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THE RELATIONSHIP BETWEEN LIFESTYLE, DEMOGRAPHIC, SITUATIONAL, AND STRUCTURAL FEATURES WITH HOMICIDE IN INDIANAPOLIS

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ABSTRACT

THE RELATIONSHIP BETWEEN LIFESTYLE, DEMOGRAPHIC, SITUATIONAL, AND STRUCTURAL FEATURES WITH HOMICIDE IN INDIANAPOLIS

By

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This study investigates the relationship between incident and structural characteristics and gang homicide. Incident level characteristics include situational features of the event, and the demographic and lifestyle attributes of the homicide participants. Prior research has shown that gang homicides have tended to be firearm related and drug motivated where multiple, younger, non-white and male actors are more inclined to be involved. The association between many of these incident level characteristics and gang homicide has been established in prior research that relied upon data from chronic gang cities, which are cities that have an extensive and historic gang problem. The generalizability of these correlates with gang homicide in emerging gang cities, which are cities that have a developing gang problem, is still largely unverified. Thus, the relationship between previously established incident level correlates of gang violence and gang homicide in an emerging gang city, Indianapolis, is examined here. Relying on binary logistic regression models, results show that correlates of gang homicide from chronic gang cities also delineated homicide in an emerging gang city. Implications support the generalizability of gang homicide research over time and across cities.

In addition, this study contributes to the ecological literature that examines the relationship between gang homicide and neighborhood context. In particular, two

structural level measures were incorporated into hierarchical generalized linear models (HGLM): economic deprivation and disorder. Prior research has shown a mixed relationship between economic deprivation and gang homicide. The disorder-gang homicide relationship, to this point, has gone untested in statistical models. The current research attempted to delineate gang homicide from non-gang homicide at the neighborhood level while simultaneously controlling for incident level measures (i.e., level-1 variables). Results suggested that the relationship between gang homicide and economic deprivation was somewhat fragile and unstable, while the association between gang homicide and disorder was much more robust, significant, and stable. These findings have both theoretical and policy implications that contribute to the gang homicide and ecological literature.

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Chapter 1: Introduction

The harm that gang homicide inflicts on communities and citizens has been a central focus of criminological research and criminal justice policy alike. Strategic intervention programs, such as Project Safe Neighborhoods (PSN) have been created and implemented on a national level in order to reduce gang and gun violence. As of 2007, over $1.5 billion has been devoted to PSN in an effort to integrate and focus criminal justice agencies and resources in order to reduce the pervasive harm of gun violence.[1] This is particularly important because last year (i.e., Fiscal Year 2006), the United States Department of Justice dedicated additional funding of over $30 million under the "Anti-Gang Initiative" program. Government and law enforcement agencies are not alone in the extended effort to understand, and undermine, gang homicide.

Criminal justice researchers began to focus specifically on gang violence, and in particular gang homicide, in the late 1980's. The augmentation of this specific type of research was largely driven by scholars attempting to understand the drug epidemic that swept through the nation, which has been attributed as a major vehicle for the increased homicide rates that occurred during the same period (Fagan, 1989; Vigil, 1988). Thus, researchers began to study, and operationalize, gang homicide as a dichotomy: gang homicide and non-gang homicide (Maxson, Gordon, and Klein, 1985).

Importantly, gang homicide research has informed the criminological literature. Gang homicides have been shown to have a number of unique, and consistent, characteristics. The most consistent correlates have been situational features of the incidents and the demographic make-up of the participants. Prior research shows that

[1] This fiscal statistics described here were found on the PSN website (www.psn.gov).

gang homicides are more likely to be clustered, to occur in the street, involve the use of a firearm, and have multiple, younger, non-white, and male actors (Decker and Curry, 2002). Many of these correlates were discovered using data that stem from chronic gang cities, a term used to describe cities with an organized, long-term gang structure and history (Spergel and Curry, 1993). However, most U.S. cities were classified as emerging gang sites, which means that gangs were not a problem in these cities until the 1980's, and that their gangs' organization was less hierarchical and less formally structured. Gangs have evolved over time and their organizational structure varies by city (Decker and Curry, 2002). In order to contribute to this evolving body of research, it is important to review the foundation on which emerging theories of gang homicide are built. This study takes the approach that it is necessary to examine whether previously established correlates of gang homicides are generalizable to emerging gang cities.

Chapter 2 serves as a review of the evolution of the gang homicide literature, paying particular attention to the situational, demographic, and lifestyle explanations of gang homicide. In addition to ascertaining the generalizability of incident level correlates between chronic and emerging gang cities, this type of examination is also important because the current research attempts to build upon the macro-social literature by examining the effect of neighborhood level influences on gang homicide. Before an examination of this scope can be accomplished, the extent to which gang homicide is generalizable from research based primarily on chronic gang cities to an emerging gang city (i.e., the city of Indianapolis) must first be established.

Prior research shows that neighborhood violence undermines social networks and cohesion among residents (Sampson, Raudenbush, and Earls, 1997). In terms of

neighborhood structure, the ecological literature suggests that high levels of disorder have a direct effect on street crime, particularly offenses that are drug-market driven (Blumstein, 1995; Sampson and Raudenbush, 1999; Wright and Decker, 1997). A number of ecological theorists propose the neighborhood-crime relationship can be explained by the "incivilities thesis", which states that physical and social incivilities in a neighborhood leads to increased fear and isolation among residents (Bursik and Grasmick, 1993; Skogan, 1990). Residential isolation increases citizen fear, which in turn promotes crime. Until recently, the extent to which neighborhood effects influence gang homicide has been largely underdeveloped in criminal justice research, though a growing body of literature in this area has begun to emerge in criminology (Curry and Spergel, 1988; Kubrin and Wadsworth, 2003; Pizarro and McGloin, 2006; Rosenfeld, Brey, and Egley, 1999).

Chapter 3 reviews the macro-social literature, paying particular attention to the indirect theoretical link that has been established between disorder and gang homicide through drug markets. More specifically, disorder has been shown to have a positive correlation with robbery (Sampson and Raudenbush, 1999), and robbery has been shown to have a positive correlation with drug markets (Wright and Decker, 1997), and drug markets have been shown to have a positive correlation with gang homicides (Blumstein, 1995). This study examines whether there may be a more direct relationship between disorder and gang homicide. This is important because to date no research has employed statistical models to test the direct relationship between disorder and gang homicide. Findings from this type of examination have the capacity to inform gang research as well as macro-social criminology.

Chapter 4 details the data sources used in this study, while Chapter 5 describes the measurement of the dependent and independent variables used in the multivariate regression models. Data were derived from three primary sources. The first source is incident level data, which includes situational features of the incident and demographic characteristics of the actors. These data were collected at bi-monthly homicide incident reviews in Indianapolis, and serve as independent variables for both the incident and structural level analyses. In addition the dichotomous outcome measure, gang versus non-gang homicide, was also collected at the homicide incident reviews. The second source of data relied upon citizen surveys that were administered to residents in Indianapolis police beats. This questionnaire was designed to gauge, among other items of interest, perceptions of the local *social* and *physical* neighborhood characteristics. Taken together, these items were aggregated to create a measure of disorder at the police beat level, which served as the neighborhood boundary in this study. The third source of data included U.S. Census measures that were aggregated to create a variable of economic deprivation at the neighborhood level. Incident level measures were incorporated into binary logistic regression models where the dichotomous gang/non-gang homicide outcome measure was predicted (Long and Freese, 2003). Both incident and neighborhood levels were analyzed together using hierarchical general linear model (HGLM) analyses, in order to account for the violation of the assumption of independent observations at the neighborhood level (Raudenbush and Bryk, 2002).

Chapter 6 describes the two research questions posed in this study, and results of the multivariate analyses used to address these lines of inquiry. Research Question #1 asks, are there demographic, situational, and lifestyle distinctions between homicides that

were classified as gang related from those that were classified as non-gang related? Binary logistic regression models were used as multivariate techniques to address this research question. Research Question #2 asks, do structural measures of the neighborhoods where the incident occurred delineate gang homicides from non-gang homicides? Given the multi-level nature of the data used in Research Question #2, Hierarchical Generalized Linear Modeling (HGLM) and mixed-level logistic regression models were used in the multivariate analyses.

Chapter 7 reviews the limitations of the current study, the theoretical and methodological contributions this research makes, and provides direction for future areas of inquiry. In addition, policy implications are discussed.

Chapter 2: Review of Gang Research

One of the classical studies in criminal justice research demonstrating the importance of understanding the relationship between gangs and general forms of crime and delinquency was written eighty years ago (Thrasher, 1927). Since then, a large volume of research has been devoted to the study of gangs in order to unwrap the multi-dimensional components that make-up gang related crime. More recently, the rise in the homicide epidemic that occurred in the United States in the late 1980's and early 1990's is largely attributed to the rise in gang-related homicide due to the increase in the number of gangs, as well as the number of gang members, and territoriality issues directly related to the drug market (Decker and Curry, 2002; Klein, 1995; Miller, 2001). This is important because the dynamics and processes previously established as factors that explain gang related homicide may have also changed, given that it is widely accepted that gangs have evolved over time. In order to build on this evolving body of theory, it is important to review the foundation on which these emerging theories are built. Indeed, if the foundation is not solid, emerging theories of gang homicide will not withstand either the test of time or empirical scrutiny.

In this chapter, some of the previously established correlates of gang homicide are first reviewed in detail. These include demographic, situational, and lifestyle correlates that previously have been shown to delineate gang homicide from all other homicide types. Following this review, a description of more contemporary definitional advancements driving gang homicide research will be discussed. These include the operational distinctions of gang-motivated and gang affiliated offenses. In addition, contemporary research has shown that the dynamics explaining gangs vary across

location and over time. A large body of research explaining gang homicide has been established in different areas (i.e., different cities) and across different points in time (i.e., different decades), which is important when attempting to contribute to the body of knowledge in gang research.

These definitional advancements could potentially open gaps in the gang-homicide foundation. With this in mind, this chapter concludes with a discussion of the opportunity for research to contribute to the body of knowledge devoted to explaining gang homicide in two ways. First, it becomes important to empirically re-establish whether previously determined factors continue to delineate gang homicide from non-gang homicide, given these recent definitional advancements. This is necessary in order to assess the generalizability of the current study with findings presented in the prior literature. Second, it becomes imperative to review the limited (but growing) body of research that has been devoted to examining whether structural factors such as neighborhood effects have an impact on gang homicide, relative to other forms of homicide. Taken together, this discussion sets the stage for the current investigation.

Demographic Characteristics of Actors in Gang Homicide

The three main demographic correlates that have been consistent predictors of gang homicides when compared to non-gang homicides include the age, race, and gender distribution of victims and suspects. One of the most consistent findings in the empirical research on gang homicides is that victims and suspects tend to be substantially younger than actors involved in non-gang homicides. Spergel (1983) demonstrated long ago that gang homicides in Chicago involved younger persons than did non-gang homicides.

Maxson and Klein (1985) conducted an even more in-depth analysis (i.e., reviewing over 700 homicide cases in Los Angeles) of the difference between gang and non-gang homicides and found that there were substantial differences in the age, ethnicity, and the number of participants of the actors involved. In terms of age, Maxson et al. (1985) found that suspects and victims involved in gang homicides were considerably younger than victims and suspects involved in non-gang homicides. In a more recent study of gang homicides in Chicago, Block (1991) demonstrated that the risk of victims and suspects being involved in gang homicides peaked between the ages of fifteen and nineteen years. In a St. Louis study, Decker and Curry (2002) found that the average age of the victim in a gang homicide was considerably younger in gang homicides (average age of 22.7 years for victims, and 19.2 years for suspects) than in non-gang homicides (28.1 years for victims, 20.3 years for suspects). Pizarro and McGloin (2006) also found that victims and suspects were younger in gang homicides in Newark, NJ. Thus, the younger age distribution of victims and suspects in gang homicides is widely seen in the literature on gangs.

Homicide research from a gang perspective has almost entirely focused on males. This is largely because gang homicide is a male oriented crime. A consistent characteristic of gang homicides is that they tend to involve male victims and suspects, particularly in comparison with other types of homicides. Maxson et al. (1985) found that gang homicides were much more likely to involve males as both victims and suspects. Maxson and Klein (1990) also concluded that gang homicides were more likely to involve male victims and suspects. In terms of explaining this difference, Bowker, Gross and Klein (1980) found that male gang members purposely kept their female

counterparts from participating in drive-by shootings and gun assaults. In addition, Joe and Chensey-Lind (1995) suggested that violence is more a normative feature of male gang involvement, than it is for female gang involvement. When explaining why, Joe and Chesney-Lind (1995) posited that violence involving female gang members is more of a consequence and response to both physical and sexual abuse.

Since the mid-1990's, research on female gang participation has certainly become more prominent within the literature (Cheney-Lind, Sheldon, and Joe, 1996; Curry, 1998; Sikes, 1997). To date, only the Miller and Decker (2001) study has examined the role of female gang participation in homicide. Miller and Decker concluded that females were most likely to be involved in gang homicides when they "were in the wrong place at the wrong time" (2001: 115). Thus, their in-depth examination showed that female involvement in gang homicide is usually a product of chance. While this study makes no contention that *gang crimes* are extensively male, research has consistently shown that *gang homicides* have almost been entirely a male phenomenon.

In terms of race, Spergel (1983) found that the aggregated racial characteristics of actors in gang homicides were different than in non-gang homicides. In a Chicago gang study, Curry and Spergel (1988) found that the gang homicide rate was higher in Hispanic communities, while the gang delinquency rate was higher in African American communities. Maxson et al. (1985) similarly found that gang homicides were distinct from non-gang homicides in that the victims and suspects were more likely to be non-white (Hispanic or African American). There have since been a vast number of studies that have found a similar racial demographic distinction between gang and non-gang

homicides (Decker, 1996; Decker, Bynum, and Weisel 1998; Pizarro and McGloin, 2005; Rosenfeld et al., 1999; Tita, 1998).

A number of classic and contemporary studies have devoted specific attention toward explaining the increased risk of non-white participants' involvement in gang violence. Classical criminology attempted to capture this relationship through strain and subculture theories of violence. Subculture of violence theories posit that a subculture emerges in defiance of greater societal norms, often due to constraint, or strain (Cohen and Short, 1958). Wolfgang and Ferracuti (1967) proposed that young, lower socioeconomic class African Americans possessed a value system where violence was an acceptable and normal part of everyday inner-city life. While this work has received extensive criticism because it fails to explain the differential treatment of African Americans and whites that has historically occurred in the United States, it set the stage for understanding how violence is socially situated and affects members of racial groups in distinct ways (Surratt, Inciardi, Kurtz, and Kiley, 2004). More recently, Parker and McCall (1999) linked the association between African American job inaccessibility and high homicide rates across subcategories of homicide, which is a modern link to strain and subculture of violence theories. The important point is that both empirical and theoretical research has consistently found, and attempted to explain, that gang homicides are more likely to involve non-white participants.

To summarize this section on the demographic makeup of gang homicides, victims and suspects tend to be younger, male, and non-white when compared with non-gang homicides. However, the growing body of research shows that these demographic measures are by no means sufficient indicators of gang homicide alone. There are a

number of situational factors that make gang homicides distinct from other forms of homicide.

Situational Correlates of Gang Homicide

There are several situational correlates that differentiate gang homicides from other forms of homicide. Gang homicide research shows that these homicides are more likely to include multiple suspects, involve the use of firearms as the method of death, and are more likely to be drug related than are non-gang homicides (Maxson and Klein, 1990, 1996; Maxson et al., 1985). These measures have theoretical links to the drug market, which will be discussed in more detail.

Maxson et al. (1985) also found that the victim-offender relationship was an important delineating factor when discriminating gang homicides from non-gang homicides in Los Angeles. This research was an extension of Wolfgang's (1958) 11-point categorization of the victim-offender relationship across all homicide types in Philadelphia. In particular, Maxson et al. (1985) found that no prior contact between the victims and suspects was more common in gang homicides than in non-gang homicides. Riedel (1987) extended this work into a slightly different gang homicide typology: expressive vs. instrumental homicides. Instrumental homicides are cases where the offender seeks to improve his or her position through some rational calculation such as minimizing risk, increasing gain, or both. Expressive events fail to include the rationality, or the 'cost-benefit' comparison. Expressive homicides tend to center around 'saving face' or 'character contests' (Decker, 1993). An important point that must be raised is that the current study has no measures of the victim-offender relationship. This

will be discussed in greater detail in the discussion section dealing with limitations and directions for future research. However, this body of research continues to build the argument that gang homicides are different than non-gang homicides.

In terms of the measures available in the current study, previous research has demonstrated that gang homicide is likely to be motivated by the drug market. The participation of gang members in illegal drug sales is well established across a variety of studies (Decker and Van Winkle, 1996; Fagan, 1989, Maxson et al., 1985; Vigil, 1988). Blumstein and Wallman (2000) linked the temporal sequencing of the rise in homicide in the early 1990's with the emergence of street drug sales.[2] They concluded that this was particularly true in crack cocaine sales, where distributors began arming themselves with firearms as a means of safety and protection.

From this theoretical explanation (i.e., the relationship between crack cocaine drug markets and gang homicide), it is plain to see how researchers have attempted to explain the relationship between the increased number of suspects, the use of firearms as the method of death, and the increased likelihood of drug-related motives as correlates of gang homicide. The group dynamic is captured in the measure of multiple suspects in that offenses are the target of the group rather than an individual perpetrator. The other two common situational correlates of gang homicides are incidents that are drug motivated and involve firearms as the method of death. In addition to these situational correlates, some research has attempted to link lifestyle measures with gang homicide, since lifestyle measures attempt to identify 'risk factors' that increase the likelihood of an

[2] It should be noted that Martin, Maxwell, White, and Zhang (2004) found little to no relationship between cocaine use and city wide violent crime in a study utilizing national data from the Arrestee Drug Abuse Monitoring (ADAM) program. However, their findings did not test the relationship between drug sellers/markets and crime trends but rather focused on arrestee drug use and crime trends.

individual becoming involved in a gang homicide. A review of lifestyle measures follows.

Lifestyle Measures of Gang Homicide

Within criminology, lifestyle measures essentially deal with risk factors that increase the likelihood of an individual being involved in crime. Hindelang, Gottfredson, and Garofalo (1978) were among the first theorists to establish a lifestyle theory of crime. They proposed that individual risk factors and characteristics influenced different risk-levels of victimization and/or offending. According to their theoretical premise, there are several propositions related to lifestyle that determine the likelihood of participating in crime and being victimized. First, they found that personal victimization was directly related to the amount of time an individual spent in public places, particularly during the evening hours, which is basically an indicator of their lifestyle. They also found individuals who were more likely to be involved in crime and victimization hung around others with similar lifestyles, which also helped explain personal victimization.

In terms of a more narrow focus toward understanding violence, Anderson (1999) extended lifestyle theory by relating it to the inner city African American population. Anderson (1999) specifically argued that violence in the inner city is largely due to the 'search for respect' that often results in the use of violence to ensure that individuals, particularly those who self-identify with the 'street culture' rather than 'decent culture', avoid being disrespected at all costs. He demonstrated that many young inner city African American men and women feel a sense of hopelessness and alienation, largely as a result of joblessness and persistent racism. This is often the precipitating and

underlying factor that causes violent confrontations. Anderson (1999) concluded that this type of violence further legitimizes the oppositional culture and the "code of the street" in the eyes of many inner city African Americans. Similarly, Oliver's (1994) work demonstrated that a large proportion of inner city Black men define masculinity (i.e., manhood) as something contingent upon their willingness to resort to violence in order to resolve disputes.

In terms of gang violence, Anderson (1999) additionally argued that lifestyle is an important indicator of violent behavior at the street-level. In particular, Anderson found that the use and threat of violence by drug dealers is a means to gain social control. This is because drug dealing is the most prominent source of income in these areas. In this setting, gangs who are involved in the drug market often use violence to maintain street credibility; otherwise, they would be unsuccessful drug dealers. Overall, this structural setting creates a constant threat of violence due to a combination of both the drug trade and the locales where drugs are most heavily purchased and sold.

Lifestyle measures are very consistent with routine activities theory (Cohen and Felson, 1979). A routine activities approach attempts to explain the relationship, and convergence, between victims and offenders (and the lack of intervening factors). Specifically, Cohen and Felson (1979) argued that drug dealing, gang involvement, and nighttime activities outside the home are all part of routine activities that are related to risk levels of violent offending and/or victimization.

The operationalization of lifestyle is discussed by Hindelang, Gottfredson, and Garafolo (1978), who asserted that lifestyle can be measured by the amount of time an individual spends with his or her family, since individuals more likely to be engaged in

deviant lifestyles tend to spend time away from their family. A proxy measure of deviant lifestyle is the criminal history based on an individual's arrest and/or conviction record. Jensen and Brownfield (1987) specifically stated, "offense activity can be considered as a characteristic of lifestyles or as a type of routine activity which increases the risk of victimization because of the motives, vulnerability, or culpability of people involved in those activities" (Jensen and Brownfield, 1987: 87).

This type of operationalization of lifestyle would fit Sampson and Lauritsen's (1994) lifestyle principle known as homogamy, which is a principle that states that persons are more likely to be victimized when they disproportionately associate with or come into contact with offenders. It is important to note that to date, no study has examined lifestyle measures as offense histories with gang homicide, though their potential is seen, both directly and indirectly, in a number of other scholarly works (Anderson, 1999; Cohen and Felson, 1979; Lauritsen and White, 2001; McGarrell, Chermak, Wilson, and Corsaro, 2006; Sampson and Lauritsen, 1994).

Thus, offense histories have potential to serve as lifestyle measures in terms of capturing the rate of risk of being involved in gang homicides, among both perpetrators and victims, by examining prior drug and weapons arrests. Given that Blumstein and Wallman (2000) linked gang homicides with drug and weapons offending, these constructs have the potential to serve as key measures of an offender's prior lifestyle. The lifestyle and routine activities theories also serve to integrate the situational measures (i.e., group, weapon, drugs) with these lifestyle characteristics. In addition to the contribution to lifestyle theory, research dealing specifically with gang-homicide also has the potential to re-affirm the relationship between prior demographic and situational

measures and gang homicide, given the recent advancements made in the literature. A review of these advancements follows.

Recent Advancements in Gang Homicide Research

In 1988, the Office of Juvenile Justice and Delinquency Prevention (OJJDP) conducted the National Youth Gang Survey. In this particular survey, the questionnaire contained a variable that allowed researchers to make distinctions in terms of defining each city's localized gang problem. The surveys were administered to participants who had some direct operational and policy experience in dealing with its local gang problem (Spergel and Curry, 1993).

From this survey, a typology arose that distinguished cities that had a gang problem into one of two types: chronic gang cities and emerging gang cities. 'Chronic gang cities' were defined as cities that had developed gang problems prior to 1980. In addition, chronic gang cities had to have at least some gangs that were organized and engaged in serious and often violent criminal activities (Spergel and Curry, 1993). The label of emerging gang cities was applied to cities that had developed gang problems after 1980, and the organizational structure of the gangs in these cites was not of particular importance to this designation. Decker and Curry (2002) noted that most of the extensive research on gang homicide emerged from cities that were defined as chronic gang cities. This is particularly true in studies that were conducted in Los Angeles (Maxson et al., 1985; Spergel, 1983) and Chicago (Block, 1991; Curry and Spergel, 1988).

In addition to these distinctions, definitional differences began to emerge even when comparing gang homicides in Los Angeles with those in Chicago, which were the two major chronic gang cities. In Chicago, the designation was more restrictive in that homicides were classified as gang homicides only when the motive for the offense was gang related (Block, 1990). In Los Angeles, the classification was more loosely defined in that homicides were classified as gang homicides if the event itself involved individuals (either a victim or suspect) who were included in a list of known street gang members (Rosenfeld et al., 1999). Maxson and Klein used the more restrictive Chicago definition on gang homicide data in Los Angeles and found that gang homicides would have been "halved" (Maxson and Klein, 1990: 190). Thus, it is necessary for research in this area to first establish the specific type of gang homicide definition that is being used, in order to compare results across previous studies.

Additional research added to this body of knowledge by further exploring the definitional issues concerning gang homicide. Maxson and Klein (1996) conducted an analysis examining an empirical distinction between gang affiliated and gang motivated homicides. Based on narrative descriptions of the incidents, the researchers classified gang affiliated homicides as incidents that involved gang members, but that the homicide itself was not a product of gang activity. Gang motivated homicides were distinguished as homicides that involved gang members where the homicide was a direct result from gang activity. Maxson and Klein (1996) found virtually no distinctions across these homicide subtypes and concluded that there was no fundamental difference between gang affiliated and gang motivated homicides, at least concerning the intent and motivation behind the offenses.

Rosenfeld et al. (1999) replicated this study and found similar results when comparing gang motivated and gang affiliated homicides. However, Rosenfeld et al. (1999) did establish that gang motivated and gang affiliated homicides did significantly differ from non-gang youth homicides, which are often classified as other forms of homicide. On a related note, Rosenfeld et al. (1999) also compared the neighborhood context across the various gang homicide typologies and did not find significant differences in the structural (i.e., neighborhood) measures across homicide subtypes. This is important because their research was one of the first studies to attempt to integrate structural measures in the designation of gang homicides, which is one of the major purposes of the current research. More detail on this contribution will be discussed in the next chapter.

An additional measurement issue related to the gang designation relates to the fact that most gang research relies on police designations of the incident and the actors as "gang related." Abundant criminological research has demonstrated the limitations of officially defined crime measures (Sykes, 1974). Among the limitations is the fact that law enforcement practices, public policies, and resource allocation can be contingent upon the operational definition of gangs and gang-related crime. This can lead to both under- and over-estimates of gang related incidents. Indeed, Esbensen, Winfree, He, and Taylor (2001) proposed that inaccurate definitions of gang membership either under or overestimate gang membership and affect public perception and research accuracy. In order to address this limitation, Esbensen et al. (2001) focused on self-reported gang identification and found it to be a reliable measure. However, self-reports are not available in the context of crime incidents. Thus, relying on a law enforcement

classification is typically the only available method when trying to assess the characteristics of an actual crime incident (i.e., whether or not the offense involves gang members).

Chapter Summary

Studies specifically explaining gang homicide have become more prominent in criminal justice research. When emphasizing the importance as to why gang homicide deserves special attention distinct from other forms of homicide, Decker and Curry (2002) demonstrated that gang homicides have a number of unique, and consistent, characteristics. These include: the spatial concentration of the event, weapon (i.e., firearm) use, race of victim and suspect, location, drug involvement, age of actors, gender, and the victim-offender relationship (2002: 345).

However, these correlates that are mainly accepted within the gang homicide literature were largely informed by research that was conducted in Chicago and Los Angeles, which have been shown to be qualitatively distinct from other cities in terms of their gang structure and history. In contrast, most U.S. cities were classified as emerging gang cities, which meant that gangs were not a problem in those cities until 1980, and that their gangs' organization was probably less hierarchical and less tightly structured.

In addition to the potential differences between chronic and emerging gang cities, some studies have defined homicides as gang affiliated (i.e., a known gang member was an actor in the offense), while other studies have relied on a more gang specific operationalization, which is gang motivated homicides (i.e., the homicide itself was a direct result of gang activity). Thus, it is important to examine whether previously

established correlates of gang homicides work within an emerging gang city, where the definition is more along the lines of gang affiliated offenses (i.e., the Los Angeles definition). The differences in the gang homicide definition create the opportunity for inconsistencies when comparing results across studies.

Examining whether previously established correlates of gang homicide provides insight into the law enforcement designation of gang homicide is especially important. A direct test of the validity and reliability of the gang homicide definition can be conducted by cross-validating the law enforcement definition of gang homicide with measures that have been previously established as correlates of gang homicide. There has been little to no research to date that has questioned the validity of these previously established incident level correlates of gang homicide. This ultimately allows for further theoretical and empirical examination of additional measures that have not been established with gang homicide, such as structural (i.e., neighborhood) effects.

Understanding gang homicide is also important because there is a limited, but growing body of research attempting to link macro-social level theories specifically to gang homicide. In order to incorporate macro-level theories into the explanation of gang homicide, a concrete distinction between gang and non-gang homicides is first required. The features between gang and non-gang homicide must be empirically and theoretically validated at the incident level in order to integrate macro-level theories into this area of research. The foundation (i.e., incident level theories of gang homicide) was the focus of the current chapter. The next chapter deals with a detailed review of macro-social theories.

Chapter 3: Macro-Social Theories of Crime

While research regarding gang homicide has grown exponentially since the early 1990's, macro-social ecological theories explaining the relationship between crime and place have a much longer and more extensive history in criminology. In order to capture the breadth of knowledge in this body of research, it is necessary to start broadly at the classical and contemporary levels that explain crime in general and eventually 'funnels down' toward a more crime specific level. This layering process is intended to inform the current research by showing how certain ecological measures are important to explain crime in general, while other ecological variables may be more attuned at explaining specific types of crime.

Taylor (1997) described how geographers use a 'cone of resolution' to organize knowledge about spatial processes at different levels of analysis (Brantingham and Brantingham, 1976). Essentially, the observed spatial pattern varies as you progress down the cone to increasingly smaller scales of analysis. Of particular importance to this funneling effect is the idea that the factors that explain crime change as our focus narrows to specific crime types. Thus, the explanatory factors narrow as you progress down each level of the cone of resolution (Brantingham and Brantingham, 1976) becoming ever more refined. Taylor (1997) argued that macro-social theories are well supported as one examines specific types of offenses.

Consistent with this theme, I will start broadly and 'funnel down' within the macro-social framework by examining how environmental factors first explain crime in general, then into more specific offenses, and eventually in terms of explaining gang homicide. Throughout, I will discuss how macro-level factors can facilitate or inhibit

crime both generally and specifically. Ultimately, the purpose of this review of the ecological literature is to demonstrate the potential relationship between neighborhood deprivation as well as incivilities and gang homicide.

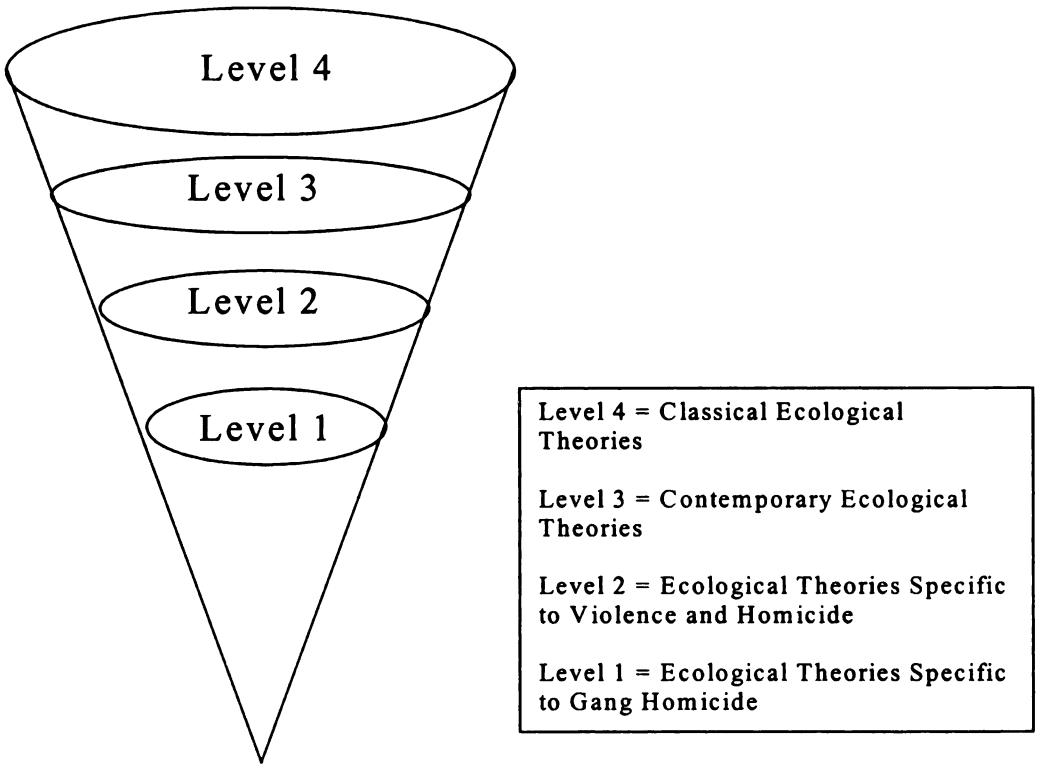
Cone of Resolution

A macro-level or ecological analysis examines how characteristics of delimited geographic areas such as neighborhoods, census tracts, cities, counties, states or nations are related to crime rates. Macro-level theories seek to explain why certain characteristics of ecological areas, but not others, account for the distribution of crime (Pratt and Cullen, 2005). Figure 1 displays the cone of resolution that is described in more extensive detail throughout this chapter.[3] The cone of resolution used in this framework includes four distinct levels used to explain crime from a macro-social process. *Level 4* involves the examination of crime from classic social disorganization theory, and is the highest level of resolution in this study. Classic social disorganization theory was among the first criminological paradigms to examine crime from a structural level by showing how demographics and social factors such as economic status, ethnic heterogeneity, and residential instability explained crime in the same neighborhoods over time. *Level 3* includes contemporary social disorganization theories, and is more narrow due to the refinements and advancements that continue to occur within the social disorganization paradigm. Specifically, this section reviews the literature on how human action such as weakened social control mechanisms, fear and incivilities, and political

[3] Taylor's (1997) use of the cone of resolution primarily focused on levels of geography moving from nations to street blocks. I extend this heuristic by moving from classic macro-social theories to theories focused on specific crime types (i.e., gang homicides). This often overlaps with a movement from larger geographical areas to smaller areas, and is distinct from Taylor's application.

and social factors converge to create crime in general. *Level 2* funnels down even further by examining violent crime, such as homicide as a specific type of offense. The premise that is built in this section is that the social processes that explain violent crime and homicide are somewhat more refined than are those theories that explain crime at a general level (i.e., multiple types of crime). Finally, *Level 1* explains gang homicide and reviews the advances made in this body of research from a structural perspective. While the research attempting to link macro-social processes to gang homicide is currently limited, it offers a great opportunity for research to contribute to the literature in this area. One of the major purposes of the current study is to advance our understanding of gang homicide from a structural perspective.

Figure 1: Framework for the macro-social theories of crime and place



Level 4: Classical Ecological Theories

Park and Burgess laid the foundation for urban sociology by defining communities as 'natural areas' that developed as a result of competition between businesses for land use and between population groups for affordable housing. A neighborhood is both a collection of people and institutions occupying spatially defined areas, influenced by ecological, cultural, and sometimes political forces (Park and Burgess, 1924). These areas are natural, activity related, residential, and physical. Natural areas include many different forms, such as ethnic enclaves or activity related areas. The activity related areas include business districts, shopping districts, manufacturing districts, and residential areas. The residential areas are different among income groupings, such as middle class neighborhoods compared with 'ghettos'. There are also physical components that divide the city, such as rivers, lakes, railroad tracks, and airports.

Park and Burgess (1924) developed a 'concentric zone theory', which was also employed by Shaw and McKay. Zone I was the central business area, which included mostly manufacturing areas. Zone II was described as the 'zone in transition', which was also referred to as the 'ghetto'. Zone II was marked by a high level of transition, with people moving in and out of the area. It was hypothesized that this zone of transition led to social disorganization. Zones III to V were residential areas, III being mostly comprised of working-class homes, IV being middle-class homes, and V being commuter residential areas.

Theories that explained neighborhood influences of criminal behavior soon emerged from this tradition. Social disorganization theory in this context focused on the

effects of 'kinds of places', or more specifically, the idea that different types of neighborhoods create conditions favorable or unfavorable to crime and delinquency. The theory of social disorganization was largely developed out of the research conducted in Chicago by Shaw and McKay.

Classic Social Disorganization Theory

Upon studying Chicago's juvenile court records over a period of several decades, Shaw and McKay (1942) noted that crime rates were not evenly dispersed across time and space in the city. They showed there were marked variations in the rate of truancy, delinquency, and recidivism between different areas, which could not be explained in terms of population size and density. They used these findings to explain some of the variation in juvenile delinquency patterns. Essentially, they found that the distribution of juvenile delinquents follows the pattern of physical structure and social organization of American cities.

Shaw and McKay (1942) also found that crime was concentrated in the poorer (slum) neighborhoods and that the racial and ethnic make-up of these neighborhoods did not particularly matter. They supported this conclusion with empirical evidence, essentially by examining the succession patterns of the city's poorest neighborhoods. In essence, as new immigrant groups replaced older ones, the delinquency rates within these neighborhoods remained remarkably stable over time. In addition, they found that ethnicity did not prove to be a significant factor related to delinquency across the city, or over time. Each ethnic group produced similar rates of delinquency, depending on the type of neighborhood in which they resided. They found that urban areas experiencing

rapid changes in their social and economic structure had the highest crime rates, regardless of the different groups residing in these areas.

The zone in transition was characterized by *low economic status, ethnic heterogeneity, and residential instability.* Shaw and McKay (1942) posited that these factors lead to the dissolution of social bonds and friendships (i.e., low social control) among residents in the community. Low economic status was seen as creating 'strain' for residents of the zone in transition because individuals were forced to live in socially disorganized neighborhoods. Strain theories emphasize the cultural goals of economic success that generate pressure on individuals who do not possess the legitimate means to accomplish material success. The tension that occurs causes a strain that leads to crime and deviance (Agnew, 1985; Cloward and Ohlin, 1960; Merton, 1959; Messner & Rosenfeld, 1994).

In addition, Shaw and McKay's neighborhood social disorganization theory relied on tenants from culture conflict theory. From a conflict perspective, crime and deviance is brought about by an inter-group struggle for dominance (Sellin, 1938). Specifically, Shaw and McKay (1942) contended that new waves of immigrants contributed to the lack of social cohesion because of the different values (and backgrounds), different traditions, and lack of communication that occurred between citizens in these areas. These same tenants from classical social disorganization theory can also be found in more contemporary criminological theories of crime and place.

Level 3: Contemporary Ecological Theories

Social disorganization theory started with (and still operates today) five major tenants (Pratt and Cullen, 2005). First, humans are social creatures and their behavior is

the product of their social environment. Second, the social environment provides cultural values and definitions to govern the behavior of those who live within them. Third, urbanization and industrialization have created communities that have a variety of competing cultures, thus breaking down older and more cohesive patterns of values. Fourth, this breakdown, or disorganization, of urban life has resulted in the basic institutions of family, friendships groups, and social groups becoming more impersonal. Fifth, as the values provided by these institutions become fragmented, several opposing definitions about proper behavior arise and come into conflict. Thus, continued disorganization makes the potential for conflict even more likely. Given this foundation, contemporary research finds that there are several components that make-up socially disorganized neighborhoods. One robust theoretical explanation of socially disorganized neighborhoods is the loss of informal social control mechanisms.

Factors that Inhibit Neighborhood Social Control

Social disorganization theory has experienced several advancements in the past two decades. In particular, recent scholars have extended social disorganization theory to include several dimensions shown to impede neighborhood social control mechanisms. These dimensions include *family disruption, participation in community organizations, urbanization, and population density* in addition to Shaw and McKay's (1942) classic components of ethnic heterogeneity, residential mobility, and low economic status. More recently, social disorganization theory began to include the constructs of *collective efficacy* and *social capital* as measures of informal social control.

According to Reiss (1985), communities are important to study in order to understand crime for various reasons. He found that a higher concentration of offenders and victims of "common crimes" lived in low status neighborhoods. In addition, Reiss (1986) showed that the social status and delinquency rate of a neighborhood had an effect on the likelihood of youths in terms of increasing the risk of delinquency due in large part because many youths were joined in local social networks.

Reiss (1986) stated that these networks were based primarily in neighborhoods or communities. From this perspective, Reiss (1986) argued that youths produce different subcultures, depending on the distinctive characteristics of a neighborhood and its integration as well as its opportunity structure (Cloward and Ohlin, 1960). Deviance or criminality is often seen as the byproduct of the failure of personal controls to deter deviant conduct and from the failure of formal and informal social controls to induce and reinforce conformity.

Sampson (1986) demonstrated the importance of the *family structure* when modeling social disorganization. From this perspective, Sampson (1986) argued that the family is important in terms of understanding the social disorganization framework for three major reasons. First, neighborhoods with pronounced family disruption are not as likely to provide an effective network of social control (e.g., participation in voluntary organizations and local affairs). Second, informal social control is attenuated due to family disruption. Third, since serious crime is mostly a male phenomenon, it may be that divorce contributes to the pool of males' unattached and therefore freed from mechanisms of social control.

Sampson and Groves (1989) found that neighborhoods with low economic status, ethnic heterogeneity, high instability, and disrupted families inhibited social control at the neighborhood level. In addition, these elements impeded individuals from participating in voluntary organizations. They found that these factors were particularly important in *urban communities* (i.e., the urbanization component), and related to a decreased capacity for social control. Thus, communities, particularly urban areas, with sparse friendship networks, unsupervised teenage peer groups, and low organizational participation had high crime and delinquency rates.

Coleman (1988) was one of the first scholars to introduce the concept of *social capital*. Social capital refers to intangible resources produced through relations among people who facilitate action for mutual benefit (Coleman, 1988). In other words, social capital refers to the resources that individuals garner from their relationships with other people. The intangible aspect of social capital refers to the resident's personal investment in community problems and his or her desire to intervene in conflicts within his or her neighborhoods in order to fix them. Thus, it is the willingness to take action developed by social capital that enables residents to work together as a collective unit to solve the problems in their communities. In contrast, the absence of social capital affects the willingness of local residents to address neighborhood crime and disorder.

In terms of the relationship between ethnicity and poverty, William Julius Wilson (1987) argued that the out migration of the middle class (in particular the Black middle class) resulted in neighborhoods with insufficient economic and social foundations for effective social control. Communities characterized by joblessness, lawlessness, and low achieving schools are crucial to understanding the development of the underclass. He

contended that without a financially stable middle class, these communities have neither the residents who socialize their youngsters to conventional values, nor the ability to sustain local institutions (Wilson, 1987).

Sampson and Wilson (1995) posited that macro social patterns of residential inequality give rise to social isolation and ecological concentration of the 'truly disadvantaged', which in turn leads to structural barriers and cultural adaptations that undermine social organization and hence the control of crime. In other words, inequality leads to concentrated disadvantage, which leads to cultural adaptations of ghetto related behavior.

Consistent with Shaw and McKay's original findings, it is not "skin pigmentation" that is captured with a race variable, but rather social conditions that are highly correlated with racial and ethnic groups. Blau and Blau (1982) showed that when relative deprivation is controlled for (in their model for violent crime), the previously significant race variable dropped out. Lauritsen and White (2001) concluded that racial difference in risk might reflect processes of community control or exposure that are beyond the control of a given individual. However, some scholars such as Parker (2002) proposed the importance of disaggregating event types (e.g., particularly homicide) because the impact of urban disadvantage and family structure is different for whites and Blacks, thus strengthening the need for context-specific explanations of crime and in particular those that have a racial or cultural influence.

In addition to structural factors, Kubrin and Weitzer (2003) stated that *culture* needs to be included in future theoretical elaboration. They showed that empirical evidence points to a model of the cultural order in disadvantaged neighborhoods as both

structurally conditioned and diverse. Social isolation occurs in socially disorganized neighborhoods. At the same time, some residents who lack opportunities for economic advancement through conventional means pursue alternative routes to gaining status and prestige. This is similar to Durkheim's concept of anomie, whereby culture mediates and conditions differential access to legitimate means (Durkheim, 1897/1979).

The role of social control in explaining the impact of social disorganization on neighborhood variation in crime was advanced considerably through the research of Sampson, Raudenbush, and Earls (1997). Specifically, they introduced the concept of *collective efficacy* as an indicator of informal social control. Collective efficacy was operationalized by two items: shared expectations for social control and social cohesion/trust. The concept *'shared expectations for social control'* was operationalized from a survey as an additive five-point Likert-scale item. Residents were asked if they would *take action* if: a) children were skipping school and hanging out on a street corner; b) children were spray-painting graffiti on a local building; c) children were showing disrespect to an adult; d) a fight broke out in front of their house; and e) the fire station closest to home was threatened with budgetary cuts. *Social cohesion/trust*, was operationalized as a four-point item: "People around here are willing to help their neighbors; this is a close-knit neighborhood; people in this neighborhood can be trusted; people in this neighborhood generally don't get along with each other (reverse coded); and people in this neighborhood do not share the same values (reverse coded). Both of these items are then aggregated to the neighborhood level.

Using this construct, Sampson, Raudenbush, and Earls (1997) found that collective efficacy was negatively correlated with violent crime (e.g., when collective

efficacy is high, violent crime is low and vice versa). They found that immigration concentration and residential stability explained 70 percent of the neighborhood variation in collective efficacy. In addition, measures of collective efficacy yielded a high 'between neighborhood' reliability and were negatively associated with variations in violence when individual characteristics, measurement error, and prior violence were controlled. Additionally, collective efficacy explained variation in violent crime even after controlling for neighborhood income levels. These results show that social control mechanisms are important when trying to explain crime at the neighborhood level. Thus, it becomes important to understand why control mechanisms are linked to neighborhood crime.

Crime Explained by Low Social Control

To further explain variation in crime, it is necessary to move further down the cone of resolution from theories that explain crime from general neighborhood characteristics to theories focused on dynamics that generate crime when social control is low. Felson (1987) stated that there are three key ingredients necessary for crime to occur. There must be a likely offender, a suitable target, and the absence of a capable guardian. Under this umbrella of routine activities theory, Felson (1987) contended that there is an inter-connection between the routine activities of a place (e.g., how often these three elements converge) and crime. Theoretically, the idea of routine activities at the neighborhood level is very much 'in line' with Travis Hirschi's control theory of crime.

Hirschi (1969) argued that attachment through social bonds prevents delinquent behavior. According to Felson (1987) this is also true of potential criminals at the neighborhood level because the presence of an intimate handler or capable guardian

prevents the criminal activity. However, such prevention is difficult to accomplish by remote (or distant) control. Both Hirschi and Felson's theories assume motivated offenders who will commit crime whenever the 'constraint' is removed.

Felson stated, "just as lions look for deer near their watering hole, criminal offenders disproportionately find victims in certain settings or high-risk occupations" (1987: 914). The very system that fosters easy movement and vast opportunity for good experiences also interferes with informal social control of youths and protection of person and property. Routine activities theory does not assume complex offender thought processes. It assumes Zipf's (1950) principle of least effort where people tend to find the shortest route, spend the least time, and seek the easiest means necessary to accomplishing a goal. In this case, the goal is choosing a potential target.

This process begins when potential offenders first shake loose from the parent or handler, then find a target for a crime when unmonitored by a guardian. Via the street, the offender finds victim just as the teenager evades parent (Felson, 1987: 917). Felson stated that the street belongs to everyone, hence is supervised by no one, except for an occasional law enforcement officer who may not know who belongs there anyway. This is directly associated with the level of social control that residents have over their neighborhood.

In the Sampson and Morenoff (2004) Chicago study, the intent was to see how neighborhoods fare as units of guardianship and collective efficacy when the outcome is homicide and robbery victimization. They found that neighborhoods were not *independent* of one-another but rather were *interdependent* and characterized by a functional relationship between what happens in one point in space and what happens

elsewhere (Sampson and Morenoff, 2004). They concluded that neighborhoods themselves can serve as guardians when the following occurs: there is high collective efficacy in and across neighborhoods; there is commitment to neighborhood organizations, such as the presence of a block organization, a community newspaper, and crime-reduction groups; and when there are voluntary (grass roots) associations such as religious, political, or ethnic organizations. Consistent with the notion of collective efficacy, residents both within and across neighborhoods can serve as guardians, if they are both invested and *unafraid* to do so (McGarrell, Giacomazzi, and Thurman, 1997; 1999). This is directly linked to the research on neighborhood incivilities and fear, which is often referred to as neighborhood disorder (Skogan, 1990).

Disorder

Fear and incivilities (i.e., neighborhood disorder) can serve as both *indicators* of as well as *impediments* to informal social control mechanisms. Some theories attempt to explain fear as an outcome (Garafolo and Laub, 1978) while others use fear as an intervening factor in explaining crime (Skogan, 1990). Most macro-social theories of crime are somewhere in-between (i.e., they control for fear when explaining crime). The evolution of the theories on fear and incivilities is discussed below.

Fear

Wilson (1975) and Garafolo and Laub (1978) were among the first to focus on fear of crime, urban unease, and psychological factors and their relationship with community dynamics. The key to their focus was to examine why so many people are fearful of crime and incivilities. Hunter (1974) extended this idea another step forward

by describing how residents may interpret signs of incivility. Garafolo and Laub (1978), Wilson (1975) and Hunter (1974) all concluded that signs of physical incivility lead to residential fear by serving as cues of danger and potential victimization.

Hunter (1974) found that residents attribute disorderly actions and deteriorating physical conditions to two complementary sources. Internally, the perceivers attributed conditions to local residents and organizations that are unable to manage or preserve the neighborhood. Beyond the neighborhood, perceivers concluded that the external agencies of control, which bear some responsibility for preserving order, were unwilling or incapable of doing so in that locale. Hunter stated that residents believed no one or no external agencies could help, which caused them to feel personally *at risk* for victimization. Hunter asserted that it was the signs of incivility, and the *meaning* attached to them. Hunter also proposed that signs of incivility and crime were reciprocal and that they were attached to an exogenous cause: neighborhood disorder. In sum, Hunter (1974) extended the explanation beyond psychological processes that cause fear, to include neighborhood crime rates and mutual impacts of crime and incivilities, and placed these factors within varying community contexts.

McGarrell et al. (1997) examined three models in terms of their relationship with fear of crime: victimization, disorder, and community concern/community control. The *victimization model* assumed those who have been victimized would have higher levels of fear, and that groups more vulnerable to crime (e.g., women and the elderly) would likely be more fearful. The *disorder model* assumed that disorder indicated weakened local social control and attenuated traditional norms because physical decay signaled the lack of residential concern about the neighborhood. The least developed of the three was the

community concern model that held that fear arose as concerns about the neighborhoods increased. The authors maintained that fear was indeed a consequence of the erosion of social control, as urban residents perceived it. In essence, fear was low in well-integrated neighborhoods. An important point is that the addition of a *community dimensions* measure increased the variance explained (in fear) by over 11 percent. Consequently, McGarrell et al. (1997) suggested the need to include the community concerns/informal social control model along with the victimization and disorder models in order to better explain fear of crime.

Whereas victimization, disorder, and community concern acted as facilitators of fear, control, community integration and community cohesiveness acted as inhibitors of fear. Specifically, residents who perceived their neighborhood as a real home, where people mostly help one another, and who perceived the overall neighborhood, the city, and the police as responsive, tended to be less fearful (McGarrell et al., 1997).

Gibson, Zhao, Lovrich, and Gaffney (2002) also examined fear of crime, and the mediating effect of collective efficacy on fear. The authors argued that social integration is a first-step in the building of neighborhood collective efficacy. Consistent with McGarrell et al.'s (1997) findings, their findings suggested that as social integration and collective efficacy co-varied, the level of citizens' perceptions of collective efficacy played a mediating role in the relationship between social integration and perceptions of fear of crime.

Gibson et al. (2002) also used measures from *victimization models* (past victimization), *social disorder models* (character of neighborhood environment), *social integration models* (ability to identify strangers in the area and feeling a part of the

neighborhood) in their investigation. They also captured individual perceptions of collective efficacy (how trustworthy they feel their neighbors are, whether neighbors will help, etc).

Gibson et al. (2002) found that *social integration* had the greatest impact (effect) on individual perceptions of collective efficacy, holding sociodemographic factors, prior victimization, and perceptions of neighborhood social disorder constant. Perceptions of social disorder had the second most important effect on collective efficacy. Social ties among neighbors may have led to attachments that resulted in the building of trust among neighbors and expectations that neighbors would intervene as agents of social control during appropriate situations. They found that increased perceptions of collective efficacy had a relatively large impact on alleviating the fear of crime among residents. Social integration may be an important initial factor in explaining fear of crime, but developing a sense of trust among neighbors and cohesion around the sense of obligation to act as agents of informal social control may have been more crucial in terms of stabilizing or improving neighborhoods. Other researchers in ecological research began integrating fear as a key component into a more dynamic process: neighborhood incivilities.

Incivilities

Neighborhood physical incivilities are not problematic in and of themselves but rather indicate a lack of neighborhood social control. Wilson (1975) examined why urban residents are often fearful for their safety. He suggested that it is not simply crimes that residents find troubling. Beyond physical signs of disorder, Wilson (1975) found that the daily *hassles* they are confronted with on the street, which include 'street people,

panhandlers, rowdy youths, or 'hey honey' hassles'--and the deteriorated conditions that surround them made residents weary and fearful.

Wilson and Kelling (1982) extended this line of thought yet another step by modeling a temporal sequence. They found that deterioration led to cues about the lack of social control and increased the likelihood of offenders coming into a neighborhood and victimizing others. This, in turn, increases residential fear. They moved beyond fear as an outcome to also explain resident-based informal social control on the street, the vitality of street life itself, and increasing neighborhood crime rates. Wilson and Kelling (1982) asserted that disorder reduced informal social control and thereby increased crime.

Skogan (1990) extended Wilson and Kelling's (1982) findings by modeling changes in neighborhood structure as the ultimate outcome of interest. Skogan (1990) found that disorder was a signal of the breakdown of the local social order. He found disorder eroded neighborhood control in terms of the capacity of residents to maintain local events and conditions. This in turn drove out residents for whom stable community life was important while at the same time discouraging people with similar values from moving into the neighborhood.

Skogan (1990) classified disorder into two types: social and physical. Social disorder was measured as public drinking, loitering (particularly groups of youths "hanging out" in the street for no particular reason), harassment, noisy neighbors, prostitution, and open-air drug markets. Physical disorder was measured as vandalism, dilapidated housing (i.e., abandoned property), and the presence of trash and litter. Skogan (1990) asserted that when present, these types of disorder were signs that nobody in the neighborhood cared. The failure to take action encouraged deviants to advance

into the community in order to commit crime. Thus he concluded that the failure to repair the disorder(s) set into motion a downward spiral of deterioration. As the small disorders became more prominent, people in turn felt a heightened sense of fear of crime victimization. This led to a collective withdrawal from the public sphere, and individuals began to lose their sense of 'territoriality'. At this point, territoriality only included their individual households, and the informal social control at the neighborhood level disappeared.

In sum, the theories discussed above progress from a sole focus on fear of crime (Wilson, 1975; Garafolo and Laub, 1978), to concern about neighborhood street life and crime (Wilson and Kelling, 1982) to neighborhood structural decline (Skogan, 1990), also known as the "disorder-decline" hypothesis, to social-structural explanations of fear that serve as a mediator of neighborhood crime (Gibson et al., 2002; McGarrell et al., 1997). The consistent finding is that physical and social incivilities are often the mediating factor in theories that explain fear and crime at the neighborhood level.

It must be noted, however, that some research has recently called into question whether disorder is a mediating factor between neighborhood structural characteristics and crime or whether disorder is a co-varying outcome along with crime. Sampson and Raudenbush's (1999) extremely rigorous neighborhood level study in Chicago essentially showed that neighborhood incivilities, defined as systematic social observation (SSO) disorder, often were explained by many of the structural features that explain crime, which included some outcomes of predatory crime. Thus, they proposed that disorder and crime are outcomes of the same social processes. They came to this conclusion because they demonstrated that when collective efficacy was introduced into the models,

the magnitude of incivilities as a correlate of crime (including homicide and burglary) often reduced to the level of insignificance (Sampson and Raudenbush, 1999).

However, Sampson and Raudenbush found that disorder did significantly predict robbery rates across census tracts, net of other structural measures including collective efficacy. They concluded that areas with greater cues of disorder appear to be more attractive targets for robbery offenders (Sampson and Raudenbush, 1999). They also asserted that this finding is very consistent with Wright and Decker's (1997) research showing that robbery offenders are attuned to the local drug markets due to the likelihood of prime targets with cash 'on hand' (Sampson and Raudenbush, 1999). Skogan (1987) also found that disorder was related to robbery victimization.

Thus, the funneling effect described by the cone of resolution can also be seen within the "disorder literature". Neighborhood disorder may be a structural correlate of specific types of offenses as was the case when explaining robberies (Sampson and Raudenbush, 1999; Skogan, 1987). The importance of examining the relationship between structural correlates and specific types of crime is established in the above review on disorder. A more substantive assessment of the specific ecological correlates of violence and homicide follows.

Level 2: Ecological Theories Specific to Violence and Homicide

Since Wolfgang's (1958) seminal work on the distribution of homicides in Philadelphia, criminologists have sought to explain the social-structural correlates of violent crime. Wolfgang found that race, gender, and age were associated with homicide, in particular certain types of homicide. He showed that the characteristics of the victim, as well as the relationship between victim and offender explained some of the different

homicide patterns. Since this work, much has been written on explaining homicide patterns in cities.

In terms of structural measures, Hsieh and Pugh (1993) found that poverty and income inequality were each positively associated with violent crime. They found that resource deprivation (measured as poverty and income inequality) appeared to be more closely associated with homicide and assault than with robbery or rape. This is suggestive that there is a need to analyze offenses by type because certain structural factors may be better at explaining specific outcomes.

Often, the explanation of violent crime and homicide is directly associated with the distribution of drugs in a neighborhood. Zimring and Hawkins (1997) hypothesized that the illicit drug market association with violent crime is significant in some social contexts and not others. They used this hypothesis to explain why there were no apparent illicit drug markets (and relatively few homicides) in European industrial countries at the time of their study. They made an important link between drug sales and homicides by stating that drug sales and drug use could be a mediating, or facilitating, construct in violent crime neighborhoods. That is, structural conditions may cause drug use, which in turn may lead to drug markets that generate more serious, violent offending.

Rengert (1996) also discussed how the distribution of drug markets influenced violent crime. More specifically, Rengert (1996) showed that neighbors tended to react violently to drug dealers and drug users in their community. In response, drug dealers tended to use violence to control citizens in the neighborhood, as well as their customers, and also the competition (i.e., other drug dealers). Finally, Rengert showed that some

drug users tended to become violent as a result of taking drugs or as a means to obtain money to purchase drugs (Rengert, 1996).

Within the violent crime context, the most obvious and arguably most studied type of offense is homicide. One of the main reasons homicide is so intensely studied is that this offense type is not as plagued by the 'dark figure' (i.e., unreported) of crime problems that are found in other types of offenses. This is because when a homicide occurs, there is a body or a missing person that is highly likely to come to the attention of the police.

Homicides tend to concentrate in certain neighborhoods. As far back as the 1940's, Bullock (1955) showed that 40 percent of all Houston homicides in 1945 to 1949 occurred within one city block of the offender's residence and 74 percent occurred within two miles. Pokorny (1965) found similar patterns in homicides in Houston in 1958-1961. Thus, homicides are also clustered in certain areas, and are not 'randomly distributed' across space.

The research on homicide is generally consistent with the studies reviewed earlier on social disorganization, routine activities, and lifestyle theories. From a *structural perspective*, Pridemore (2002) showed that there are generally three explanatory approaches relating social structure to homicide: *culture, strain (usually economic deprivation), and social control.* Cultural explanations of homicide have historically tended to focus on values and beliefs of social groups (such as subculture of violence theories). In terms of homicide, much of the cultural explanations have geared around the 'southern' states accounting for more homicide than other states. Cultural explanations have shown "mixed support" in explaining homicide, but Pridemore (2002)

argued they should not be ignored. Strain theories have tended to focus mostly on economic deprivation (either absolute or relative depending on the study), while social control models propose that the breakdown in social bonds decreases a community's ability to control its members, thereby freeing them to commit crime (Pridemore, 2002).

In terms of the relationship between race and violent crime at the neighborhood level, Lauritsen and White (2001) proposed that neighborhood disadvantage has an independent influence on an individual's risk of violence. They found that the magnitude of the neighborhood disadvantage coefficient was similar across each of the race and ethnic gender subgroups (Blacks, whites, and Latinos) that lived in disadvantaged areas. The authors concluded that living in disadvantaged areas made individuals more likely to be the victim of stranger and non-stranger violence, particularly when comparing them to counterparts in more advantaged communities.

Morenoff, Sampson, & Raudenbush (2001) found that concentrated disadvantage (i.e., high strain) combined with low collective efficacy (i.e., low social control) independently predicted homicide. They also found that local organizations, voluntary associations, and friend/kinship networks promoted collective efficacy. And, homicide events were not randomly distributed across a city. They concluded there is a high degree of overlap between the spatial distribution of collective efficacy and homicide.

Land, McCall, and Cohen (1990) found three robust and reliable main effects in terms of explaining homicide patterns: resource deprivation (measured as an index), population structure index (percentage divorced) and unemployment rate and percentage of the population ages 15 to 29 (as a factor variable). Morenoff et al. (2001) also showed that there is a spatial proximity effect when examining violence, collective efficacy and

alternative measures of neighborhood inequality. The 'indices of concentrated extremes' they used to capture these patterns emerged as the most consistent predictor of the variation in homicide rates.

Thus, this section shows that certain structural factors have been consistently correlated with macro-level homicide patterns, across a variety of studies. Measures of economic disadvantage, or deprivation, unemployment, and percentage divorced have been consistent neighborhood level correlates of violent crime and homicide. However, a growing body of research has attempted to examine the relationship between structural factors and a specific type of homicide, which is gang homicide. The next section focuses on this limited, but growing body of research.

Level 1: Ecological Theories Specific to Gang Homicide

Since Thrasher's (1927) seminal research in Chicago that showed gangs were more likely to commit crime in distinct geographic areas (i.e., known as "gangland"), research examining the social and structural processes of gang crime has emerged. Moving forward, longitudinal analyses revealed that the national homicide rate peaked twice in the 20th century (National Research Council, 1993). The first peak occurred in the early 1930's and the rate then fell for the next 30 years. The national homicide rates then began to increase in 1973 and peaked between 1979 and 1981 and again in the mid- to late 1980's.

The predominant change in homicide beginning in the mid-1980s has been attributed to a dramatic growth in youth homicide that resulted from the recruitment of youth into illicit drug markets (Blumstein, 1995). The characteristics of these criminal offenses became much of the focal point in gang research. Blumstein (1995) showed that

because of the nature of the markets, participants felt the need to arm themselves for self-protection and the resulting arms race among young people increased use of guns as methods for dispute-resolution. Reiss (1993) showed that the increase of gun availability and drug markets presented greater opportunities for violence. Specifically, in terms of gun availability, firearms were involved in approximately 60 percent of all homicides. Similarly, Fox and Zawitz (2002) also reported that in the late 1990's, over 60 percent of all homicides in the U. S. were committed with a firearm.

Zimring and Hawkins (1997) argued that the huge disparity between U.S. homicide rates and other nations was largely attributable to the importance of guns as an explanatory factor. They rejected the notion that race or the media coverage (glamorization of violence) was associated with the large discrepancy between U.S. and other nation's homicide rates. Ousey and Lee (2002) revealed partial support for the theory of systematic violence and contingent causation models. They found that between 1984-1997 the within city variation in illicit drug markets activity had a significant, positive relationship with within city variations in rates of homicide offending. They concluded that as illicit drug markets expanded, there was a corresponding increase in the rate of lethal violence. In terms of structural measures, Ousey and Lee (2002) found that the effect on homicide rates as well as the expansion in illicit drug market activity depended on the neighborhood levels of resource deprivation. In cities where the pre-existing level of resource deprivation was average or above average, illicit drug market activity tended to have a significant positive impact on homicide rates. However, in cities where the preexisting level of resource deprivation was below average, the drug market homicide association became negative.

It can be seen then that the social explanation of homicide events became more complex in the late 1980's than before. Specifically, research showed an increase in youth homicides involving firearms was linked to the rise in drug markets. Thus, several studies have since examined the neighborhood-gang homicide relationship. The first of these studies was an investigation conducted by Curry and Spergel (1988), where they examined the gang and non-gang homicides that occurred in Chicago between 1978 and 1985. They found that gang homicides were more likely than non-gang homicides to occur in socially disorganized areas. In particular, they concluded that economic disadvantage, the percent of Hispanics living in a community, and poverty were significantly related to gang homicides. This investigation became a focal point for future research in this area. In particular, given the social changes that occurred in gang homicides (Blumstein, 1995; Maxson, 1999) and the fact that Chicago was defined as a chronic gang city (see Chapter 2 for more details), this conclusion needed to be validated using a different time frame (i.e., more recent) and different cities (i.e., emerging gang cities).

Rosenfeld et al. (1999) made this type of contribution. They examined gang-affiliated, gang-motivated, (see Chapter 2 for more details) and non-gang youth homicides between 1990 and 1995 in St. Louis, Missouri, which was defined as an emerging gang city (Spergel and Curry, 1993). In terms of structural measures, Rosenfeld et al. (1999) examined the relationship between neighborhood disadvantage[4], neighborhood instability[5], and race[6] across sub-categories of homicide. Their models

[4] Neighborhood disadvantage was measured as a combined score of poverty, public welfare assistance, and female household items (Rosenfeld et al., 1999).
[5] Instability was a combined measure of residential stability (length of homeownership more than 5 + years and percentage of occupied housing units) transformed, multiplied by –1 (Rosenfeld et al., 1999).

showed that neighborhood disadvantage and poverty became insignificant predictors when race (% African American) was included. In addition, residential instability was more likely to predict non-gang homicides. They concluded that gang homicides were highly concentrated in disadvantaged neighborhoods that were situated in predominantly African American communities in St. Louis (Rosenfeld et al., 1999: 514). However, this was also true of non-gang homicides. Concentrated disadvantage and racial isolation explained homicide in general, but not across specific types of homicide (i.e., gang homicide). It is important to note, the structural models employed in this study were Maximum Likelihood Regression Models in order to distinguish the independent neighborhood effects on homicide type. These models also included spatial weights to control for observed spatial autocorrelation. In essence, the complex statistical models employed were 'neighborhood level' models, which did not take into account incident level measures (though their research found incident level distinctions in prior analyses).

In another St. Louis study, Kubrin and Wadsworth (2003) studied disaggregated homicides that specifically involved Black perpetrators from 1985 to 1995. While race-specific gang homicides were only one subtype of homicides included in this study, their findings contributed to the body of research linking structural measures with gang homicide. In particular, Kubrin and Wadsworth (2003) found a significant positive relationship between Black disadvantage[7] and Black gang homicides. In addition, instability had a marginal ($p < .10$) negative relationship with Black gang homicides

[6] Race was defined as percent African American. Some studies (Wilson, 1987) combine this measure with neighborhood disadvantage to create a measure of economic deprivation, but the authors wanted to examine its independent effect on gang homicide (Rosenfeld et al., 1999).

[7] Black instability was composite variable composed of percentage Black in poverty, Black per capita income, percentage Blacks no working, percentage Black families that are female headed, and percentage Blacks with no high school degree (Kubrin and Wadsworth, 2003: 17).

leading the authors to conclude that gang homicides involving Black perpetrators were more likely to emerge in neighborhoods where the perpetrators had long-standing social connections and social ties (Kubrin and Wadsworth, 2003).

The results from Kubrin and Wadsworth's (2003) findings are difficult to compare with other gang studies in this area because of three major reasons: first, they limited their analysis to a race-specific subset that only involved Black perpetrators, which makes generalization difficult. Second, the structural covariates here, operationalized as factor scores, only included measures that captured the percentage Black disadvantage, percentage Black residential instability, and Black population totals. Third, the outcome variable (i.e., count of gang homicides) fits the gang-motivated typology (Rosenfeld et al., 1999) because only homicides that were motivated from disputes over the control of the neighborhood or drug markets were included in this subgroup (Kubrin and Wadsworth, 2003: 11). These limitations are by no means a criticism of this research because this study specifically set out to explain *Black homicide* as a whole, of which Black gang-motivated homicide was but one subgroup. Kubrin and Wadsworth's (2003) findings are important because they lend empirical support to the idea that there is a relationship between structural measures and homicide subgroups, including Black gang homicides. From a structural perspective, subgroup homicide analyses seem to yield divergent results, which continues to fuel interest and research in this area.

Pizarro and McGloin (2006) extended this body of research by examining the gang and non-gang homicides in Newark, New Jersey from January 1999 through July 2004. They included covariates at the incident level as well as macro-social level

measures. The incident level measure was an escalation measure (see Decker, 1996) created from narratives in order to measure whether there was evidence that the homicide occurred as a result of a 'threat' made against a person's family, social group, or gang where applicable. The macro-level variables included measures of poverty[8], social disorganization[9], and percent African American. In their final statistical model, Pizarro and McGloin (2006) combined the incident level variable (i.e., escalation measure) with the three macro-level variables. Controlling for incident (a level 1 situational measure) and percent African American (a level 2 structural measure) appeared to wash away the effects of poverty. The social disorganization variable did not significantly differentiate between gang and non-gang homicides in any model in this study. This research supported Rosenfeld et al.'s (1999) findings that neighborhood disadvantage does not significantly delineate gang homicides from non-gang homicides. In addition, this study built upon Rosenfeld's research by combining an incident level situational measure (i.e., escalation) with previously established macro-level correlates of homicide.

To summarize this section on Level 1 in the cone of resolution, the more contemporary studies examining the ability of structural processes to delineate gang homicides from non-gang homicides had similar findings: measures of neighborhood poverty and instability did not delineate gang homicides from non-gang homicides when neighborhood race and incident level measures were controlled. Both Rosenfeld et al. (1999) and Pizarro and McGloin (2006) concluded that the structural processes

[8] Poverty was constructed as a composite variable including the percent of families living in poverty, percent unemployed, percent receiving public assistance, and percent of single-parent households (Pizarro and McGloin, 2006).

[9] Social disorganization was constructed as the percentage of residents who had lived less than five years in the census tract, population size, and the number of different ethnic/racial groups residing in the tract (Pizarro and McGloin, 2006).

measuring disadvantage explained gang homicides and non-gang homicides fairly similarly. Homicides of all types tended to occur in disadvantaged neighborhoods. This is particularly true when measures of race (percent African American) were incorporated in the models (Curry and Spergel, 1988; Kubrin and Wadsworth, 2003; Pizarro and McGloin, 2006; Rosenfeld et al., 1999). Combined, this research supports Wilson's (1987) and Sampson and Wilson's (1995) propositions that crime occurs in areas where economic deprivation is prominent.

Chapter Summary

This chapter reviewed the theories and empirical evidence relating to the delineation of gang homicides from non-gang homicides using structural level measures. These structural measures have been designed to capture what Rosenfeld et al. (1999) described as the social facilitation of gang violence. A consistent finding across research has been that measures of neighborhood deprivation, as well as informal social control, consistently correlate with crime. My strategy is to take advantage of these robust results from macro-level theories, but also use the cone of resolution as a framework to begin to narrow the focus to determine the specific measures that predict gang homicide at the structural level.

When reviewing the research examining the relationship between macro-level ecological measures and gang homicide, two consistent findings emerge. First, there does not appear to be any support that neighborhood deprivation, or social disorganization, successfully delineate gang homicides from non-gang homicides. It would appear that the current measures of neighborhood disadvantage do an equally good

job at predicting all types of homicide. Second, it becomes apparent that no research to date has examined the relationship between disorder and gang homicide.

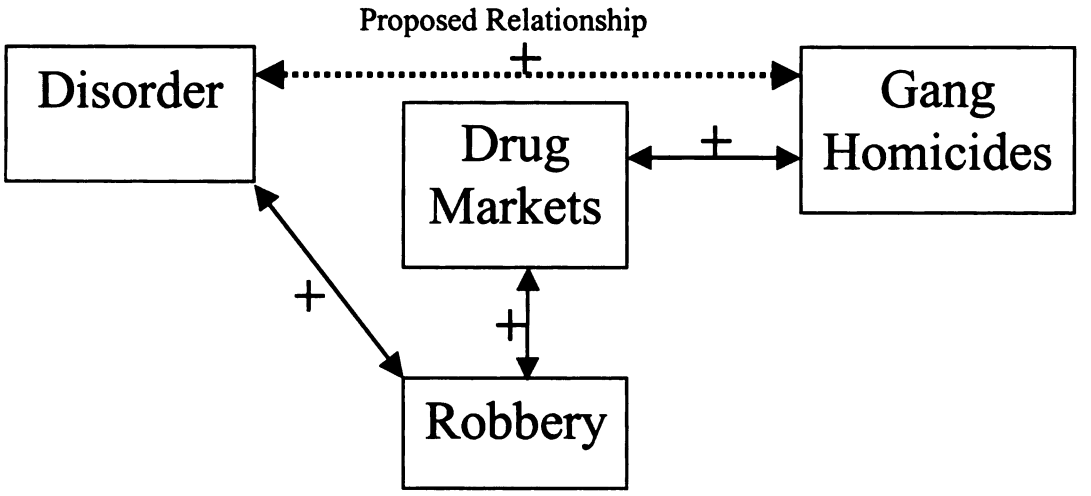
Research examining the relationship between disorder and gang homicide is particularly important when considering the recent developments in the ecological literature concerning gang "set space". In particular, Tita et al. (2005) examined the structural features of communities that both facilitate and insulate gang activity. They conducted interviews with gang members and found that individuals in gangs often chose places to "hang out" in areas where diminished social control, such as the absence of capable guardians and physical abandonment of place was prominent. Thus, Tita et al. (2005) have demonstrated low informal social control mechanisms are important structural dimensions when attempting to explain gang set space, or areas where gangs hang out.

From a broken windows perspective, both fear (i.e., lack of trust among neighbors and fear of victimization) and incivilities (i.e., physical signs of disorder) are indicators of, and mediating factors in, the absence of informal social control mechanisms. When combined, incivilities and fear create a measure of neighborhood disorder (Sampson and Raudenbush, 1999; Skogan, 1990). Sampson and Raudenbush's (1999) extensive analysis in Chicago assessed the ability of disorder to predict homicides (i.e., all homicides), burglaries, and robberies at the neighborhood level. They found that disorder did not significantly explain homicides (i.e., all homicides) or burglary rates in Chicago neighborhoods when other important structural features were present in the model, including measures of disorder and economic deprivation.

However, Sampson and Raudenbush (1999) did find that disorder was a statistically significant covariate of robberies at the neighborhood level and asserted that this finding was consistent with Wright and Decker's (1997) prior research demonstrating that armed robbers are attuned to the local drug markets due to the likelihood of prime targets with cash 'on hand' (Sampson and Raudenbush, 1999: 630). Thus, research has shown that disorder may have predictive power when attempting to explain predatory crimes that are directly related to drug markets (Sampson and Raudenbush, 1999; Skogan, 1987; Wright and Decker, 1997). This fits with the major tenants of broken windows and "disorder-decline" theories, which posit that there is a relationship between physical and social incivilities and low levels of informal social control (Skogan, 1990). The theory also proposes that these incivilities cue offenders in ways that increase the likelihood that those offenders will engage in criminal activity. While research has called into question the temporal sequencing of this relationship (Sampson and Raudebush, 1999), the relationship still remains empirically strong.

As discussed earlier, a relationship between gang homicides and the drug market has been suggested by Blumstein (1995) and supported by Ousey and Lee (2002). Given that disorder (i.e., survey incivilities) is positively associated with robbery (Sampson and Raudenbush, 1999), and robbery is positively associated with drug markets (Wright and Decker, 1997), and drug markets are positively associated with gang homicides (Blumstein, 1995), I theorize that there may be a more direct relationship between disorder and gang homicide (see Figure 2). A test of the relationship between disorder and gang homicide could contribute to the body of knowledge in this area.

Figure 2: Proposed theoretical model



Though disadvantage alone does not appear to explain gang homicides[10], as evidenced in prior research (Rosenfeld et al., 1999; Pizarro and McGloin, 2006), Sampson and Raudenbush (1999) contend that disorder is explained by many of the underlying social processes that explain crime in general, including economic deprivation. Thus, any model attempting to assess the capacity of disorder to delineate gang homicides from non-gang homicides (i.e., the bottom of the cone of resolution) should control for neighborhood level deprivation (i.e., a measure shown to be important in the middle of the cone of resolution). Again, the analysis of this model is one of the major goals of the current study.

[10] The lone exception in the literature is Kubrin and Wadsworth's (2003) study that found disadvantage significantly co-varied with the count of Black gang homicides. However, their results are difficult to generalize with other gang research studies because both their independent and dependent variables were race (i.e., Black) specific.

Chapter 4: Description of the Current Study

This study employs a theoretical framework, drawn from lifestyle, routine activities, and social disorganization theory that examines the incident and structural characteristics among homicide subtypes, specifically gang and non-gang homicides. Using this framework as a guide, this research has two main objectives. The first goal is to assess the empirical congruity of the law enforcement designation of homicide as gang-related with previously established indicators of gang homicide at the incident level, based on prior gang research. The second goal is to determine the extent that measures of neighborhood economic deprivation and disorder explain gang homicide, both independent of, as well as in conjunction with, incident level measures. Both objectives are discussed in detail.

Research Objective #1

This study looks at the gang/non-gang homicide classification from data in Indianapolis where gangs were defined as loosely structured networks of known, chronic offenders (McGarrell and Chermak, 2003). Based on previous research, incident level measures should co-vary with the gang homicides because these incidents have been shown to have different demographic, situational, and lifestyle characteristics than non-gang homicides. Specifically, gang homicides are distinct from non-gang homicides in that the offense is more likely to be carried out with a firearm, to be drug-related, and that suspects are more likely to be non-white as well as younger (Decker and Curry, 2002).

A growing body of research from the gang literature shows not all measures of gang incidents and structure are similar, particularly across cities. As discussed in

Chapter 2, Spergel and Curry (1993) distinguished cities as either *chronic* gang cities or as *emerging* gang cities in terms of the timing and organization of the gangs in the cities. In essence, only two cities fit the chronic gang city classification: Chicago (Block, 1996) and Los Angeles (Maxson, 1999). The majority of the U.S. cities included in Spergel and Curry's study fit the 'emerging gang cities' typology.

A vast amount of the classic empirical research on gangs derived from studies in Los Angeles and Chicago (Decker and Curry, 2002), where many of the gangs were classified as tightly structured and hierarchical (Skolnick, 1990). Consequently, many of the underlying gang-related incident measures shown to predict gang homicide emerged from research focused on chronic gang cities, which have qualitative differences in terms of gang structure from other metropolitan areas (Klein, 1995). Emerging research has shown that cities such as St. Louis (Decker et al., 1998) and Newark (McGloin, 2005) have gangs that are more loosely structured.

This is important when examining the relationship between incident level measures of demographic, situational, and lifestyle measures and homicide. It is necessary for research in this area to examine whether these previously established incident level correlates of gang homicide holds true in emerging gang cities where gang behavior may not necessarily fit the previous recognized typology. In order for studies that focus on gang behavior to be comparable, and generalizable, this classification must be examined in an empirical manner.

This research will examine the statistical ability of demographic (age, race, and gender of homicide participants), situational (firearm use, drug motivation, and the number of suspects), and lifestyle measures (homicide participants' prior drug and

weapons arrest histories) to predict the gang/non-gang homicide incident defined by law enforcement agents in Indianapolis. This classification of gang homicide in the Indianapolis data fits the gang-affiliated model, where a homicide is classified as a gang-incident when at least one actor is part of a known gang network[11] (Rosenfeld et al., 1999).

This examination will serve several purposes. First, from a routine activities and lifestyle theoretical perspective, it will test whether previously established incident level correlates of gang homicide delineates those homicides in Indianapolis that were classified as gang-related. As noted above, this is important because many of these measures stem from research that focused in chronic gang cities (i.e., more highly organized gangs), which is not seen in emerging gang cities, such as Indianapolis (i.e., more loosely structured gangs). In order to generalize findings across studies, this empirical distinction should be consistent. Second, this research will enhance the literature dealing with police decision-making. As Weisburd and Braga (2006) noted, police decision-making and classification has traditionally followed a clinical model. That is the case with the classification of gang homicides in Indianapolis. To the extent that the classification of gang homicides are differentiated from non-gang homicides based on variables drawn from lifestyle theory, then the clinical police designation may have a theoretically grounded basis consistent with prior gang research. It will also help identify factors that law enforcement agents look for in order to grasp, and operationalize, their local gang-problem.

[11] The other classification is the 'gang-motivated' type (Rosenfeld et al., 1999), which is defined as the incident being a confrontation resulting from gang-behavior rather than a violent incident that may or may not be gang-initiated. Decker, et al. (1999) argued there is an inherent distinction between these two offense classifications that should be defined before any generalizations can be made.

Research Objective #2

There exists a great body of research in the gang literature that explains gang homicide at the incident level. However, there is a void in the research literature in terms of distinguishing gang homicide from non-gang homicide at the macro-social level. Researchers have attempted to fill this void by examining the effect that neighborhood social disorganization has when examining the gang homicide/non-gang homicide distinction (Curry and Spergel, 1988; Kubrin and Wadsworth, 2003; Pizarro and McGloin, 2006; Rosenfeld et al., 1999). While research consistently shows that neighborhood measures of social disorganization explain homicides in general, the relationship between structural measures and gang-specific homicide is still vastly understudied.

As seen in the review of the literature in Chapter 3, some studies have shown that macro-level variables measuring neighborhood disadvantage and poverty significantly explain gang homicide (Curry and Spergel, 1988; Kubrin and Wadsworth, 2003). However, Curry and Spergel's study examined the relationship between neighborhood structure and gang homicide from data between 1975 and 1985, which was before the significant change, and increase, that occurred in gang homicides due to the emergence of drug and gun markets associated with crack-cocaine (Blumstein, 1995). In addition, Kubrin and Wadsworth's (2003) study only examined the effects of neighborhood deprivation and social disorganization on race-related (i.e., Black) homicides. Thus, these findings must be interpreted with caution. As discussed earlier, Rosenfeld et al. (1999) found that neighborhood disadvantage did not distinguish gang homicides from

non-gang homicides. In addition, Pizarro and McGloin (2006) found that neighborhood social disorganization did not demarcate gang homicide from non-gang homicide, while poverty did have a discriminating effect between these subgroups of homicide incidents. Thus, the relationship between neighborhood disadvantage (i.e., economic deprivation) and gang homicide appears to be mixed, at best.

In addition, there is little, to no, current research available that has examined the relationship between neighborhood disorder and gang homicides. One of the most likely reasons for this lack of inclusion of disorder in statistical models measuring is that these data are not readily available at the macro-social level given the cost and difficulty in obtaining survey data. Census measures of economic deprivation and concentrated disadvantage are extremely important in that they are the most consistent and robust indicators of social disorganization (Pratt and Cullen, 2005). However, ecological research examining neighborhood disorder shows the importance of citizens' perceptions concerning the surrounding environment in terms of explaining local crime (Skogan, 1990).

From a broken windows perspective, the appearance of physical and social disorder leads to a breakdown in social control, which promotes gang violence (Wilson and Kelling, 1982). Both fear (i.e., lack of trust among neighbors and fear of victimization) and incivilities (i.e., physical and social signs of disorder) are indicators of, and mediating factors in neighborhood disorder. While Sampson and Raudenbush (1999) found that disorder was not significantly associated with homicides (i.e., all homicides) or burglaries, they did find disorder significantly co-varied with robbery rates at the neighborhood level. They concluded this finding was consistent with prior robbery

research (see Wright and Decker, 1997) that armed robbers are attuned to the local drug markets due to the likelihood of prime targets with cash 'on hand' (Sampson and Raudenbush, 1999: 630).

Given the established relationship between gang homicides and the drug market (Blumstein, 1995; Ousey and Lee, 2002), it is important to examine whether neighborhoods exhibiting higher disorder are at a greater risk for gang homicide. A test of the relationship between disorder and gang homicide will contribute to the body of knowledge in this area. This type of examination is consistent with the major tenants of broken windows and disorder-decline theories, which posit that there is a relationship between the physical and social cues of a neighborhood, marked by low informal social control, and the willingness of offenders to commit street crime in these areas (Skogan, 1990).

This research will examine the statistical ability of concentrated disadvantage (a factor score obtained through Census data) and disorder (an aggregated citizen survey factor score) to distinguish gang homicides from non-gang homicides, both independently and in conjunction with important incident level measures. Models that examine multi-level data, both at the incident and structural levels, have the potential to contribute to the research that attempts to delineate gang homicides from non-gang homicides. In addition, it may be possible to identify important factors that correspond with gang homicides that have yet to be uncovered.

Although this second stage of the analysis is primarily a test of the utility of theoretically driven neighborhood factors to account for gang crime, the analysis also contributes to the assessment of police classification of gang and non-gang homicides.

Despite the fact that the findings of this impact of neighborhood level indicators on gang/non-gang homicide in prior research are limited, theory would predict that both individual lifestyle indicators and neighborhood level characteristics should relate to gang homicides. A finding of no association between neighborhood characteristics and gang homicides would not "disprove" the validity of the police classification. It would, however, raise questions as to whether the police classification has a theoretical basis or whether it is simply capturing clinical judgments based on individual characteristics of the incident (Weisburd and Braga, 2006).

Research Questions

As noted above, this study will focus on two central research questions:

1) Are there demographic, situational, and lifestyle distinctions between homicides that were classified as gang-related (i.e., homicides involving known groups of chronic offenders) from those that were classified as non-gang-related?
2) Do structural measures of the neighborhoods where the incident occurred delineate gang-related homicides from non-gang-related homicides?

Research Hypotheses

1) Incidents classified as gang-related homicides will involve multiple, younger, non-white, males with more extensive criminal histories than will non-gang-related homicides. In addition, drug motivation and firearm use will increase the likelihood that homicides were classified as gang-related.

2) Measures of disorder and economic deprivation will be more predictive of incidents classified as gang homicides compared to non-gang-related homicides.

Sources of Data

The data used in this study come from three primary sources: local incident level data, POPN, and the U.S. Census. The first source consists of incident level data that were collected at bi-monthly homicide incident reviews, which took place at the Indianapolis Violence Reduction Partnership (IVRP) meetings. The IVRP was created as a strategic problem solving initiative to combat homicide, and thus data were used as part of the strategic process (McGarrell and Chermak, 2003). Second, POPN data (Mastrofski and Parks, 1990) were used to create a structural level measure (i.e., neighborhood disorder). These surveys were administered to citizens residing in police beats in Indianapolis to gauge perceptions of the local social and physical neighborhood characteristics. The third data source is from the 2000 U.S. Census, which is used to create the economic deprivation measure (see Sampson and Raudenbush, 1999; Sampson and Wilson, 1995; Wilson, 1987). A more in-depth review of these three sources of data follows.

IVRP Data

The incident data derive from the IVRP, which was a multi-agency, collaborative effort to reduce homicide and serious violence in Indianapolis, Indiana (McGarrell and Chermak, 2003). The IVRP was part of the U.S. Department of Justice's Strategic Approaches to Community Safety Initiative (SACSI), of which Indianapolis was one of

the six original jurisdictions[12]. IVRP was based on a data-driven, 'strategic problem solving approach' where the local firearms violence problem was analyzed, leading to strategic interventions that were based on the problem analysis (McGarrell et al., 2006). Included in this multi-agency collaboration was the Office of the Mayor, the Indianapolis Police Department, Marion County's Sheriff and Prosecutor's Office, the Superior Court Criminal and Juvenile Division, Office of Probation and Parole, the Indiana State Police, Bureau of Alcohol, Tobacco, Firearms and Explosives, Federal Bureau of Investigation, U.S. Attorney's Office, Drug Enforcement Administration, and U.S. Marshal's Service. In addition to these agencies that represented the practitioners of the criminal justice system, researchers from Hudson Institute and Indiana University contributed to the task force by providing feedback to the team, while simultaneously collecting process and outcome measures for the evaluation component of the IVRP (McGarrell and Chermak, 2003).

As part of their strategic agenda, the task force conducted bi-monthly homicide incident reviews. This process involved a case-by-case review of homicide incidents by teams of detectives, street level officers, prosecutors, probation and parole officers, and other criminal justice personnel. Researchers coded detailed information about the homicides based on the review by criminal justice officials. Two distinct steps were employed by the research team to ensure data reliability. First, data collection protocols along with a data collection instrument (i.e., an incident review sheet) were used to capture important homicide information, including information about the incident, as well

[12]The original six sites included Indianapolis, New Haven, Portland, Memphis, Winston-Salem, and Rochester. Since then, a four other sites (i.e., St. Louis, Detroit, Albuquerque, and Atlanta) implemented the SACSI model as a means to reduce violence, gun crime, and homicide. These studies served as the foundation for the Project Safe Neighborhoods (PSN) initiative, a national firearm and violence crime reduction strategy (www.psn.gov).

as the actors (i.e., victims and suspects) involved. Second, reliability checks were completed after data collection to make sure there was consistent inter-coder reliability. The working relationship between Hudson Institute/Indiana University researchers and the IVRP working group provided a setting where rich information was obtained about the homicide incidents (McGarrell and Chermak, 2003; McGarrell et al., 2006)

The data employed in the present study focused on the 563 homicides that occurred between January 1, 1997 and June 30, 2001. Of the 563 incidents 155 occurred in 1997, 146 in 1998, 110 in 1999, 102 in 2000 and 50 from January 1, 2001 to June 30, 2001. The following information was coded at the incident reviews: the incident location, the names and demographic information of the actors (i.e., both the victim and all suspects) involved, the motive of the offense, the method of death, and whether the incident involved individuals who were associated with "a group of known, chronic offenders" (McGarrell and Chermak, 2003: 61). The working group used the term 'group of known, chronic offenders' to capture the chronic, persistent offending that appeared to be the pattern of gang-members in Indianapolis.[13] More specifically, consensus emerged that the term 'group of known, chronic offenders' captured both structured gangs as well as loosely affiliated gangs and neighborhood crews. This operational definition was explicitly chosen to avoid controversies over local definitions of which groups constituted formal gangs with a hierarchical structure and extra-local connections and which groups constituted local gangs with less structure and hierarchy.

In addition to the information made available at the incident reviews, researchers conducted an additional step and ran criminal histories on the victims and suspects

[13] By using this definition, the IVRP working group attempted to capture the impact that a 'group' has on individual actors, across victims and suspects, since it is well established that individuals tend to violate the law in groups (Hindelang, 1971; Reiss, 1986).

involved in the homicides. This was achieved by using the offender history database housed in the Indianapolis Police Department (IPD). The criminal histories are specific to Marion County, Indiana. The variables obtained at the IVRP meetings make-up the Level-1 incident measures.

Project on Policing (POPN) Survey Data Description

In 1996, the Project on Policing Neighborhoods (POPN) study was carried out in both Indianapolis, Indiana and St. Petersburg, Florida. This multi-agency study was designed to assess and strengthen the relationship between policing agencies and citizens (Mastrofski and Parks, 1990). One of the components of this study was the collection of citizen surveys at the neighborhood (i.e., police beat) level in order to provide appropriate context for the types of different neighborhoods that exist in the city.[14] Indiana University's Center for Survey Research (CSR) administered community surveys to residents across the fifty police beats in Indianapolis.

The ideal sampling frame called for completion of 100 surveys in each IPD police beat, from which at least 80 or more completions were obtained in 34 of the 50 beats. In total, 5,389 citizens were surveyed in Indianapolis, equating to a 53 percent completion rate of the households in the sample frame (Reisig and Parks, 2004). Reisig and Parks also stated that refusals after at least two attempts in order to reverse a respondents initial refusal accounted for 31 percent, while 16 percent were persistently unavailable after at least eight callbacks at various times of the day and evening (Reisig and Parks, 2004). Interviews followed a structured format. Most questions provided a set of response

[14] It is important to note that Taylor (1996) posited that strategies to reduce crime must be at the street block level or smaller in order to facilitate a response from local residents. Taylor (1996) specifically argued that fear and physical deterioration can be reduced by strengthening formal social control mechanisms at the street block level, and that a neighborhood must be defined at this level of analysis.

options from which respondents were instructed to choose the one that most closely corresponds to their experience or view. While no individual identifiers were available in these data, the police beat of the respondent was coded making it possible to aggregate responses to the neighborhood level.

Previous researchers have used these citizen surveys to construct quality of life measures at the neighborhood level (i.e., police beat) by aggregating citizen responses to select questions (Reisig and Parks, 2004). As an example, Reisig and Parks (2004) created an index of physical and social incivilities by aggregating individual responses to six survey items to the neighborhood level. These items reflected citizen's judgments on the neighborhood problems of litter/trash, loitering, vandalism, gangs, abandoned buildings, and drug dealing. Responses to these items were based on a three-point ordinal scale ranging from *no problem* to *a major problem*.

Thus, the POPN citizen surveys have previously been aggregated to construct neighborhood level items in research, which is pivotal for the type of data required to examine Research Question #2 (i.e., structural effects on gang homicides) in this study. Specifically, this study seeks to examine the relationship between neighborhood disorder and gang homicide. However, the aggregated citizen surveys alone do not capture many of the important macro-level theoretical constructs that represent socially disorganized neighborhoods. Therefore, U.S. Census data are utilized to complement the survey data.

U.S. Census Data

This study relies on data collected by the U.S. Census Bureau in order to capture structural measures of the different neighborhoods in Indianapolis. Census data are available on-line from the Social Assets and Vulnerability Indicators (SAVI) project

housed at Indiana University-Purdue University at Indianapolis (IUPUI). The SAVI project is designed to better inform policy-makers of the various types of neighborhoods in Indianapolis by making demographic, economic, and housing data public.

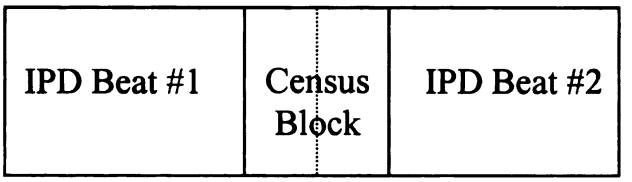
These data represent the latest Census conducted in 2000, which are available at the Census block level. Many of the measures have been used in prior research to create an index of structural disadvantage. For example, Reisig and Parks (2004) previously created a structural disadvantage index by computing a factor score, using principle component analysis, using the following items in Indianapolis: percentage of people living in poverty, percentage of labor force unemployed, percentage of female-headed families (as a measure for family disruption), and percentage of population that is African American.

In order to maintain consistency at the structural level, the data sources had to be aggregated into the same unit of analysis, which were the fifty IPD police beats in Indianapolis. This unit was chosen because the POPN data were already aggregated to the police beat level, and it was not possible to disaggregate these data smaller than the beat level. In terms of the Census block measures, data consistency was achieved by aggregating each Census block, and its respective measure[15] up to the police beat level. For those Census blocks that were completely housed within a single police beat, the aggregation was straightforward in that the total value for each measure at the block level was included into the beat's aggregation. However, for those Census blocks that were housed within two or more police beats, the value of the Census block given to a

[15] These measures are further discussed in Chapter 5.

particular police beat was equal to the proportion (i.e., area)[16] that the Census block was encompassed within that beat.[17] Thus, if a Census block was housed in two different police beats, the value of the Census measure of that block was divided among the beats it was housed within (see Figure 3 for a visual display). In the Figure 3 example, the value of the Census block measure (e.g., number of people living in poverty) would be .50 for IPD Beat #1 and .50 for IPD Beat #2.

Figure 3: Example of census block aggregation to police beat level



Using police beats as surrogates for neighborhoods in order to capture contextual effects is not unprecedented in criminal justice research, as a number of studies have employed this practice (see Chermak, McGarrell, and Gruenewald, 2006; Reisig, McClusky, and Mastrofski, 1999; Reisig and Parks, 2004; Skogan, Harnett, DuBois, Comey, Kaiser, and Loving, 1999). In terms of the specifics, the average number of block groups aggregated to the IPD beat level was 7.78, the median was 7.37, the mode was 7.0, and the standard deviation was 2.98. This means that, on average, an IPD beat was roughly equal to 7.78 Census blocks, and that roughly 68 percent of the IPD beats housed between 4.8 to 10.76 Census blocks.

[16] The area available for each Census block was compared against its own area actually housed in each distinct police beat. Most of the shapes (i.e., beats and Census blocks) were either squares or rectangles. Area was calculated as base x height for squares and rectangles, and ½ base x height for triangular shaped units (Bradford, 1987). Integration techniques were used where the shape of the perspective police beat did not fit conform to the regular pattern.

[17] The proportion that each census block was housed in a particular police beat was rounded at cut-points .25, .50, and .75 and 1.00.

A far more common strategy has been the reliance of U.S. Census tract data as surrogates for neighborhoods (see Curry and Spergel, 1988; Kubrin and Wadsworth, 2003; Pizarro and McGloin, 2006; Rosenfeld et al., 1999; Sampson and Groves, 1989; Sampson and Raudenbush, 1999). In order to provide a contextual comparison across these different neighborhood constructs, this study utilized the clip function found in the Geoprocessing Wizard in Arcview GIS (version 3.2). By using IPD police beats as the merging unit, it showed that there were 164 Census Tracts and 539 Census blocks in the same area. This means, on average, there were 3.2 Census blocks per police beat. Thus, the IPD beats, which are the neighborhood surrogates used in this study, are roughly two to three times larger than are the U.S. Census tracts in Indianapolis. While prior research has used police beats as neighborhood surrogates, it is important to remember that the neighborhood boundaries in this study are larger than in a majority of macro-level studies.

Chapter Summary

This chapter describes the objectives of the current study, including the specific research questions and hypotheses. As described earlier, the purpose this dissertation is to delineate gang homicides from non-gang homicides using both incident (i.e., level-1) and structural level measures (i.e., level-2). Data from the IVRP, POPN, and U.S. Census are used in order to achieve this goal. The level-1 measures are the situational, demographic, and lifestyle variables that were obtained in the IVRP. These items will be included as level-1 measures in subsequent statistical analyses. The level-2 measures come from the POPN citizen surveys and U.S. Census. While the unit of analysis is

different across these data sources, this study aggregated the census data to the IPD police beat level in order to provide consistent structural measures. The next chapter provides specific detail concerning operationalization of the dependent and independent variables used in this study.

Chapter 5: Data Description

This study is based on a cross-sectional design, which relies on data from the IVRP incident reviews, IPD criminal history database, survey questionnaires acquired through the POPN study, and U.S. Census data. Thus, the unit of analysis for the two research questions in the current study is the homicide incident. Although experimental and quasi-experimental designs are often preferred methods for uncovering causation, such designs are not always possible (Cook and Campbell, 1979). The use of the data sources employed here is consistent with prior research attempting to uncover the situational, lifestyle, demographic, and structural dimensions that delineate gang homicide from non-gang homicide (see Curry and Spergel, 1988; Kubrin and Wadsworth, 2003; Pizarro and McGloin, 2006; Rosenfeld et al., 1999). This chapter details the operationalization and distribution of the dependent and independent variable(s) used in the current study.

Dependent Variable

The IVRP working group classified a gang homicide as any incident where either the victim or suspect(s) were part of a group of known, chronic offenders (McGarrell and Chermak, 2003). This classification is similar to prior gang research that classified "gang affiliated" homicides as incidents where the incidents themselves were not necessarily a product of gang related activity, but simply involved suspected gang members (Maxson and Klein, 1990). In terms of the coding of these offenses, the research team in Indianapolis only coded an offense as gang related if there was confirmatory evidence

(e.g., if an actor was a confirmed gang member or the group described was part of a drug-selling organization) or if at least two review participants independently provided information indicating prior gang involvement (McGarrell and Chermak, 2003: 64). In this case, a gang homicide refers to any homicide that involved either a victim or suspect who was involved in a gang, or was part of a known periphery gang network (i.e., known associates). In essence, this is a more 'loose' classification, which is often referred to as the "Los Angeles" definition of gang homicides (Maxson and Klein, 1990).

In terms of the breakdown of gang member profile by *actors*, Table 1 displays the distribution of gang homicides between January 1997 and June 2001.[18] The table shows that 48.6 percent of suspects were classified as belonging to a known group of chronic offenders (i.e., gang homicide). In addition, 37.3 percent of the victims were classified as belonging to a known group of chronic violent offenders.[19]

Table 1: Actor distribution across gang and non-gang homicides in Indianapolis

Victim information			Suspect information		
	N	%		N	%
Victim was a gang member	210	37.3	One or more suspects was a gang member	333	48.6
Victim was not a gang member	353	62.7	No suspect was a gang member	352	51.4
Total	**563**	**100**	**Total**	**685**	**100**

[18] One of the potential threats to the reliability of the gang homicide measure is that law enforcement agents would be more likely to define homicides as gang related as they became more comfortable with the classification procedure over time. A logistic regression model (0 = non-gang homicide, 1 = gang homicide) was estimated including year as an interval independent measure. This rival hypothesis was not supported in the model. Actually, homicides were less likely (i.e., negative estimate) to be classified as gang homicides over time. This is supported by the intervention analysis conducted by McGarrell et al. (2006).

[19] Stockton, CA also relied on a similar law enforcement designation based upon homicide incident reviews (Braga, 2008), which is very consistent with the approach used in Indianapolis. Between 1997-1999, Stockton law enforcement officials classified fifty-three percent of homicide victims and sixty-one percent of homicide suspects as gang members, which is very similar to the distribution in Indianapolis (seen in Table 1).

In terms of the *incident*, which is the unit of analysis in this study, Table 2 displays the distribution of gang homicides that occurred in Indianapolis between January 1, 1997 and June 30, 2001. Again, gang homicides included those homicides where either the victim or the suspect was involved with a known group of gang offenders (i.e., gang affiliated homicide). Slight majorities of the total homicide number were classified as non-gang offenses (51.9 percent) compared with gang homicides (48.1 percent).[20]

Table 2: Total number of homicides in Indianapolis classified by type

Homicide type	N	%
Gang Homicides	271	48.1
Non-Gang Homicides	292	51.9
Total	**563**	**100**

Independent Variables

As mentioned earlier, this study employs four theoretically based sets of groups of measures in order to distinguish gang homicides from non-gang homicides: one that examines the situational characteristics of the incident (i.e., situational measures); one that examines demographic characteristics of the actors involved (i.e., demographic measures); one that examines the prior drug and arrest histories of the actors involved (i.e., lifestyle measures); and one that examines the structural characteristics where the homicide took place (i.e., structural measures).

[20] In order to assess the 'face validity' of the gang/non-gang homicide classification in Indianapolis, gang homicide rates in other cities were compared. Since this study relied on the Los Angeles definition of gang homicide, it was important to compare the proportion of gang homicides observed in Indianapolis with Los Angeles. In 1994, nearly 45 percent of all homicides in Los Angeles were gang related between 1994-1995 (Maxson, 1999). In Newark, NJ homicides were gang related in 40 percent of the cases between 1999-2004. Thus, the proportion of gang related homicides in Indianapolis (51.9 percent) are consistent with prior gang research.

Situational Measures

There are three situational variables that are used in this study: the incident number of suspects involved in the incident, the motive as drug related, and the method of death as firearm related. The *incident number of suspects* is a continuous variable that measures the number of suspects identified in each homicide incident. A homicide incident is unique in that the presence of a single victim constitutes a new incident. Thus, the number of suspects in each incident is always proportional to one homicide victim.

Of the five hundred sixty three homicides that occurred in Indianapolis, eighty-four (14.9 percent) involved multiple suspects. Table 3 displays the measures of central tendency and dispersion for the different homicide types in Indianapolis. The average number of suspects in gang homicides was 1.35, while the average (mean) number of suspects in non-gang homicides was 1.10. The standard deviation for the number of suspects in gang homicides was .83 and .37 in non-gang homicides. Thus, gang homicides averaged a higher number of suspects and also had more variability in the number of suspects per homicide incident than non-gang homicides.

Table 3: Distribution of multiple suspects involved in incidents across homicide subtypes

Homicide type	Mean	Median	Mode	SD
Gang Homicides (n = 291)	1.35	1.0	1.0	.83
Non-Gang Homicides (n = 264)	1.10	1.0	1.0	.37

Another situational independent variable is the homicide motive. The motive was coded from the IPD's homicide incident sheet as well as the bi-monthly incident reviews. The code sheet had five distinct categories from which investigators and researchers had to select in order to classify the offense: drug related, street fight/dispute, domestic,

robbery, or other. Table 4 displays differences in homicide type by the motive. Two hundred fifty five of the five hundred sixty three homicides (45.2 percent) were excluded from this descriptive analysis due to missing data. Given there were two stages to this coding process (i.e., the bi-monthly incident review meetings and the incident sheet coded by law enforcement at IPD), missing data in these cases were most likely due to unknown motives.

This presence of missing data for this variable appears to be relatively similar across the different homicide subtypes because the proportion of the total offenses was somewhat similar for gang homicides (53.9 percent) as it was for non-gang homicides (57.5 percent). The most probable known motive for gang homicides was a street dispute/fight (44.1 percent), compared with non-gang homicides where a domestic situation (44.9 percent) was the most common motive. Robberies were the second most likely motive for gang homicides (20.4 percent), compared with street disputes/fights in non-gang homicides (31.4 percent).

Table 4: Distribution of the incident motive across homicide subtypes

Motive	Gang homicides		Non-gang homicides	
	N	%	N	%
Drug	30	10.3	10	6.4
Street Disputes/Fights	67	44.1	49	31.4
Domestic	19	12.5	70	44.9
Robbery	31	20.4	22	14.1
Other	5	3.3	5	3.2
Total	**152**	**100**	**156**	**100**

However, this variable warranted recoding based on prior gang research. The participation of gang members in illegal drug sales is well established across a variety of studies (Decker and Van Winkle, 1996; Fagan, 1989, Maxson et al., 1985; Vigil, 1988).

Maxson and Klein (1990) also demonstrated that gang homicides were more likely to be drug-motivated. Thus, this nominal level variable was recoded into a dummy variable that captured a *drug-motivated* incident (0 if the incident was not drug motivated, 1 if the incident was drug motivated). In addition, the missing motive data were included in the reference group because this variable was specifically designed to capture homicides that were drug motivated. Given that the distribution of unknown motives were similar across gang and non-gang homicides, the possibility of creating a bias in the delineation of gang and non-gang homicides appear to be minimal. Table 5 shows the distribution of drug-motivated incidents across the different homicide types in Indianapolis. Gang homicides were more likely to be drug motivated (10.3 percent) than were non-gang homicides (3.7 percent).

Table 5: Distribution of the drug-related incidents across homicide subtypes

Drug-related	Gang homicides		Non-gang homicides	
	N	%	N	%
No	262	89.7	261	96.3
Yes	30	10.3	10	3.7
Total	**292**	**100**	**271**	**100**

The final situational variable is the method of death. Table 6 displays the method of death distribution for the two homicide subtypes in Indianapolis. Ten homicides were excluded from this analysis due to missing data. The most obvious difference is that gang homicides were much more likely to involve the use of a firearm (87.9 percent) than non-gang homicides (59.1 percent). In addition, the method of death in non-gang homicides was asphyxiation (10.2 percent of the time), blunt force (12.9 percent) and stabbing (14 percent). These methods were much less common in gang homicides (2.4 percent for asphyxiation, 4.5 percent for blunt force, and 4.8 percent for stabbing).

Table 6: Distribution of the method of death across homicide subtypes

Motive	Gang homicides		Non-gang homicides	
	N	%	N	%
Arson	0	0.0	2	0.8
Asphyxia	7	2.4	27	10.2
Blunt Force	13	4.5	34	12.9
Gunshot	254	87.9	156	59.1
Stabbing	14	4.8	37	14.0
Other	1	0.3	8	3.0
Total	**289**	**100**	**264**	**100**

The method of death measure was recoded into a dummy variable that captured *firearm use* (0 if the method of death was not firearm related, 1 if the method of death was due to a firearm) based upon prior research that has shown gang homicides are more likely to involve firearms (Maxson and Klein, 1990, 1996; Maxson et al., 1985). The incidents where the method of death was unknown were included in the reference group due to the low number of missing cases, and the likelihood that the incident being firearm related would be easier to distinguish given the clues that accompany such an offense (e.g., appearance of gunshot wounds on the victim). Table 7 displays the distribution of firearm related offenses across homicide subtypes. Gang homicides were more likely to involve firearm use in the method of death (86.9 percent) than were non-gang homicides (57.6 percent).

Table 7: Distribution of firearm related offenses across homicide subtypes

Firearm-related	Gang homicides		Non-gang homicides	
	N	%	N	%
No	38	13.1	115	42.4
Yes	254	86.9	156	57.6
Total	**292**	**100**	**271**	**100**

Demographic Measures

The demographic measures of interest in this study include the actors' (i.e., both victims and suspects) age, race, and gender. As a first step, the description of these measures is at the actor-level, which means the descriptive demographic data are partitioned across victims and suspects. It is necessary to examine the demographic distribution across the different actors because there are less missing data for victims than for the suspects. The victim was unknown (i.e., unidentified) in only one case, though the missing data varies by the age, race and gender variables. Comparatively, of the six hundred eighty five total suspected offenders, one hundred eighty five were classified as having unknown suspects. This means that at least 27 percent of the suspect demographic information was missing. Thus, examining these descriptive statistics across the different actors is an imperative first step in order to control for missing data, particularly those data pertaining to suspects. As a second step, the demographic information for both victims and suspects will be combined to create joint-demographic measures at the incident level, which is consistent with prior research (see Decker, 1996). These joint-demographic measures at the incident level will be used in the multivariate analyses in the subsequent chapter.

The actors' age, race and gender were coded at the IVRP bi-monthly incident review meetings. Table 8 displays the descriptive statistics for the age, race, and gender measures of the actors involved in both gang and non-gang homicides in Indianapolis. The measures of central tendency are displayed for the age of the actors involved in the different types of homicides in Indianapolis. Gang victims averaged 28.1 years of age, while non-gang victims averaged 34.3 years of age. Suspects in gang homicides

averaged 24.0 years of age, while non-gang homicide suspects averaged 29.9 years of age.

Table 8 also displays the percent of non-white[21] actors involved in the different homicide subtypes. In gang homicides the victim was non-white 83.9 percent of the time, compared with non-gang homicides where 59.0 percent of the cases involved a non-white victim. In gang homicides, the suspects were non-white 59.6 percent of the time, while suspects in non-gang homicides were non-white 43.3 percent of the time. In addition, victims were male in gang homicides 88.7 percent of the time. Comparatively, in 68.8 percent of the non-gang homicides the victim was male. Finally, males were suspects of gang homicides 95.9 percent of the time, while males were the suspects in 84.2 percent of the cases in non-gang homicides.

Table 8: Descriptive demographic measures across homicide subtypes

	Gang homicide				Non-gang homicide			
Age	N	Mean	Median	SD	N	Mean	Median	SD
Victims	290	28.1	25	11.3	260	34.3	32	18.3
Suspects	279	24.0	22	8.8	213	29.9	26	13.5
Non-white	N		Percent		N		Percent	
Victims	290		83.9		251		59.0	
Suspects	266		59.6		197		43.3	
Male	N		Percent		N		Percent	
Victims	291		88.7		263		68.8	
Suspects	267		95.9		203		84.2	

[21] The original race categories were white, African American, Hispanic, and other. The use of non-white as a dummy variable serves both theoretical and empirical purposes. First, prior gang research has shown that African American communities (Kubrin and Wadsworth, 2003) and Hispanic communities (Curry and Spergel, 1988) are at greater risk for gang activity. Second, Hispanics made up a very small percentage of both victims and suspects in Indianapolis homicides. Specifically where the race of the actor was known, Hispanics made up less than 2.9 percent (29 of the 1,027 known victims and suspects combined) of the cases. Thus, for theoretical and empirical clarity, Hispanics and African American actors were collapsed into a non-white category.

In order to combine these measures into joint-demographic variables, this study relied on prior research to serve as a guide in terms of the operationalization of the measures. Prior research has demonstrated that intra-racial homicides are distinct across racial subgroups (see Decker, 1993; Decker, 1996; Morris, 1981). As an example in a St. Louis study, Decker (1993) showed that while most homicides were intra-racial, Black-on-Black homicides were more likely to involve actors with 'distant relationships' (e.g., acquaintances) while white-on-white homicides were more likely to stem from more intense relationships, such as romantic links (Decker, 1993: 601). This pattern of homicide across relationship types is relevant when attempting to delineate gang homicides from non-gang homicides. Prior research has also shown that non-whites are at greater risk for gang activity (see Curry and Spergel, 1988; Kubrin and Wadsworth, 2003). Thus, the joint-demographic variable used in this study is labeled *non-white intra-racial homicide*, which captures non-white on non-white homicide incidents.

Non-white intra-racial homicide is a dummy coded variable (0 or 1) where the value is zero for the reference group and one for any homicide where both the victim and the suspect are non-white. For those homicides involving multiple suspects, only incidents where every participant is non-white is coded as a non-white intra-racial homicide. Where the suspect information was known, inter-racial suspect affiliation was an issue in less than 2.4 percent of the total cases (N = 8). Thus, the reference category includes white-on-white homicide as well as inter-racial homicide. Table 9 displays the joint-demographic measure of race across gang and non-gang homicides. Non-white intra-racial homicides comprised 78.3 percent of gang homicides, compared to 57.7 percent of non-gang homicides.

In terms of a joint-demographic variable for gender, this study uses *male-on-male* as a measure. Given that gang homicides are more likely to involve male offenders (Maxson et al., 1985), this measure is more likely to capture this established phenomenon. The male-on-male incident variable is dummy coded (0 or 1) where the value is zero for the reference group and one for any homicide where both the victim and suspect are male. For those homicides involving multiple suspects, only incidents where every participant is male is coded as a male-on-male homicide. Inter-gender suspect affiliation among multiple suspects was an issue in 3.4 percent of the cases (N=12). Table 9 shows that male-on-male homicides comprised 81.4 percent of gang homicides. Conversely, 50.8 percent of the non-gang homicides were male-on-male incidents.

Finally, a joint-demographic measure measuring the age of the actors is defined as the *combined mean age* of the victim and suspect(s) involved. Again, prior research shows that gang homicides are more likely to involve younger actors (see Maxson et al., 1985). The combined mean age variable is a continuous variable that is measured as the total age of the victim and suspects (averaged) involved. In terms of the average, each incident only has one victim, and may or may not involve multiple suspects. For the 85.1 percent of the incidents where there is only one known suspect (N = 479), the average age is equal to the known suspect's true age. For the 14.9 percent of the cases where there were multiple suspects (N =84), the age variable here becomes the average age for the total number of suspects involved in each incident. Table 9 shows that the combined age of gang homicides was 51.80 years, or a mean age of 25.9 years for both victims and suspects. Non-gang homicides had a combined average age of 63.9 years, or a mean age of 31.9 years for both victims and suspects.

Table 9: Descriptive demographic measures of actors across homicide subtypes

	Gang homicide				Non-gang homicide			
	N	Mean	Median	SD	N	Mean	Median	SD
Nonwhite								
Intra-racial non-white	171	.783	1.0	.412	168	.577	1.0	.495
Male								
Male-on-male	172	.814	1.0	.390	179	.508	1.0	.501
Age								
Total average age	180	51.80	48.0	15.12	186	63.97	60.0	26.08

Lifestyle Measures

This category includes two measures that capture whether the actors' involved in the different types of homicide were at greater risk of being involved in the local drug market. Similar to the strategy used with the demographic measures, the lifestyle measure employed here will be at both the actor-level as well as the incident level. In order to capture a lifestyle measure concerning potential involvement in gang crime, the *total number of prior drug arrests* as well as the *total number of prior weapon arrests* are examined. The use of criminal offense histories as lifestyle measures has been used in prior research (see Jensen and Brownfield, 1987). The criminal histories used in this study are specific to Indianapolis, which means that prior criminal involvement outside of Indianapolis is not captured with these measures. These two variables are based on the idea that individuals who have a local history (i.e., in Indianapolis) of drug possession as well as weapon carrying are more likely to have a stake in the Indianapolis drug market.

For the actor-level measures, these variables are discrete, continuous measures that capture the total number of previous drug and weapon arrests, by actor, in Marion

County, Indiana. A drug arrest is any arrest where the actor was apprehended for possession or distribution of an illegal substance. A weapon arrest is any arrest where the actor was in possession of a weapon of any kind (e.g., gun or knife). In terms of the victim, this measure is the true sum of the prior total drug and weapons arrests in Marion County, Indiana. This is also true where there is only one suspect. When an incident involves multiple suspects, these two variables are the sum of the average prior drug and weapon arrests across multiple suspects. In terms of the sequencing, the average number of drug and weapon arrests are obtained independently across the number of suspects.

If an actor had no prior drug and weapon arrest history in Indianapolis, he or she received a zero for both measures. Again, the victims' information had fewer missing values due to the fact that the victim was known in all but one of the incidents (i.e., unidentified). Table 10 displays the descriptive statistics for the lifestyle measures for both victims and suspects. Victims in gang homicides had an average of .74 prior drug arrests and .36 weapon arrests, compared with non-gang victims who averaged .35 prior drug arrests and .17 prior weapon arrests. Suspects in gang homicides averaged .80 prior drug arrests and .42 prior weapon arrests, while non-gang suspects averaged .35 prior drug arrests and .19 prior weapon arrests.

For the joint-lifestyle measures, the prior number of drug and weapon arrests for both victims and suspects were combined into two joint measures using summation, for both drug and weapon arrests. These variables are designed to capture the combined risk that the actors were involved in the drug market. Table 10 shows that actors in gang incidents averaged 1.4 combined drug arrests, compared with non-gang incidents where actors averaged .72 prior drug arrests. Actors involved in gang homicides averaged .72

weapon arrests, compared with non-gang homicides where actors averaged .37 prior weapon arrests.[22]

Table 10: Descriptive statistics for actors' lifestyle measures of prior drug and weapon arrests across homicide subtypes

	Gang Homicide				Non-Gang Homicide			
	N	Mean	Median	SD	N	Mean	Median	SD
Drug								
Victims	292	.74	0	1.4	270	.35	0	.89
Suspects	182	.80	0	1.2	196	.35	0	.84
Joint	182	1.4	0	2.2	196	.68	0	1.2
Weapon								
Victims	292	.36	0	.91	270	.17	0	.57
Suspects	182	.42	0	.85	196	.19	0	.50
Joint	182	.72	0	1.3	196	.37	0	.86

Structural Measures

Two structural measures were aggregated to the IPD police beat level: concentrated disadvantage and disorder. The concentrated disadvantage measure was culled from the 2000 U.S. Census, while the disorder measure was created from the POPN survey data. This section describes the specific dimensions that comprise these two structural measures.

Concentrated disadvantage has been used to represent urban neighborhoods that are structurally disadvantaged and racially segregated (Sampson and Raudenbush, 1999). The use of this measure has been widely employed in prior macro-level research (McGloin and Pratt, 2003; McNulty and Bellair, 2003; Parks and Reisig, 2004; Sampson

[22] McGarrell et al. (2006) found that in Indianapolis homicide victims averaged 12.5 arrests and suspects averaged 11.5 arrests. Consequently, I also examined the total number of prior arrests. However, these were directly proportional to the age of the victims (i.e., increased risk of prior arrest). Given the younger age of gang homicide victims and suspects, the total number of prior arrests was not theoretically or empirically grounded as a measure of gang homicide.

and Raudenbush, 1999). Consistent with prior research, concentrated disadvantage is a factor variable (i.e., principal component) comprised of four census measures: the percent of families that reside in the incident neighborhood who live below the United States Social Security Administration Poverty Line; the percentage of people who are 16 years of age and older and who are unemployed within the neighborhood; the percent of single-mother households with children under 18 years of age; and the percentage of the population who are African American.

Factor analysis is used to find the existing commonality between variables (DiLeonardi and Curtis, 1988). Variables that contribute the same information can be formed into factor variables. Thus, the four census variables used to capture concentrated disadvantage were included in a data reduction (i.e., principal component) factor analysis. The distribution of the values in the loading of the factor variable must be sufficiently large enough to warrant the use of factor analysis. No assumptions of factor analysis were violated in this reduction technique.[23] Table 11 shows the communalities and the total variance explained for the factor variable *concentrated disadvantage*. The standardized communality loading in the principal component was relatively similar across the four census measures, though unemployment was the weakest relative contributor to this measure. The cumulative loading of this variable was moderate (2.80) and explains over seventy percent of the co-variance in these four measures. The factor variable measuring concentrated disadvantage is therefore statistically and theoretically appropriate for further statistical modeling.

[23] The KMO test was larger than .50 (.592) and the Bartlett's test of Sphericity was statistically significant ($p < .05$), which means that no statistical assumptions were violated in this analysis.

Table 11: Factor analysis for concentrated disadvantage

Variable	Communalities
Percent single mother headed homes	.851
Percent African American	.656
Percent living below poverty	.714
Percent unemployed	.581
Total sum of squared loading	**2.80**

The second structural measure, *disorder*, has been used in a number of ecological studies (see McGarrell et al., 1997; Reisig and Parks, 2004; Sampson and Raudenbush, 1999; Skogan, 1990). Skogan (1990) classified neighborhood disorder into two dimensions: physical disorder and social disorder. Physical disorder deals with the physical appearance of a neighborhood, which Skogan (1990) operationalized as vandalism, dilapidated and abandoned properties, as well as the appearance of trash and litter. These measures capture the physical cues that a neighborhood is un-kept, which serves as a sign that there is a breakdown of the local social order. Skogan's (1990) definition of social disorder included the presence of public drinking, loitering (e.g., youths hanging out on street corners for no particular reason), harassment, noisy neighbors, prostitution, and open-air drug markets. These signs of social disorder are proposed to lead to residential withdrawal from the community because daily life in these areas creates fear and anxiety, which ultimately leads to the loss of social capital (Skogan, 1990).

Eight survey items were culled from the POPN citizen surveys. Five of these items measured the residents' perceptions concerning physical disorder, while three items measured their perception of social disorder and cohesion. As mentioned in Chapter 4, there were 5,389 surveys that were completed by residents in Indianapolis.

Table 12 displays the questions that were used to create the beat-level disorder measure, as well as the completion rate for each item. The joint completion rate for these select items was 93.7 percent. In addition, the Chronbach's Alpha reliability was .765, which means that there was a high degree of consistency between these eight survey measures.[24]

Table 12: Survey items used to create disorder measure

Disorder	Item Completeness	
Physical	N	Percent
How big of a problem is litter/trash in neighborhood [a]	5,350	99.2
How big of a problem is vandalism in neighborhood [a]	5,136	95.3
How big of a problem is gangs in neighborhood [a]	4,954	91.9
How big of a problem is abandoned buildings in neighborhood [a]	5,244	97.3
How big of a problem is drug dealing in neighborhood [a]	4,582	85.0
Social		
Respondent feels safe walking in neighborhood alone after dark [b]	5,287	98.1
How many neighbors will cooperate with police [c]	5,195	96.4
Who causes problems in your neighborhood [d]	4,221	78.3
Combined item completion	25,266/26,945	93.7
Chronbach's Alpha	.765	

[a] = 1-not a problem; 3-a minor problem; 5-a major problem

[b] = 1-very safe; 2-somewhat safe; 3-somewhat unsafe; 4-very unsafe

[c] = 1-just about everyone; 2-more than half; 3-about half; 4-fewer than half; 5-almost no one

[d] = 1-something else; 2-people outside; 3-people from inside and outside; 4-people inside

[24] George and Mallery (2003) state that an alpha level higher than .7 is moderately strong, which means these items were highly interrelated.

Each question was aggregated into a beat level measure by taking the average item response from residents living inside each police beat. Given the moderately strong reliability, high item completion percentage, and previous established theoretical relationship (Skogan, 1990), these eight averaged items were then combined into a single factor score called *disorder* at the police beat level. All assumptions of the principal component analysis were met.[25] Table 13 shows the communalities and the total variance explained for the disorder variable. The standardized communality loading into the variable was sufficient for each of the eight averaged items. The cumulative loading of this variable was moderate (6.09) and explained over seventy-six percent of the co-variance in these eight measures. The factor variable measuring disorder was therefore statistically and theoretically appropriate for further statistical modeling.

Table 13: Factor analysis for disorder

Variable	Communalities
Litter is a problem	.907
Vandalism is a problem	.554
Gangs is a problem	.803
Abandoned property is a problem	.795
Drug dealing is a problem	.817
Safe at night	.764
Neighbor cooperation with police	.849
Who causes problems in neighborhood	.605
Total sum of squared loading	**6.09**

Analytic Strategy

In order to answer research questions 1 and 2, there are two distinct levels of data employed in this study: incident level data and macro-social data.[26] Both research questions have the same outcome variable, which is a dichotomous measure that

[25] The KMO test was larger than .50 (.901) and the Bartlett's test of Sphericity was statistically significant ($p < .05$).

[26] For detailed information of the data by measure and source, see Table A-1, Appendix A.

classified an incident as either a non-gang homicide (0) or a gang homicide (1). Regression models for binary, discrete, outcomes allow researchers to explore the relationship between exogenous variables and the probability that a specified event (i.e., gang homicide) occurs (Long and Freese, 2003: 109). Thus, for both research questions the use of maximum likelihood (ML) methods[27] that rely on a logit link function, such as logistic regression models, is well suited for this type of outcome measure.

Research Question #1

The logistic regression model assumes the outcome to be a binary measure, where its values are either 0 or 1. By meeting this criterion, logistic regression models can be used to: predict an outcome measure on the basis of continuous and categorical independent variables; determine the amount of variance explained in the outcome by covariates; rank relative importance of independents; and, understand the impact of control variables (Aldrich and Nelson, 1984). The linear function that determines how a set of independent variables affect a dichotomous outcome is written as follows:

$$\ln\left(\frac{pi}{1-pi}\right) = \beta_0 + \beta_1\chi_{1i} + \ldots + \beta_k\chi_{ki} \qquad \text{[Equation 1]}$$

Where p_i is the probability of an event being a gang homicide, β_0 is the log-odds of a gang homicide when all of the independent variables have a value of zero, β_1 is the effect of the first independent variable on the log-odds of a gang homicide, χ_1 is the value of the i^{th} observation on the log-odds of a gang homicide, β_k is the effect of the last independent variable on the log-odds of a gang homicide($_k$), and $\chi_{k,i}$ is the value of the i^{th} observation

[27] Aldrich and Nelson (1984) describe maximum likelihood estimation as an iterative process that determines the direction and size change in the logit coefficients by increasing the log-likelihood (i.e., the odds that the observed values of the outcome are predicted by the covariates) of the model's fit until no significant increase occurs (i.e., convergence).

for the last independent variable($_k$).

Aldrich and Nelson (1984) described six assumptions for the logistic regression model. First, the dependent variable is assumed to be binary, taking on only two values (e.g., zero and one). Second, the outcomes are mutually exclusive and exhaustive. Third, the variation in the probability of an event (i.e., gang homicide) depends on K observable independent variables. This assumption is written as follows:

$P = P(Y|X)$ [Equation 2]

Where P(Y) is the probability of a gang homicide, X is the set of K independent variables. Fourth, that the unknown relationship between Y and X is unbiased. Fifth, that all irrelevant variables are excluded from the model. Sixth, there is no exact linear relationship between the independent variables.

For research question #1 (Are there demographic, situational, and lifestyle distinctions between homicides that were classified as gang related from those that were classified as non-gang related?), all of the independent variables are incident level (i.e., level-1) measures. The use of a logistic regression model, where the outcome is measured as either a gang homicide or a non-gang homicide, is appropriate for this research question. The null model (-2 Log Likelihood) is written as

$-2 * \ln(L_0)$ [Equation 3]

Where L_0 is the likelihood of obtaining the observations if the independent variables had no effect on the outcome (i.e., gang homicides). The full model is written as:

$-2 * \ln(L)$ [Equation 4]

Where L is the likelihood of obtaining the observations with all the independent variables incorporated in the model. The difference in the Log Likelihood yields a Chi-square statistic, which is a measure of how well the independent variables affect the outcome measure (gang homicide) (Long and Freese, 2003). The first Chi-square statistic, which will only model situational measures, will yield the difference between the null model (i.e., that no independent variables had an affect on the outcome) and the full model (i.e., that the situational measures had an affect on the outcome). The second model will yield the difference between the situational measures as the base model and the demographic characteristics of the actors will represent the full model. The final level-1 model will yield the difference between both the situational and demographic measures combined and the lifestyle measures. Model comparisons ($p < .05$) will be used to evaluate the predictive ability of situational, demographic, and lifestyle measures at the incident level. Examining and comparing the logistic regression's model's Chi-square statistics will determine the most predictive model, given the number and type of independent variables.

After the best-fitting model is discovered for both the victim-only and joint-actor data, predicted probabilities will be displayed in order to provide context to the model's coefficients. Predicted probabilities are used to determine the impact each coefficient has, both alone and in conjunction with other measures, in terms of predicting the change in the outcome measure (Long and Freese, 2002). Probabilties are written as follows:

$P^* = (odds/(1+odds)$ [Equation 5]

Where p^* is the predicted probability of an outcome and the odds are equal to one minus the probability of the outcome. In a logistic regression equation, the odds are in

logarithmic form, which can be transformed based on the following formula suggested by Liao (1994: 12):

$P^* = \exp(Z_1)/(1+\exp(Z_1))$ [Equation 6]

Where P^* is the predicted probability of an outcome (i.e., gang homicide) and Z_1 is the logistic regression equation (see Equation 1).

The main issue of concern with this analysis is the relative high frequency of missing suspect information. While the victim information is well known in almost all measures, the suspect information is much less complete. Over twenty-seven percent of the homicide cases involved unknown suspects. As described earlier, even in cases where the suspect was known, measures capturing some of the demographic and lifestyle measures were also missing and cannot be recoded. Therefore, for Research Question #1, two models will be presented in the subsequent chapter: 1) a model that only includes the victim's demographic and lifestyle measures (due to the high level of complete data). 2) A model that includes joint information where both the victim and suspect were known, and where demographic and lifestyle measures were captured for both actors. Situational measures (i.e., drug related motive, firearm use as the method of death, and number of suspects) will be incorporated into both models. This approach allows for an examination between gang/non-gang homicides when only the victim's demographic and lifestyle measures are modeled, and when both actors' demographic and lifestyle measures are modeled. By relying on both models, rather than simply choosing one or the other, this study attempts to reduce potential bias due to missing suspect data.

Research Question #2

Research Question #2 (Do structural measures of the neighborhoods where the incident occurred delineate gang related homicides from non-gang related homicides?) attempts to distinguish gang homicide from non-gang homicide based on neighborhood characteristics. Similar to the strategy used in Research Question #1, the analytic procedure will focus on a binary, logistic regression model where non-gang homicides have a value of 0 and gang homicides have a value of 1. However, a major difference in these two research questions is that the latter question relies on structural level data, which requires a modified statistical procedure. Given both the discrete, dichotomous outcome measure and the use of structural level independent variables, a hierarchical generalized linear model (HGLM) is an appropriate methodological strategy (Raudenbush and Bryk, 2002). Essentially, HGLM models the variance explained in the probability of an outcome (i.e., odds) by partitioning the covariates into level-1 and level-2 components, or (logit) links, in order to reduce the shared error variance between the structural measures (Hox, 2002). When both level-1 and level-2 sets of measures are incorporated into a single model (i.e., a standard logistic regression model), the error terms are too optimistic, or small, due to the shared error variance in the level-2 measures (Hox, 2002). Often, this leads to a Type I statistical error, where researchers are more likely to reject the null hypothesis when it is in fact true. This is also known as the error of accepting the alternative hypothesis that one or more of the independent variables correspond with the outcome measure, when in fact they are only related due to chance (Cook and Campbell, 1979).

Type I error often occurs in this instance because observations within the same neighborhoods are not independent of one another, and standard statistical tests are not robust against the violation of the independence assumption (Hox, 2002). By partitioning the level-1 and level-2 measures, HGML estimates reduce the likelihood of a type I error. The HGLM level-1 structural model is written as follows:

$\eta_{ij} = \beta_{0j} + \beta_{1j}\chi_{1ij} + \ldots + \beta_{pj}\chi_{pij}$ [Equation 7]

Where η_{ij} is the log of the odds of a gang homicide i in neighborhood j, β_{0j} is the log-odds of success for a gang homicide in neighborhood j when all of the independent variables have a value of zero, β_{1j} is the effect of the first independent variable on the log of the odds of a success (gang homicide) in neighborhood j, χ_{1ij} is the value of the i^{th} gang homicide in the j^{th} neighborhood for the first independent variable, β_{pj} is the effect of the last independent variable on the log-odds of success in neighborhood j, and χ_{pij} is the value of the i^{th} gang homicide in the j^{th} neighborhood for the last independent variable.

The intercept of the level-q model becomes the outcome variables of the level-2 model, which is given by the following formula:

$\beta_{0j} = \gamma_{00} + u_{0j}$ [Equation 8]

Where γ_{00} is the average intercept across neighborhoods and u_{0j} is the unique increment to the intercept associated with neighborhood j.

If the intercept as an outcome model yields a statistically significant result, which is a criterion before examining slopes as outcomes (Raudenbush and Bryk, 2002), the next step is to estimate the slopes at level-1 using the structural measures at level-2. This is given by the following formula:

$\beta_{1j} = \gamma_{10} + u_{1j}$ [Equation 9]

Where γ_{10} is the average regression slope across the neighborhoods on the log-odds of success of the first independent variable and u_{1j} is the unique increment to the slope of the first independent variable associated with neighborhood unit j.

Spatial Autocorrelation

In addition to the HGLM procedure, this study will examine, and control if necessary, the impact of spatial autocorrelation across police beats in Indianapolis. Previous research has shown that spatial autocorrelation can be a serious obstacle when trying to model the relationship between crime and place (Morenoff and Sampson, 1997; Morenoff et al., 2001; Smith and Jarjoura, 1989). More specific to this study, prior research examining the impact of structural measures on violent crime, including gang homicide, has shown that spatial autocorrelation has the potential to create bias in the neighborhood level estimates (Kubrin and Wadsworth, 2003; Rosenfeld et al., 1999). Spatial autocorrelation refers to the susceptibility of geographical units to be influenced by similar events (e.g., homicides) because of spatial proximity. The observed value at a particular location depends on the values observed at neighboring locations (Anselin, 2003). When this happens, the assumption of random spatial independence is violated, which leads to biased estimates among independent variables (Baller, Anselin, Messner, Deane, and Hawkins, 2001). There are two main types of spatial autocorrelation that can create bias in statistical models: spatial lag and spatial error. Spatial lag refers to spatial autocorrelation that occurs across space in the error term (Baller et al., 2001). Spatial error refers to spatial autocorrelation where the dependent variable in a location is affected by both independent variables in that location as well as neighboring locations (Baller et al., 2001).

GeoDa software was created to identify, and control for spatial autocorrelation (Anselin, 2003). GeoDa relies on six specific diagnostic tests to identify spatial autocorrelation. Three tests determine the extent that spatial error is a problem, which include the Moran's I test, the Lagrange Multiplier error test, and the Robust Lagrange Multiplier error test. Two tests determine the extent that spatial lag is a problem, including the Lagrange Multiplier lag test and the Robust Lagrange Multiplier lag test. One test, the Lagrange Multiplier SARMA test, examines whether both spatial lag and spatial error exists simultaneously. These tests allow the researcher to identify whether spatial autocorrelation exists, and which set of control variables need to be included in a given statistical model to down-weight the bias that occurs when spatial autocorrelation is present. These set of control variables are generated in GeoDa and can be linked into common statistical packages such as SPSS or HLM files, if necessary (Anselin, 2003).

GeoDa software requires the dependent variable (i.e., number of homicides in police beats) to be normally distributed and continuous because it generates estimates using an Ordinary Least Squares (OLS) method. This study models all homicides in Indianapolis, which include both non-gang and gang homicides. The outcome variable in this instance is the count of homicides at the police beat level, which is often a highly skewed distribution. A common strategy used in prior research (see Morenoff and Sampson, 1997; Sampson and Raudenbush, 1999) is to transform the count into a measure that is more normally distributed by using the following formula:

$$\ln((\text{number of homicides} \div \text{population}) * 10{,}000)) \quad \text{[Equation 10]}$$

Thus, the logged homicide rate as the outcome measure approximates a continuous, normal distribution. The independent variables in this model include the two structural

measures: economic deprivation and disorder. GeoDa software will be used to determine whether spatial autocorrelation is a problem in the Indianapolis data.

Chapter Summary

This chapter presents the description and distribution of the independent measures and the dependent variable that will be included in statistical models in the subsequent chapter. In addition, the analytic strategies that will be used for both research questions were described. The outcome measure for the two research questions posed in this dissertation is a dichotomous variable that captures whether an incident was a non-gang or gang homicide. Logistic regression models will be used to determine the various measures that best explain gang homicide in Indianapolis. For Research Question #1, a series of level-1 variables including situational, demographic, and lifestyle measures will be modeled in order to delineate gang homicides from non-gang homicides. This model will be applied in two ways: 1) where the victim's demographic and lifestyle measures are taken into account and 2) where both the victim and suspect's (i.e., joint) demographic and lifestyle measures are modeled. While the latter approach paints a more complete picture of the homicide incident, the presence of missing data (due in large part to missing suspect information) cannot be ignored. This study attempts to explain gang homicides with data that are complete and thorough, which requires this multi-stage approach.

The second Research Question relies on neighborhood level data, which entails the use of statistical techniques specifically designed to handle structural measures. This study will first examine the extent that spatial autocorrelation exists in Indianapolis by

using GeoDa software to model whether there is a significant bias between neighborhoods (i.e., spatial lag or spatial error). Where bias exists, a set of control variables, which are generated in GeoDa, will be included in the HGLM statistical models to regulate the effect of spatial bias. If spatial autocorrelation is not a significant problem in the Indianapolis data, the validity and generalizability of the study will be more clearly understood. The second step for Research Question #2 is to model the effects of disorder and deprivation on gang homicides by controlling for the level-1 measures that best explain this offense type. Thus, the latter research question builds upon the findings of the first research question. The following chapter presents the results of these analyses.

Chapter 6: Results

The purpose of this dissertation was to assess the relationship between incident and structural level measures and gang homicides. This chapter presents the results of the univarite, bivariate, and multivariate statistical models used to address Research Question #1 and Research Question #2 posed in Chapter 4. The analyses for Research Question #1 relied upon on level-1 data (i.e., incident level measures). The analyses for Research Question #2 relied upon both on level-1 and level-2 data (i.e., both incident and neighborhood level measures). In addition, the appropriate level-2 structural model was contingent upon results from the level-1 model. This was because it was essential to control for the most important incident level measures, which were uncovered in the analyses for Research Question #1. Thus, this chapter presents the results sequentially by the research question.

Research Question #1

Are there demographic, situational, and lifestyle distinctions between homicides that were classified as gang related from those that were classified as non-gang related? The variables used to address this research question are presented below.

Univariate Results

Table 14 displays the measures of central tendency and dispersion for the gang homicide dependent variable as well as the incident level covariates. Seven of the measures here are dummy coded, including the gang homicide outcome measure. The other measures, which include the age of the actors and the prior number of drug and

weapon arrests, are continuous variables. In addition, the variables that are labeled as "joint" measures include data for both the victims and suspects combined.

Table 14: Descriptive statistics for variables used in incident level analysis

Variable	N	Mean	Median	S.D.	Min	Max
Dependent variable						
Gang homicide *	563	.518	1.0	.500	0	1
Situational measures						
Firearm use *	563	.728	1.0	.445	0	1
Number of suspects	555	1.23	1.0	.666	1	8
Drug-motivated incident *	563	.07	0.0	.071	0	1
Demographic measures						
Victim age	550	31.0	28.0	15.3	< 1	95
Victim non-white *	541	.748	1.0	.434	0	1
Victim male *	554	.792	1.0	.405	0	1
Joint age (sum)	366	57.9	53.0	22.2	16	160
Joint intra-racial non-white *	339	.681	1.0	.466	0	1
Joint male-on-male *	351	.655	1.0	.476	0	1
Lifestyle measures						
Victim prior # of drug arrests	562	.556	0.0	1.2	0	10
Victim prior # of weapon arrests	562	.268	0.0	.777	0	7
Joint prior # of drug arrests	378	1.05	0.0	1.85	0	11
Joint prior # of weapon arrests	378	.533	0.0	1.11	0	7

* dummy coded variable

Bivariate Results

Two bivariate analyses are presented here. First, for the seven dummy coded measures Pearson's r correlations were used to determine the relationship between the variables. Pearson's r correlation statistics measure the direction and strength of association between two variables (George and Mallery, 2003). All covariance relationships were assessed based upon their association with the outcome measure, gang homicide. Second, a series of independent sample t-tests are displayed for the continuous

variables age and prior drug and weapon arrests among actors, where the group classification was non-gang and gang homicide (i.e., zero or one). T-tests were used to determine whether there was a mean difference for the continuous independent variables between the groups classified as non-gang and gang homicides, provided the underlying assumptions were met.[28]

Table 15 displays the Pearson's r correlation statistics between the six dummy coded independent variables and the gang homicide outcome measure. Each of the six measures had a positive, statistically significant relationship with gang homicide. The strongest standardized Pearson coefficient was seen in firearm use, a situational measure (Pearson's r = .330). The joint male-on-male incident variable, a demographic measure, had the second strongest relationship observed in this analysis (Pearson's r = .327). The drug motivated incident variable had the weakest relative co-variance association with gang homicides (Pearson's r = .128), though this relationship was also statistically significant.

Table 15: Pearson's r correlations between outcome and independent variables included in analysis

Variable	Gang homicide	N	p-value
Firearm use	.330	563	< .001
Drug-motivated incident	.128	563	< .01
Victim non-white	.238	541	< .001
Victim male	.244	554	< .001
Joint intra-racial non-white	.221	339	< .001
Joint male-on-male	.327	351	< .001

[28] These assumptions of the t-tests include equality of variances, where the distributions are not significantly different from a normal distribution, and that the samples are independent of one-another. The former two assumptions are tested directly in the SPSS software program, while the latter is true given that each case where homicide occurs is distinctly coded as a non-gang or a gang homicide. When the Levene's test for the equality of variances showed that the variances were significantly distinct, meaning the variances are not equal, the more conservative t coefficient was used to adjust for this violated assumption (George and Mallery, 2003).

Table 16 displays the independent sample t-tests for the continuous independent variables used in this analysis, where the group classification was non-gang homicide and gang homicide. Gang homicides averaged significantly more suspects (mean = 1.35 suspects) than non-gang homicides (mean = 1.10 suspects). Victims in gang homicides were, on average, significantly younger (mean = 28.12 years) than victims than in non-gang homicides (mean = 34.36 years). The joint age distribution of victims and suspects combined was also shorter for gang homicides (mean = 51.8 years) than non-gang homicides (mean = 63.9 years). Victims in gang homicides averaged more drug arrests (mean = .746 drug arrests) and weapon arrests (mean = .363 weapon arrests) than victims in non-gang homicides (mean drug arrests = .351; mean weapon arrests = .166). This was also true where the victim's and suspect's prior drug and weapon histories were combined into joint-actor measures.

Table 16: T-test results for independent variables for homicide subtypes

Gang compared with non-gang homicides	N	T	df	p-value	Mean Difference	S.E. Difference
Number of suspects	555	4.67	409.5	< .001	.251	.053
Victim age	550	-4.73	422.7	< .001	-6.23	1.31
Joint age	366	-5.48	298.5	< .001	-12.16	2.22
Victim prior # of drug arrests	562	3.89	486.9	< .001	.394	.101
Victim prior # of weapon arrests	562	3.06	491.7	< .01	.196	.064
Joint prior # of drug arrests	378	4.05	279.4	< .001	.771	.190
Joint prior # of weapon arrests	378	3.09	308.2	< .01	.356	.115

The purpose of the bivariate analyses was to determine whether measures from situational, demographic, and lifestyle models were substantively different across homicide subtypes (i.e., gang and non-gang homicides), at least at the bivariate level.

The prior bivariate analyses indicated there was a substantive and consistent distinction between gang homicides and non-gang homicides. In terms of *situational* measures, gang homicides significantly averaged more suspects, were more likely to involve a firearm, and were more likely to result from a drug dispute. The *demographic* measures showed that gang homicides were more likely to involve younger actors, non-white actors, and male actors. Finally in terms of the *lifestyle* measures, gang homicide actors averaged more drug and weapon arrests than non-gang homicide actors. Table 17 displays the summary of the bivariate relationships between the independent variables and the gang homicide outcome measure.

Table 17: Summary of bivariate analyses

Variable	Statistical Model	Relationship with Gang Homicide	Statistically Significant
Situational measures			
Firearm use	Correlation	Positive	Yes
Number of suspects	T-test	Positive	Yes
Drug-motivated incident	Correlation	Positive	Yes
Demographic measures			
Victim age	T-test	Negative	Yes
Victim non-white	Correlation	Positive	Yes
Victim male	Correlation	Positive	Yes
Joint age (sum)	T-test	Negative	Yes
Joint intra-racial non-white	Correlation	Positive	Yes
Joint male-on-male	Correlation	Positive	Yes
Lifestyle measures			
Victim prior # of drug arrests	T-test	Positive	Yes
Victim prior # of weapon arrests	T-test	Positive	Yes
Joint prior # of drug arrests	T-test	Positive	Yes
Joint prior # of weapon arrests	T-test	Positive	Yes

Multivariate Analyses

All of the incident level measures were incorporated into logistic regression models. Two sets of logistic regression equations are presented in this section. The first set of models examines the situational, demographic, and lifestyle measures where only the victim's demographic and lifestyle measures were included (i.e., victim-only models) in order to minimize the impact of missing data. The second set of logistic regression models relied upon the joint-actors (i.e., both victims and suspects combined) demographic and lifestyle measures. The joint-actor models have substantially more missing data, but also take into account both the theoretically relevant victim *and suspect* information at level-1.

Victim-Only Models

Model 1 in Table 18 shows that when all of the situational level measures were entered into the logistic regression, each of the covariates had a significant positive main effect on gang homicide. The anti-logarithm (i.e., exponentiation), which is the logarithm's multiplicative inverse, transforms the coefficient from a log-odds scale into an odds-ratio, after subtracting one (Long and Freese, 2003). This ratio shows the main effect that each variable had in terms of predicting gang related homicides. Model 1 in Table 18 shows that when homicides were drug motivated they were nearly 1.5 times more likely (odds = 1.47) to be gang homicides. Similarly, when homicides were firearm related, they were five times more likely (odds = 4.02) to be gang related. Finally, each additional homicide suspect doubled the likelihood (odds = 1.09) that homicides were gang related. When only the situational variables were included in the model, roughly 20 percent of the variance in gang homicides was explained. The logistic model's Chi-

square was 91.26, which served as the base model for comparison in subsequent analyses since these measures are independent of the relevant actor-level data. Thus, gang homicides were significantly more likely to be drug motivated, involve firearms, and have multiple suspects in the victim-only model.

Model 2 in Table 18 indicates that adding the victim-level demographic information yielded a significant improvement in the explained variation of the gang homicide outcome measure over and above the effects of the situational level variables that were already included in the model.[29] The variance explained in gang homicides rose from 20.2 percent when only the situational variables were included to 28 percent when the demographic measures of the victim were modeled. As the age of the victim increased by one year, the likelihood that the homicides were gang related declined roughly 1.8 percent (odds = -.018). When victims were non-white, the likelihood that incidents were gang homicides increased 1.4 times (odds = 1.42). Similarly, when victims were male, it improved the odds that homicides were gang related by 1.31, or 131 percent. Thus, victims were significantly more likely to be younger, non-white, and male in gang homicides. Each situational measure also retained a significant association with gang homicides, net of the demographic measures. While the situational measures retained their significant relationship with gang homicide, each variable's estimated effect on predicting gang homicide changed, compared with Model 1, with the inclusion of the victim's demographic measures.[30]

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[29] The difference in the Chi-square statistics showed the model significantly improved the explained variance in gang homicides given the addition of the demographic variables. The difference in the model fit (129.39 – 91.26 = 38.03) was greater than the critical Chi-square value (6 – 3 = 3; 7.81 critical value where $p < .05$). Thus, the model that includes both the victim's demographic information and situational measures is a significant improvement over the situational effects model.

[30] In Model 2, when homicides were drug motivated they were twice as likely (odds = 1.02) to be gang homicides. Similarly, when homicides were firearm related, they over three times more likely (odds =

Model 3 in Table 18 shows that including the victim-level lifestyle measures did not significantly increase the amount of variation explained in gang homicides. The difference in the model Chi-square statistics was negative (127.9 – 129.3 = -1.4), meaning the model was actually hindered by the inclusion of the demographic measures of the victims. While the variance rose slightly from 28 percent to 28.7 percent when the victim-level lifestyle measures were included, the minimal increase could not be attributed to more than random chance. Alternative lifestyle measures were also created and modeled, though none of these measures yielded a significant result.[31] Thus, lifestyle measures did not enhance the incident level explanation of gang homicides in Indianapolis. The best victim-only model was Model 2, where the situational and demographic measures explained 28 percent of the variance in gang homicide.

Table 18: Unstandardized coefficients (Beta) and Odds Ratios (OR) for victim-only logistic regression models

	Model 1 (N=555)		**Model 2** (N=529)		**Model 3** (N=529)	
Variable	Beta (S.E.)	OR (Exp(b)-1)	Beta (S.E.)	OR (Exp(b)-1)	Beta (S.E.)	OR (Exp(b)-1)
Intercept	-2.05	--	-2.60	--	-2.57	--
	(.302)		(.506)		(.505)	
Firearm use	1.61	5.02***	1.18	3.26***	1.15	3.17***
	(.222)	(4.02)	(.244)	(2.26)	(.244)	(2.17)
Number of	.739	2.09***	.883	2.41***	.891	2.43***
suspects	(.193)	(1.09)	(.223)	(1.41)	(.222)	(1.43)
Drug-motivated	.905	2.47**	.698	2.01*	.620	1.85
incident	(.400)	(1.47)	(.412)	(1.01)	(.414)	(.85)
Victim age			-.018	.982**	-.019	.982**
			(.007)	(-.018)	(.007)	(-.018)

2.26) to be gang homicides. Finally, each additional homicide suspect improved the odds that homicides were gang related by 1.41, or 141 percent.

[31] Alternative lifestyle measures were created to control for the impact of age. Older actors had a greater likelihood for more criminal arrests. This became problematic when trying to explain gang homicides, as actors in gang homicides tended to be younger. This assertion was also supported in Model 2. Drug and weapon arrest rates (# of arrests/age) and interaction terms (# of arrests*age) were included in logistic regression models. No measure approached statistical significance ($p < .10$) in any of these alternative measures.

Table 18 (cont'd)

Victim non-white	.887 (.245)	2.42*** (1.42)	.828 (.247)	2.28*** (1.28)
Victim male	.839 (.259)	2.31*** (1.31)	.783 (.261)	2.18*** (1.18)
Victim # of drug arrests			.168 (.104)	1.18 (0.18)
Victim # of weapon arrests			-.011 (.151)	.989 (-.011)
Nagelkerke (pseudo) R-square	.202	.280		.287
χ^2 model improvement (df)	91.26 (3)	129.39** (6)		127.9 (8)

*p < .10, **p < .05, ***p < .01

Joint-Actor Models

Model 1 in Table 19 is the same for both the victim-only model and the joint-actor model since the actor information was excluded from the first (i.e., baseline) analysis. It shows that when all of the situational level measures were entered into the logistic regression, each of the covariates had significant positive main effects on gang homicide. Again, gang homicides were significantly more likely to be drug motivated, involve firearms, and have multiple suspects. When only the situational variables were included in the model, roughly 20.2 percent of the variance in gang homicides was explained. The logistic model's Chi-square was 91.26, which was the base model for comparison in subsequent analyses since these measures were independent of the relevant actor-level data.

Model 2 in Table 19 shows that adding the joint-actor demographic information yielded a significant improvement in the explained variation of the gang homicide outcome measure over and above the effects of the situational level variables that were

already included in the model.[32] The variance explained in gang homicides rose from 20.2 percent when only the situational variables were included to 34.2 percent when the joint-actors demographic measures were modeled. As the combined-actors age increased by one year, the likelihood that homicides were gang related declined roughly 1.6 percent (odds = -.016). When both actors were non-white, the odds that incidents were gang homicides doubled (odds = 1.02). Similarly when all the actors were male, it improved the odds that homicides were gang related by 1.35, or 135 percent. Thus, actors were significantly more likely to be younger, non-white, and male in gang homicides. In terms of the situational measures, both the incident number of suspects and firearm related situational variables retained their significant association with gang homicides, net of the demographic measures. However, the significant relationship between the drug-motivated homicide measure and gang homicides became statistically insignificant with the inclusion of the joint-actor demographic data.

Model 3 of Table 19 shows that adding the joint-actor lifestyle measures did not significantly increase the amount of explained variation in the gang homicides outcome measure.[33] The variance explained did rise from 34.2 percent to 35.9 percent when the joint-actor lifestyle measures were included, but this improvement was not a statistically significant change. Including both lifestyle measures did not improve the incident level

[32] The difference in the Chi-square statistics showed the model significantly improved the explained variance in gang homicides given the addition of the demographic variables. The difference in the model fit (97.99 – 91.26 = 38.03) was greater than the critical Chi-square value (6 – 3 = 3; 6.25 critical value where $p < .10$). The significance threshold is reduced to an alpha level of 90 percent due to the missing data (i.e., lower degrees of freedom). The model that includes both victim and suspect demographic information and situational measures for is a significant improvement over the situational effects model.
[33] The difference in the model Chi-square statistics indicated that the model fit (103.8 – 97.99 = 5.81) was less than the critical Chi-square value (8 – 6 = 2; 4.60 critical value where $p < .10$).

explanation of gang homicides in Indianapolis.[34] The best model in the joint-actor analysis is Model 2, where the situational and demographic measures explained 34.2 percent of the variance in the gang homicide outcome measure. The next step was to examine the impact that specific measures had in terms of predicting gang homicides, which can be seen using predicted probabilities.

Table 19: Unstandardized coefficients (Beta) and Odds Ratios (OR) for joint-actor logistic regression models

	Model 1 (N=555)		**Model 2** (N=331)		**Model 3** (N=331)	
	Beta	OR	Beta	OR	Beta	OR
Variable	(S.E.)	(Exp(b)-1)	(S.E.)	(Exp(b)-1)	(S.E.)	(Exp(b)-1)
Intercept	-2.05	--	-2.24	--	-2.29	--
	(.302)		(.675)		(.681)	
Firearm use	1.61	5.02***	.939	2.55***	.945	2.57***
	(.222)	(4.02)	(.311)	(1.55)	(.316)	(1.57)
Number of	.739	2.09***	1.10	3.02***	1.10	3.02***
suspects	(.193)	(1.09)	(.262)	(2.02)	(.261)	(2.02)
Drug-motivated	.905	2.47**	.505	1.65	.428	1.53
incident	(.400)	(1.47)	(.509)	(0.65)	(.517)	(0.53)
Joint age			-.016	.984**	-.017	.983**
			(.007)	(-.016)	(.007)	(-.017)
Non-white			.706	2.02**	.653	1.92**
intra-racial			(.294)	(1.02)	(.303)	(0.92)
Male-on-male			.857	2.35***	.788	2.19***
			(.291)	(1.35)	(.298)	(1.19)
Joint actor # of					.193	1.23**
drug arrests					(.091)	(0.23)
Joint actor # of					-.033	1.21
weapon arrests					(.148)	(0.21)
Nagelkerke (pseudo) R-square		.202		.342		.359
χ^2 model improvement (df)		91.26 (3)		97.99* (6)		103.8 (8)

*p < .10, **p < .05, ***p < .01

[34] However, the number of prior drug arrests was statistically significant in Model 3 in the joint-actors model. Each drug arrest for both the victim and suspect combined increased the odds that homicides were gang related by 23 percent (odds = .23). Based on this empirical finding, it became apparent that the best joint-actor incident level model included drug arrests but excluded weapon arrests (χ^2= 103.79, 7 df). This model (Model 4) is displayed in Appendix A, Table A-2. Given that theory would predict both drug and weapon arrests as lifestyle measures should co-vary with gang homicides, and that the bivariate results for weapon arrests was statistically significant, this model is not displayed in the main-results section.

Predicted Probabilities

The substantive patterns in the data can be better revealed using predicted probabilities because they allow researchers to understand the exact impact a measure, or set of measures, have with an outcome of interest (Long and Freese, 2003). Predicted probabilities are the estimated probability that the dependent variable takes its high value (i.e., gang homicides) (Long and Freese, 2003). The predicted probabilities are the percent of correctly predicted cases of those that were correctly classified in the logistic regression equation. In the subsequent analyses, all variables were set to their mean values, except those variables that were specifically modeled in order to determine their exact impact on predicting gang homicides. This was done in order to assess the relationship between both structural and demographic measures. For the victim-only model the correct classification was 73 percent, while the joint-actor model was 73.7 percent. Thus, predicted probabilities were independently displayed for the victim-only and the joint-actor models.

Table 20 displays the predicted probabilities for the victim-only model. In terms of predicting gang homicides based on the relationship between the race of the victim and firearm use, it became apparent that when an incident was *firearm related* the difference in predicting gang homicides was minimal (4.4%) between whites and non-whites. However, when an incident was *not firearm related*, the difference in gang homicide prediction was 11.5 percent between non-whites and whites, which is substantively (i.e., relatively) larger. A similar distinction was observed in the gender-firearm relationship. The difference in predicting gang homicides based on the victim's gender was less than half as large when an incident was *firearm related* (4.3%) compared with an incident that

was *not firearm related* (11 percent). Finally, for incidents that had *two suspects*, the race of the victim predicted 3.3 percent of the gang homicide prediction. However, when an incident had only *one suspect*, the race of the victim explained over twice that amount (7.2 percent).

Thus, a consistent pattern emerged. Situational measures, such as a firearm related incident and the number of suspects had more relative importance in terms of predicting gang homicides than the demographic measures of the victim. However, when the situational variables of interest were absent (i.e., an incident only had one suspect or was not firearm related), the race (i.e., non-white) and gender (i.e., male) of the victim were more important contributors to the gang homicide classification. Thus, race and gender were not as important as the situational features that predicted gang homicide, but in their absence demographics were twice as important.

Table 20: Predicted probabilities of gang homicides based on situational and demographic measures for victim-only model

	Predicted probability of gang homicide	Δ
Firearm & Race		
Non-white victim, no firearm	89.8	
White victim, no firearm	78.3	11.5%
Non-white victim, firearm	96.6	
White victim, firearm	92.2	4.4%
Firearm & Gender		
Male victim, no firearm	89.3	
Female victim, no firearm	78.3	11%
Male victim, firearm	96.5	
Female victim, firearm	92.2	4.3%
Number of Suspects		
One suspect-non-white victim	94.2	
One suspect-white victim	87.0	7.2%

Table 20 (cont'd)		
Two suspects-non-white victim	97.5	
Two suspects-white victim	94.2	3.3%

Table 21 displays the predicted probabilities for the joint-actors model. In terms of the relationship between the race of the actors and firearm use, when an incident was *firearm related* the difference in predicting gang homicides was 5.5 percent between white actors and non-white actors. However, when an incident was *not firearm related*, the difference in gang homicide prediction was 10.9 percent between non-white actors and white actors, which is relatively larger. In terms of the gender-firearm relationship, the difference in predicting gang homicides based on the gender of the actors was 6.8 percent when an incident was *firearm related* compared with an incident that was *not firearm related* (13.3%). For incidents that had *two suspects*, the race of the actors only explained 3.5 percent of the gang homicide prediction. However, when an incident had only *one suspect*, the race of the actors explained over 8.5 percent of the gang homicide prediction, which is over twice that amount.

The same consistent pattern emerged in both the joint-actors model and the victim-only model. Situational measures, such as a firearm related incident and the number of suspects had more relative importance in terms of predicting gang homicides than the actors' demographic measures involved in the joint-actors model as well. Again, when an incident only had one suspect or was not firearm related the race and gender of the actors was twice as important to the gang homicide classification. This finding was consistent across both models, which adds to the reliability (i.e., consistency) of the results.

Table 21: Predicted probabilities of gang homicides based on situational and demographic measures for joint-actor model

	Predicted probability of gang homicide	Δ
Firearm & Race		
Non-white actors, no firearm	85.7	
At least one white actor, no firearm	74.8	10.9%
Non-white actors, firearm	93.9	
At least one white actor, firearm	88.4	5.5%
Firearm & Gender		
All male actors, no firearm	86.6	
At least one female actor, no firearm	73.3	13.3%
All male actors, firearm	94.3	
At least one female actor, firearm	87.5	6.8%
Number of Suspects		
One suspect-non-white victim	89.7	
One suspect-white victim	81.2	8.5%
Two suspects-non-white victim	96.4	
Two suspects-white victim	92.9	3.5%

Diagnostic Tests

Diagnostic tests were performed to ensure the logistic regression models displayed in the previous section were not in violation of statistical assumptions (Menard, 1995). Model 2, which included situational and demographic measures, was the best overall model fit, given by the model Chi-square statistics, for both the victim-only and the joint-actor models. Thus, diagnostic tests were performed for both sets of logistic regression models.

It is imperative to include all theoretically relevant variables in the analysis in order to avoid model misspecification (Menard, 1995). While the prior analyses include many of the previously established correlates of gang homicide, they do not include

incident measures of escalation (Decker, 1993; Pizarro and McGloin, 2006), expression (Decker, 1996) or the victim-offender relationship (Ridel, 1987). Thus, not all of the theoretically established correlates that gang research has uncovered were incorporated in the current study. This will be discussed in more detail in the limitations section of the Chapter 7. However, many of the measures included in the statistical models are theoretically relevant indicators of gang homicide, which were discussed in Chapter 2.

Another important examination was to assess whether the independent variables in the logistic regression models had a high degree of collinearity. Perfect collinearity among the independent variables means that at least one independent variable is a perfect linear combination of the others (Menard, 1995). While perfect collinearity is rarely a problem, a high degree of inter-correlation (i.e., multicollinearity) between independent variables can also be problematic. In the presence of multicollinearity, estimated coefficients will be unbiased and efficient, but their standard errors will be inflated (Berry and Feldman, 1985). Inflated standard errors leads to Type II statistical error, that is researchers fail to reject the null hypothesis when in fact the null hypothesis is false. According to Berry and Feldman (1985) multicollinearity is not a problem unless a correlation exceeds some predefined cut-off value, which is typically around .80. The highest observed correlation for the victim-only model was -.278 (see Appendix B, Table B-1). The highest observed correlation for the joint-actor model was -.355 (see Appendix B, Table B-2).

Thus, the diagnostic tests indicated that multicollinearity was not a problem with either set of the logistic regression models. Heteroscedasticity, or an uneven error variance distribution, can also be a problem in a logistic regression (Menard, 1995). In

order to detect the accuracy of the logistic regression models, two different tests were performed.

First, the cut-values were altered in the logit model to assess whether the default cut-value of .50 was the best in terms of overall model fit. The classification table for the victim-only model showed that correct classification occurred nearly 73 percent of the time with a cut-off value of .50. The cut-values were altered from .35 to .70 to see if the classification could be improved. Correct classification occurred 68.8 percent of the time in the victim-only model with a cut-value of .35 and 57.8 percent of the time with a cut-value of .70. The cut-value of .50 was acceptable because this yielded the highest correct classification percentage. The cut-value of .50 was also the best delineating value for the joint-actor model. When the cut-value was set at .50, correct classification of the outcome measure occurred 73.7 percent in the joint-actor model. The joint-model's correct classification occurred 71 percent of the time with a cut-value of .35 and 62.5 percent of the time with a cut-value of .70. Thus, the cut-value of .50 was acceptable for both the victim-only model as well as the joint-actor model. A correct classification of over 73 percent for both models is moderately strong, meaning heteroscedasticity was an unlikely problem.

The second test was to examine the standardized residuals, which are measures that capture the difference between the predicted and observed values for both sets of logistic regression models. The mean for the residuals was less than .001 for both the victim-only and the joint-actor models, which indicates that the residuals did not have a mean substantially different than zero. Thus, no test of multicollinearity or heteroscedasticity showed that either set of logistic regression models presented in this

section violated any major statistical assumptions. These diagnostic tests indicate that overall the models presented in this section fit both the victim-only and joint-actor data, meaning the results can be interpreted with increased confidence.

Summary of Level-1 Analyses

This section was designed to assess the statistical relationship between level-1 situational, demographic, and lifestyle measures and gang homicides. Two sets of logistic regression models were presented here: 1) a victim-only model, and 2) a joint-actor model. The victim-only model had more complete data (roughly 94 percent complete) than the joint-actor model (roughly 59 percent complete), due in large part to the high number of unknown suspects. Conversely, the joint-actor model incorporated data from both the victim and the suspects. Thus, both sets of models included important incident level information that neither model alone could achieve. When examining the estimates, diagnostics, and predicted probabilities both sets of models had very similar and consistent results. Just as important, the logistic regression diagnostic tests did not reveal any violated assumptions. The results, then, can be interpreted with a relatively high degree of confidence.[35]

The situational and demographic measures were significant predictors of gang homicides in both sets of models. Gang homicides were more likely to involve firearm use, involve multiple suspects, and have younger, non-white, and male actors. While drug related motive was a significant covariate in Model 1 (i.e., situational variables

[35]It should be noted that missing data analysis (i.e, mean replacement of missing suspect information combined with a control variable for missing data) indicated that there was a selection bias in the joint-actor models. In particular, homicides were significantly more likely to be defined as gang homicides when suspect demographic data were missing. This is not unexpected, since the victim was identified as part of a known group of chronic offenders roughly forty-five percent of these cases. However, the estimates observed in the missing data models were almost identical to those presented in this chapter in terms of direction and statistical significance in the situational, demographic, and lifestyle measures.

only), its effect was diminished when the demographic measures were included in both sets of regression equations. In addition, the lifestyle measures operationalized as the number of prior drug and weapon arrests did not significantly improve the prediction of gang homicides at the incident level. Thus, Model 2 was selected as the most robust and parsimonious statistical model at level-1 based on the model Chi-square comparison tests.

The predicted probabilities showed that there was an observed relationship pattern between the situational and demographic measures. At least in terms of a relative-relationship, the situational variables were more important to the gang homicide classification than the demographic measures. In terms of predicting gang homicide, when the incident was firearm related and when there were multiple suspects, there was a marginal difference between the race and gender of the actors. However, when the method of death was not firearm related, and when there was only one suspect, incidents were more likely to be classified as gang homicides when the actors were non-white and/or male. In either case, the predicted probabilities had a high percentage of correct classification, which means these measures are statistically strong correlates of gang homicides at the incident level. The next step was to assess whether structural measures (i.e., economic deprivation and disorder) predicted gang homicides, net of the incident level measures observed here.

Research Question #2

Do structural measures of the neighborhoods where the incident occurred delineate gang homicides from non-gang homicides? In order to address this research question, this study employs incident level measures used in Research Question #1 as

well as two neighborhood level measures: economic deprivation and disorder. Incident level controls help ensure that any observed neighborhood level relationship (i.e., level-2) with gang homicide is net of the incident factors (i.e., level-1) that have been shown to delineate gang homicide from non-gang homicide. In particular, the situational and demographic measures used in the analyses for Research Question #1 are incorporated into the HGLM statistical models (i.e., Bernoulli models) as control variables. Again, two models are presented in this section to control for missing suspect information: a victim-only model and a joint-actor model.

Univariate Results

Table 22 displays the measures of central tendency and dispersion for the gang homicide dependent variable, the incident level control variables, and the neighborhood level structural variables. It is important to note that the number of homicide incidents reduced from 563 to 452, which is a 19.7 percent decrease. The reason for this decline is because 111 homicides occurred outside the fifty IPD police beats in Marion County (i.e., in a non-IPD jurisdiction).[36] Since the police beat is the neighborhood boundary at the structural level, the incidents that occurred outside this boundary were thus excluded from the HGLM models. In addition, the structural measures are factor-scores, which have a mean of zero and standard deviation of one. A constant (3.0) was added to both neighborhood level measures in order to eliminate the negative values because

[36] All homicides occurring in Marion County were included in the IVRP incident reviews and in the database. However, despite Marion County having a unified city-county government, there were separate law enforcement jurisdictions within the county (Marion County Sheriff's Department and several small township police departments) that were outside the police department's beats. In 2007, the Indianapolis Police Department and the Marion County Sheriff's Department merged.

independent variables are not permitted to have a negative value when using logistic regression (Long, 1997) or HGLM models (Hox, 2002).

Table 22: Descriptive statistics for variables used in structural-level analysis

Variable	N	Mean	Median	S.D.	Min	Max
Dependent variable						
Gang homicide *	452	.555	1.0	.49	0	1
Incident level controls						
Firearm use *	452	.756	1.0	.429	0	1
Number of suspects	447	1.21	1.0	.649	1	8
Drug-motivated incident *	452	.084	0.0	.277	0	1
Victim age	446	31.3	28.0	14.9	< 1	95
Victim non-white *	444	.801	1.0	.399	0	1
Victim male *	451	.815	1.0	.387	0	1
Joint age (sum)	289	58.2	54.0	21.5	16	160
Joint intra-racial non-white *	270	.748	1.0	.434	0	1
Joint male-on-male *	276	.673	1.0	.469	0	1
Neighborhood level covariates						
Economic deprivation	49	3.02	2.78	.999	.86	4.99
Disorder	49	3.01	2.80	1.00	1.37	5.31

* dummy coded variable

Bivariate Results

Table 23 displays the bivariate relationship between the gang homicide outcome measure and the independent variables used here. Each of the incident level control variables had a significant bivariate association with gang homicide, which is consistent with the findings in Research Question #1. In addition, the structural measures had a significant positive correlation with gang homicides, suggesting that both neighborhoods with higher levels of economic deprivation and disorder were more likely to have gang homicides. Thus, both the incident and structural-level measures displayed in Table 23 met the criteria for inclusion in the subsequent HGLM models.

Table 23: Pearson's r correlations between outcome and independent variables included in analysis

Variable	Gang homicide	N	p-value
Incident level controls			
Firearm use *	.333	452	< .001
Number of suspects	.137	447	< .01
Drug-motivated incident *	.111	452	< .05
Victim age	-.198	446	< .001
Victim non-white *	.223	444	< .001
Victim male *	.221	451	< .001
Joint age (sum)	-.259	289	< .001
Joint intra-racial non-white *	.218	270	< .001
Joint male-on-male *	.335	276	< .001
Neighborhood level covariates			
Economic deprivation	.078	452	< .10
Disorder	.104	452	< .05

Multivariate Results

Similar to the strategy used in Research Question #1, both victim-only models and joint-actor models are presented in this section in order to control for missing suspect data.

Victim-Only Models

Table 24 presents the results of the HGLM analysis[37] for the baseline neighborhood level models. Model 1 and Model 2 are conditional fixed-effects models where the intercept at level-1 varies across neighborhoods as a function of the slope estimates from the level-2 variables, which are fixed structural measures. These models show the average log-likelihood of a gang homicide outcome (i.e., the average intercept, $ß_{0j}$) varies across neighborhoods as a function of the measured structural level estimates.

[37] It is important to note that there is no intra-class correlation coefficient (ICC) when the outcome is based on a nonlinear link function (i.e., Bernoulli distribution). The ICC is the proportion of variance in the outcome explained by the level-2 measures. According to Raudenbush and Bryk (2002), the level-1 variance becomes heteroscedasitic when the outcome is dichotomous, which creates bias in the variance estimate. No pseudo-estimates have been created in the latest HLM software package (HLM 6.2).

The relationship between economic deprivation and gang homicide has been examined in prior studies (see Chapter 3). Thus, this relationship served as the baseline model for comparison purposes. Model 1 shows the association between gang homicides and economic deprivation (γ_{01}). The average likelihood that homicides were gang related significantly increased ($p < .05$) across neighborhoods as economic deprivation increased. This relationship, independent of other incident and structural measures, has been observed in prior research (see Pizarro and McGloin, 2006; Rosenfeld et al., 1999).

The current study is also concerned with the relationship between gang homicide and neighborhood disorder, particularly since this association has not been examined in prior research. Model 2 in Table 24 shows that disorder (γ_{01}) had a significant positive relationship ($p < .05$) with gang homicide, net of economic deprivation. As disorder increased at the neighborhood level, there was an increase in the likelihood that homicides were gang related across neighborhoods. In addition, the significant relationship between economic deprivation and gang homicide remained when disorder was included as a structural measure. The difference in the deviance statistics indicates that Model 2, which included both disorder and economic deprivation at the neighborhood level, fit the data better than Model 1.[38] The next step was to assess whether economic deprivation and disorder maintained their significant association with gang homicide after controlling for incident measures at level-1.

[38] The difference in the deviance statistics is calculated as $D_1–D_2$, which approximates a Chi-square distribution ($P_1–P_2$), where D_1 is the –2logLikelihood for Model 1 and D_2 is the –2Loglikelihood for Model 2. Here, the difference in the deviance statistics is divided by the difference in the degrees of freedom (Δ deviance statistics / Δ df) and compared against a Chi-square distribution. Thus, (618.29 – 615.28) / 450 – 449) = 3.01(1 df) > Chi-square critical value of 2.705 where $p < .10$.

Table 24: HGLM conditional fixed effects models

Variable	Model 1 (N=452)		Model 2 (N=452)	
	Beta (S.E.)	OR (Exp(b)-1)	Beta (S.E.)	OR (Exp(b)-1)
Intercept as outcome, β_{0j}				
γ_{00} (Intercept level-2)	-.262 (.152)	.769* (-.231)	-.684 (.194)	.504* (-.496)
Level-2 measures				
Economic deprivation, γ_{01}	.139 (.042)	1.149** (.149)	.084 (.044)	1.088* (.088)
Disorder, γ_{02}			.180 (051)	1.197** (.197)
Deviance Statistic (df)	618.29 (450)		615.28 (449) *	

*p < .10, **p < .05, ***p < .01

Table 25 displays the results of the HGLM mixed model, which shows the variation in the gang homicide outcome measure (η_{ij}) as a function of both the incident level data and neighborhood level data, simultaneously. This type of analysis focuses on the difference in gang homicides *across* neighborhoods, net of situational and demographic factors that are associated with gang homicides at the incident level. It is important to assess whether the neighborhood level measures retained their significant association with the outcome variable above and beyond the incident level factors in order to establish whether the relationship between economic deprivation and disorder with gang homicide is robust.

Model 3 in Table 25 shows that the average intercept (β_{0j}), which is the estimated likelihood that homicides were gang related when all the covariates are equal to zero, increased as neighborhood disorder increased. The observed main effect between

disorder and gang homicides maintained a significant relationship above and beyond the incident level controls that delineate gang homicide from non-gang homicide, and was also found net of economic disorder at the neighborhood level. However, after controlling for the incident level variation in gang homicide, the effect of economic deprivation (i.e., was no longer statistically significant). In addition, the effect that drug motivation had at the incident level in terms of predicting gang homicide was diminished ($p = .186$) when disorder and economic deprivation were included in the model.[39] The difference in the deviance statistics indicates that Model 3, which included both incident and structural level measures, fit the data better than Model 2.[40]

Thus, when the incident level measures were included in the model, only disorder as a neighborhood level variable retained a marginally significant association ($p < .10$) with gang homicide.[41] Homicides that occurred in neighborhoods with higher levels of disorder were more likely to be gang homicides, holding incident level measures and economic deprivation constant. This finding suggests there is empirical support for the disorder-gang homicide hypothesis.[42]

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[39] The wash out effect that disorder and economic deprivation had on drug motivation was not unexpected. For example, Rengert (1996) showed that drug trafficking was highest where there was large neighborhood instability, which is a key theoretical component of social disorganization (Shaw and McKay, 1942). Thus, it is highly likely that drug motivated homicides at the incident level along with disorder and economic deprivation at the structural level are both theoretically and statistically inter-related (i.e., autocorrelated).

[40] The difference in the deviance statistics is 115.6 (615.28 – 499.62 = 115.6) > critical Chi-square statistic 35.2 with 23 degrees of freedom.

[41] The significance level (i.e., p-value) for Research Question #2 is relaxed to a .10 threshold at level-2 since the disorder-gang homicide relationship is an exploratory test. Henkel (1976) asserted that it is inappropriate to set a stringent significance level in exploratory research, and thus a .10 level is acceptable. However, when examining the relationship between situational and demographic measures and gang homicide, the more traditional significance threshold of .05 was employed.

[42] Given that drug motivation at level-1 was not statistically significant, I ran two additional HGLM models where drug motivation was grand mean centered at level-1 and group mean centered at level-1. Neither additional model obtained estimates where drug motivation was statistically significant at level-1 or made disorder fit better (i.e., significance threshold) than the models displayed in the main results section.

Table 25: HGLM mixed model with victim-only data

	Model 3 (N=435)		
Variable	Beta (S.E.)	OR (Exp(b)-1)	p-value
Intercept, $ß_{0j}$			
γ_{00} (Intercept level-2)	-2.99 (.734)	.050 (-0.95)	< .001
Incident level control measures			
Firearm use, $ß_1$	1.35 (.279)	3.84 (2.84)	< .001
Number of suspects, $ß_2$	.616 (.238)	1.83 (0.83)	.010
Drug-motivated incident $ß_3$	.560 (.422)	1.74 (0.74)	.186
Victim age, $ß_4$	-.018 (.008)	.982 (-.018)	.035
Victim non-white, $ß_5$	.677 (.306)	2.01 (1.01)	.028
Victim male, $ß_6$	.857 (.294)	2.38 (1.38)	< .01
Neighborhood level measures			
Economic deprivation, γ_{01}	-.024 (.124)	.978 (-.022)	.843
Disorder, γ_{02}	.251 (.138)	1.28 (0.28)	.076
Deviance Statistic (df)		499.62 (426)	

Given that this dissertation was focused on examining the relationship between situational, demographic, structural, and lifestyle measures it was necessary to examine whether the addition of lifestyle measures impaired the structural estimates found in the HGLM model. Lifestyle measures were excluded from Model 3 (Table 25) because the analyses for Research Question #1 found no empirical support for the lifestyle measures ability to delineate non-gang homicide from gang homicide in the victim-only model.

However, given that disorder was supported net of the incident level measures, it was desirable to include lifestyle measures as potential control variables at level-1.

The HGLM model would not converge when both prior drug and weapon arrests were included with other level-1 control measures. Thus, a number of analytical steps were performed in order to test the relationship between disorder and gang homicide, net of the relevant incident level controls, including lifestyle measures. First, model convergence did occur when drug and weapon arrests were incorporated at level-1 and only disorder was included as a level-2 measure (i.e., economic deprivation was excluded). In this case, disorder retained its significant association ($p = .085$) with gang homicide (see Appendix C, Table C-1, Model 4). Second, model convergence occurred when only prior drug arrests were included as a lifestyle measure at level-1 (i.e., prior weapon arrests were excluded), which allowed both disorder and economic deprivation to be incorporated as level-2 variables. Again, disorder retained its significant association ($p = .095$) with gang homicide (Appendix C, Table C-2, Model 5). Finally, and perhaps the best approach, the HGLM model converged when prior drug and weapon arrests were combined (i.e., added) to create one lifestyle control variable, which allowed both disorder and economic deprivation to be included as level-2 measures. In this model, disorder maintained its significant association ($p = .090$) with gang homicide (see Appendix C, Table C-3, Model 6). Thus, incorporating lifestyle measures as level-1 controls did not diminish the observed relationship between disorder and gang homicide, net of other incident level control variables and holding economic deprivation constant.

The prior analyses utilized an intercept as outcome approach, which is appropriate when trying to examine the direct relationship between gang homicides and disorder.

The next step was to examine whether disorder had an interactive effect with level-1 variables, which is also referred to as a cross-level interaction model. In this model, both the intercept at level-1 ($ß_{0j}$) and the slopes of the incident level measures ($ß_{xj}$) vary as a function of disorder at level-2. No cross-level interaction effects were statistically significant where the slopes of the incident level measures were allowed to vary based on the estimates from the disorder measure (see Appendix C, Table C-4). Thus, the observed relationship between gang homicides and disorder appears to be a direct main effect rather than an interactive association between disorder and incident measures at level-1.

Joint-Actor Models

An HGLM mixed model was attempted where the joint-actors demographic measures were included as demographic control variables at level-1. This was an important examination, given that important suspect information was excluded from the prior analyses due to missing data. However, the estimated HGLM model would not converge after 100 iterations, which was most likely due the presence of missing actor data. Where there were complete data for the situational, demographic and structural measures, the number of cases available for the model was less than 60 percent (N = 264/452) of the original homicide incidents. HGLM models are designed to diminish the shared error variance between the level-2 measures in order to create more reliable standard errors, which reduce the likelihood of Type I error. In this instance, the shared error variance between homicides that occurred in the same police beats appears to be of minimal concern.

Table 26 shows that no single police beat accounted for more than 5.3 percent (N = 14/264) of the total outcome measures, which includes both non-gang and gang homicides at the neighborhood level. Most beats housed less than 2 percent (N = 5/264) of the total number of homicides available where the joint-actor demographic measures are included. Thus, a logistic regression model can be used here without seriously violating the independent observation (i.e., shared error variance) assumption, though the results should be interpreted with some caution.

Table 26: Descriptive statistics for the number of homicides that occurred in police beats for the joint-actor model

Homicide distribution	N	Mean	Median	S.D.	Min	Max
Number of homicides per beat	48	5.50	5.0	3.71	1	14

Model 6 in Table 27 shows the results of the mixed logistic regression model for the joint-actor data. The variance explained in the gang homicide outcome measure was 31.9 percent when the situational, demographic, and structural measures were included in the model. Similar to the victim-only model, disorder maintained a significant association ($p < .10$) with gang homicide above and beyond the effects of the incident level measures, and net of economic deprivation. For each unit change in the disorder measure, the likelihood that homicides were gang related increased by 36 percent (odds = .36). Economic deprivation no longer had a statistically significant effect on gang homicides when incident level measures were included in the model ($p = .533$). In addition, many of the situational and demographic measures retained their significant association with gang homicides when measures of neighborhood disorder and economic deprivation were included in the model. One obvious difference was the diminished

effect of non-white intra-racial homicide variable, which became statistically insignificant (p = .226). Thus, one can tentatively assert that when both the victim and suspect's demographic measures are included as incident covariates, and neighborhood measures of economic deprivation and disorder are also incorporated, the significant main effect between the race of the actors and gang homicides is no longer observed. However, this assertion should be interpreted with a degree of caution.

Table 27: Mixed logistic regression model for joint-actor data

	Model 6 (N=264)		
Variable	Beta (S.E.)	OR (Exp(b)-1)	p-value
Intercept	-2.99 (.909)	--	< .01
Incident level control measures			
Firearm use	1.05 (.351)	2.86 (1.86)	< .01
Number of suspects	.763 (.273)	2.14 (1.14)	< .01
Drug-motivated incident	.312 (.521)	1.36 (0.36)	.549
Joint age	-.017 (.008)	.983 (-.017)	.032
Non-white intra-racial	.438 (.362)	1.55 (0.55)	.226
Male-on-male	.893 (.326)	2.44 (1.44)	< .01
Neighborhood level measures			
Economic deprivation	.093 (.149)	1.10 (0.10)	.533
Disorder	.305 (.163)	1.36 (0.36)	.061
Nagelkerke (pseudo) R-square	.319		
Model χ^2 (df)	72.167 (8)		

Similar to the approach used in the HGLM victim-only data, a number of additional mixed logistic regression models were estimated to assess whether disorder maintained its significant relationship with gang homicide while controlling for actor-level lifestyle measures. The results were mixed. When both the joint-actors prior drug and weapon arrests were included as level-1 controls, disorder no longer maintained its significant association with gang homicide ($p = .13$). However, when only the combined actors prior drug arrests was included as a single lifestyle control measure (i.e., weapon arrests were excluded), disorder maintained its significant relationship ($p = .069$) with gang homicide (see Appendix C, Table C-6, Model 8).

Although one model that included lifestyle measures distorted the observed significant relationship between disorder and gang homicide, three other mixed logistic regression models found support for the association. The one model where the statistical significance between disorder and gang homicides washed away included two lifestyle measures that were each statistically insignificant, which likely hindered all of the model's estimates. Given that disorder was only marginally associated with gang homicide in all prior models ($p < .10$), this result was not entirely unexpected.

The above mixed logistic regression models only examined the direct relationship between gang homicides and disorder. The next step was to examine whether disorder had an interactive effect with the incident level control measures in the joint-actor model. No interaction effects were statistically significant (see Appendix C, Table C-7). Similar to the victim-only model, the observed relationship between gang homicides and disorder appears to be a direct main effect rather than an interactive association between disorder and incident level measures.

Predicted Probabilities

Predicted probabilities show the predictive effect that specific measures have with an outcome of interest (Long and Freese, 2003). HGLM models are not well suited for this type of analysis because the intercept at level-1 is a function of the level-2 slopes. Thus, the equations that estimate the final model are extremely complex in that they vary with changes in the level-2 data. This makes the use of predictive probabilities impractical in this case because the level-2 measures are the focus of the current research question and thus could not be set as fixed estimates. In addition, the current HLM software package (version 6.2) does not contain a user-function that performs this task. Thus, predicted probabilities will only be estimated for the joint-actor model, given its coefficients were obtained in a logistic regression model. The results appear to be generalizable to the victim-only model because the odds-ratios are relatively similar between the two models.

The current analysis is interested in explaining the substantive relationship between disorder and gang homicides. Disorder is a factor variable measured on a continuous scale, which requires the variable to be set to both extreme values and quartiles based on the observed distribution of the measure (Long and Freese, 2003). Table 28 shows the predicted probability that homicides were gang related based on neighborhood disorder changes. All of the incident level control variables as well as economic deprivation were set equal to their mean values. Any change in the predicted probability that homicides were predicted to be gang related is based solely on a change in the disorder measure. The probability that homicides were gang related increased 5.8 percent when the neighborhood level disorder measure was changed from its lowest

observed value (1.37) to its highest observed value (5.3), holding all other measures equal to their mean. Thus, we can generalize that homicides were almost 6 percent more likely to be gang related in the most disordered neighborhood compared to the neighborhood with the least amount of observed disorder, holding all other factors constant. In terms of the middle of the distribution, the probability homicides were gang related increased 2 percent when the disorder measure was changed from its value in the first-quartile to its value in the third-quartile.

Table 28: Predicted probabilities of gang homicides based on changes in neighborhood disorder

	Predicted probability of gang homicide	Δ
Extreme values		
Highest observed disorder value	97.3	
Lowest observed disorder value	91.5	5.8 %
Quartile values		
3rd quartile value	96.2	
1st quartile value	94.2	2 %

Diagnostic Tests

One of the greatest threats to the validity of the findings presented in this section is the presence of spatial autocorrelation (Anselin, 2003). Spatial autocorrelation can affect the estimates at the neighborhood level due to the fact that geographic units are susceptible to the influence of similar units in close proximity. Thus, beat level measures could be autocorrelated with beat level measures of its nearest neighbor (i.e., adjacent police beats). As discussed in Chapter 5, when spatial autocorrelation occurs the assumption of random spatial independence is violated, which leads to biased estimates among independent variables (Baller et al., 2001).

In order to assess whether spatial autocorrelation was an issue in the Indianapolis data, a spatial regression model was estimated in GeoDa (0.95-i) software. Specifically, first-order rook continuity weights[43] were used in order to capture the shared neighborhood variation in both the disorder and economic deprivation measures since these were the structural level independent variables used in the previous logistic regression models. The rook continuity weights were incorporated into a spatial regression model where the homicide rate in each police beat was logged in order to approximate a normal continuous distribution, which is a requirement of the GeoDa software package. The outcome measure used in the previous logistic regression models included both non-gang and gang homicides, which included all homicides at the neighborhood level.

The major difference between the homicide outcome used in the logistic regression models and the one used in the spatial regression model is the presence of a denominator that controls for police beat size (i.e., the rate component). The Pearson r correlation between disorder and police beat size was -.024 ($p = .874$). The Pearson r correlation between economic deprivation and police beat size was -.016 ($p = .917$). Thus, there appears to be no association with the two structural measures and police beat size. This means the results are generalizable between the OLS and logit models, at least in terms of the spatial autocorrelation between the structural measures and a beat's nearest neighbor (i.e., adjacent beat) value. Again, the relationship among the neighborhood level independent variables across police beats is what is important in this analysis.

[43] Rook spatial weights are constructed from those neighborhoods that share a common linear boundary with the neighborhood of interest. These are the most common type of spatial weights (Anselin, 2003).

Table 29 displays the results of the spatial regression analysis. Specifically, it shows that both disorder and economic deprivation significantly co-vary with the (logged) homicide rate at the neighborhood level, which is consistent with the base HGLM model (see Model 2, Table 24). Most importantly, the model shows that spatial autocorrelation, which includes measures of spatial lag, spatial error, and a combination of both spatial lag and spatial error (i.e., the SARMA model) was not a problem in the Indianapolis data. Given that one of the assumptions of the logistic regression model is to exclude theoretically irrelevant independent variables, it would be inappropriate to include spatial weights that reduce spatial autocorrelation in the multivariate models used to address Research Questions 1 and 2 because spatial independence was not violated. None of the spatial autocorrelation tests approached statistical significance meaning that there was no observed bias among the police beats in terms of the two independent variables: disorder and economic deprivation. This strengthens the validity of the findings of the previous multivariate regression models.

Table 29: OLS spatial regression model

	DV = ln(homicide rate) (N = 50)		
Independent Variable	Beta (St. Error)	T-statistic	P-value
Intercept	2.263 (.108)	20.78	< .001
Disorder	.298 (.129)	2.30	.025
Economic Deprivation	.408 (.129)	3.16	< .01
Model F value (df)	15.90 (47)		< .001
Adjusted R-square	.378		--
Spatial Autocorrelation Tests			
Moran's I (error model)	.067	1.05	.292

Table 29 (cont'd)

Lagrange Multiplier (error model)	1	1.16	.280
Robust LM (error model)	1	1.18	.277
Lagrange Multiplier (lag model)	1	0.44	.505
Robust LM (lag model)	1	0.46	.497
Lagrange Multiplier (SARMA)	2	1.62	.444

As previously mentioned, multicollinearity is not a problem unless a correlation exceeds some predefined cut-off value, which is typically around .80 (Berry and Feldman, 1985). In terms of the victim-only HGLM model, the highest observed correlation for the incident level measures was -.305 (see Appendix D, Table D-1). The highest observed correlation for the structural level measures was .353, which was the relationship between disorder and economic deprivation. In terms of the joint-actor logistic regression model, the highest observed correlation for the incident level data was .319 (see Appendix D, Table D-2). The highest observed correlation between the structural measures was .364, which was the correlation between disorder and economic deprivation. The joint-actor correlation was based on complete actor data (N = 264). Thus, the diagnostic tests indicate that multicollinearity among the independent variables was not a problem with any of the multivariate models used in this chapter.

The level-1 standardized residuals of the HGLM model were assessed, which included estimates from the level-2 structural measures. The mean was .08, the median was 1.19, and the standard deviation was 2.42. The histogram of the level-1 residuals shows the distribution approximated a normal curve (see Appendix D, Figure D-1). Similarly, the standardized residuals from the joint-actor mixed logistic regression model had a mean of .01 and a standard deviation of 1.0. The histogram of the residuals indicates the errors approximated a normal distribution in this model as well (see

Appendix D, Figure D-1), which is an assumption of the test. Both histograms showed a homoscedastic error distribution. Thus, influential cases do not appear to undermine either the victim-only or the joint-actor models' efficiency. In sum, no test of spatial autocorrelation, multicollinearity, or heteroscedasticity showed that any of the aforementioned models violated statistical assumptions. These diagnostic tests lend weight that the estimates obtained from the multivariate models were not due to observed bias in the data, which adds validity to the findings.

Summary of Level-2 Analyses

This set of analyses sought to address whether economic deprivation and disorder at the neighborhood level affected the likelihood that homicides were gang related. A number of steps were taken to ensure that the results presented in this chapter were not compromised due to bias in the data. First, given that the suspect data were missing in many of the homicide events, two separate sets of multivariate regression models were estimated: a set of victim-only models, and a set of joint-actor models. Importantly, both sets of models had consistent results in terms of the estimates, odds-ratios, and significance levels. Second, HGLM models were used to control for the shared error variance that often occurs when neighborhood level data are employed. This is particularly true in the victim-only models, where a large majority of the observed homicides were included in the models and thus many of the homicide incidents occurred in the same neighborhoods. However, the HGLM models would not converge for the joint-actor models, which was likely due to missing data.[44] Fortunately, the fact that

[44] As noted earlier, the joint-actor models excluded homicides where the suspects' demographic measures were unknown. Again, missing data analysis was conducted in order to assess the impact this selection bias

HGLM models would not converge where there were suspect data added strength to the assertion that both sets of models (i.e., joint-actors and victim-only) were a necessity. In addition, where the joint-actors data were used, there did not appear to be a major problem with shared error variance because fewer than 60 percent of the original cases were included in the models and thus most of the homicides occurred in different neighborhoods. Third, a number of diagnostic tests were performed that examined the extent that spatial autocorrelation, heteroscedasticity, and multicollinearity existed in the observed data. None of these tests indicated that there was an inherent bias due to extreme or influential cases, creating a sense of confidence in the results.

The results showed that when economic deprivation and disorder were modeled independent of incident level control measures, both variables had a significant positive relationship with gang homicide. When level-1 control measures were included, the effect of economic deprivation on gang homicide washed away. This was true in both the victim-only model (Table 25) and joint-actor model (Table 27) and for the majority of the joint-actor models that tested different approaches to the inclusion of lifestyle measures. Interestingly, the relationship between gang homicide and economic deprivation was seen independent of other incident and structural level variables, but did not hold when other theoretically relevant variables were included in the analysis. This exact finding between economic deprivation and gang homicide has been observed in prior research (see Chapter 3). Thus, the association between economic deprivation and gang homicide appears to be one of a mediating effect (i.e., mediated through other measures), rather than a direct effect.

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created. As with the level-1 models, the level-2 estimates that relied on data where the missing values were imputed had very similar estimates to the models presented in this chapter.

However, the direct relationship between disorder and gang homicide was much more robust. Disorder maintained a significant positive relationship with gang homicide, controlling for incident level control measures and net of economic deprivation. This was true in a large majority of the multivariate models. Disorder did not have a direct relationship with the slope estimates at level-1, suggesting its relationship with gang homicides is more direct. Given that no previous study has relied upon multivariate techniques to explain the disorder-gang homicide relationship, the results presented here are suggestive that such a relationship exists. These findings have the potential to inform future research, policy, and theory, which will be discussed in the next chapter.

Chapter 7: Discussion

This chapter focuses on the limitations, theoretical implications, directions for future research, and overall results from the prior analyses. First, a brief summary of the research findings will be presented. Next, a number of important limitations of the current study are discussed in detail, which additionally provides direction for future research in this area. Finally, this chapter concludes by synthesizing the information obtained from the results of the current study with a number of different bodies of knowledge in criminal justice research. More specifically, a link between the findings observed here and the implications for ecological criminology, gang research, directions for research methodology, and public policy is discussed.

Overall Summary of Results

This study relied on two sets of statistical models (i.e., victim-only and joint-actor models) at both level-1 and level-2. Both sets of models had very similar results in that the situational, demographic, lifestyle, and structural measures were robust in their direction and significance thresholds across all of the various sets of models. It begs the question, which is the best set of models? Given the similarity between the joint-actor and victim-only models, the best overall set of regression equations likely stems from the victim-only models because excluding cases where suspects are unknown has the potential to eliminate pertinent incident information. The victim-only models had far fewer missing cases because it was extremely rare for homicide victims to remain unidentified (i.e., one exception in four years). In addition, the level-2 analyses that relied on HGLM techniques converged when relying on the victim-only data, which

controlled for the violation of independent observations (i.e., multiple events in the same neighborhood). The joint-actor models did not converge and thus relied on mixed-logistic regression estimates, which were more likely to have shared error variance (Raudenbush and Bryk, 2002). Thus, the victim-only models reduce the likelihood of a selection or statistical bias.

Situational and demographic correlates of gang homicides have been established in prior gang research. However, the knowledge about the relationship between situational and demographic correlates with gang homicides was ascertained in classical gang studies that relied on data from chronic gang cities (Spergel and Curry, 1993). This dissertation employed data from an emerging gang city, Indianapolis, which made it possible to assess whether the current findings were consistent with prior gang homicide research.

In terms of situational and demographic measures, gang homicides were more likely to be drug motivated, involve multiple suspects, be firearm related, and have more male, non-white, and younger actors. This was true in both the victim-only and joint-actor models. Thus, at the incident level, this study was consistent with prior gang research. Implications for the incident level findings suggest that there does not appear to be a substantive difference between chronic and emerging gang cities in terms of explaining gang homicide from level-1 measures. Even though many of these incident level measures were ascertained in research that relied upon data from chronic gang cities, the results presented here suggest that their explanatory power is robust across the different gang city subtypes. This lends support to the idea that cross-city comparisons of gang homicide research are indeed generalizable.

In terms of lifestyle measures, prior studies have shown that individuals who engage in gang activity are more likely to participate in serious, risky 'street oriented' behavior (Anderson, 1997; Oliver, 1994; Thornberry, 1998; Wright and Decker, 1997). The use of criminal histories as a surrogate of lifestyle measures (i.e., criminal propensity) has been established in lifestyle research (Jensen and Brownfield, 1987). However, the efficacy of criminal histories as measures of violent gang behavior is still widely unverified. This study examined the utility of criminal histories as surrogates of gang violence, and the results were mixed at best.

Most of the models predicting gang homicide did not contain statistically significant estimates from the prior number of drug and weapon arrests of the victim or the combined actors. In the joint-actor model, the combined actors prior number of total drug arrests did have a positive significant association with gang homicide in one of the models. Thus, there appears to be minimal support for the use of criminal histories as lifestyle surrogates for gang violence, but the results were not consistent or overwhelming. This does not mean that lifestyle measures are unimportant in explaining homicide. Indeed, both victims and suspects had extensive criminal histories. However, these results suggest this is true for homicide generally but does not effectively discriminate between gang and non-gang homicide.

At the neighborhood level, the established relationship between economic deprivation and gang homicide was inconsistent. In prior research, economic deprivation measures have been shown to co-vary with gang homicide until other structural and incident level controls are modeled (Pizarro and McGloin, 2006; Rosenfeld et al., 1999). Then, the relationship between economic deprivation and gang homicide seems to

diminish. The same result was observed in this study. Economic deprivation significantly predicted gang homicide at the neighborhood level only when disorder was included as a structural covariate. However, when incident level control variables were included, the relationship between economic deprivation and gang homicides was no longer statistically significant. This was true in both sets of multivariate regression models.

The relationship between disorder and gang homicide has never been directly tested in the criminological literature, at least using statistical techniques. A link between disorder and gang homicide is theoretically plausible since disorder has been shown to positively correlate with robbery (Sampson and Raudenbush, 1999), and robbery has been shown to positively correlate with drug markets (Wright and Decker, 1997), and drug markets have been shown to positively correlate with gang homicides (Blumstein, 1995).[45] Therefore, it was necessary to test whether a direct relationship between disorder and gang homicide existed.[46] Controlling for relevant incident level factors, and holding economic deprivation constant, disorder had a statistically significant positive influence on gang homicide. This finding was consistently observed across a large majority of multivariate regression models in this study.

In sum, the findings reported in Chapter 6 were fairly consistent with the research hypotheses presented earlier. Before the implications of this study are discussed in detail, the limitations of the current investigation are noted.

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[45] Blumstein argued that that the crack cocaine market was distinct in terms of generating lethal violence. This is an important qualification because the research on the link between drug trafficking and gang homicides is mixed (see Block and Block, 1993).

[46] Skogan (1990) contended that disorder generates a variety of criminal opportunities (e.g., public drinking, drug use, prostitution, assaults and fights) in addition to robbery and drug markets.

Limitations

This research has a number of theoretical, operational, and methodological limitations. While the obvious goal was to address as many limitations as possible, it was unfeasible to alleviate all major issues. However this section, at a minimum, attempts to discuss some of these concerns as a way of both cautioning against inappropriate conclusions as well as directing prospective studies in this area. In particular, the limitations discussed in this section have the potential to serve as guides for future areas of inquiry.

While the incident level correlates used in this study have been shown to distinguish gang homicide from non-gang homicide, they are by no means an exhaustive list of important measures that have been shown to make this delineation. Rather, they were measures that were generated at the IVRP incident reviews, and prior research has shown their relative importance. Indeed, a wide number of studies have found that gang homicides differ from non-gang homicides in a number of important ways that were not captured in the data used here. Maxson et al. (1985) found that gang homicides were more likely to take place in public settings, particularly on the street. This is important because the gang literature shows that the street context is very important when attempting to explain why gang homicides often occur. Researchers such as Riedel (1987) and Decker (1993) distinguished the nature of a homicide based upon the victim-offender relationship. For example, Riedel (1987) found that instrumental homicides often occurred when the offender attempted to improve his or her position through some rational calculation such as minimizing risk, increasing gain, or both. In a similar vein, Decker (1993) found that expressive homicides tended to occur as a way of 'saving face'

or character contests. While Anderson's (1999) research was more concerned with explaining the differences between street and decent culture, his research demonstrated that drug dealers (i.e., those involved in street culture) have to save face in order to maintain street credibility by being respected. Thus, these incident level measures that capture the nature of the dispute that led to gang homicide should be included in gang homicide models.

When trying to explain gang homicide using structural measures, Pizarro and McGloin (2006) used a dummy coded escalation measure as an incident level control variable in order to capture the common incident level characteristics of gang homicide. Unfortunately, in the current research detailed narratives describing the victim-offender relationship, or the manner in which the homicide escalated, were not gathered at the IVRP incident review meetings. Rather the task force was more concerned with identifying the individuals who had a pattern of chronic, persistent offending since they were the targets of the IVRP deterrence-coercion strategy. Thus, future gang homicide research in this area should attempt to gather measures of escalation, and/or the victim-offender relationship when possible in order to include as control variables at the incident level.

Another limitation was the use of drug and weapon arrests as lifestyle measures. Undeniably, the use of criminal histories as a surrogate for an actor's lifestyle is more the exception than the rule. Most research concerning an actor's lifestyle focuses on four dimensions: irresponsibility, self-indulgence, interpersonal intrusiveness, and social rule breaking (Walters, 2006). In terms of routine activities theory, Cohen and Felson (1979) operationalized lifestyle as drug dealing, gang involvement, delinquent peer association,

and the amount of time spent away from home. They found that individuals who engaged in these behaviors were more likely to be victimized since they were engaging in activity that increased their risk of victimization.

Jensen and Brownfeld (1987) proposed that criminal histories serve as a measure of routine activity in that a higher number of offenses increase the risk of victimization because of the motives, vulnerability, or culpability of people involved in those activities. However, the weapon carrying measure employed in this study was limited. The criminal histories in Marion County did not capture the weapon type the actor was carrying at arrest. There is also the problem that not all suspects were arrested at the scene of the homicide. A potential strategy would be to assess whether the weapon obtained at the arrest was a firearm or not, given that firearm carrying among gang members is common (Block and Block, 1993; Blumstein, 1995; Blumstein, Rivara, and Rosenfeld, 2000; Blumstein and Rosenfeld, 1998; Bjerregaard and Lizotte, 1995; Huff, 1998; Lizotte, Tesoriero, and Thornberry, 1994; Maxson et al., 1985). This would be a more likely surrogate for lifestyle behavior that may predict the likelihood of being involved in a gang homicide.

In addition, Developmental Life Course (DLC) research shows that criminal propensity is not constant throughout offenders' lifecycle (Loeber and Farrington, 2000; Sampson and Laub, 1993). In a similar vein, DeJong (1997) advanced deterrence theory by showing that arrestees incarcerated for longer periods of time took longer to reoffend (i.e., had a significantly longer time until failure) than arrestees incarcerated for shorter periods of time. Lifestyle research attempting to predict victims and suspects involvement in gang homicide might benefit from models that take into account the

amount of time (e.g., the number of days) from their most previous drug and weapon arrest to the time of the homicide incident. Theory would predict that actors more recently involved in the drug market would be at greater risk for gang homicide involvement. This type of variable operationalization may capture this risk element. Unfortunately, these measures were not captured in the Indianapolis data. Future research could benefit from an empirical examination testing whether this measure of lifestyle predicts gang homicide involvement at the individual level.

In terms of the structural data, Wilson and Kelling (1993) and Taylor (1997) contend that the streetblock is the appropriate unit for neighborhood-level analysis, particularly when trying to model neighborhood incivilities. The authors argue that neighborhood structure is a relatively small group dynamic and that disorder (i.e., incivilities) is more likely to predict crime in a more concentrated area than at higher units of analysis. Studies that have used more concentrated neighborhood data measuring disorder have relied upon measures of physical and social incivilities from observational data (Sampson and Raudenbush, 1999; Skogan, 1990). By using this methodology, these studies constructed streetblock level estimates of disorder.

This study relied upon survey data from the POPN study to construct a measure of disorder, which required aggregation to the police beat level. This is not overly problematic because police beat borders have been used as neighborhood boundaries in prior research (Chermak, McGarrell, and Gruenewald, 2006; Reisig, McClusky, and Mastrofski, 1999; Reisig and Parks, 2004; Skogan et al., 1999). However, this makes a more concentrated analysis impossible. Fortunately, Taylor's (1997) main argument is that incivilities cannot be aggregated to cities or police districts because these units of

analysis are theoretically misaligned. Given that prior research has relied upon police beats and that the police beat unit is much smaller than a single city wide measure, the use of police beats as a neighborhood level boundary is methodologically appropriate, though limited.[47]

Another limitation was missing data. In 24 percent of the cases (N = 135) the suspect(s) was unknown, and therefore the demographic and lifestyle measures of the suspect were excluded where the offender was unknown. This was because, at least at the time of the homicide incident review, these cases remained open given the presence of an unknown suspect. Missing data has the potential to compromise the efficiency and accuracy of the estimates obtained in statistical models (Shadish, Cook and Campbell, 2002). The use of both the victim-only and joint-actor models was intended to control for missing actor data. Missing data techniques showed that homicides were more likely to be gang related when the suspect information was missing. Fortunately, the coefficients were very consistent across both sets of models, suggesting that missing suspect information did not bias the estimates in the joint-actor models. However, caution should be taken when examining the joint-actor models because of missing suspect information.

An additional limitation is that the dependent variable in this study is only similar to the gang affiliated homicide outcome measure used in prior gang research (Maxson and Klein, 1990). Perhaps a better analytic strategy would be to perform an analysis similar to Rosenfeld et al.'s (1999) approach, which involved the use of two outcome measures: gang affiliated homicide and gang motivated homicide. This study found

[47] Researchers need to be aware that the same people are involved in multiple sources of data in this type of analysis. As a potential way to capture the likelihood of covarying error, the addresses of the victims and suspects should also be coded and aggregated to the neighborhood level in order to assess the degree that actors commit offenses in their same (or different neighborhoods) where they live.

support for the disorder-gang homicide hypothesis, which is particularly relevant to this limitation. Theory would predict that the disorder-gang homicide relationship would be strongest where the incidents are a direct product of gang activity. In particular, gang motivated offenses are more likely to occur from street disputes, as a likely product of participation in the illegal drug market (Blumstein, 1995). Where possible, future research in this area should attempt to assess the disorder-gang homicide relationship with both sets of outcome measures.

It is also important to mention that this study is limited to the use of cross sectional data, which is particularly significant when trying to explain the disorder-gang homicide relationship. Taylor (1999) did not find support for temporal sequencing when explaining the disorder-crime relationship with longitudinal data (i.e., the "incivilities thesis"). Specifically, Taylor (1999) determined that incivilities at an earlier point in time did not necessarily increase fear and crime in the same neighborhood at a later point in time. Taylor's work challenged the disorder-decline hypothesis (Bursik and Grasmick, 1993; Skogan, 1990), which posits that physical and social incivilities *lead* to crime. However, this is not overly problematic here because this study attempted to simply assess whether there was an observed disorder-gang homicide *relationship*. Thus, no attempts were made in terms of explaining causation through temporal sequencing (i.e., whether or not more disorder leads to more gang homicide in the same neighborhood). Indeed, no causal claims are attempted given the aforementioned limitations of the data and the fact that the alpha level for disorder was only marginally statistically significant ($p < .10$) throughout most models. Put simply, this study sought to address whether there was an observed correlation between disorder and gang homicide, and the results are

indeed suggestive of a relationship. However, longitudinal data at the neighborhood level would improve both the generalizability and validity of this finding.

Though the current study has a host of limitations, the results from this research address a number of gaps in criminal justice research. The advancements made in the criminological literature are detailed throughout the remainder of this chapter.

Implications for Theory

One of the challenges for gang homicide theoretical development is that many of the same predictors of violence and homicide in general are thought to be predictors of lethal violence could discriminate gang homicides from homicides generally. Essentially, the proposition is based on the idea that situational, lifestyle, and ecological variables should be even more robust predictors of gang homicide because they represent the type of group-based street violence that these theories were designed to explain. In contrast, homicide in general includes a more heterogeneous group of incidents that, though predicted to relate to these theoretical constructs, may be less well-explained by routine activities, lifestyle, and ecological theory.

Indeed, the findings of the analysis are consistent with this theoretical foundation. Both incident-level and structural variables drawn from situational and ecological theories of crime significantly delineated gang homicides from non-gang homicides. The only exceptions were indicators of lifestyle measures drawn from arrest records and neighborhood-level economic deprivation. Even with these variables, there was some evidence of robust zero-order relationships between situational and ecological variables and gang homicide. Indeed, this research shows that the theories designed to explain

group-based street violence do indeed explain a significant proportion of the variation between violence in general (represented by non-gang homicide) and street violence (represented by gang homicide). While this study was designed to examine this relationship, future research is needed in this area in order to better understand gang homicide from a theoretical perspective.

Implications for Gang Research

The analyses presented here tested the explanatory power of incident and neighborhood explanations at multiple levels of analysis. One of the main goals of this study was to assess whether previously established incident level correlates delineate gang homicides from non-gang homicides in emerging gang cities, since many of these correlates were revealed in research from chronic gang cities. This is important because a number of studies have shown that the scope and nature of the gang problem has changed dramatically over the years (Egley and Ritz, 2006; Webb and Katz, 2003). Gangs have emerged as problems seen in large cities to problems in small and medium-sized cities as well. Thus, gang homicides are a product of social, and in many cases bureaucratic, operationalization. Law enforcement personnel are forced to define and understand how gang structures exist, especially since gang dynamics vary over time and across different cities. This was a potential threat to the generalizability of the Indianapolis data since these measures were obtained in an emerging gang city, where law enforcement does not have an extensive history in dealing with gangs.

The findings suggest that situational features of the incident and demographic characteristics of the actors distinguish gang homicides from non-gang homicides in a similar fashion in both chronic and emerging gang cities. Thus, the previously

established correlates of gang homicides continue to stand up to empirical scrutiny when explaining different homicide subtypes. Gang homicides are more likely to involve multiple, younger, non-white, male actors and the incidents tend to be firearm related, and drug motivated. This was true in large, chronic gang cities in the early 1980's and held true in Indianapolis (i.e., an emerging gang city) in the late 1990's. Thus, the incident level correlates of gang homicide from this study are considered generalizable with the results from prior gang homicide studies.

In terms of the law enforcement literature, Webb and Katz (2003) showed that gang units specialize in intelligence gathering, investigation, and suppression techniques. Also, gang units often differ across agencies because the local gang problems and issues vary by locale. This is important because the tasks performed by the gang units are very specialized across different cities and by police department. However, when defining the relationship between homicide actors and gangs, many specialized gang unit officials tend to look for similar network dynamics (i.e., relationships) among gang members and offenders. For example, in Indianapolis, incidents were classified as gang homicides when multiple law enforcement participants in the homicide incident reviews agreed upon the relationship between an actor and a gang (i.e., the actor was part of a 'group of known, chronic offenders') and when the individual describing the actor-gang relationship provided extensive detail on the group of known chronic offenders (McGarrell and Chermak, 2003).

As discussed earlier, Weisburd and Braga (2006) proposed that law enforcement decision-making has tended to follow the clinical model, which is where police personnel make decisions about the classification of offenses and strategies for reducing crime

based solely upon their own prior experience. Weisburd and Braga (2006) stated that this model is frequently employed in a theoretically weak manner and is often not well suited for strategic intervention approaches. In terms of understanding the gang homicide problem, the IVRP team in Indianapolis appeared to extend an individually based clinical classification approach through the group review as part of a strategic approach to reduce violence. This conclusion is based upon three major factors.

First, when defining an incident as a gang homicide the IVRP working group and researchers were diligent about internal consistency and accuracy. Thus, their definition of gang homicides tended to be more conservative due to the strict standard they adhered to when classifying offenders as members of a group of known chronic offenders (McGarrell and Chermak, 2003). Again, offenders were classified as gang members' only when there was an abundance of reliable information obtained about the actors at the homicide incident reviews, including when at least two law enforcement officials could describe the gang or group.

Second, there was little empirical support for the lifestyle measures in terms of predicting gang-affiliated homicides. Thus, a likely explanation is that law enforcement agents did not simply define individuals as belonging to a group of known, chronic offenders based upon their prior contact (i.e. arrests) with actors. A less strategic approach would have likely relied upon official police records in terms of defining an actor as someone who was a chronic, persistent offender. It would thus appear the gang homicide task force was more concerned with understanding the relationship among actors suspected to be involved in gang activity than solely using official police records.

Third, results from this study suggest that the Indianapolis definition of gang homicide was consistent with prior gang research in both chronic and emerging gang cities. This was true when modeling the situational features of the incident and demographic characteristics of the actors. Although defining the gang problem is a local decision, the classification developed by law enforcement personnel and researchers in Indianapolis turned out to be consistent with other cities in terms of defining events as gang homicides. Taken together, these three factors suggest that the Indianapolis team defined gang homicides by utilizing an empirically driven investigation rather than simply "going through the motions", which is often the criticism of the clinical model (Webb and Katz, 2003). Again, the IVRP was a replication of the Operation Ceasefire intervention in Boston, which relied on a problem-oriented, strategic approach to reduce gang violence. Thus, it would appear that extending the individually based clinical classification approach through a group-based strategic problem solving process enhances the validity and reliability of the gang homicide identification process.

In addition, the disorder-gang homicide relationship has implications for the law enforcement literature as well. Again, this study indicates that disorder has a significant positive relationship with gang homicide, and thus, two final implications are discussed. First, the community policing and community-organizing approaches that have been shown to reduce disorder have the potential to reduce the likelihood of gang violence (Skogan, 1990; 2007). Indeed, the disorder-gang homicide relationship will be better understood if future research shows that strategic approaches specifically designed to reduce neighborhood disorder impacts gang homicide. Second, a rival hypothesis in terms of explaining the disorder-gang homicide relationship is that groups in high

disorder contexts may get labeled as gangs. Policing research should attempt to gather more information on the incident and whether structural cues are important to gang task force members as they label incidents as gang or non-gang related.

Implications for Ecological Criminology

The relationship between neighborhood structure and gang homicide also informs the ecological literature. This study utilized two neighborhood variables: economic deprivation and disorder. The relationship between economic deprivation[48] and gang homicide has been examined in prior research. The disorder-gang homicide relationship had not been specifically examined in statistical models until this study. Thus, the macro level implications for the ecological literature vary by neighborhood measure.

Economic Deprivation

Based on the results from this study as well as the findings from prior research, the relationship between economic deprivation and gang homicides appears fragile. Pizarro and McGloin (2006) found that when escalation was included as an incident level control variable, the once significant relationship between poverty and gang homicide

[48] Pizarro and McGloin (2006) examined the relationship between poverty and gang homicide. They constructed their poverty variable by summing the standardized value of the following four census measures: percent of people living in poverty, percent of people unemployed, percent of people receiving public assistance, and the percent of single parent households. Rosenfeld et al.'s (1999) research constructed a neighborhood disadvantage variable, which was a four-item principal component of the following measures: family poverty rate, percentage males unemployed, percent female-headed households with children under 18, and percent of families receiving public assistance. Operationally, both of these constructs are theoretically and methodologically very similar to the economic deprivation measure used in this study. Of particular importance, Rosenfeld et al. (1999) could not separate the influence of neighborhood disadvantage on gang homicide from the influence of racial composition. In some of their results, the authors exclude either racial composition or neighborhood disadvantage, as the two covariates combined tended to confound their results. This lends support to Wilson's (1987) contention that economic deprivation should include a measure of percent African American, as this construct is a better indicator of structural disadvantage.

diminished. In this study, only when disorder and economic deprivation were isolated from incident level controls did economic deprivation exert a significant relationship with gang homicide. However, when incident level correlates were incorporated into HGLM models the once significant relationship between economic deprivation and gang homicides observed in this study also diminished.

A comparison with Rosenfeld et al.'s (1999) findings is slightly more difficult to disentangle because they attempted to isolate the independent effects between gang homicide and neighborhood disadvantage and race. Of particular importance, the researchers could not separate the influence of neighborhood disadvantage on gang homicide from the influence of neighborhood racial composition (Rosenfeld et al., 1999). In many of their models, the authors excluded either racial composition or neighborhood disadvantage, as the two covariates combined tended to confound their regression estimates. When racial composition was included in their multivariate models, but neighborhood disadvantage was excluded, racial composition exerted a significant influence on gang homicides at the neighborhood level. In contrast, when neighborhood disadvantage was included and racial composition was excluded, neighborhood disadvantage significantly predicted non-gang homicides. The authors concluded when racial composition is controlled, neighborhood disadvantage does not significantly increase the frequency of gang homicide (Rosenfeld et al., 1999: 512).[49]

[49] In an effort to replicate this specific facet of Rosenfeld et al.'s (1999) research, I re-estimated an additional HGLM victim-only model using three structural measures: disorder, neighborhood deprivation without percent African American included as part of the factor variable, and percent African American as a stand-alone structural measure (see Appendix E, Table E-1). Incident level controls were also incorporated into the model. Results from this analysis indicate that economic deprivation (minus percent Black population) was *positively* associated with gang homicide ($p = .04$), while percent African American was *negatively* associated with gang homicide ($p = .05$). Disorder retained its positive significant association with gang homicide ($p = .01$) regardless of the deprivation-race delineation. In addition, when either percent African American *or* economic deprivation was included as a structural measure, and the

Both Rosenfeld et al.'s (1999) findings as well as the results from this study provide support for the use of a more conservative measure of economic deprivation that incorporates race (i.e., the percent African American population) as a dimension into the structural variable. Combining the percent African American population with other measures of economic disadvantage into one overall variable has been done in a number of prominent ecological studies (see Sampson and Raudenbush, 1999; Sampson and Wilson, 1995; Wilson, 1987). Indeed, the results from this study were very consistent with Rosenfeld et al.'s (1999) findings. Again, only when the neighborhood level models included measures of disorder and economic deprivation did economic deprivation exert a significant relationship with gang homicide. Once other important control variables were incorporated, the relationship between economic deprivation and gang homicide diminished.

Thus, prior research as well as the results from this study suggests that the relationship between economic deprivation and gang homicide is extremely unstable. It would appear that, by itself, economic deprivation significantly predicts gang homicide at the neighborhood level. Once other structural and incident level control variables are incorporated, there is no significant association between economic deprivation and gang homicide. On the surface it would appear that the most disadvantaged neighborhoods are more likely to have gang homicide, but when other incident and structural factors are

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other measure was excluded, disorder still retained its positive significant association with gang homicide. Thus, this analysis finds empirical support for Rosenfeld's et al.'s (1999) assertion that there is a confounding relationship between the estimates of the measures percent African American and economic disadvantage. Perhaps more importantly, the confounded relationship between deprivation and race had no effect on the disorder-gang homicide estimates. In terms of interpretation, just as gang homicides can be defined as gang affiliated (i.e., the Los Angeles definition) or gang motivated (i.e., the Chicago definition), non-gang homicides are also likely to have varying operational components, such as dispute or domestic related. This might explain why deprivation and racial composition explain non-gang homicides differently. Implications for these findings suggest the need for additional research in this area, particularly when attempting to understand non-gang homicides at the structural level.

controlled, this is not the case. Though it must be noted that these findings do not diminish the importance of economic deprivation as a structural correlate of homicide in general. Indeed prior research has shown that homicide in general is more likely to occur in socially and economically disenfranchised areas (Hsieh and Pugh, 1993). However, it would appear that economic deprivation as an ecological measure explains both non-gang homicides and gang homicides in a similar fashion. These findings suggest that economic deprivation's impact on gang homicide seems to be mediated by both individual and structural characteristics, including neighborhood disorder.

Disorder

The relationship between disorder and general forms of crime has been examined in a number of studies. As discussed in Chapter 3, Sampson and Raudenbush (1999) found that the disorder-crime relationship was not robust across different crime types. In particular, they found that disorder lost its statistically significant relationship with homicide (in general) and burglary when measures of collective efficacy were incorporated into their multivariate regression models (Sampson and Raudenbush, 1999). Sampson and Raudenbush (1999) did find that disorder maintained a statistically significant relationship with robbery after controlling for collective efficacy at the neighborhood level. This finding is consistent with the qualitative work of Wright and Decker (1997), who showed that armed robbers are attuned at targeting dealers in the local drug market, since these actors have access to cash and are unlikely to report to police.

As discussed earlier, based upon longitudinal data, Taylor (1999) found little support for the idea that neighborhood disorder at time 1 leads to crime at time 2. This finding challenged the "incivilities thesis" proposed by Bursik and Grasmick (1993) and Skogan (1990). Thus to this point, the ecological literature suggests that disorder is not particularly well suited at explaining crime *in general*, either cross sectionally (i.e., the relationship with different types of crime at a fixed point in time) or longitudinally (i.e., local disorder leads to increased crime). Rather, the prior research suggests that the disorder-crime relationship is one that exists in *specific types* of crime, particularly violent crime that is associated with drug markets. Given that gang homicides are more likely to be drug-market driven (Blumstein, 1995) and take place in the street (Maxson et al., 1985), the direct relationship between disorder and gang homicide was examined in this study.

Ecological theory states that disorder is high when neighborhood informal social controls are low (Bursik and Grasmick, 1993; Skogan, 1990). Street crime is higher in neighborhoods with lower levels of informal social control (Morenoff, Sampson, and Raudenbush, 2001; Sampson and Raudenbush, 1999; Sampson, Raudenbush, and Earls, 1997; Wilson and Kelling, 1982). This study found that disorder maintained a marginally significant positive relationship with gang homicide net of economic deprivation and after controlling for incident level measures of gang homicide. This suggests that the relationship between disorder and gang homicides is relatively robust. At this point it would be premature to assert that disorder exerts a strong relationship on gang homicides at the neighborhood level, but the results presented here certainly suggest that such a

relationship may indeed exist. Thus, the observed relationship between disorder and gang homicide has important implications for future macro-social research.

Given that disorder maintained a significant relationship with gang homicide after controlling for other theoretically important factors, a number of questions remain. Does disorder maintain its effect with gang homicide when measures of collective efficacy are included as neighborhood level variables? Skogan (1990) posited that low social control leads to high disorder. Sampson et al. (1997) proposed that low informal social control is explained by low collective efficacy. Thus, criminological theory states that disorder and collective efficacy are both inter-related with neighborhood informal social control mechanisms. However, collective efficacy incorporates one key neighborhood level element that disorder does not take into account, which is citizens' willingness to take action when there is a disturbance (Sampson et al., 1997). Sampson and Raudenbush (1999) examined the predictive power of disorder on different types of crime when measures of collective efficacy were incorporated and found mixed results based on different types of outcomes (i.e., different types of crime). The question remains, is it high disorder that is predicting gang homicides at the neighborhood level or is it low informal social control mechanisms? In particular, are gang homicides more likely to occur where residents are unwilling to take action, or where physical and social cues promote gang homicide, or both? Only when measures of collective efficacy are included as structural covariates can this relationship be untangled.

As discussed in the earlier limitations section, theory would also suggest that disorder would have a stronger influence on gang-motivated homicides since these incidents are more likely to occur as a direct product of gang specific activity (Maxson

and Klein, 1990). Specifically, gang motivated homicides are more likely to involve public space, to be drug-market related, or to involve other types of street crimes (Maxson and Klein, 1990). However, gang-affiliated homicides are incidents that involve known gang participants, meaning that the incident itself does not necessarily have to be gang-related (i.e., it is more of a lifestyle measure of the actors than a measure of a gang-motivated incident). Since this study only relied on an outcome measure that is consistent with gang-affiliated homicides, future studies should attempt to model the gang motivated homicide-disorder relationship. Finally, the size of the neighborhood boundary used here has important theoretical implications for ecological research. Most police beats in Indianapolis were comprised of two to three census tracts. Given Tita et al.'s (2005) findings that gang "set space" is likely to be much smaller than neighborhoods or census tracts, future research attempting to unravel the disorder-gang homicide relationship should rely upon more micro-level neighborhood boundaries.

Though many of these theoretical and methodological questions cannot be addressed in the current study, the results from this study lend support to the idea that disorder is more of crime specific structural factor than a neighborhood level correlate of crime in general. In addition to its established relationship with residential fear, the literature is beginning to suggest that neighborhood disorder is a structural correlate of violent, drug-market related crime. The findings presented here suggest that more rigorous empirical examinations are certainly worthwhile because future studies can address many of the aforementioned gaps in the literature.

Policy Implications

Taken collectively, the findings from this research have clear implications for public policy. Evidence exists that strategic intervention programs have the potential to reduce gang homicide (Kennedy et al., 1996; McGarrell et al., 2006; Webb and Katz, 2003). The incident level findings from this research suggest that gang homicides in Indianapolis are similar to other chronic and emerging gang city homicides, at least in terms of the situational features of the incidents and the actors' demographic make-up. The neighborhood level findings suggest that disorder has a significant effect on gang homicide. Thus, this section describes some key policy implications based on the empirical results observed in this study.

Actor Level Initiatives

In terms of the incident level findings, one of the most consistent predictors of gang homicide was firearm use. A prominent policy intervention designed to reduce gun violence by targeting youth gang offenders was the Operation Ceasefire program in Boston (Braga, Kennedy, Waring, and Piehl, 2001). Kennedy (2006) described the 'lever pulling' strategy implemented in Boston as a relatively narrow focus that utilized a wide variety of data sources and analytic techniques, relied heavily on experiences and insight of front-line law enforcement and community actors, and attempted to have a substantive impact. Project research showed that the problem of youth homicide was largely concentrated among a small group of chronically offending, gang-involved, youth (Kennedy, Piehl, and Braga, 1996).

Organizational members (i.e., law enforcement and research personnel) in the Operation Ceasefire project diagnosed the gang problem, and researchers concluded that

chronic disputes among gangs appeared to be the most significant cause of gang violence in Boston (Braga et al., 1999). After implementing the focused-deterrence strategy (Braga et al., 2001; Kennedy et al., 1999), the evaluation component of the Operation Ceasefire project showed that Boston experienced a 63 percent reduction in youth homicide and similar large reductions in nonfatal serious gun violence (Braga et al., 2001). Because of its observed potential, the Operation Ceasefire project was replicated in several cities including Baltimore, Minneapolis, and Indianapolis (Braga and Weisburd, 2006: McGarrell et al., 2006). More recently, this strategy was a driving force behind the PSN, a national program designed to reduce violent-gun crime.

The results from these strategic intervention programs are suggestive that targeting gang members in a tactical manner can reduce overall homicide in emerging gang cities. Multiple studies have now provided evidence that the prevalence of citywide homicide has been shown to decrease when these programs are implemented. Given that prior research, as well as the results from this study indicating that gang homicides are more likely to be firearm related, strategic firearm reduction programs have the potential to reduce the occurrence of gang homicide.

Neighborhood Level Initiatives

The neighborhood level results in this study suggest that gang homicides are more likely in areas with higher disorder. Prior research has shown that disorder is more prominent in areas with low informal social control mechanisms. Policy suggests when informal mechanisms are low to non-existent it may be necessary to augment formal social control mechanisms. This idea is based on the notion that there are areas where citizens have a difficult time policing themselves. Therefore, these neighborhoods may

need formal assistance, by way of law enforcement, to help regulate behavior and build informal social control mechanisms. This has been empirically observed because formal social control mechanisms can also serve as a vehicle, or as a mediator, for strengthening informal social control mechanisms (Greene, 2003).

From a theoretical perspective, strengthening informal social control by enhancing formal social control is what Bursik and Grasmick (1993) refer to as public level control. The idea behind public level control is to link citizens in disordered neighborhoods to outside agencies, such as government organizations. In this sense, public control is achieved because local organizations are able to secure public goods and services that are allocated by agencies outside the neighborhood (Bursik and Grasmick, 1993). An example of this type of policy-driven intervention can be seen in broken windows policing.

Broken windows policing is a law enforcement emphasis designed to reduce disorderly behavior and minor offenses, often referred to as 'quality of life' offenses, such as prostitution, public urination, and aggressive panhandling (Sousa and Kelling, 2006). Many of the behaviors targeted in broken windows policing are cues of neighborhood level disorder (Skogan, 1990). This is important because Rosenfeld et al. (2006) found that arresting offenders for minor crimes (i.e., vagrancy, vandalism, public drunkenness, and aggressive panhandling) often 'nets bigger fish', such as offenders who have outstanding warrants for more serious forms of crime. Further, Rosenfeld, Fornango, and Rengifo (2007) and Messner, Galea, Tardiff, Tracy, et al., (2007) found that arrests for less serious disorder-type offenses related to declines in the overall crime rate, at least in New York City. Sousa and Kelling (2006) contended that only one part of

policing is crime reduction, but another component of policing is 'order maintenance'. Order maintenance as a policing strategy attempts to reduce neighborhood level instances of accumulative harms and offenses. Reducing social and physical disorders in areas marred with disorder has a worthwhile effect on citizens' quality of life. Thus, it may be possible to reduce gang homicides indirectly by improving neighborhood disorder, given that study finds support for a disorder-gang homicide relationship.

However, critics argue that aggressive disorder policing actually increases harm at the neighborhood level (Harcourt, 2001). Specifically, Harcourt (2001), Kennedy (2006), and Skogan (2006) contend that increased arrests for minor offenses will likely create neighborhood confusion as well as introduce even greater levels of racial inequality to the criminal justice system, rather than changing views toward minor offending. Indeed, some scholars see aggressive disorder policing as a form of social disorder itself (i.e., residents may not want to witness police arresting people in their neighborhood for minor offenses). Future research in this area is vital to understanding the impact of aggressive disorder policing at the neighborhood level. Whether aggressive disorder policing has a positive or negative effect on neighborhood social order is still widely unknown, given the low number of studies that have addressed this question. More research is needed in this specific area, especially given there is suggestive evidence that disorder and gang homicide are related.

Conclusion

In conclusion, this study addresses gaps in the gang homicide literature. The findings suggest that many of the significant incident level correlates that explain

homicide in chronic gang cities also hold in emerging gang cities. This was particularly the case in Indianapolis, where the situational features of the incident and demographic characteristics of the actors were significantly more likely to predict gang homicide. The extent to which gang homicides are similar across chronic and emerging gang cities remains largely unverified, though this research showed the similarities may be more common than the differences. Although many of these incident level measures emerged from research dealing with chronic gang cities, the results presented here suggest that their explanatory power is robust across different city subtypes. However, several important incident level explanations of gang homicide were not measured in this study. Future research should examine explanations of gang homicide in terms of the victim-offender relationship (see Decker, 1993; Riedel, 1987) across different city subtypes. This type of empirical investigation could test the generalizability of gang homicide across different locales.

The situational and demographic features that significantly predict gang homicide alone are theoretically insufficient. Simply stated, these factors (i.e., multiple, young, non-white males that carry firearms, and are involved in the drug market) do not explain gang homicide alone mainly because these dynamics do not always result in a fatal confrontation. Indeed, something else has to happen to explain how these dynamics all *converge* to explain gang homicide. Decker (1996) found that homicides are often linked through networks and described how these networks link victims, suspects and witnesses to violence. In essence, a witness to one event can become the victim or suspect in another event. Some researchers propose that once predictors from social learning theory (i.e., measures that capture association with delinquent/criminal peers) are controlled, the

importance of demographic characteristics of the actors is superseded (Esbensen et al., 2001: 20). Thus, it is vital to include theoretically relevant measures of peer association and escalation when trying to explain gang homicides.

This research supports the hypothesized link between disorder and violent crime, specifically gang homicide. Until the late 1990's, there was an extensive limitation of research that examined the neighborhood effect on gang homicide. Fortunately, a growing body of literature has begun to disentangle the neighborhood-gang homicide relationship. The results presented here are suggestive that a disorder-gang homicide relationship exists, net of incident level features and other structural characteristics. These findings do not contradict prior ecological research, but rather support the notion that structural level disorder has a direct effect on violent neighborhood drug crime (Sampson and Raudenbush, 1999; Wright and Decker, 1997).

Results from this study lend support to the idea that disorder is more of crime specific structural factor than a neighborhood level correlate of crime in general (i.e., does not fit at the top of the cone of resolution). More specifically, neighborhood disorder may be a specific structural correlate of violent, drug-market related crime (i.e., it appears to fit at the bottom of the cone of resolution). However, until future research conducted in different cities examines the disorder-gang homicide relationship at a more micro-social level (Tita et al., 2005) as well as including measures of collective efficacy (Sampson et al., 1997) and incident level escalation (Decker, 1996), neighborhood level explanations of gang homicide will be theoretically inadequate.

It is important to provide a future research agenda that will take gang homicide research in the appropriate direction. Future research in this area should focus on the

gaps in the gang homicide literature. Gang homicides need to be explained in terms of the situational features of the event and demographic characteristics of the actors in multiple gang city subtypes (i.e., whether they are chronic or emerging gang cities) and by using different gang classifications (i.e., gang affiliated or gang motivated offenses), while controlling for the victim-offender relationship (i.e., escalation measures).

In addition, missing data analysis showed that there was a bias in the joint-actor models where demographic information on the suspect was unknown. In particular, where suspect demographic information was missing, homicides were more likely to be gang related. Based upon censorial evidence from the researchers involved in the incident reviews, it became apparent that this was consistent with social disorganization theory (Sampson et al., 1997) and the 'no snitch' street culture (Anderson, 1999). Indeed, Decker (1996) showed that individuals involved in the street culture were often concerned about retaliatory responses from groups of violent offenders (i.e., gangs). Criminological theory would suggest that individuals residing in socially disorganized neighborhoods are less likely to cooperate with law enforcement, which is vital to solving an open homicide. The fact that neighborhood disorder was a significant predictor of gang homicide is thus consistent with theoretical assertions drawn from social disorganization theory as well as ethnographic observations (Anderson, 1999). Future gang homicide research in this area should rely heavily on the contextual information about all homicide incidents in order to uncover the factors that predict gang homicide. Based on the results of the missing data analysis it becomes apparent that unknown suspect information is not data missing at random. Rather there appears to be a

relationship with unknown suspect information and gang homicide, which should be the focus of future research in this area.

Most researchers would agree, demographic, situational, lifestyle, and structural measures alone do not explain gang homicide. All of these factors have to come together to create a combustible atmosphere where a fatal confrontation is more likely to result. Continuing to examine the empirical validity of theoretically relevant measures that explain the environment where gang homicides flourish is a vital step to criminological research. Only then will our understanding of gang homicide become more valid and generalizable. The research presented here has been a step in that direction.

Appendix A

Table A-1: Missing data table for data sources used in the multivariate analyses in Indianapolis

Variable	Total Included	%	Narrative
IVRP data			
Firearm use	563	100	Complete data from incident reviews
Drug-motivated incident	563	100	Complete data from incident reviews
Number of suspects	555	98.6	6 cases involved missing suspect details
Victim non-white	563	100	Complete data from incident reviews
Victim male	554	98.4	7 cases where coding information was lost
Victim age	550	97.7	13 cases missing data for victim's age
Joint male-on-male	351	62.3	184 cases with unknown suspects combined with missing victim data (gender)
Joint age (sum)	366	65.0	184 cases with unknown suspects combined with missing victim data (age)
Joint intra-racial non-white	378	67.1	184 cases with unknown suspects combined with missing victim data (race)
Victim prior drug arrests	562	99.8	1 unknown victim, was unable to run criminal history for this person
Victim prior weapon arrests	562	99.8	1 unknown victim, was unable to run criminal history for this person
Joint prior drug arrests	378	67.1	1 unknown victim, 184 cases with unknown suspects
Joint prior weapon arrests	378	67.1	1 unknown victim, 184 cases with unknown suspects
POPN data			
Disorder Measure	452	80.2	111 homicides fell outside IPD jurisdiction. Overall survey completion rate was 53 percent (5,389/8,245)
Census data			
Economic Deprivation Measure	452	80.2	111 homicides fell outside IPD jurisdiction. Demographic measures are estimated to be with 1-2 percent of actual population (Freedman and Wachter, 2002)

Table A-2: Joint-actor logistic regression model including drug arrests but excluding weapon arrests

	Model 4 (N = 331)	
Variable	Beta (S.E.)	OR (Exp(b)-1)
Intercept	-2.28	--
	(.677)	
Firearm use	.939	2.55***
	(.315)	(1.55)
Number of suspects	1.10	3.01***
	(.260)	(2.01)
Drug-motivated	.437	1.54
incident	(.515)	(0.54)
Joint age	-.017	.983**
	(.007)	(-.017)
Non-white intra-racial	.641	1.89**
	(.298)	(0.89)
Male-on-male	.782	2.18**
	(.296)	(1.18)
Joint actor # of drug	.184	1.20**
arrests	(.081)	(0.20)
Joint actor # of weapon arrests	--	--
Nagelkerke (pseudo) R-square		.359
χ^2 model improvement (df)		103.79 (7)

Appendix B

Table B-1: Pearson's r correlations between independent variables included in victim-only logistic regression

	Pearson r P-value N	Pearson r P-value N	Pearson r P-value N	Pearson r P-value N	Pearson r P-value N	Pearson r P-value N
Variable	Variable A	Variable B	Variable C	Variable D	Variable E	Variable F
A) # of suspects	--	.069 .102 555	.036 .396 555	-.052 .225 542	-.043 .320 534	.074 .086 546
B) Drug-motivated incident	.069 .102 555	--	.076 .073 563	-.040 .347 550	.082 .056 541	.074 .082 554
C) Firearm use	.036 .396 555	.076 .073 563	--	-.278 < .001 550	.264 < .001 541	.191 < .001 554
D) Age of victim	-.052 .320 534	-.040 .347 550	-.278 < .001 550	--	-.183 < .001 536	-.116 < .01 548
E) Non-white victim	-.043 .320 534	.082 .056 541	.264 < .001 541	-.183 < .001 536	--	.226 < .001 541
F) Male victim	.074 .086 546	.074 .082 554	.191 < .001 554	-.116 < .01 548	.226 < .001 541	--

Table B-2: Pearson's r correlations between independent variables included in joint-actor logistic regression

	Pearson r P-value N	Pearson r P-value N	Pearson r P-value N	Pearson r P-value N	Pearson r P-value N	Pearson r P-value N
Variable	Variable A	Variable B	Variable C	Variable D	Variable E	Variable F
A) # of suspects	--	.069 .102 555	.036 .396 555	-.011 .838 339	.118 .028 351	-.128 .014 336
B) Drug-motivated incident	.069 .102 555	--	.076 .073 563	.072 .187 339	.108 .044 351	-.039 .459 366
C) Firearm use	.036 .396 555	.076 .073 563	--	.269 < .001 339	.267 < .001 351	-.216 < .001 366
D) Non-white intra-racial	-.011 .838 339	.072 .187 339	.269 < .001 339	--	.214 < .001 339	-.211 < .001 331
E) Male-on-male	.118 .028 351	.108 .044 351	.267 < .001 351	.214 < .001 339	--	-.355 < .001 341
F) Total age of actors	-.128 .014 366	-.039 .459 366	-.216 < .001 366	-.211 < .001 331	-.355 < .001 341	--

Appendix C

Table C-1: Additional HGLM model where both prior drug and weapon arrests were included as level-1 control measures

Variable	Model 4 (N=435)		
	Beta (S.E.)	OR (Exp(b)-1)	p-value
Intercept, $ß_{0j}$			
γ_{00} (Intercept level-2)	-2.95 (.703)	.052 (-.948)	< .001
Incident level control measures			
Firearm use, $ß_1$	1.32 (.278)	3.74 (2.74)	< .001
Number of suspects, $ß_2$	.623 (.236)	1.87 (0.87)	.085
Drug-motivated incident $ß_3$	.511 (.424)	1.66 (0.66)	< .01
Victim age, $ß_4$	-.018 (.008)	.981 (.019)	.033
Victim non-white, $ß_5$	.635 (.301)	1.88 (0.88)	.035
Victim male, $ß_6$	.818 (.296)	2.26 (1.26)	< .01
Victim drug arrests, $ß_7$	.102 (.103)	1.10 (0.10)	.326
Victim weapon arrests, $ß_8$	.001 (.152)	1.01 (0.01)	.993
Neighborhood level measures			
Economic deprivation	n/a	n/a	n/a
Disorder, γ_{01}	.221 (.127)	1.25 (0.25)	.085
Deviance Statistic (df)		498.3 (425)	

Table C-2: Additional HGLM model where prior drug arrests were included as a level-1 control measure and both level-2 measures were included

Variable	Model 5 (N=435)		
	Beta (S.E.)	OR (Exp(b)-1)	p-value
Intercept, β_{0j}			
γ_{00} (Intercept level-2)	-2.91 (.735)	.054 (-.946)	< .001
Incident level control measures			
Firearm use, β_1	1.32 (.279)	3.77 (2.77	< .001
Number of suspects, β_2	.625 (.236)	1.87 (0.87)	< .01
Drug-motivated incident β_3	.509 (.423)	1.66 (0.66)	.230
Victim age, β_4	-.018 (.008)	.981 (-.019)	.033
Victim non-white, β_5	.648 (.307)	1.91 (0.91)	.035
Victim male, β_6	.817 (.295)	2.26 (1.26)	< .01
Victim drug arrests, β_7	.103 (.092)	1.11 (0.11)	.263
Neighborhood level measures			
Economic deprivation, γ_{01}	-.031 (.124)	.969 (-.031)	.803
Disorder, γ_{02}	.237 (.139)	1.27 (0.27)	.095
Deviance Statistic (df)		498.2 (425)	

Table C-3: Additional HGLM model where a combined lifestyle measure was included as a level-1 control measure and both level-2 measures were included

Variable	Model 6 (N=435)		
	Beta (S.E.)	OR (Exp(b)-1)	p-value
Intercept, β_{0j}			
γ_{00} (Intercept level-2)	-2.91 (.734)	.055 (-.945)	< .001
Incident level control measures			
Firearm use, β_1	1.32 (.279)	3.77 (2.77)	< .001
Number of suspects, β_2	.620 (.236)	1.86 (0.86)	< .01
Drug-motivated incident β_3	.534 (.422)	1.71 (0.71)	.207
Victim age, β_4	-.018 (.008)	.981 (-.019)	.033
Victim non-white, β_5	.642 (.307)	1.90 (0.90)	.037
Victim male, β_6	.811 (.297)	2.25 (1.25)	< .01
Total victim drug & weapon arrests, β_7	.065 (.064)	1.06 (0.06)	.305
Neighborhood level measures			
Economic deprivation, γ_{01}	-.030 (.124)	.969 (-.31)	.807
Disorder, γ_{02}	.241 (.139)	1.27 (0.27)	.090
Deviance Statistic (df)		498.4 (425)	

Table C-4: Cross-level interaction models-disorder with incident level measures

Variable*	Intercept Coefficient (st. error)	Slope Coefficient (st. error)
Number of suspects, γ_{10} & γ_{11}	.697	-.022
	(.407)	(.921)
Drug-motivated incident, γ_{20} & γ_{21}	.719	-.045
	(1.69)	(.465)
Firearm use, γ_{30} & γ_{31}	.924	.122
	(.968)	(.267)
Victim age, γ_{40} & γ_{41}	-.007	-.003
	(.030)	(.008)
Victim non-white, γ_{50} & γ_{51}	1.52	-.257
	(1.01)	(.290)
Victim male, γ_{60} & γ_{61}	1.23	-.403
	(1.13)	(.316)

*Each measure was estimated independent of the other interactive terms, and was included with the measures from Model 3 in Table 25.

Table C-5: Mixed logistic regression model for joint-actor data where both drug and weapon arrests were included as lifestyle control measures

Variable	Model 7 (N=264)		
	Beta (S.E.)	OR (Exp(b)-1)	p-value
Intercept	-2.86 (.918)	.057	< .01
Incident level control measures			
Firearm use	1.05 (.354)	2.85	< .01
Number of suspects	.768 (.271)	2.15	< .01
Drug-motivated incident	.269 (.525)	1.31	.609
Joint age	-.017 (.008)	.983	.034
Non-white intra-racial	.447 (.371)	1.56	.228
Male-on-male	.837 (.334)	2.31	.012
Prior drug arrests	.129 (.093)	1.14	.165
Prior weapon arrests	-.036 (.149)	.964	.808
Neighborhood level measures			
Economic deprivation	.079 (.151)	1.08	.601
Disorder	.251 (.168)	1.29	.136
Nagelkerke (pseudo) R-square	.328		
Model χ^2 (df)	74.37 (10)		

Table C-6: Mixed logistic regression model for joint-actor data where only drug arrests were included as a lifestyle control measure

Variable	Model 8 (N=264)		
	Beta (S.E.)	OR (Exp(b)-1)	p-value
Intercept	-2.95 (.915)	.052	< .01
Incident level control measures			
Firearm use	1.04 (.352)	2.84	< .01
Number of suspects	.761 (.272)	2.14	< .01
Drug-motivated incident	.323 (.521)	1.38	.536
Joint age	-.017 (.008)	.983	.032
Non-white intra-racial	.418 (.366)	1.51	.253
Male-on-male	.874 (.330)	2.39	< .01
Prior drug arrests	.049 (.137)	1.05	.721
Neighborhood level measures			
Economic deprivation	.089 (.150)	1.09	.551
Disorder	.299 (.164)	1.35	.069
Nagelkerke (pseudo) R-square	.320		
Model χ^2 (df)	72.29 (9)		

Table C-7: Interaction terms added to the mixed logistic regression joint-actors model

Variable*	Coefficient	St. error	P-value
Number of suspects*disorder	-.113	.252	.653
Drug-motivated incident*disorder	-.708	.652	.277
Firearm use*disorder	.027	.333	.935
Victim age*disorder	-.002	.008	.998
Victim non-white*disorder	-.168	.317	.846
Victim male*disorder	-.195	.325	.823

*Each measure was estimated independent of the other interactive terms in Table C-4, and was included with the measures from Model 6 in Table 27.

Appendix D

Table D-1: Pearson's r correlations between independent variables included in victim-only HGLM model

Variable	R P-value N Variable A	R P-value N Variable B	R P-value N Variable C	R P-value N Variable D	R P-value N Variable E	R P-value N Variable F
A) # of suspects	--					
B) Drug-motivated incident	.046 .327 447	--				
C) Firearm use	.028 .559 447	.060 .200 452	--			
D) Age of victim	-.018 .707 441	-.040 .402 446	-.305 < .001 446	--		
E) Non-white victim	-.025 .598 439	.071 .133 444	.271 < .001 444	-.210 < .001 440	--	
F) Male victim	.036 .449 446	.062 .191 451	.197 < .001 451	-.088 .062 446	.208 < .001 444	--
G) Disorder	.030 .525 447	.050 .291 452	-.007 .887 452	.039 .412 446	.104 .029 444	.018 .700 451
H) Economic Deprivation	-.048 .312 447	.010 .836 452	.084 .076 452	-.014 .766 446	.256 < .001 444	.051 .277 451
(con't) G & H	.353 < .001 452		--	--	--	--

Table D-2: Pearson's r correlations between independent variables included in joint-actor mixed logistic model

(N = 264) Variable	R P-value Variable A	R P-value Variable B	R P-value Variable C	R P-value Variable D	R P-value Variable E	R P-value Variable F
A) # of suspects	--					
B) Drug-motivated incident	.074 .233	--				
C) Firearm use	.068 .272	.071 .251	--			
D) Age of victim	-.022 .724	-.020 .251	-.257 < .001	--		
E) Non-white victim	.023 .716	.047 .448	.290 < .001	-.218 < .001	--	
F) Male victim	.111 .071	.069 .264	.197 < .01	-.120 .051	.190 < .01	--
G) Disorder	.070 .254	.064 .302	.008 .901	.056 .367	.134 .029	.029 .639
H) Economic Deprivation	-.054 .385	.006 .920	.070 .258	.027 .667	.297 < .001	.009 .884
(con't) G & H	.364 < .001		--	--	--	--

Figure D-1: Histogram of standardized residuals from the victim-only HGLM mixed model

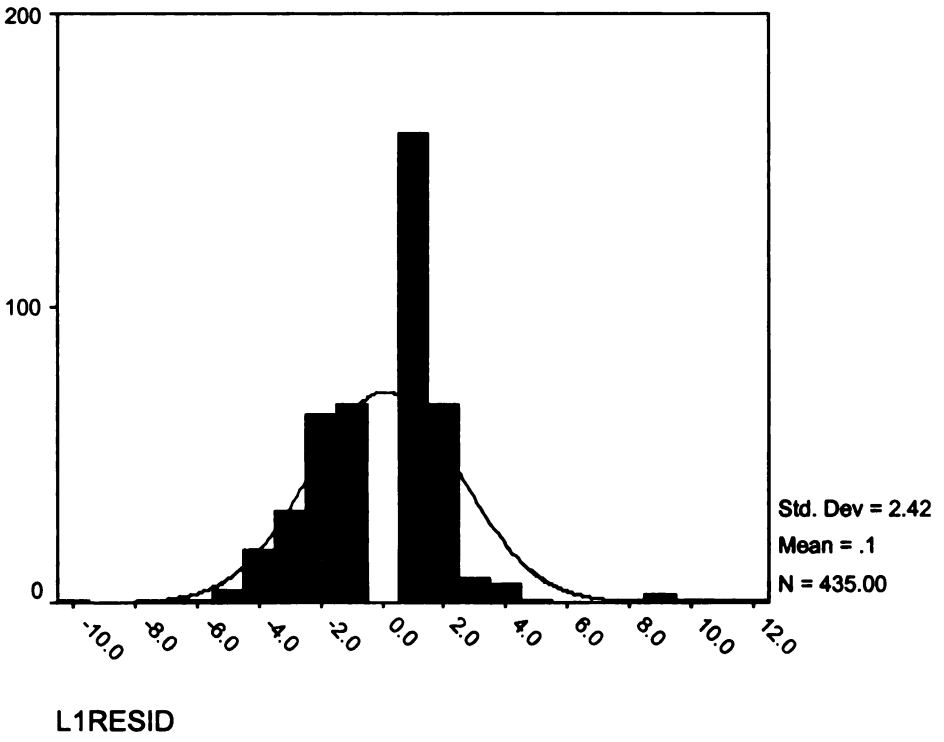
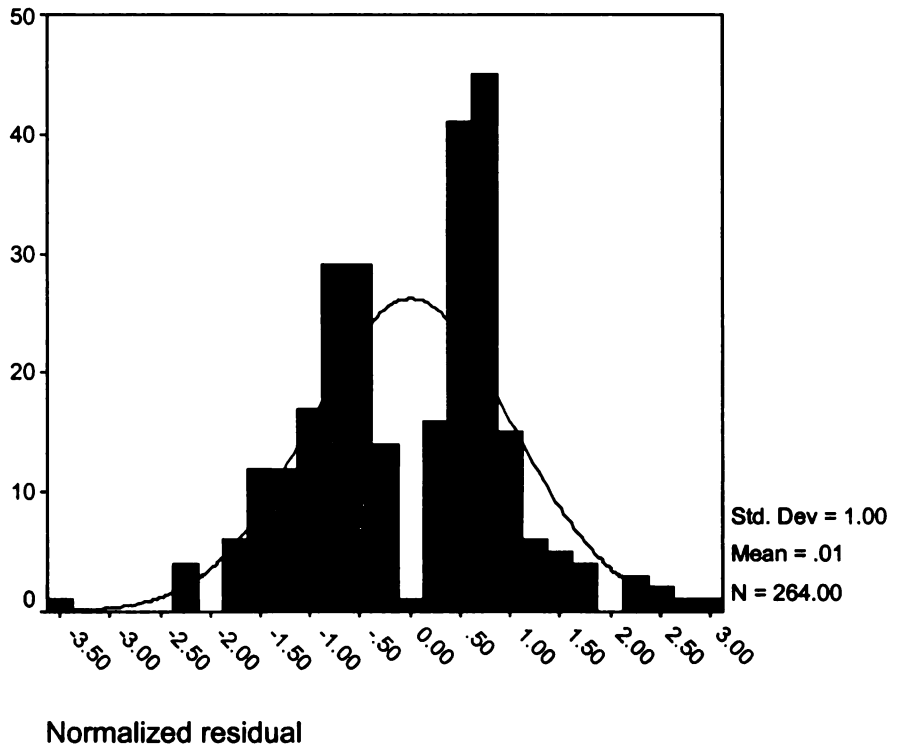


Figure D-2: Histogram of standardized residuals from the joint-actor mixed logistic model



Appendix E

Table E-1: Additional HGLM model separating race and economic deprivation

Variable	Model 9 (N=435)		
	Beta (S.E.)	OR (Exp(b)-1)	p-value
Intercept, β_{0j}			
γ_{00} (Intercept level-2)	-3.83 (.815)	--	< .01
Incident level control measures			
Firearm use, β_1	1.27 (.281)	3.58 (2.58)	< .01
Number of suspects, β_2	.635 (.241)	1.88 (0.88)	< .01
Drug-motivated incident β_3	.585 (.427)	1.79 (0.79)	.172
Victim age, β_4	-.019 (.008)	.980 (-.02)	.023
Victim non-white, β_5	.444 (.327)	1.55 (0.55)	.176
Victim male, β_6	.876 (.295)	2.40 (1.40)	< .01
Neighborhood level measures			
Disorder, γ_{01}	.403 (.154)	1.49 (0.49)	.013
Deprivation minus pct A.A., γ_{02}	.015 (.007)	1.01 (0.01)	.043
Percent African American, γ_{03}	-.380 (.194)	.683 (-.317)	.056
Deviance Statistic (df)	494.3 (425)		

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