003; Hare 2005), environmental modeling (Goodchild et al. 1993; Kernohan et al. 1998), economics (Clapp 1997; Geoghegan et al. 1997), and crime mapping (Brantingham and Brantingham 1995; Block and Block 1995; Boba 2005).

Research focused on gang location has not commonly used spatial statistics or GIS software. Most studies (Thrasher 1927; White 1942; Cartwright and Howard 1966; Curry and Spergel 1988) are ethnographically based and do not use quantitative reasoning to explain the findings. However, in more recent studies (Tita et al. 2005; Ye and Wu 2010) GIS has been adopted and the results have generated specific findings that can be interpreted to focus on specific census tracts or census block locations. This software allows researchers like Tita et al. (2005) to characterize city-wide neighborhood demographics without needing to rely on ethnographic field

3.4: Neighborhood Characteristics

Block Groups N=418	Min	Max	Mean	Standard Deviation	Skewness Statistic	Kurtosis Statistics
Disadvantage	-2.26	3.50	0	1.000	0.649	0.290
Instability	-3.13	4.11	0	1.000	0.656	0.457
Total Population	36.00	4791.00	1286.68	632.972	1.380	3.282
% Under 18	3.34	71.99	25.58	8.414	0.228	1.859
Offender Crime*	-0.73	5.44	2.70	1.094	-0.382	0.177
Offender Residence*	-0.25	5.49	2.79	1.005	-0.520	0.129
Gang Crime*	-1.20	3.71	1.19	1.008	-0.059	-0.672
Gang Residence*	-0.99	3.68	1.31	1.002	-0.007	-0.836
Non-Gang Crime*	-0.43	5.60	2.82	1.124	-0.359	-0.094
Non-Gang Residence*	-0.25	5.56	2.79	1.049	-0.487	-0.084

* Variables were log transformed to assess skew and kurtosis.

research. The current study follows in the tradition of recent applications of spatial analysis using GIS software to understand gang behavior.

Geographic information systems. Geographic Information Systems (GIS) are “organized collections of computer hardware and software to efficiently create, manipulate, analyze, and display all types of geographically or spatially referenced data” (Pine 1998). One can input or encode spatial information in a GIS, such as addresses or neighborhoods, to manage and analyze spatial distributions as well as generate visual output such as maps and charts. The benefits of a GIS are immense, but the key value of a GIS is the provision to the researcher of an enhanced understanding of the data and a firmer foundation for making decisions based on linking complex datasets with real-world social contexts. I use two GIS systems in this project; ArcGIS and Geoda. Each tool provides sets of useful techniques for exploring gang crime data in Albuquerque, NM.

ArcGIS. ArcGIS 10.0 supports data creation and processing, as well as facilitates the discovery of patterns, relationships, and trends that are not seen in non-spatial exploratory data (ESRI 2010). ArcGIS allows for easy editing, manageable workflow, and powerful spatial statistics. Also, ArcGIS makes it possible to share work between organizations and departments. In this study, ArcGIS was used to transfer data from GEODA, and create final maps. These maps were improved by ArcGIS’ ability to change map symbology for visual analysis and insert legends, scale bars, titles, and north arrows for data presentation.

Geoda At first, GEODA was considered a spatial tool that was an introduction to spatial data analysis (Anselin et al. 2005). GEODA is relatively similar to other spatial analytical tools, but none of these provide a user-friendly interface and extensive statistical functions (Anselin et al. 2005). GEODA has an easy point and click interface that facilitates use by researchers who are not proficient in spatial analysis. GEODA provides a natural path that starts with mapping procedures, moving toward exploration analysis, spatial autocorrelation estimates, and spatial regression (Anselin et al. 2005). I use both univariate and bivariate local indicators of Moran's I to evaluate the spatial autocorrelation of the data. Tests of spatial autocorrelation determine if spatial relationships affect the data values in particular location. The presence of spatial autocorrelation also indicates that results of traditional non-spatial statistics might be unreliable and spatial statistical techniques are necessary. Local Indicators of Spatial Autocorrelation (LISA) maps are also used, both univariate and bivariate, to illustrate the demographic clustering or dispersion of study variables across the study area. Bivariate LISA maps are used to determine the differences between gang and non-gang residence and neighborhood crime rates and demographic variables such as poverty, neighborhood stability, and ethnic heterogeneity.

OPERATIONAL RE-STATEMENT OF RESEARCH QUESTIONS/ ANALYTICAL TECHNIQUES

This study's research questions are:

- 1) Is social disorganization, as measured by neighborhood resident disadvantage and neighborhood instability, associated with the rate of criminal offenders residing there, and does this relationship differ by gang affiliation?
- 2) Is social disorganization, as measured by neighborhood resident disadvantage and neighborhood instability, associated with the neighborhood crime rate and does this relationship differ by gang affiliation of the offender?

Hypotheses

With the comprehensive nature of this study, several general hypotheses, and corollaries for non-gang and gang offender subgroups, can be generated concerning the direction of the relationship between indicators of neighborhood characteristics on the one hand and offender residence and neighborhood crime rate, on the other.

Based on the literatures of social disorganization theory and gang behavior, and descriptive characteristics of Albuquerque, I hypothesize that:

H1. The greater the social disadvantage of residents in a neighborhood, the greater the concentration of criminal offenders living there.

C1a. Social disadvantage is positively associated with the rate of non-gang offenders residing in a neighborhood.

C1b. Social disadvantage is positively associated with the rate of gang members residing in a neighborhood.

H2. The greater the instability in a neighborhood, the greater the concentration of criminal offenders living there.

C2a. Neighborhood instability is positively associated with the rate of non-gang members residing in a neighborhood.

C2b. Neighborhood instability is positively associated with the rate of gang members residing in a neighborhood.

H3. The greater the population in a neighborhood, the greater the concentration of criminal offenders living there.

C3a. Total population is positively associated with the rate of non-gang offenders residing in a neighborhood.

C3b. Total population is positively associated with the rate of gang offenders residing in a neighborhood.

H4. The greater the proportion of youthful residents in a neighborhood, the greater the rate of offenders residing there.

C4a. Proportion of youthful residents is positively associated with the rate of non-gang offenders residing in a neighborhood.

C4b. Proportion of youthful residents is positively associated with the rate of gang offenders residing in a neighborhood.

H5. The greater the social disadvantage of residents in a neighborhood, the greater the crime rate.

C5a. Social disadvantage is positively associated with the rate of crimes committed by non-gang offenders.

C5b. Social disadvantage is positively associated with the rate of crimes committed by gang members.

H6. The greater the instability in a neighborhood, the greater the crime rate.

C6a. Neighborhood instability is positively associated with the rate of crimes committed by non-gang offenders.

C6b. Neighborhood instability is positively associated with the rate of crimes committed by gang members.

H7. The greater the total population in a neighborhood, the greater the crime rate.

C7a. Total Population is positively associated with the non-gang offender crime rate .

C7b. Total Population is positively associated with the gang crime rate.

H8. The greater the proportion of youthful residents in a neighborhood, the greater the crime rate.

C8a. The proportion of youthful residents is positively associated with the non-gang offender crime rate.

C8b. The proportion of youthful residents is positively associated with the gang crime rate.

H9. The greater the proportion of residents in a neighborhood who are criminal offenders, the greater the crime rate.

C9a. The proportion of neighborhood non-gang offender residents is positively associated with the non-gang crime rate.

C9b. The proportion of neighborhood gang offender residents is positively associated with the gang crime rate.

H10. The effects of the neighborhood characteristic variables on the respective residence rates of gang and non-gang offenders do not differ significantly..

H11. The effects of the neighborhood characteristic variables on the respective neighborhood crime rates of gang and non-gang offenders differ significantly.

DATA ANALYSIS

To review differences in gang and non-gang offender residential and criminal patterns, this study uses both non-spatial and spatial analytical techniques. I use traditional, non-spatial data analysis techniques such as descriptive measures of central tendency, bivariate correlations, and ordinary least-squares (OLS) regression analysis. I use several spatial analysis techniques available in ArcMap and Geoda such as kernel density mapping, univariate and bivariate Moran's I, univariate and

bivariate Local Indicators of Spatial Autocorrelation (LISA) maps, and spatial regression. My analyses, and the techniques involved, depend on the accuracy of the address information given for each arrest. This is important because the contextual factors that are gathered come from the neighborhood of the gang member residence and/or neighborhood where the crime occurred. If these locations are entered incorrectly, individuals in the study could be assigned the wrong neighborhood or no neighborhood at all. The geocoding process was conducted using ArcGIS 10.0 to create the neighborhood variables. The geocoding processes eliminated bad addresses, PostOffice boxes, and other complications in determining accurate addresses. This process reduced the study population of offenders by 10%, from 16,867 cases to 15,334.

The spatial analysis uses point maps to determine neighborhood crime rates and the residence at which the person arrested lives. These point maps were used to create more refined kernel density maps (Levine 1995). Kernel density maps are used to pin-point high levels of arrests and offender residential concentrations around the city. Other univariate analyses conducted are univariate LISA maps. Univariate LISA maps are used to locate statistically significant clusters of residences, neighborhood crime rates, and demographic distributions. LISA maps compare values in specific locations with those of their neighbors and assess spatial randomness associated with the variable distribution (Laurin et al. 2010).

Next, bivariate analyses were conducted to assess the correlation between residence and neighborhood crime rates and neighborhood characteristics. Bivariate LISA maps are used to determine significant differences between gang and non-gang offender neighborhoods, either residential or criminal, in regards to established socially disorganized characteristics.

Finally, standard OLS regression is conducted to determine the influence and direction of the independent variables on crime rates across the city. To assess the effects of spatial autocorrelation on the regression results, each OLS regression model is followed up with an analysis of spatial lag and spatial error effects. Spatial lag indicates that there is a possible diffusion process while spatial error indicates unexplained residuals by structural factors (Ye and Wu 2010). On one hand, the spatial lag regression model determines if the dependent variable (for example, the crime rate) is spatially lagged and observed through neighboring communities and the independent variables specified. On the other hand, spatial error regression asserts that the dependent variable depends on an unobserved set of variables and the error term is spatially auto-correlated (Ye and Wu 2010). T-tests are used to assess the significance levels of the differences between the coefficients of the non-gang OLS regression models and the coefficients of the gang OLS regression models. These significance tests are performed for the models predicting offender residence as well as those predicting crime rates.

Chapter 4

Empirical Results

In this chapter I show results of the research to test the hypotheses derived from the general research questions, using the methodological approaches described in the previous chapter.

ANALYSIS OF OFFENDER RESIDENCE

As noted in Chapter 3, there are two constructed independent measures of social disorganization: social disadvantage and neighborhood instability. Based on the literature reviewed in chapter 2, results should indicate that the residences of criminals are positively associated with disadvantage and neighborhood instability.

Residential Patterns for All Offenders.

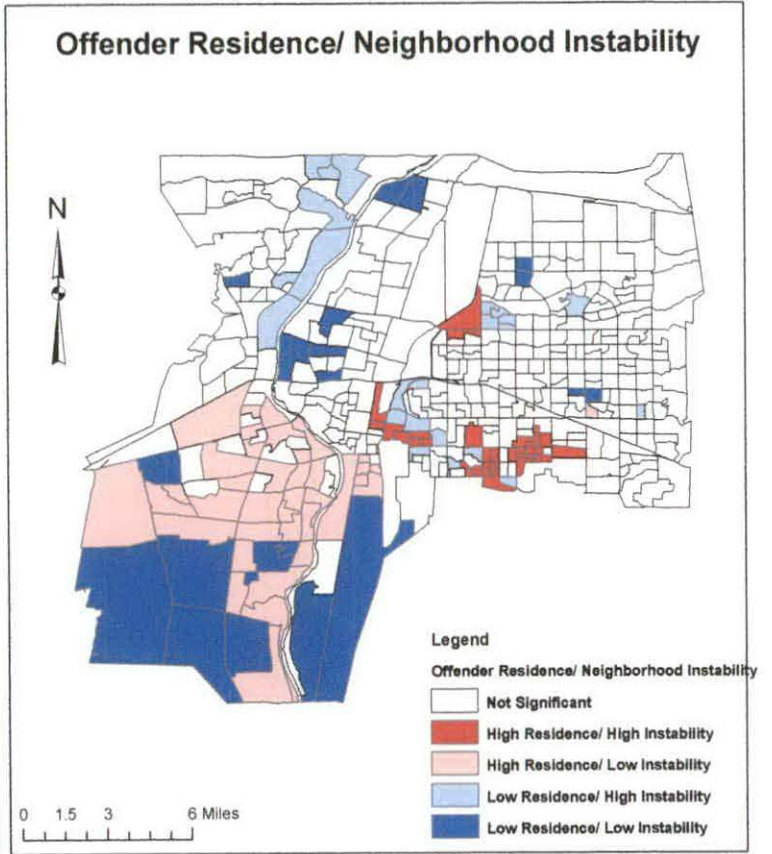
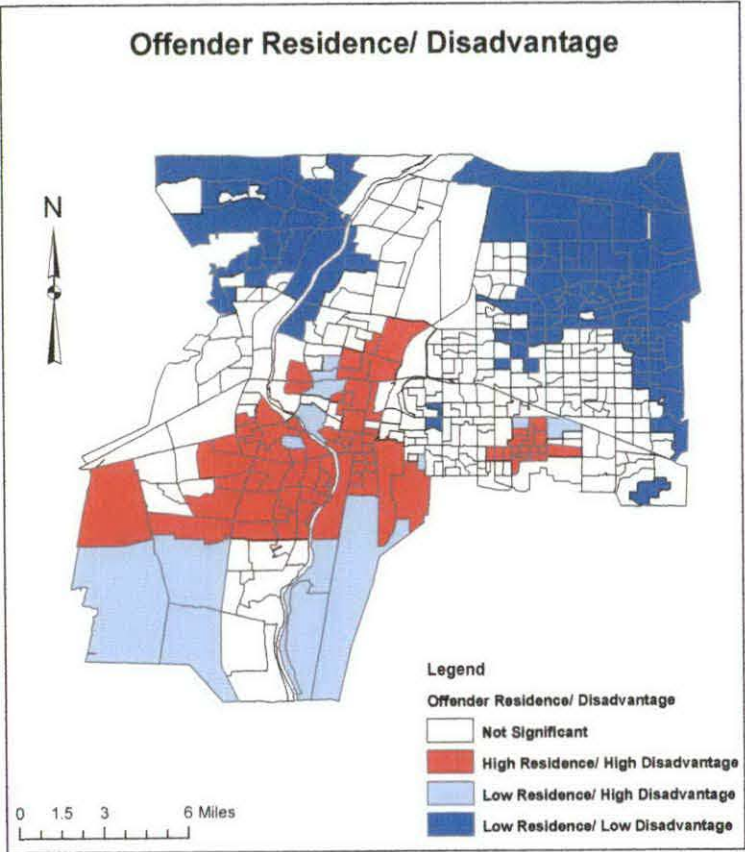
Figure 4.1 illustrates the relationship between where offenders reside and the two indices of social disorganization. Social disadvantage is present in a small area of the southeast, known to law enforcement professionals as the “war zone,” and a large area of the valley both north and south of downtown and on the west side of the city. Usually there are five categories in a bivariate LISA map; however, there were no neighborhoods that experienced significant levels of high non-gang residence and low disadvantage.

Table 4.1 presents the OLS regression results for the association between where offenders reside and measures of social disorganization, youthful residents and

total population. When testing for spatial dependence, the spatial lag model must have a higher R-squared value and a lower AIC value than the spatial error model to indicate that the model explains the structural variation and is spatially coherent. If the error model were to have a higher R-squared or lower AIC values than the lag model, it would indicate that the OLS model is not effectively explaining the variation in offender residence. In this case, the OLS model explains approximately half (.5077) of the variance in offender residence, and the model has a low Akaike Information Criterion (960.35). The regression results show that the data are sensitive to spatial patterning, resulting in the lag R-squared (.5885) increasing and AIC being lower (906.21) than the error r-squared (.5644) and AIC (929.22). The lag model is a better fit than the error model, meaning the data are spatially dispersed, high rates in one location predict that neighboring blocks experience the same high rates.

The table shows significantly positive relationships between offender residence and both disadvantage and neighborhood instability, although the effect of disadvantage is nearly ten times as large as the effect of neighborhood instability. Also, percent under 18 yields a surprisingly negative relationship with offender residential locations, albeit with small effect size, suggesting that offenders tend to live in areas that are older demographically. From these results, I conclude that Hypothesis 1 is supported, both in predicted direction and by the statistical significance of the relationship. Hypothesis 2 is supported since the relationship is statistically significant for the entire study population of offenders.

Figure 4.1: Offender Residence/ Social Disorganization



4.1: Offender Residence OLS Model

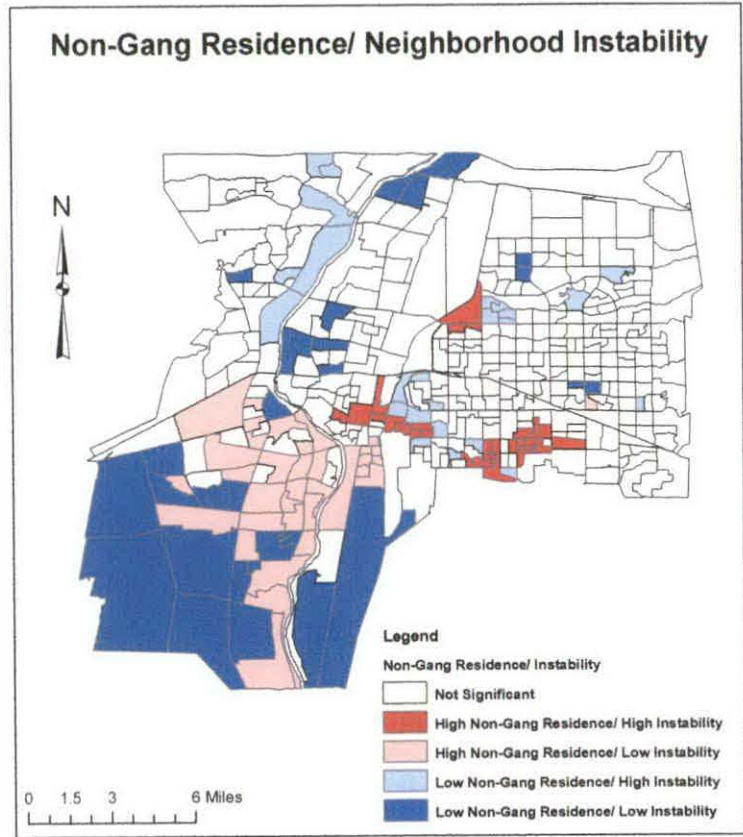
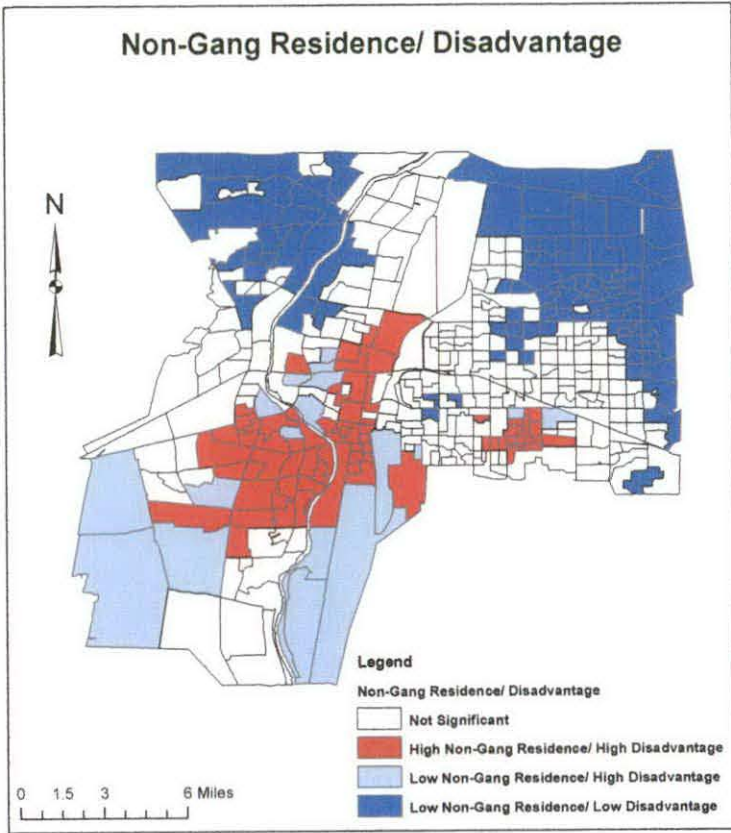
Total Residence Variables	Coefficients	Std. Error	Probability
Constant	3.0672	0.1379	0.001***
<i>Disadvantage</i>	0.8164	0.0404	0.001***
<i>Instability</i>	0.0889	0.0396	0.025*
% Under 18	-0.0158	0.0051	0.002**
Total Population	0.0004	0.0006	0.488
	Adjusted R-Squared		Akaike Info Criterion
	0.5077		960.35
		Spatial Error R-squared	Spatial Error AIC
Spatial Lag R-squared	Spatial Lag AIC	vs.	
0.5885	906.21		0.5644 929.22

Hypothesis 3 is not supported due to the relationship between offender residence and total population was positive but not significant. Finally, Hypothesis 4 is not supported in that the predicted direction of the relationship between youthful residents of a neighborhood and concentration of offenders is slightly negative, although the effect is significant.

Residential patterns for offenders not affiliated with gangs. Focusing exclusively on those offenders not affiliated with gangs, Figure 4.2 illustrates that the residential distribution of non-gang offenders is similar to the overall pattern of residence and indicators of social disorganization, most likely because they make up the majority of the study population.

Table 4.2 depicts the OLS regression results for the association between where offenders not affiliated with gangs reside and measures of social disorganization, proportion of younger neighborhood residents, and total population. The model explains slightly more than half (.5285) of the variance in non-gang offender residence and has a relatively low Akaike Information Criterion (977.73). Like all offender reside, the regression models were sensitive to spatial distribution

Figure 4.2: Non-Gang Residence/ Social Disorganization



4.2: Non-Gang Residence OLS Model

Non-Gang Residential Variables	Coefficients	Std. Error	Probability
Constant	3.1460	0.1408	0.001***
<i>Disadvantage</i>	0.8661	0.0412	0.001***
<i>Instability</i>	0.1071	0.0405	0.008**
% Under 18	-0.0156	0.0052	0.003**
Total Population	0.0006	0.0006	0.328
	Adjusted R-Squared		Akaike Info Criterion
	0.5285		977.73
Spatial Lag R-squared	Spatial Lag AIC	vs.	Spatial Error R-squared
0.6095	920.32		967.52

resulting in the lag models r-squared (.6095) increasing and AIC decreases (920.32) while the error r-squared decreased (.5826), and spatial error AIC increased (967.52).

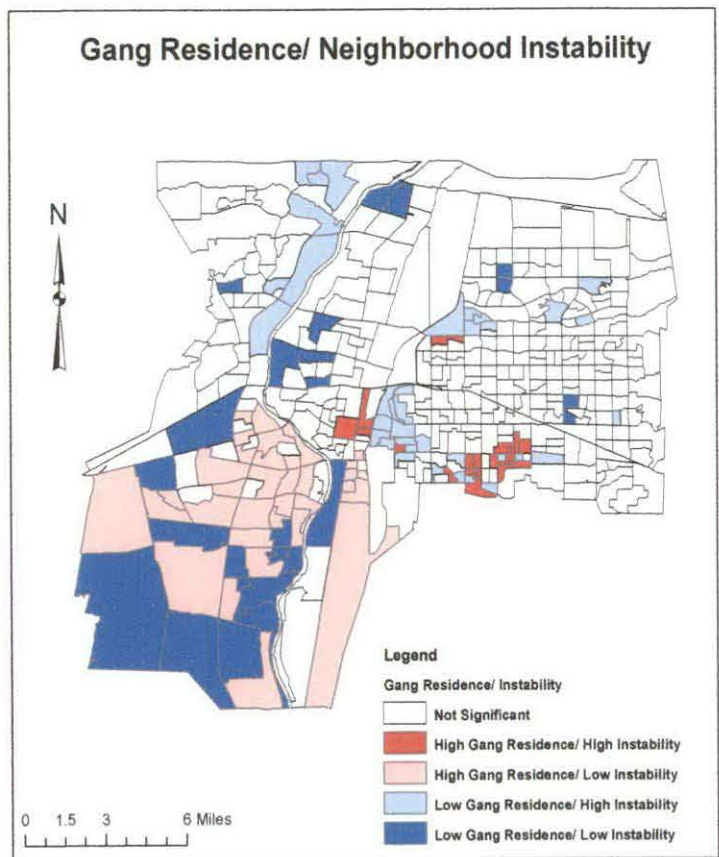
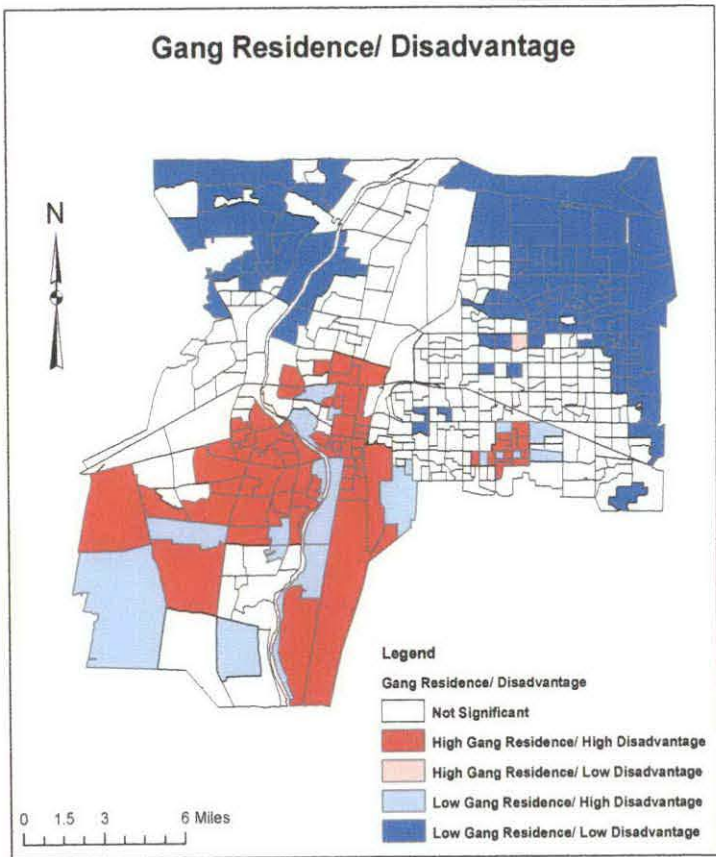
As shown in the table, social disadvantage and neighborhood instability were positively and significantly related to residential concentration of non-gang offenders.

These findings support Corollaries 1a and 2a. However, as with the overall offender results, total population (C3a) was not significantly associated with non-gang residential concentration, and the proportion of neighborhood youth (C4a) was not associated in the predicted (positive) direction, although it produced a statistically significant result in the opposite (negative) direction. Thus, these findings supported neither of the corollaries C3a and C4a.

Residential patterns for gang offenders. Figure 4.3 illustrates the relationship between concentration of gang member residences and the two indicators of social disorganization. Gang members are more likely to reside in disadvantaged areas in the southern and western portions of the city that are stable. Also, neighborhood instability seems less related to concentrations of gang residences.

Table 4.3 presents the OLS regression results for gang residential locations and social disorganization, youthful residents, and population density. The model explains approximately half (.5003) of the variance in gang residence and has a low

Figure 4.3: Gang Residence/ Social Disorganization



4.3: Gang Residence OLS Model

Gang Residential Variables	Coefficients	Std. Error	Probability
Constant	0.7732	0.1297	0.001***
<i>Disadvantage</i>	0.7105	0.0379	0.001***
<i>Instability</i>	-0.0784	0.0373	0.035*
% Under 18	0.0042	0.0048	0.386
Total Population	-0.0008	0.0005	0.882
	Adjusted R-Squared		Akaike Info Criterion
	0.5003		909.69
		Spatial Error R-squared	Spatial Error AIC
Spatial Lag R-squared	Spatial Lag AIC	vs.	
0.5695	865.47		0.5333 893.93

Akaike Information Criterion (909.69). Since the data are effected by spatial patterning, space was considered in the regression model resulting in the lag r-squared increasing (.5695) and AIC being lower (865.47) than the error r-squared (.5333) and AIC (893.93) suggesting that the model was acceptable in regards to spatial dispersion. Findings in the table show that social disadvantage is positively and significantly associated with gang member residence, supporting corollary C1b.

Interestingly, the findings related to Corollary C2b, predicting that gang members are more likely to reside in unstable neighborhoods, was not supported. Rather, gang members were more likely to reside in relatively less unstable neighborhoods, and the relationship is statistically significant, leading to the rejection of C2b. The association of total population was in the opposite direction from that predicted and was not significant showing a lack of support for C3b. Finally, while gang members were more likely to reside in neighborhoods with higher proportions of youthful residents, the relationship was not significant, leading to a rejection of C4b.

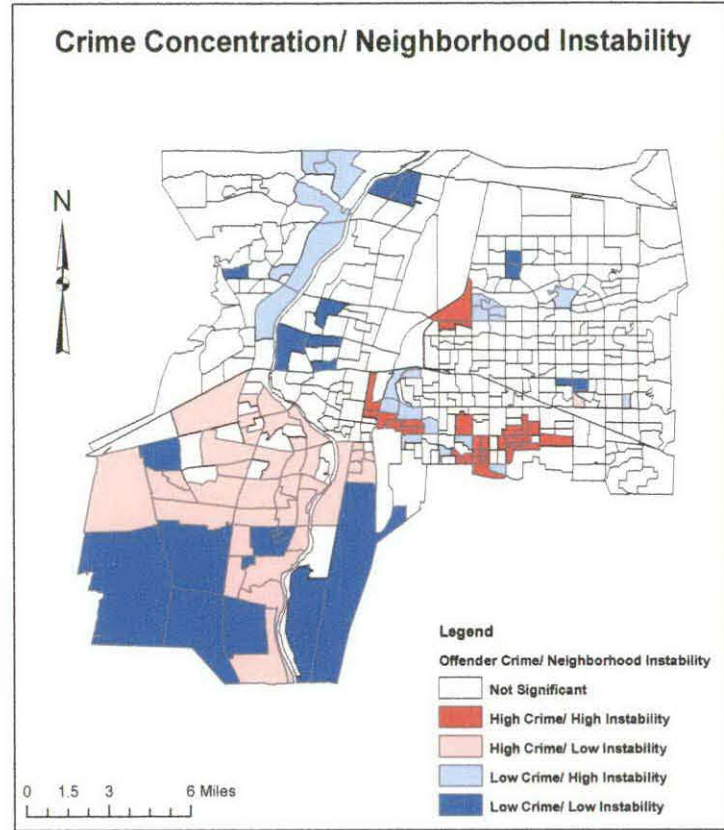
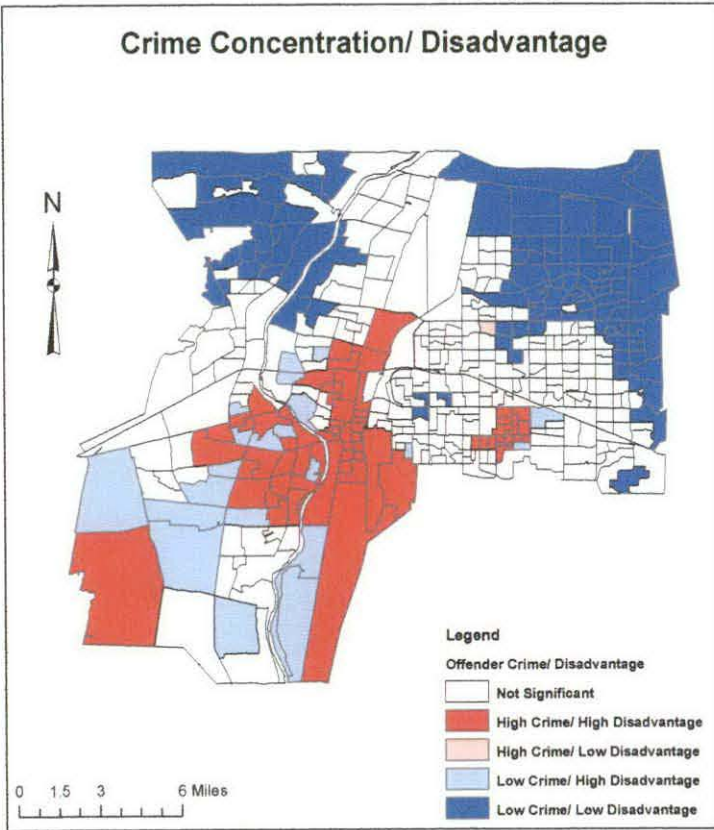
ANALYSIS OF OFFENDER NEIGHBORHOOD CRIME RATE

This section assesses the spatial distribution of the neighborhood crime rates where gang members and offenders not affiliated with gangs commit crime. This section presents findings in the same order as those related to the first dependent variable; that of offender residence.

Crime rate patterns for all offenders. Figure 4.4 illustrates a bivariate LISA map that assesses the relationship between offender neighborhood crime rate and measures of neighborhood social disorganization. Concentrations of high crime rates are more likely to occur in areas that experience social disadvantage. These neighborhoods, previously mentioned, are in the southeast and central areas of the city. It should be noted, however, that many disadvantaged neighborhoods (depicted in light blue in Figure 4.7) do not have high crime rates. The map showing areas with high crime and high instability illustrate that this pattern is more common in the southeast area of the city. Interestingly, many high crime rates are concentrated in less unstable areas (depicted in pink), primarily in the southern and western portions of the city.

Table 4.4 presents the results of an OLS regression model that explains neighborhood crime rates for all offenders. The regression model shows that crime rates are higher in areas that are highly disadvantaged and unstable. Also, crime rates are higher in areas that are less populated with younger residents. Finally, crime rates are highly associated with neighborhoods where more offenders live, as might be expected. The model explains almost two-thirds (.6484) of the variance in neighborhood crime rates and yields an AIC of 871.92, which is relatively low. The data are sensitive to spatial autocorrelation, so when controlling for spatial dispersion, the lag model suggested a better fit as the r-squared is higher (.6886) and the AIC is lower (835.99) than the spatial error models r-squared and AIC values (.6758 and 852.68, respectively).

Figure 4.4: Crime Concentrations/ Social Disorganization



4.4: Offender Crime Rate OLS Model

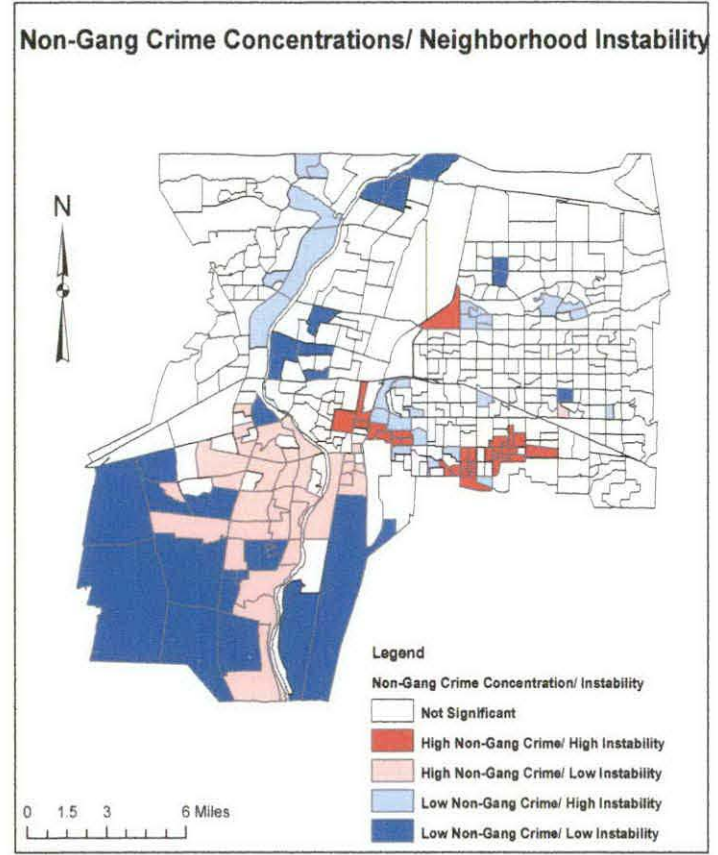
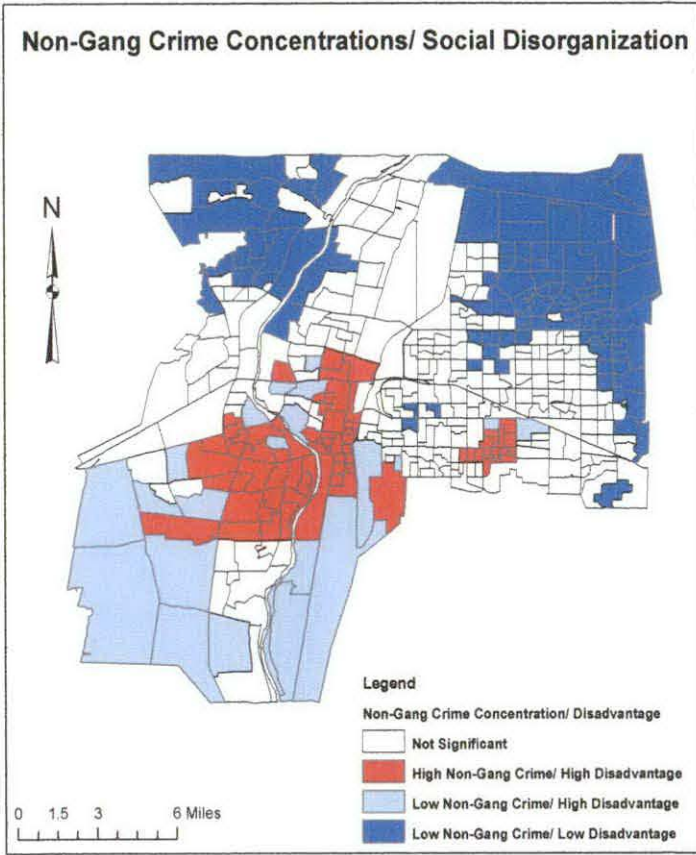
Total Crime Variables	Coefficients	Std. Error	Probability
Constant	1.6988	0.1841	0.001***
<i>Disadvantage</i>	0.4528	0.0513	0.001***
<i>Instability</i>	0.1865	0.0358	0.001***
% Under 18	-0.0139	0.0047	0.003*
Total Population	-0.0008	0.0005	0.154
Total Residence Rate	0.5120	0.0444	0.001***
	Adjusted R-Squared		Akaike Info Criterion
	0.6484		871.92
		Spatial Error R-squared	Spatial Error AIC
Spatial Lag R-squared	Spatial Lag AIC	vs.	
0.6886	835.99		0.6758 852.68

These results suggest that the social disadvantage of residents in a neighborhood is positively associated with crime, supporting hypothesis H5. Hypothesis H6 is also supported, in that neighborhood instability is positively associated with high neighborhood crime rates. However, offenders were more likely to commit crime in areas with fewer total residents, refuting hypothesis H7. Although concentration of youthful residents was associated with high crime rates at a moderately significant level, the direction of the association was in the opposite direction of that hypothesized, leading to the rejection of hypothesis H8. Finally, the residential concentration of offenders was highly associated with where their crime rates were high, lending support to H9.

Crime rate patterns for offenders not affiliated with gangs. Figure 4.5 shows that crimes committed by offenders not affiliated with gangs occur in highly disadvantaged areas that are relatively close to the center of the city, and in the southeastern neighborhoods highly implicated in crime from earlier analyses. As for neighborhood stability, non-gang offenders are more likely to commit their offenses in the unstable areas of the southeast and central city, but also in more stable southern areas near the Rio Grande River.

The OLS regression for non-gang crime rates (Table 4.5) illustrates that non-gang offenders were significantly more likely to commit crimes in areas that were

Figure 4.5: Non-Gang Crime Concentrations/ Social Disorganization



4.5: Non-Gang Crime Rate OLS Model

Non-Gang Variables	Coefficients	Std. Error	Probability
Constant	1.7805	0.1811	0.001***
<i>Disadvantage</i>	0.4656	0.0513	0.001***
<i>Instability</i>	0.1802	0.0352	0.001***
% Under 18	-0.0146	0.0046	0.002*
Total Population	-0.0007	0.0005	0.163
Non-Gang Residence Rate	0.5147	0.0427	0.001***
	Adjusted R-Squared		Akaike Info Criterion
	0.6735		856.45
Spatial Lag R-squared	Spatial Lag AIC	vs.	Spatial Error R-squared
0.7195	809.62		0.6491
			Spatial Error AIC
			917.05

highly disadvantaged, residentially unstable, and demographically older. Non-gang offenders also commit their crimes in areas of low total population, but this association was not significant. When considering the association between residential location of non-gang members and where they commit their crime, the model revealed that non-gang offenders were significantly more likely to commit their crimes in neighborhoods in which they lived.

The model explains a little more than two-thirds (.6735) of the variance in non-gang crime rates, and has an AIC that is lower (856.45). Due to the sensitivity of spatial patterns in the data, spatial regression was used revealing that the R-squared was higher in the lag model (0.7195) than in the spatial error model (0.6491). Also, the lag model was a better fit than the error model with a lower AIC value (809.62 and 917.05, respectively).

The results indicate that corollary C5a and C6a are both supported. Non-gang offenders commit their crimes in areas that are disadvantaged and unstable. These relationships were positive and significant, leading to the confirmation of C5a and C6a. Non-gang offenders were negatively associated with total population, leading to the rejection of corollary C7a, which anticipated a positive association between crime rates and the total population of the neighborhood. Also, non-gang offenders committed their crimes in neighborhoods that had fewer residents under 18, a

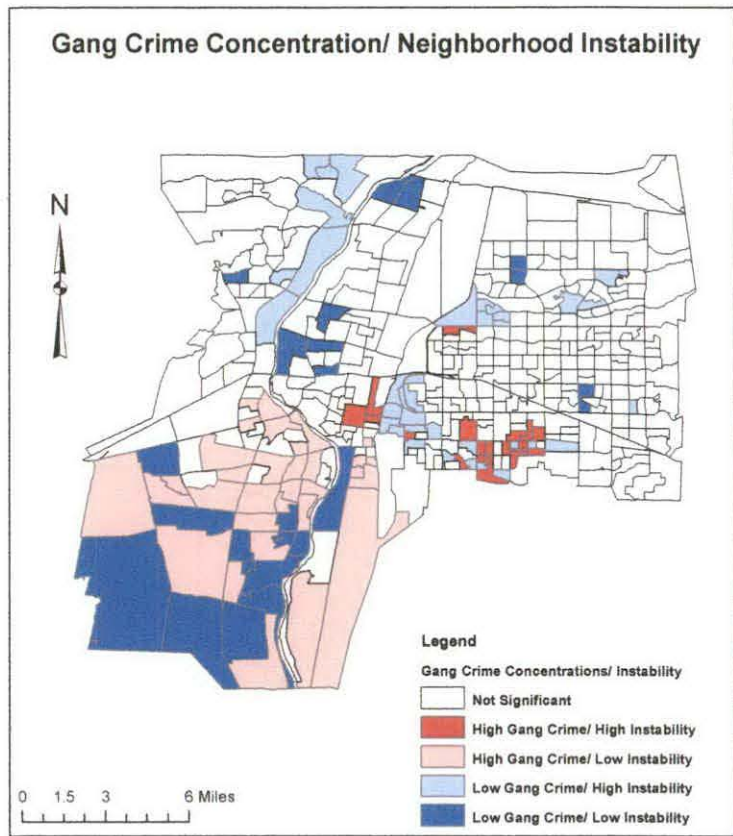
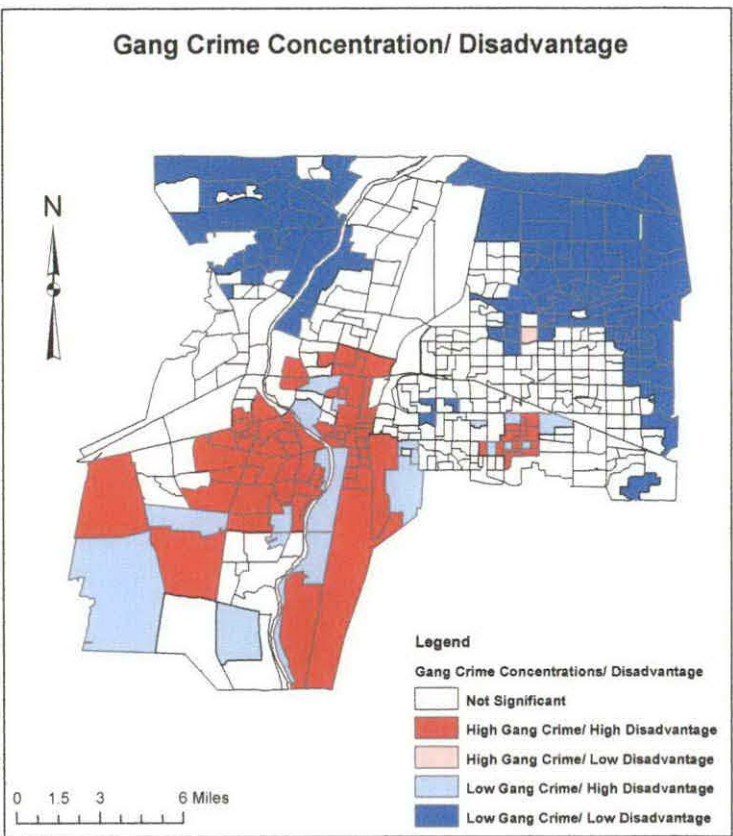
relationship opposite to that predicted in corollary C8a, leading to its rejection. On the other hand, C9a was strongly supported, as non-gang offenders were highly likely to commit their offenses in areas where non-gang offenders reside.

Crime rate patterns for gang offenders. Figure 4.6 presents bivariate LISA maps for gang crime rates and indicators of social disorganization. The maps illustrate that gang members commit their crimes in areas of high disadvantage, similar to non-gang offenders (as shown in Figure 4.9). However, gang crime is shifted further to the west, creating high crime and disadvantage clusters in areas that non-gang crime was not significantly concentrated.

Also, gang member crime was concentrated in the southeast where disadvantage is high, but not to the same degree as their non-gang counterparts. Gang members were also more likely to commit their crime in the southwest, and on the west of the river where neighborhood stability is higher than any other area of the city.

Table 4.6 shows the results of the OLS regression model for the neighborhood crime rates of gang members. Neighborhood disadvantage and instability were significantly and positively associated with neighborhoods with high gang crime rates. The gang model explains a little more than half of the variance (.5495) of gang crime. The regression model was affected by spatial patterning that resulted in the use of spatial regression. Results revealed that the spatial lag model had a higher R-

Figure 4.11: Gang Crime Concentrations/ Social Disorganization



4.6: Gang Crime Rate OLS Model

Gang Variables	Coefficients	Std. Error	Probability
Constant	0.9948	0.1272	0.001***
<i>Disadvantage</i>	0.4318	0.0487	0.001***
<i>Instability</i>	0.1039	0.0352	0.003**
% Under 18	-0.0116	0.0045	0.011*
Total Population	-0.0001	0.0046	0.043*
Gang Residence Rate	0.3902	0.0466	0.001***
	Adjusted R-Squared		Akaike Info Criterion
	0.5495		860.21
		Spatial Error R-squared	Spatial Error AIC
Spatial Lag R-squared	Spatial Lag AIC	vs.	
0.6009	825.94		0.5689 852.13

squared (0.6009) than the error model (0.5689) and a lower AIC value (825.94 and 852.13, respectively). The results allow the confirmation of corollary C5b that gang crime was more likely to occur in areas of social disadvantage. Although neighborhood instability was less strongly associated with gang neighborhood crime rates, the relationship is significant and in the direction hypothesized, leading to the confirmation of corollary C6b. The gang crime rate is significantly lower in areas where more of the population is under the age of 18 years. This finding does not support corollary C7b. Gang crime rates were lower in populated neighborhoods, like their non-gang counterparts, also refuting corollary C8b. Lastly, gang crime rates were significantly higher in neighborhoods where offenders reside, supporting C9b.

DIFFERENCES IN THE FACTORS THAT EXPLAIN GANG AND NON-GANG RESIDENCE AND NEIGHBORHOOD CRIME RATE

To assess the significance of the differences in the factors that explain gang and non-gang offender residence and neighborhood crime rate, t-tests are used. The Excel formula for the t-test of the difference in means is as follows:

$$t\text{-value} = (a - b) / \text{SQRT}((SE_a)^2 + (SE_b)^2)$$

where a: non-gang regression coefficient

b: gang regression coefficient

SEa: standard error of the non-gang coefficient

SEb: standard error of the gang coefficient

4.7: Differences in Means Tests for Residence OLS Models

Variable	Non-Gang coeff.	Gang coeff.	Difference	Non-Gang SE	Gang SE	t-value
Disadvantage	0.8661	0.7105	0.1556	0.0412	0.0379	2.7795
Instability	0.1071	0.0784	0.1855	0.0405	0.0373	3.3691
% Under 18	-0.0156	0.0042	-0.0198	0.0052	0.0048	-2.7979
Total						
Population	0.0006	0.0008	0.0014	0.0006	0.0005	1.7925

A t-value greater than 1.96 indicates a significant difference in the means at the $p \leq 0.05$ level.

The results shown in Table 4.7 indicate that disadvantage and instability have a larger positive effect on the residential location of non-gang offenders than gang offenders. In contrast, the difference in the effect of % under 18 for non-gang and gang offenders is significantly negative. Thus, gang members' residence is more positively associated with a larger percentage of youth in the population although this effect is very weak, as already noted. offenders were more likely than gang members to live in areas that were The tiny effects of total population on residence do not reveal a significant difference when non-gang and gang offenders are compared.

After assessing the factors affecting the neighborhood crime rate for non-gang and gang offenders (table 4.8), only one variable was found to be significantly different between these sub-groups, The crime rate of non-gang offenders is more influenced by the residence rate of offenders than is the crime rate of gang offenders.

Table 4.9 shows a summary of the results by hypothesis and corollary. The hypotheses and corollaries were either supported (Y) or not supported (N).

4.8: Differences in Means Tests for Crime Rate OLS Models

Variable	Non-Gang coeff.	Gang coeff.	Difference	Non-Gang SE	Gang SE	t-value
Disadvantage	0.4656	0.4318	0.0338	0.0513	0.0379	0.5299
Instability	0.1802	0.1039	0.0763	0.0352	0.0373	1.4877
% Under 18	-0.0146	-0.0116	-0.003	0.0046	0.0048	-0.4512
Total						
Population	-0.0007	-0.0001	-0.0006	0.0005	0.0005	-0.8485
Residence Rate	0.5147	0.3902	0.1245	0.0427	0.0466	1.9698

4.9: Results for Hypotheses and Corollaries

Factor	Offender Residence	Offender Crime	Non-gang Residence	Non-gang crime	Gang Residence	Gang Crime	Gang vs. Non-Gang
Disadvantage	Y (H1)	Y (H5)	Y (C1a)	Y (C5a)	Y (C1b)	Y (C5b)	NA
Instability	Y (H2)	Y (H6)	Y (C2a)	Y (C6a)	N (C2b)	Y (C6b)	NA
Population	N (H3)	N (H7)	N (C3a)	N (C7a)	N (C3b)	N (C7b)	NA
Youthfulness	N (H4)	N (H8)	N (C4a)	N (C8a)	N (C4b)	N (C8b)	NA
Residence Rate	NA	Y (H9)	NA	Y (C9a)	NA	Y (C9b)	NA
Residential Location	NA	NA	NA	NA	NA	NA	N (H10)
Neighborhood Crime Rate	NA	NA	NA	NA	NA	NA	N (H11)

CHAPTER 5 DISCUSSION

This chapter presents a discussion and interpretation of the research findings in the preceding chapter. Findings related to the residential concentration of offenders are presented first, in the context of each hypothesis and corollary related to this dependent variable. At each point, I show the connection between the outcomes of the current research and the relevant literature reviewed in Chapter 2. In a similar manner, I then present the findings of the current study concerning spatial concentrations of neighborhood crime rates, in relation to the relevant literature. I conclude with a discussion of the relationship between residence of offenders and neighborhoods with high crime rates.

RESIDENCE OF OFFENDERS

The results indicate that H1 was supported for all offenders in the study population, showing a positive and significant relationship between social disadvantage and offender residential concentration. This relationship was also in the predicted direction and significant for both non-gang (C1a) and gang member subgroups (C1b). The relationship between offender residence and neighborhood instability (H2) was in the predicted direction for all offenders, and the relationship was significant. Considering subgroups of offenders, the relationship between instability and non-gang residence was in fact significant (C2a), but the relationship

was reversed and significant for gang offenders, suggesting that gang members are more likely to reside in a less unstable neighborhood, thus not supporting C2b.

The predicted relationships between neighborhood total population and offender residential concentration (H3), as well as the concentration of non-gang offenders (C3a) was in the direction predicted, but the findings are not significant, refuting H3 and C3a. This relationship for gang offenders was also negative and not in the predicted direction, but not significant.

The prediction that offenders were significantly more likely to live in neighborhoods with higher proportions of youthful residents was not supported in direction or significance for the entire study population (H4), or for the non-gang affiliated offenders (C4a). For gang members the direction was, as predicted, slightly positive for this association (C4b), but it was not statistically significant.

Interpreting Residence of Offenders

Offenders in the study, along with non-gang offenders, were more likely to live in areas that were characterized as socially disadvantaged and unstable. These two variables were composites of many individual measures of socio-demographic and residential achievement indicators. Social disadvantage is partially indicated by low educational attainment. These areas are also characterized by high levels of poverty and unemployment along with a large proportion of residents supported by some sort of public assistance. Also, low housing values and high proportions of

Hispanic residents are indicators of disadvantage. The instability construct contained low levels of residents living there for more than five years, and high proportions of vacant housing, renter-occupied housing, and female headed households. From unpacking the constructed variables, we get a closer look at the contextual characteristics that are indicative of these types of neighborhoods.

The literature would suggest that offenders live in areas that are characterized by high levels of social disorganization. Jensen (2003) says that social disorganization contributes to crime experienced by the community. More specifically, Shaw and McKay (1942) describe disorganized neighborhoods as experiencing high levels of poverty, population heterogeneity, and residential mobility. Consistent with this literature, both offenders and non-gang offenders in the current study are more likely to reside in areas that are experiencing high levels of social disorganization.

The residences of offenders identified in GangNet as gang members are dispersed in patterns and concentrations that differ from those of offenders not affiliated with gangs. Gang members reside in communities that are characterized as socially disadvantaged, but these neighborhoods were less unstable, i.e., with high levels of ethnic (Hispanic) homogeneity and relatively low rates of in- and out-mobility. One possible reason that gang members live in areas of stability is that social capital is strong within the community. Usually, low rates of residential mobility is an indicator of high bonding social capital (Coleman 1990) which is associated with lower crime rates in a neighborhood (Rosenfeld et al. 1999).

However, recent research has found that higher levels of non-conformist social capital among delinquent groups could cause higher crime rates (Glaeser et al. 1996; Narayan 1999). The residence of these delinquent groups could also be explained by stronger social ties in their neighborhoods. When considering stability of gang neighborhoods we could also attribute the findings to the ethnically homogeneous nature of the southwest area of the city of Albuquerque.

Some of the findings of the current study concerning neighborhood stability and gang residence rate are not consistent with previous studies of the social ecology of offender residence. The relevant research literature has repeatedly indicated that criminals are more likely to reside in neighborhoods that are both disadvantaged and unstable (Shaw and McKay 1942; Sampson et al. 2002; Vigil 2002; Pyrooz et al. 2010). While the current study supports this assertion among non-gang offenders, it finds that gang members live in areas that are disadvantaged, but less unstable. The latter finding raised the question “Why are gang members more likely to live in areas that are less unstable than those in which non-gang members reside?” It could very well be that gangs serve as a stabilizing sub-cultural influence in some socially disadvantaged neighborhoods, but research must be conducted to definitively support this possible explanation.

In addition, this study was unable to confirm the frequently cited notion that offenders live in the more populated areas of the city (Shaw and McKay 1942; Roncek 1981; Bursik and Grasmick 1993; Tita et al. 2005). Gang offenders are

usually much younger than other offenders (Esbensen et al. 1993; Spergel 1993; Decker 1996; Ye and Wu 2010). The results of this study do in fact indicate that gang offenders live in areas that tend to have younger residents than other areas of the city, but this result was not significant. Other offenders in the study were more likely to reside in areas that were older, refuting the proposed hypothesis.

NEIGHBORHOOD CRIME RATE

The results of the current study indicate that offender crime occurs in disadvantaged areas of the city, confirming hypothesis 5. Also, non-gang offenders (C5a) and gang offenders (C5b) were more likely to commit crimes in areas that experienced social disadvantage. Although instability was significant and in the predicted direction for both offenders (H6) and non-gang offenders (C6a), gang offenders yield a positive direction, but less significance than the other offender groups.

All offenders (H7), non-gang offenders (C7a), and gang offenders (C7b) were all more likely to commit crime in areas that are less populated, but this relationship is only significant with gang members. On the other hand, the proportion of residents in an area that were young was associated with the concentration of neighborhood crime rate differently for study subgroups. Specifically, the entire study population of offenders (H8), non-gang offenders (C8a), and gang offenders (C8b) were significantly more likely to commit their crime in areas that had a higher proportion of older residents. Serious criminal offenses were concentrated in areas where violent

offenders reside, supporting Hypothesis 9. Further, non-gang offenders committed the majority of their crimes in areas that non-gang offenders reside, leading to the confirmation of Corollary 9a, and gang offenders commit crime in areas that were also characterized as having high proportions of gang member residents, supporting Corollary 9b.

Interpreting Neighborhood Crime Rates

The findings are relatively similar among overall offenders and the two subgroups, non-gang and gang offenders. Each subgroup was more likely to commit crimes in areas that are disadvantaged and unstable. These areas are characterized in the literature as having weakened informal controls and social ties (Sampson and Groves 1989; Shaw and McKay 1942). Here, community members are less likely to intervene when disorder is occurring and have less trust in their neighbors. It is possible that some types of crime could be accepted in neighborhoods where many community members accept crime and the gang culture (Tita and Ridgeway 2007). Another explanation can be inferred from routine activities theory (Cohen and Felson 1979). Since high crime areas also have a high proportion of single-parent households, the supervision of children might be limited, non-nurturing, and/or inconsistent. Only the gang population was more likely to commit crime in areas that are less populated. Although this finding is inconsistent with most research on crime (Roncek 1981; Bursik and Grasmick 1993; Tita et al. 2005) the result seemed less surprising after the residential patterns of offenders was determined. Although I did

not analyze the distance between residence and neighborhood crime rates for offenders in the sample, one can reasonably assert that offenders in the sample commit their crime in areas that are similar to where they live.

LINKING RESIDENCE AND NEIGHBORHOOD CRIME RATE

The link between residence and crime is one that has been controversial in the social sciences for many years. In particular, gang research is still attempting to properly define gang territory, if there is a set territory at all. In most studies of the ecology of crime, offender activity space is not a significant concern: neighborhoods that are characterized as crime hot spots are those with high levels of disadvantage and neighborhood instability (Sampson and Groves 1989; Sampson et al. 1997; Tita and Ridgeway 2007). There is some research concerning the areas in which offenders reside and its relationship to where they commit their crimes which is referred to as “Journey to Crime” research (Brantingham and Brantingham, 1995). These studies indicate that offenders are most likely to commit crimes in neighborhoods where they spend the most time (i.e, where they live, work, and spend their leisure time) and on the pathways between these locations. While this perspective cannot be definitively supported with the results of the current study, the results do find that the overall population of offenders (H9), non-gang offenders (C9a) and gang offenders (C9b) are all more likely to commit their crimes in areas in which there was a high proportion of similar offenders (i.e. gang crime occurred in areas with more gang members residing in them, etc.). However, non-gang offenders had a much higher coefficient

level than gang offenders, suggesting that non-gang offender residence was more strongly associated with neighborhoods that had high rates of gang crime. This finding leads to the tentative conclusion that gang offenders are more likely to commit crime in areas away from their home, relative to non-gang offenders. In short, offender and non-gang offender neighborhoods with high crime rates can be explained by distance decay, while gang offender neighborhoods are more complicated resembling patterns of group offender cohorts known as “itinerant crime groups” in Europe (Van Daele and Beken 2009). It could well be that gangs in fact provide an incentive for members to travel to areas in which crimes occur, in a manner not apparent with non-gang offenders.

Distance decay. In their study of European criminal patterns, Van Daele and Beken (2009) find that average travel time for offenders from their residence to the location of crime was 6.2 miles. In fact, 59.5 percent of all crime was reported to be within this 6.2 mile range, while only seven percent of crime occurred in areas 12-18 miles away from their residence. Further, offenders that commit crimes in association with others tend to travel further to their crime location: approximately 11.3 miles, compared to offenders acting alone who travel 9.7 miles.

Itinerant crime groups. Although all offenses that involves crime associates occurs further from home, members of an itinerant crime group are especially likely to commit their crime further away from their residence. These groups closely resemble gangs, in that members commit crimes together (Thrasher 1927; Reiss 1988; Decker

1996) and, more often than offenders not affiliated with gangs, away from their residence (Moore et al. 1983; Moore and Vigil 1985; Tita et al. 2005). The results of Van Daele and Beken's (2009) study were that itinerant criminal groups traveled a lot further (14.2 miles as compared to 9.7 miles for solitary offenders). In fact, less than half of the crimes committed by traveling criminal groups occurred within 6 miles of the home (Pp. 11). It would seem that offenders of these criminal groups are attracted to crime locations further away from their homes. Like gang members (Moore et al. 1983; Moore and Vigil 1985) itinerant criminal groups are more likely to export their crime to other areas (Van Daele and Beken 2009).

DIFFERENCES BETWEEN GANG AND NON-GANG PATTERNS

I hypothesized that gang and non-gang residential location would be similar and the location they chose to commit crime would be different. However, the results indicate that the residence is significantly different between both groups, refuting Hypothesis 10. Also, neighborhoods with high rates of crime were similar between each group, refuting Hypothesis 11.

The results indicate that gang and non-gang offender residence locations are different, but each subgroup commits crime in similar neighborhoods with high crime rates. After t-tests were conducted to test the differences between coefficients, the factors affecting gang and non-gang residence were found to be statistically different in most instances. For example, neighborhood disadvantage and instability both had a

greater affect on non-gang residence than on gang residence. Moreover, the relative size of the youth population tended to have a more positive association with gang residence than non-gang residence. In the residence models, the only independent variable that did not register a significant difference between non-gang and gang subgroups was total population.

The factors that affect the neighborhood crime rate are statistically similar between the non-gang and gang sub-groups in most instances. The exception is residence. This variable has a significantly greater influence in the non-gang subgroup than in the gang subgroup.

After evaluating the results, non-gang and gang offenders appear to live in different neighborhoods. Gang offender residence is less influenced by neighborhood disadvantage and instability than non-gang offender residence. If gang members are target-oriented in their criminal pursuits, they are travelling to other gang areas to commit crime. Although offender residence rates are different, the overall population commits crime in similar areas.

A final finding of this study, which was not hypothesized but is nevertheless interesting in light of the social disorganization theory of crime, concerns the much stronger effect size of disadvantage compared to instability, which was found in all the regression models. Socially disorganization neighborhoods are characterized as being disadvantaged, and residentially mobile and ethnically heterogenic (Sampson

and Groves 1989; Sampson et al. 1997; Jensen 2003). The association of disadvantage and high crime rates has been established (Pratt and Cullen 2005); however I have not seen any crime literature that measures the degree to which disadvantaged neighborhoods influence crime rates as compared to other variables associated with social disorganization.

CHAPTER 6 SUMMARY AND CONCLUSION

OVERVIEW OF THE CURRENT STUDY

This study uses spatial statistical techniques to evaluate social disorganization theory through comparing gang and non-gang offender residential and crime locations. The differences between the general population and two subgroups, non-gang offenders and gang offenders, were explored. I used GIS applications to analyze neighborhood-level offender patterns in Albuquerque, New Mexico. First, I specifically questioned the association of social disorganization with the residential distributions of offenders, non-gang offenders, and gang offenders. Second, I assessed the association of factors of social disorganization with the neighborhood crime rates for offenders, non-gang offenders, and gang offenders. Each research question accounts for the effect of gang membership.

METHODS

Data were collected from three sources: arrest records from Albuquerque, New Mexico Police Department and Bernalillo County Sheriff's Department, GangNet, and U.S. Census Bureau estimates for the year 2000. The study population consisted of 15,334 total arrests, with gang offenders representing 2,140 of them. The population was mostly male (82.7%) and white (43.0%). However, the gang population was almost exclusively male (97.2%) and the majority were Hispanic (55.2%). Finally, data were extracted from the U.S. Census Bureau for the year 2000 to estimate neighborhood characteristics for each census block in Albuquerque. Both

spatial (Moran's I, LISA maps, spatial regression) and non-spatial (OLS regression, t-tests) analytical techniques were used to analyze the data.

RESEARCH FINDINGS

The results of the spatial analysis reveal that offenders are more likely to reside in areas that are disadvantaged and unstable. When subgroups are considered, non-gang offenders were more likely to live in areas that are both disadvantaged and unstable. However, gang offenders were more likely to reside in neighborhoods that are disadvantaged, but less unstable. Results pertaining to neighborhood crime rates show that offenders commit crime in areas that are similar, regardless of gang affiliation. Each group significantly commits crime in neighborhoods that are characterized as disadvantaged and unstable. Although significance levels were different, offenders in general commit crime in neighborhoods that were older demographically.

Differences between each subgroup, gang and non-gang offenders, reveal that there are significant differences in residential distributions. The t-test revealed significant results for each variable, except total population, meaning there is a significant difference between gang and non-gang residential locations. The effect size of coefficients was higher and more influential for non-gang offenders. Neighborhoods with high crime rates had similar results for both gang and non-gang offenders. When neighborhood crime location differences were assessed the only variable that was statistically significant was the residence rate, meaning the

neighborhoods in which offenders commit crime are influenced by the residence rate of similar offenders.

LIMITATIONS OF THE STUDY, AND FUTURE RESEARCH

There are a number of limitations to the current study. First, the study only uses official data records and does not have access to ethnographic research on the area. When ethnographic research is available, the study findings may be reassessed.

Second, the analysis only focuses on a single city in the American Southwest. The findings may not generalize to other cities and other regions. Albuquerque has an overwhelming proportion of Hispanic residence compared to the overall distribution of ethnicity throughout other cities. Although this research could be duplicated in areas that have a high proportion of Hispanic residents, the outcome may be different due to contextual differences in neighborhood composition.

Third, the study uses data on arrests that have occurred between 1996 and 2006. This is a decade of arrests that have occurred through developmental changes in neighborhoods and composition of the city as a whole. Also, neighborhood characteristics come from the year 2000, roughly the middle of the range of arrest data. This is a limitation in that neighborhood changes, either before the data or after the data cannot be accounted for.

Fourth, this study uses GangNet to identify known gang members in the population of arrests. Although this data is integral to the research, there might be other gang members that have been arrested that just haven't been recognized as gang members by law enforcement agencies.

Finally, this study uses aggregated data and is susceptible to the ecological fallacy. This could be avoided by using multilevel modeling techniques, however these techniques were not compatible with the spatial analysis techniques that were integral to the design of this study.

CONCLUSION

In concluding, the present study contributes to the literature on the ecology of gang residence and neighborhood crime rates. I am not aware of any other literature that uses spatial analytical techniques to assess gang residence and where they commit their crime using social disorganization as a theoretical perspective.

The majority of the differences between groups came when analyzing residential locations of offenders. Both offenders and non-gang offenders lived in areas that are disadvantaged and unstable, similar to socially disorganized neighborhoods. However, gang offenders lived in areas that were disadvantaged, but these neighborhoods were less unstable. This contributes to the literature that evaluates social capital in gang organizations as neighborhoods that are less unstable have higher levels of social capital than other neighborhoods. The neighborhood crime rate was theoretically consistent with social disorganization theory in that offender and both subgroups were more likely to commit crime in areas that were disadvantaged and unstable. The only significant difference in neighborhood crime rate between the subgroups was the effect size of residence rate. Non-gang offenders were more affected by the residence rate of similar offenders in the neighborhoods. One might speculate that gang offenders sometimes commit crimes away from their

neighborhood of residence. More research is needed in the ecology of gang offenders and their similarities with non-gang offenders.

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