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The Driving Force: A Comparative Analysis Of Gang-motivated, Firearm-related Homicides

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THE DRIVING FORCE:
A COMPARATIVE ANALYSIS
OF
GANG-MOTIVATED, FIREARM-RELATED HOMICIDES

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ABSTRACT

The knowledge of gang homicides is constantly increasing, but one aspect of gangs rarely studied is drive-by shootings (Dedel 2007; Hutson, Anglin, and Pratts 1994; Hutson, Anglin, and Eckstein 1996; Polczynski 2007; Sanders 1994; Sugarmann and Newth 2007). In this paper are comparative analyses of gang-motivated, firearm-related homicides perpetrated through a drive-by shooting to those which are not perpetrated through a drive-by shooting, by spatial and regression analyses. The data used for the analyses are a combination of incident variables, such as victim, offender, and incident characteristics, as well as social and economic characteristics of the communities in which the homicides occurred for a 31 year time period in Chicago. The findings indicate that there are differences in the characteristics and spatial location of gang-motivated, firearm-related homicides whether perpetrated through a drive-by shooting or by some other means. Based on the findings there may be policy implementations that are available in order to reduce the likelihood of a gang-motivated drive-by shooting.

This work is dedicated to Ismael Ferniza. Ismael does not know the positive impact he has on others; his constant faith is to be admired. In addition, the topic of this research would never have crossed my mind if it were not for the life of Ismael Ferniza.

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

CHAPTER ONE: INTRODUCTION

In the movie *Gone Baby Gone* the opening monologue begins with, "I always believed it was the things you don't choose that makes you who you are; your city, your neighborhood, your family. People here take pride in these things, like it was something they'd accomplished." This opening monologue is a thought that encompasses many theories of an individual and his or her community, from the nurture versus nature debate to how much an individual can exact community change. The research presented here is an analysis of the idea that both individual and community characteristics affect crime, specifically homicide motivated by gangs.

An insufficient amount of research has been written about the phenomenon of drive-by shootings. What is commonly known about drive-by shootings has been written by media journalists. There are few scholarly studies that solely address the issues of drive-by shootings; one is based on conversations with gang members in Los Angeles (Sanders 1994), two studies are based on data from the Los Angeles Police Department about juvenile victims of drive-by shootings in the 1990s (Eckstien, Hutson, and Anglin 1996; Hutson, Anglin, and Pratts 1994), one study relies on Chicago's Police Department data comparing drive-by shootings to other homicides (Polczynski 2008), and a six-month study is based on Google news reports (Sugarmann and Newth 2007).

Although little information is known about drive-by shootings there is a plethora of information on gangs and gang homicides. The literature on gangs and gang homicides is thoroughly reviewed in this work in order to lay a foundation for understanding the analyses. Studies that solely focus on drive-by shootings and studies

that mention an aspect of drive-by shootings within a larger context of gangs are also addressed in the literature review.

It has been determined by research on drive-by shootings that about 90 percent of drive-by shootings are gang-motivated, meaning the purpose of the crime was for gain of the gang, i.e. turf protection or retaliation (Polczynski 2008; Sanders 1994). Based on this knowledge about drive-by shootings the first purpose of this study was to determine if the characteristics of gang-motivated homicides due to drive-by shootings are different than other gang-motivated homicides perpetrated with a gun, based on data on Chicago homicides from 1965 to 1995. Secondly, this study determined there was enough difference in the characteristics between the two types of homicide to predict whether or not a homicide case as a drive-by shooting. Third, an analysis of the locations in which the two types of homicides was investigated to determine the differences between the communities in which the homicides occur. The purpose of these analyses was to better understand the phenomenon of drive-by shootings and to explore the possibility of developing and implementing policy aimed at reducing the frequency of drive-by shootings.

CHAPTER TWO: LITERATURE REVIEW

Gangs

Definitions

During the nearly 90 years in which gangs have been studied, many different definitions for gangs have been used (Klein 2006). The definitions range from those that apply to very specific groups to those that could encompass many forms of gangs such as prison gangs, biker gangs, and terrorist groups (Klein 2006). Some of the more commonly used definitions will be addressed here; additional definitions are covered in Klein's book (2006).

Miller's (1974) definition of the term gang is more in-depth than most. The defining conditions Miller utilized include:

1. a recurrent congregation of the gang,
2. a territorially- and age-based group,
3. the main activities of the gang include illegal activities, and
4. the gang is differentiated by groups.

Recurrent congregation by an exclusive group is that in which the members do not desist after a short period of time and who meet regularly at a location away from the residence of its members. According to Miller gangs are territorially-based by the places they frequent and the particular area they consider as their turf. The age basis is dependent on the number of members; the larger the gang the more likely it is to congregate in sub-groups of individuals who are similar in age. According to Miller the activities that gangs are involved in are hanging out, especially with people of the other gender; committing illegal activities; and joining in athletic competitions. The final criterion is

that the gang members differentiate themselves from others within the group through authority, roles, prestige, and cliques that are established by the gang. As stated above many of these defining criteria fluctuate depending on the social situation by the time period, community members, and the individual gang members.

Miller's (1974) in-depth definition is often hard to use, especially when law enforcement members are trying to distinguish groups from gangs (Block and Block 1993). Police generally go by a simpler definition of gangs[1] which is not always accurate, in order to more easily identify gangs and their involvement in crimes (Klein 2006). Although the issue of defining gangs still exists there is more of a consensus about the definition. At one point the U.S. Justice Department even became involved in determining a definition of a gang. Their involvement in defining gangs was to create a common definition that would be used by all jurisdictions to have better reliability from law enforcement in identifying and counting the gangs in their communities. Although a consensus was not reached, the basic points were agreed upon for identifying gangs:

1. the gang is a permanent group that uses symbols,
2. gang members constantly communicate with one another,
3. the group is bound in a turf, and
4. is involved in crime (Curry and Spergel 1988; Decker 1996; Decker and Curry 2002).

Mostly likely the difficulty in defining and identifying a gang is rooted in the problem that the differences between gangs and non-gang groups are often ambiguous (Klein 2006). A major difficulty is that there are no written rules that the gangs observe, nor a register to keep track of who is a member. Miller (1974), along with many other

[1] Youth who loiter in groups and seem to be committing unacceptable behaviors (Klein 2006).

researchers (e.g., Curry and Decker 1998; Klein 2006), used the action of illegal behavior by a group to be the determining characteristic between gangs and non-gang groups. The distinction between groups and gangs may not be definitive, but each has different social phenomena; generally gangs use more violence, and sometimes have established rules and leadership (Curry and Decker 1998; Curry and Spergel 1988).

Due to the lack of commonality of the definitions of gangs the difficulty of gathering and sharing data by police departments is complicated. Yet law enforcement departments, particularly of larger jurisdictions, try to keep track of gangs and their members (Block, Christakos, Jacob, and Przybylski 1996). In those jurisdictions where gang members are identified there is an added difficulty in identifying when an individual is a gang member or when they have desisted from being a part of a gang (Decker and Curry 2002). Some of the ways in which gang members are identified by police are through traditional gang characteristics, such as symbols and behaviors used by the youth.

The individuals in the gang generally range in age from eleven to twenty years and homogeneity of sex and ethnicity within a gang is common. Predominantly gangs consist of male members, but some gangs do have females as associates or an auxiliary gang, and though more rare, there are all female-member gangs (Campbell 1992, Curry 1998, Miller 2001, Molidor 1996, and Sikes 1997). Gangs contain clusters meaning that the individuals are grouped by rank as well as age (Miller 1974). The two common ranks among gang members are those of fringe and core members (Klein and Maxson 1989; Egley, Howell, and Major 2006). Fringe members generally associate with the gang but have no control over gang actions. Core members include the leaders of the gang who

determine actions, set forth purposes, call meetings, and perform leadership roles. According to Klein and Maxson (1989), the gang members try to model the leader's actions, not necessarily follow the leader's requests, because gang leadership changes depending on the time period and activity in which the gang is involved. A commonly misunderstood aspect of gangs is that they are inflexible groups, when in fact they are more likely an adaptive and flexible group, which allows them to change with a situation or with the ebb and flow of membership (Klein and Maxson 1989).

Another misunderstood concept of gangs is that gangs are all similar; this is not the case (Howell 2007; Thrasher 1963). Thrasher (1963) and other gang researchers (e.g., Howell 2007; Klein 2006) have found that no two gangs are alike. The differences are based on many aspects, such as who is in the gang, what is the gang's purpose, and from what community does the gang come (Howell 2007).

Perceptions of gangs are often misunderstood due to the portrayal given by the gang members themselves as well as the media (Howell 2007). A gang may mimic a more powerful gang by using the same colors and symbols to portray themselves as a part of the bigger faction because it seems more impressive or intimidating than what they are in actuality. The media misrepresents gangs in many ways, but often does so because of the misunderstanding that all gangs are alike. The media also portrays gangs as a group with a structured hierarchy, who are all males of ethnic minority; this portrayal generally sensationalizes the gang. The misunderstandings about gangs are not new, just as gangs are not new.

Progression

Youth gangs have been documented since the 1800s (Decker and Curry 2002) and have generally followed periods of growth and retreat. The periods of growth seem to be initiated by periods of social change, such as in the 1800s, when gangs are thought to have been a product of the social and economic conditions of recent immigrants who were confined to urban areas. Gangs in the 1930s are thought to be a result of the Great Depression; it should be noted however that these youth gangs did differ from organized gangs that were run by individuals such as Al Capone and Bugs Moran (Miller 1974). In the 1940s and 1950s, gangs were formed because of the change in the families, such as females joining the workforce. Finally, in the 1970s an increased activism both politically and ideologically by young adults and increased use of drugs has often been documented as the cause of gang growth (e.g., Decker and Curry 2002; Miller 1974).

Although gangs have followed a pattern of growth and retreat since the 1800s, the gangs that formed in the 1960s were of a different variety (Decker and Curry 2002). From the 1960s on the retreat of gangs was not witnessed as it had been before; in the 1960s it seemed that gangs subsided, but they did not. Instead, the media attention was directed and focused on the Viet Nam War and protests against the war, so gangs became a forgotten problem (Miller 1974). Before the 1960s, it was shown that youth would grow up and out of gangs. Now those who are growing up and out of gangs are more quickly being replaced by other youth who keep the gang stable in numbers but with a constant change in membership (Decker and Curry 2002). The rise in gang homicide in the 1970s once again brought gangs to the forefront of society's attention. It seems that since the 1970s gangs have been active in the larger cities across the United States (Decker and Curry 2002). In addition, gangs became more involved in crime and

violence. Guns and automobiles made for quicker and easier retaliations between gangs (Decker and Curry 2002; Miller 1974).

Although gang presence has fluctuated in large urban areas since the 1800s, it was not until the 1990s that rural areas and small cities had gangs appear more regularly in their communities (Decker and Curry 2002). The phenomenon of the presence, growth, and retreat of gangs is now present in rural areas and small cities (Klein 2006). The perception commonly held is that the emergence of gangs is related to the community's aspects such as areas in which there are high frequencies of youth, where there are people who have lower socioeconomic statuses, or where there is increased reaction to the gang activities (Klein 2006; Thrasher 1963). The cohesion of gangs increases as the community reacts as if threatened by the gang. The threat that gang members present often isolates individual gang members from socialization with the general public, such as at schools, with their extended families, and at community activities in which other youth are involved (Curry and Spergel 1988).

Klein (2006) takes issue with the idea that gangs emerge quickly in a community. It is perceived that gangs emerge quickly because the gangs are often ignored until the gang acts in a way that is not commonly accepted by society, such as by committing a crime. Therefore it may be perceived that gangs emerge more quickly than they actually do. Klein concludes that the emergence begins with gang members being marginalized by society, and facing open opposition from the community, social services, or law enforcement members. In response to the marginalization the gang becomes involved in illegal activities more regularly and uses more violence. The actions of illegal activity

and violence aid the gang in unifying as a more solidified group. The increase in cohesion of the group continues a cycle with increasing crime rates (Klein 2006).

These points bring about two questions: why do youth join gangs and are youth in gangs different than youth who do not join gangs? The first question will be addressed here, the second will be addressed later in relationship to the violence that gang members commit. Klein (2006) does not agree with the common belief, which began with Thrasher (1963), that youth become gang members because of social characteristics, such as levels of poverty in the community, racism, and opportunities available through jobs. Klein (2006) claims that risk factors for joining a gang are more likely to be at the personal rather than the community level. Some personal risk factors include negative events in a youth's life, problematic behavior, low parental supervision, low academic achievement, and association with peers who have dimensions of being delinquent.

Miller (1974) claims that information about the number, size, and activities of the gang is influenced by the observer. Klein (2006) adds to this by stating that the number of gangs and the amount of crime they commit greatly depends on the definition of gangs. As addressed above the definition for a gang varies, therefore the number of gangs and how many people are involved in them is difficult to determine. Since 1995, the National Youth Gang Center (NYGC) has conducted a survey of police departments randomly selected from many different types of communities in order to better understand the fundamental components of gangs.

What is known about the count of gangs is that their problems and memberships have increased from the 1970s. In 1974, Walter Miller surveyed twelve large cities to better understand their gang problems, and only six of the twelve cities reported a

problem. In 2004 the statistics on gangs reported 760,000 gang members and 24,000 gangs in cities with a population of 2,500 or more (Egley and Ritz 2006). The NYGC found that the percentage of gang problems in each type of community has fluctuated over the years, but all types of communities have seen a decrease in gang problems since the late 1990s.

Klein (2006) states that police counts cannot always be considered accurate, as police may either over- or underestimate gang members depending on the characteristics. The count obviously depends on the accuracy of the agency that completes the counting. Klein found that police tend to under-count smaller gangs, members who have not been confronted by police, female members, and minor crimes committed by gang members. Police tend to over-count large established gangs, the core members of the gangs who have police records, and older gang members.

Klein (2006) projects that in cities where gangs are apparent, 10 to 15 percent of the youth will at some point join a gang, but only one to two percent of the youth in the community will be in a gang at any given time. The members of gangs have some similar characteristics such as age and gender, but race is not a steady variable. Although there has been an increase in gang membership and activity, the characteristics of the members of gangs has been relatively stable.

Members and Characteristics

Are gang members getting younger? Research indicates that there has actually been very little change in the ages of gang members since the mid 1980s (Block, Christakos, Jacob, and Przybylski 1996), but the number of gang members in the upper

age range is growing and is expected to continue to increase (Decker and Curry 2002; Klein and Maxson 1989).

The age of gang members typically ranges from eleven to the mid-twenties (Klein 2006), with the average age of gang members being 17 to 18 years old, although there are gang members in their forties (Decker and Curry 2002). In 2001, 67 percent of gang members in the U.S. were 18 years of age or older. In areas with small populations the percent of gang members 18 years or younger has declined therefore leaving law enforcement members to focus their attention on older gang members who are more criminally active (Egley, Howell, And Major 2006).

Howell (2007) states that more often than not youth are in gangs by choice and are not pressured into doing so.[2] For many youth who choose to be in a gang, associating with people who have parties, dance, do drugs, and participate in social activities within the protection of a group is alluring. It is thought that youth as young as 11 to 13 years old hang out with gangs but do not join the gang for a couple of years. Surprisingly, there are some documented cases in which gang members refuse to allow juveniles to join the gang (Howell 2007; Venkatesh 2008).

Another more easily identifiable characteristic of gang members is gender; the vast majority of gang members are male. A focus on understanding the role of females' involvement in gangs has occurred only in the past ten to fifteen years (Campbell 1992; Curry 1998; Miller 2001; Molidor 1996; Sikes 1997). Prior to this the interest, females' connections with gangs was posed by Thrasher (1963) who viewed women's connections with gangs as a relation to a gang member or from the perspective of sexual appeal. Both

[2] The exception to this is prison gangs who do recruit through force, but youth gangs rarely do.

the understanding of the involvement of females and their roles in gangs have greatly changed.

More girls are joining gangs than ever before; in some locations among younger youth gangs girls account for up to one fourth of gangs' members (Howell 2007). The increase in female members and female gangs has been apparent, yet female gang members still generally lie under the detection of law enforcement members.

When females are part of a gang they are documented more often as associate members. There are a few gangs which are entirely female but that is even less frequent than females in mixed-gender gangs (Miller 2001 and Sikes 1997). Females most often join gangs because the gangs are visibly present in their communities or their family members are in the gang (Miller 2001).

Although the exact number of female gang members is unknown, in a report by NYGC from 2000 it was found that 84 percent of communities with gang problems reported the presence of females in gangs. Approximately 43 percent of gangs have female members and it is accepted that females make up only about five percent of all gang members and usually commit far fewer offenses than males as well (Decker and Curry 2002; Egley, Howell, and Major 2006).

It is believed that females join and leave gangs at a younger age and more quickly than male gang members (Decker and Curry 2002; Egley, Howell, and Major 2006). Female gang members, it has been documented, are not involved in serious crimes as frequently as many male gang members. For these two reasons, it is believed that the number of female gang members is greater than what is currently documented (Block, Christakos, Jacob, and Przybylski 1996; Egley, Howell, and Major 2006).

The race and ethnicity of gangs is even more difficult to determine, because it is less easily identifiable and gangs may be of mixed race and ethnicity. There are gangs that have members of one similar ethnicity and other gangs that have members of different ethnicities (Klein 2006). The gangs in the late 1990s and early 2000 are most commonly perceived as African American/Black or Hispanic/Latino (Egley, Howell, and Major 2006). The NYGC found from reports of law enforcement agencies that about half of the gang members were Hispanic/Latino. They also found that African American/Black gang members made up about one-third of all gang members while Caucasian/White gang members accounted for one-tenth of all gang members.

The race/ethnicity of the gang members varies, of course depending on the area of the United States and the population make-up of the neighborhood in which the gang is located (Howell 2007; Klein and Maxson 1989). Although an individual's race/ethnicity seems to be an indication of gang membership, it is more commonly perceived that the gang members are from socially and economically disadvantaged communities (Bureau of Justice Assistance, 1998:19). The gang members are more often Black and/or Hispanic because they are more likely to be from neighborhoods which are economically and socially disadvantaged (Bursik and Grasmick, 1993:132; Egley, Howell, And Major 2006).

Klein (2006) claims that there are ethnic patterns to gangs within the United States. Eastern states and those states north of Texas tend to have more Black gang members. Hispanic gangs are more often found in the southwestern states, Texas, and California. Asian gangs are scattered but are more apparent on both coasts of the U.S. Therefore the race/ethnicity of "pure" race gangs is closely associated with the

demographics of the community in which the gang resides (Egley, Howell, And Major 2006). There is evidence that gangs are becoming more interracial (Decker and Curry 2002), so ethnicity of the members is not the best way to distinguish gangs (Klein 2006).

Member Actions

Other factors that are important in understanding gangs include the use and sale of drugs, violence including the use of weapons, and the organization and migration of gang members. There are two conflicting views about gangs and drugs. The first is that gangs are well-organized groups that sell illegal drugs for profit; the other view is that a few gangs sell drugs, but in a more casual manner than for profit (Decker and Curry 2002). Both views have research to back up the claims. Curry and Decker note that this conflict of views may be due to the fact that it is hard to distinguish between the actions of an individual in a gang and the actions of the gang members as a whole. The survey from the NYGC found that most law enforcement agencies report that the gang members were involved in drug sales. Block and Block (1993) found that of the four major street gangs in Chicago between 1987 and 1990, most of their offenses were for drug crimes, especially cocaine and heroin possession.[3] Drugs and gangs may have a relationship, but it may be compounded by other factors (Egley, Howell, and Major 2006).

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3 Yet, they found the connection of gangs, drugs, and homicide to be weak. The increase of homicides and drug crimes in the late 1980s did not seem to have a direct relationship in Chicago. Rarely does gang involvement in drugs lead to violence. Gangs account for a large number of homicides in many locations but the connection to drugs is not there. This may be due to the fact that gangs differ as to the type of criminal activities in which they are involved (Block and Block 1993).

There are other researchers who state that the connection between gangs and drug trafficking is a difficult phenomenon to understand (Howell 2007). The individual members of the gang may be involved in drugs, but youth gangs are rarely involved in drug trafficking, which is left more to the organized crime and drug cartel groups.

Other researchers explain the conflicting views of gangs and drugs with the idea that gang members do use drugs, but do not often sell them unless it is to their friends (Klein 2006). It is commonly perceived by the general population and the police that drugs and gangs are highly related; this may drive the perception of the connection of gangs and drugs. The issue of gangs and drugs will only be touched upon in this research.

One factor that is most studied about gangs is their involvement in crime. Decker (1988) finds that violence in gangs is very prevalent and that violence is at the core of the gang. Violence is present when an individual joins the gang; violence continues throughout being part of a gang, even when an individual renounces a gang. It is violence that helps define the gang (Curry and Spergel 1988). Decker (1998) developed a seven-step process about how violence is part of a gang in which retaliation is the key that continues the process of violence, either by creating a new gang for protection or a continuation of war between the gangs.

The most common offenses in the 1970s by gang members were creating disturbances by roughhousing or being loud followed by mild forms of assault and property damage, throwing things at cars, breaking windows, and theft. Gang fighting in both the 1970s and today may seem frequent, but is not as prevalent as delinquent and nuisance type actions committed by gang members (Decker and Curry 2002).

Miller (1974) claims that in the 1970s serious injuries seldom occurred, because firearms were rare, which is the opposite for gangs today. Encounters of violence have changed since the 1960s and 1970s, when violence usually involved a mass of people fighting and followed the general flow of provocation, attack, and retribution. Since the late 1980s fighting is more often one-on-one or done in a small group and with a firearm (Block, Christakos, Jacob, and Przybylski 1996; Decker and Curry 2002). The use of firearms, especially high-caliber, automatic, and semiautomatic weapons by gangs is no longer rare. The use of these weapons has increased greatly from 1965 to 1990, and almost five-fold from the mid 1980s (Block, Christakos, Jacob, and Przybylski 1996; Decker and Curry 2002). Firearms are more available to gang members, which is why the actions of gang members are more dangerous.

Although the use of firearms by gang members has increased, property crimes and minor crimes against people still occur more often then serious violent crimes (Klein 2006). However the serious violent crimes receive more attention from the media because of the devastation that serious violent crimes cause. Youth in gangs still commit a variety of illegal activities, but most are not violent. Instead they are more along the lines of drinking, drug use, graffiti, and theft (Klein 2006).

To understand the important connection between gangs and crime frequent studies have been conducted in many different cities including Chicago, New York, Boston, Los Angeles, Milwaukee, Detroit, and St. Louis (Decker and Curry 2002). It has been found that gang members commit more crimes than non-gang members and their crime and delinquency are more violent (Decker and Curry 2002).

There are many questions about the differences between youth who join a gang and those who do not. Esbensen, Huizinga, and Weihe (1993) found many differences exist between non-offender non-gang youth and gang youth members. Esbensen et al. studied psycho-social differences in the youth, and found some commonly expected associations of youth gang members and youth non–gang members. Youth associate with people who are more like themselves, and gang and non-gang members have different levels of anomie[4] at home, school, and with their peers. In addition, the levels of tolerated deviance differed between the groups of youth; gang members tolerated deviance much more than non-gang non-offending youth. The difference between gang and non-gang offenders, were not as polar as would be expected, the only significant difference was that non-gang member offenders were less likely to be negatively labeled by their teachers (Esbensen, Huizinga, and Weiher 1993).

According to the NYGC police, gang members are more delinquent and have higher levels of involvement of serious and violent offenses than non-gang youth (Egley, Howell, and Major 2006). The gang facilitation model suggests that there is a noticeable difference between gang involved youth and non-gang youths' rates of delinquency. This is a facilitation model that when youth are members of a gang they should have a higher rate of delinquency. Thornberry (1993) found this to be true in relation to offenses against a person and drug sales and on a smaller scale drug use, but the relationship does not hold for property offenses. Gang members overall are more likely to be contributors to the level of crime in society than non-gang members (Thornberry 2006).

[4] Or normlessness, where norms have been devalued through degrees of diminishment.

Location and Migration

The crime effects of gang members are more often noticed in cities than suburban or rural areas (Klein and Maxson 1989). Gangs are apparent and have been for decades in many cities, particularly large cities across America. During the 1980s smaller cities with populations less than 250,000 people began to witness gang problems. The change in the location of gangs closely relates to the general migration of the population from the city centers to the suburbs. Gangs migrated out of the city centers into the suburbs and then in 1990s into rural communities and small towns. Migration of gangs as an entity is rarely reported (Egley, and Ritz 2006). Those who have studied gang migration, however, believe that moves occur because an individual moves with his or her family and then creates a satellite gang (Egley and Ritz 2006; Howell 2007; Klein 2006). Other reasons for gang migration are documented as a pursuit of legitimate employment opportunities (Egley and Ritz 2006; Howell 2007; Klein 2006), drug market opportunities (Egley and Ritz 2006), avoidance of law enforcement, and other illegal ventures. The expansion of a gang is not usually further than 100 miles from the gang's original city because of the inability of a gang to support activities and functions further than that (Howell 2007; Klein 2006).

Thrasher (1963) found that gangs were more likely to develop in low-class unstable communities where there were few forms of social control. He also asserted that social control can be implemented by three groups: the primary group which is the family, the parochial group which is a church or school, and the public group which is related to corruption of and exclusion from groups within the community. Bursik and Grasmick (1995) take Thrasher's explanation a little further and explain that gangs develop from two types of neighborhoods, as opposed to Thrasher's one type of

neighborhood. The two types of neighborhoods from which gangs are most likely to develop are both lower-class areas, but one is unstable and institutionally weak, while the other is stable and well-organized (Bursik and Grasmick 1995). Curry and Decker (2002) state that one key to understanding gang members is understanding the social institutions from which they come or are a part of, including their family, school, the criminal justice system, politics, and the labor market. By understanding the social institutions from which the gang members have resided in or currently are a part of, it will be better understood why the individuals join, remain in, and even desist from gangs.

Participation

Most often youths' membership in gangs is short-lived (Howell 2007). There are two common misperceptions about joining and leaving a gang: once in the gang always in the gang, and blood in and blood out. This is not often the case; membership is more transitory within and between gangs than originally perceived. Youth may join one gang and then another (Bolden 2006), or only belong to a gang for a few months or years of their adolescent lives (Howell 2007).

The general process of gang involvement is associating with the gang's members, being formally initiated into a gang, and for some ranking in a gang[5], and then leaving the gang (Decker and Curry 2002). Individuals join a gang for different reasons and in different ways. Some gangs have initiations and others do not. When gangs require an initiation process, it sometimes involves violence against the individual who wants to join the gang or another person, but it rarely requires the victimization of an "innocent"

[5] Ranking in a gang refers to the gang member moving from being a fringe or core member of the gang to one of its leadership roles (Decker and Curry 2002).

person (Howell 2007). When used, the initiation process is to demonstrate courage, loyalty, and strength of the gang or individual joining.

Gang membership longevity depends on the individual; some are a part of a gang for a long time while for others involvement is only short-lived (Decker and Curry 2002). Those who stay in the gang for longer periods of time are more likely to move up in the ranks. Moving up in the ranks is different for each gang and individual, and some members choose to always be an associate member and never move up in the ranks of the gang leadership. While in a gang, members may commit violence to protect territory, for personal and collective honor, or to achieve prestige. Leaving the gang is just as variable as all other parts of the gang involvement process; some gangs require an exit act of violence or pain and others do not.

Assist Communities

In very few cases has it been documented that a gang aids a community. Venkatesh (2008) is one of the few sociologists who, in some aspects, points to the fact that a gang may be the mainstay of or a quasi-institution for a community. He spent many years casually interviewing and observing a gang's members, and its community members in Chicago. He found that although the gang was involved in the sale of drugs and committed acts of violence, its members and especially the gang leaders were supportive of the community. As long as groups and individuals in the community did not have problems with the gang, the gang did not have problems with them.

When someone needed help in the community the gang members were there to physically, monetarily, and emotionally support them (Venkatesh 2008). Some of the ways the gang supported the community was buying school supplies for the children,

protecting the women of the community from abusive spouses, or running squatters and trouble-makers who were usually high on drugs out of the community. In addition to these forms of support, they encouraged children to stay in school, and in some documented cases students who succeeded in school were not allowed to join the gang.

In many cases the gang in this community was seen as a support system causing the community members to simultaneously support and often secretly oppose the gang (Venkatesh 2008). As stated before this is a rare documented action of gangs; as it is more often reported by the media and more commonly perceived that gang activities are often violent and harmful to the community and its members.

Gang Homicides

Definitions

Just as there is a range of definitions for gangs, there is also a variety of definitions for gang-related crimes. As discussed below whether the gang homicide is gang-related depends on the definition used for "gang". The law enforcement agencies in Los Angeles and Chicago, which are termed the gang capitals of the world (Block and Block 1993), have different focuses in the definition of gang-related crimes. This difference in definitions is significant in the understanding of crimes proliferated by gangs (Maxson and Klein 1996).

The broad definition, which is used by Los Angeles law enforcement, is that a crime is gang-related if either the offender or victim is a gang member (Maxson and Klein 1996; Klein 2006). This definition is referred to as the gang-member definition. Chicago law enforcement department uses a more stringent definition, which is referred to as gang-motivation. Gang-motivation requires evidence that the crime was committed

with the motive as a gang activity or for gang membership purposes. The NYGC found that there is a varied use of these two definitions; large municipalities use the definitions about equally, while the smaller municipalities use the gang-motivation definition slightly more often (Egley, Howell, and Major 2006).

In research by Maxson and Klein, they found that applying the gang-motivation definition to the Los Angeles homicides caused the number of gang-related homicides to be reduced by almost half, but the qualitative differences between gang and non-gang homicides did not change (Maxson and Klein 1996).

Characteristics

Gang-related crimes can have either or both expressive and instrumental aspects to the crime (Block And Block 1993). A gang member protecting his turf by shooting a member of another gang for entering a rival gang's territory would be a form of instrumental assault. Retaliation for injury to one of their gang members would be an expressive crime. It has been found that many gang violations are retaliatory; retaliatory crimes can also be both expressive and instrumental in nature (Curry and Spergel 1988).

Just as there are differences between gang and non-gang youth and the activities that they participate in, there are also differences in the characteristics of the homicides that gang members and non-gang members commit. Although they differ, it has been found that the characteristics of the participants in the homicide are more important than that of the setting (Klein And Maxson 1989; Maxson, Gordon, And Klein 1985; Maxson And Klein 1996).

The setting characteristics that differ for gang and non-gang homicides are as follows: gang homicides more often occur in the street or in public places (Hutson,

Anglin, Kyriacou, Hart, and Spears 1995), involve automobiles (Maxson, Gordon, and Klein 1985) and guns (Decker and Curry 2002; Hutson, Anglin, Kyriacou, Hart, and Spears 1995), include unidentified offenders (Decker and Curry 2002), involve a fear of retaliation (Curry and Spergel 1988; Decker and Curry 2002), and involve injuries to other people (Decker and Curry 2002). Surprisingly it is also found that drug use and presence is less common in gang-motivated than non-gang motivated homicides. The exception to this is that the involvement of drug sales in gang homicides is slightly higher than that of non-gang homicides (Decker and Curry 2002; Maxson and Klein 1996). Decker and Curry (2002) also found that gang homicides have a stronger spatial concentration than non-gang homicides.

The time periods involved are not significantly different for gang-motivated homicides than for non-gang-motivated homicides. In one study it was found that the time of day that gang-related homicides occurred, 42.7 percent from 3 to 10 PM and 45.2 percent from 11 to 3AM, is not much different than the frequencies of other homicides (Hutson, Anglin, Kyriacou, Hart, and Spears 1995). For gang-related and non-gang homicides, the summer months have a higher average of homicides than winter months (Hutson, Anglin, Kyriacou, Hart, and Spears 1995, Polczynski 2008).

A more important aspect to consider is the participants. Compared to non-gang related homicides, gang homicides involve a higher average number of people (Hutson, Anglin, Kyriacou, Hart, and Spears 1995), victims and offenders are less likely to have had prior contact (Decker and Curry 2002; Hutson, Anglin, Kyriacou, Hart, and Spears 1995), there are more victims (Dedel 2007) who are clearly gang members (Decker and Curry 2002), suspects and victims are younger (Decker and Curry 2002; Hutson, Anglin,

Kyriacou, Hart, and Spears 1995) more likely male (Decker and Curry 2002) and Hispanic or Black (Decker and Curry 2002). Additionally, the victim is more often an innocent bystander—although it is less often than perceived (Bursik and Grasmick 1995)—and witnesses are less likely to give information to law enforcement in gang homicides than in other homicides (Hutson, Anglin, Kyriacou, Hart, and Spears 1995).

Locations

Block and Block (1993) describe the rates of street gang homicides as occurring in bursts and as being clustered in geographical areas of the city. Their data on Chicago street gang homicides from 1965-1990 show that there is a large amount of fluctuation in the number of homicides over the 25 year period. The suggestion Block and Block make for the fluctuation in the homicide rate is that it depends a great deal on how well the gangs are relating with each other, which may be affected by how well the gangs are established and how willing they are to compete with other gangs.

The increase in gang homicides in the late 1980s and early 1990s was witnessed in the gang capitals of Chicago and Los Angeles, as well as in other locations (Block and Block 1993; Howell 1999; Klein 1995). Gang homicides increased five-fold in Chicago between 1987 and 1994 (Block and Block 1993), while they increased two-fold in Los Angeles between 1987 and 1992 (Klein 1995).

The national frequency of gang homicide is best recorded by the NYGC. Based on a survey from 2004, the NYGC found that a total of 173 cities reported gang homicides (Egley and Ritz 2006). Los Angeles and Chicago alone contributed to more than half of the gang homicides totaling nearly 1,000 in 2004. From the other cities that reported gang homicides, it was found that on average one-fourth of the city's homicides

were gang-related. In 2004, the rate of gang homicides was 11 percent higher than the average of the past eight years.

As explained above, gangs commit crimes in particular areas of a city (Block and Block 1993; Curry and Spergel 1988). Curry and Spergel (1988) looked at gang homicide and delinquency within communities. They found that racial/ethnic communities have different patterns of homicide and delinquency by gangs depending on the level of poverty in the area. Gang homicide rates are also connected to the overall social disorganization in the community. Stable community characteristics, such as rates of poverty and social disorganization produced a stable rate of gang homicide within an area of the city (Curry and Spergel 1988). For example in the late 1980s, Chicago's gang-motivated homicides were concentrated on the west side of Chicago (Block and Block 1993). Of the 77 Chicago neighborhoods, 17 did not have any gang-motivated homicides and many only had one between 1987 and 1990. The Blocks found that the most lethal areas are those along disputed boundaries of gang turf, rather than in areas where illegal entrepreneurial gang-motivated crimes occurred.

As explained above the connection of youth gangs and drug trafficking has two sides. The somewhat mirrored increase of gang homicides and the cocaine epidemic has led many researchers to believe there is a connection between drugs and gang homicides, while other researchers question the findings of the connection between gang homicides and drug trafficking (see Howell 1999). The best explanation of the two-sided debate is that drugs have an indirect relationship to youth homicides.

Block and Block (1993) found that the relationship between gang-motivated drug crimes and gang-motivated homicides was moderate, but the rates of gang-motivated

assault and battery were strongly correlated with the rate of gang-motivated homicide. Over the 30 year period studied, drug-motivated gang homicides made up only two percent of all gang homicides (Block and Block 1993; Howell 1999).

Block and Block (1993) additionally found that entrepreneurial, including drug and turf crimes, are both motives for gang-motivated homicides in Chicago, but the location of entrepreneurial and turf homicides often differ from one another. They also found that small Latino gangs were more likely involved in turf wars, where as Black gangs were more often involved in entrepreneurial crimes (Block, Christakos, Jacob, and Przybylski 1996).

Participants

Not only do the locations of a homicide vary, but the participants of gang homicides also vary (Howell 1999). The variation is significantly related to the location of the city and neighborhood of the gang (Block 1993; Block, Christakos, Jacob, and Przybylski 1996; Howell 1999). Compared to all other demographic groups in Chicago there is a greater probability that the victim and offender of gang-motivated homicides was a young Latino male (Block, Christakos, Jacob, and Przybylski 1996, Polczynski 2008). In addition the risk of homicide for any age and gender is higher for a non-Latino Black than non-Latino Whites in Chicago (Block and Block 1993), but other cities are different (Decker and Curry 2002). It has been determined both in Chicago and Los Angeles that gang related homicides were more often intra-racial (Block and Block 1993; Maxson, Gordon, and Klein 1985).

The median age of homicide victims who were gang members compared to non-gang members is significantly different; gang members are more likely to be younger

(Hutson, Anglin, Kyriacou, Hart, and Spears 1995; Klein and Maxson 1989; Polczynski 2008). From a study based on data from 1979 to 1994 in Los Angeles, it was found that the average age of gang-related homicide victims was 20 years while the average for non-gang homicide victim's was 26 (Hutson, Anglin, Kyriacou, Hart, and Spears 1995). A study based on data from Chicago starting in 1965 to 1995 showed similar findings, with both the age of the victim and offender in gang-motivated homicides being significantly younger than those in non-gang-motivated homicides (Polczynski, 2008). In addition to the fact that females are less likely to be involved in gangs, they are also less likely to be offenders or victims of gang-motivated homicides than non-gang-motivated homicides. (Hutson, Anglin, Kyriacou, Hart, and Spears 1995; Polczynski 2008).

Weapons

As mentioned above, the use of guns has contributed to the large increase in gang homicides (Block and Block 1993; Klein and Maxson 1989). Block and Block (1993) state that one explanation of the increase in gang-motivated homicides is the increased use of guns, specifically automatic and semi-automatic weapons. They found in the late 1980s and early 1990s in Chicago that in 96 percent of gang-related homicides a gun was used. They also claim that the increased use of automatic, semi-automatic, and high-caliber weapons can solely account for the increase in homicides motivated by street gangs. The proportions of gang homicides committed with a firearm has continued to increase, and as of the late 1990s, they were almost completely perpetrated with a gun (Howell 1999). In Los Angeles from 1979 to 1994, it was found that handguns were used almost 70 percent of the time in gang-related homicides, while in fifteen percent of the cases another type of gun was used, such as a shotgun or rifle (Hutson, Anglin, Kyriacou,

Hart, and Spears 1995). Guns are used more often in gang-related homicides than in non-gang-related homicides as well (Klein and Maxson 1989).

Drive-By Shooting

The increase in the use of guns by gang members also ties in with the increase in the number of drive-by shootings (Polczynski 2008). Yet, very little has been written about drive-by shootings (Dedel 2007; Eckstien, Hutson, and Anglin 1996; Hutson, Anglin, and Pratts 1994; Polczynski 2007; Polczynski 2008; Sanders 1994; Sugarmann and Newth 2007). The accessibility to a gun and an automobile, whether the vehicle is their own, rented, borrowed, or stolen has increased (Dedel 2007). Gang members are more likely to carry a gun and be in situations where a gun is used than non-gang members (Dedel 2007). In addition to the increased use of a gun to resolve conflicts, over half of the juvenile offenders interviewed stated that they obtained a gun without forethought by either someone giving it to them or finding it (Dedel 2007).

History and Definition

Historically, once automobiles were available drive-by shootings began to occur (Miller 1977). Klein (1971) explains that drive-by shootings were originally called *japping*, named after the tactics of Japanese soldiers in World War II, who used a shoot and run tactic. Another term for drive-by shootings is *forays*[6], first used by Miller (1966), but now almost exclusively the term drive-by shootings is used (Howell 1999 p215; Sanders 1994; Sugarmann and Newth 2007). Sanders (1994) adds to Miller's (1974) reason for the increase of drive-by shootings by stating that besides the

[6] As defined by Merriam-Webster dictionary (Foray 2008) a foray is a sudden or irregular invasion or attack for war or spoils. Miller used this term for what is now called drive-by shootings.

availability of guns and automobiles, cities are more spread out now, and automobiles are more often used to get from one place to another, so the use of the automobile in a crime is more frequent (Howell 1999; Sanders 1994).

The definitions of drive-by shootings vary. The most general use of the term means arriving at a location in a car, on a bicycle, or other 'vehicle' (Sanders 1994) and quickly exiting the vehicle to shoot the victim or more often shooting from the vehicle (Dedel 2007; Sanders 1994). For the purposes of this investigation the definition of a drive-by shooting will be that used by the Chicago Police Department: shooting at the victim from within a car (Dedel 2007).

Purpose

This type of gang fighting is the opposite of the original form of a rumble, in which gangs set a meeting place and fought it out hand-to-hand (Sanders 1994). A gangster from the 1950s claimed that drive-by shootings were a gut-less way to show power (Harden 1999). Although, some may view a drive-by shooting as a sign of weakness, it is generally viewed as just the opposite. Sanders (1994) claims that drive-by shootings fulfill many purposes, such as increasing the status of a gang/gang member, resolving a conflict or argument, and providing a way to easily attack another gang.

Drive-by shootings also have many advantages that hand-to-hand fights do not. The use of a drive-by shooting usually allows the shooter to approach the target with little notice and to be able to exit the scene quickly and return safely to his or her turf (Dedel 2007; Sanders 1994). The car is also a form of protection in case of return fire (Dedel 2007). Additionally, victims may be slower to retaliate because of the surprise of the

attack, which allows the offender to prepare for retaliation on his or her turf (Dedel 2007; Sanders 1994).

One of the most important aspects is that police do not often get much information on drive-by shootings from witnesses because the incident happens very quickly and occurs more often at night (Dedel 2007). In some cases members of the neighborhood are unwilling to give the police information about the incident because they are intimidated by gangs.

Even with all the advantages that drive-by shootings provide they are perpetrated less frequently than someone walking up and shooting with a gun (Wilson and Riley 2004). Drive-by shootings account for about 10 percent of the homicides in San Diego (Wilson and Riley 2004) and less than one percent in Chicago (Polczynski 2008). The difference in percentage by location of drive-by shootings relates highly to the area in which the shooting occurs. It has been found that in congested eastern cities drive-bys are less likely to happen because of high-density populations, narrow streets, and traffic (Sanders 1994). West coast neighborhoods are more likely to be spread out and have lower density ground level buildings; in addition good, wide-open roads and lack of public transportation allows for higher frequency of drive-by shootings (Dedel 2007).

Sanders (1994) claimed that Los Angeles is a prime city for drive-by shootings because of its layout, population density, lack of public transportation, and a good highway system. Data that are available on drive-by shootings indicate that they happen more often in large urban areas that have gang problems, and that there is often an on-going rift occurring between gangs at the time of the shootings (Dedel 2007; Sugarmann and Newth 2007). Drive-by shootings are not as prevalent in Chicago as Los Angeles

(Block, Christakos, Jacob, and Przybylski 1996), perhaps due to use of public transportation and layout of the buildings. About eight percent of Chicago's gang homicides are committed by a drive-by shooting. Gang homicides in Los Angeles between 1974 and 1994 were perpetrated 25 percent of the time by a drive-by shooting (Hutson, Anglin, Kyriacou, Hart, and Spears 1995). The highest rate of drive-by shootings in Los Angeles were from 1989 to 1994 making up one-third of all gang homicides.

Drive-by shootings are not always gang-related. Some are outcomes of road rage or disputes between strangers (Dedel 2007). They occur more than half the time at a residence (Sugarmann and Newth 2007). However, drive-by shootings do seem to be a national phenomenon. During a six month study based on Google news reports only five states had no drive-by shootings reported. The states with the most reported drive-by shootings in order of frequency were California, Florida, Texas, and Illinois (Sugarmann and Newth 2007).

Participants

Howell (1999) claims that the interest in and fear of drive-by shootings is due to the possibility of an innocent bystander being killed and that it is a more lethal and impersonal form of fighting. The possibility of an innocent bystander being shot in a drive-by shooting is much less than the media portrays to the general public, however (Hutson, Anglin, Kyriacou, Hart, and Spears 1995). Approximately one-fourth (352) of the people killed in drive-by shootings were determined to be innocent by-standers in Los Angeles between 1979 and 1994, while seventy-seven point six percent of the victims were gang members (Hutson, Anglin, Kyriacou, Hart, and Spears 1995).

Gang members do not try to harm innocent bystanders, but claim that if they are injured they were at the wrong place and at the wrong time (Sanders 1994). Yet, deaths of bystanders often receive more attention from the media, which causes public outcry, especially when safety of family members or friends is a factor (Dedel 2007). Additionally many drive-by shootings result in nonfatal injuries to the intended or bystander victims (Hutson, Anglin, and Pratts 1994). According to Wilson and Riley (2004), whether the drive-by shooting is lethal or not depends on the location of the wound or able medical attention and not on the intent of the offender.

Younger people tended to be involved in drive-by shootings more often than other types of gang-related homicides (Hutson, Anglin, and Pratts 1994). Nearly half of the victims of drive-by shootings were under 18 years old in 1991 in LA, and less than six percent of the victims younger than 18 years old died because of the drive-by shooting (Hutson, Anglin, and Pratts 1994). Victims of homicide resulting from a drive-by shooting in LA from 1979 to 1994 were even younger (19 years old) on average than victims (22 years old) of gang related homicides not resulting from a drive-by shooting.

According to Dedel (2007) equal proportions of males and females have reported taking part in a drive-by shooting, although females less often claim to have been the shooter in a drive-by shooting. Females therefore play a minor role in the drive-by shootings.

Gang membership studies have shown that youth involved in gangs are more likely to have been involved in a drive-by shooting than a youth not involved in a gang (Dedel 2007). Los Angeles police estimate that nearly 90 percent of drive-by homicides involve members of street gangs (Hutson, Anglin, and Pratts 1994). Eighty-nine percent

of the Chicago drive-by shooting homicides are gang-motivated (Polczynski 2008). According to a nation-wide analysis on Google news reports, 46 percent of the drive-by shootings were mentioned as being gang-related (Sugarmann and Newth 2007).

Drive-by shootings involve the deliberate hunting of a particular person. The shooting of an individual is not usually just for fun or entertainment purposes (Sanders 1994). Motivations may differ, but are often based on rival gangs, disputes over turf, a show of courage or loyalty to the gang, to promote social status, or as a form of retaliation (Block and Block 1993; Dedel 2007; Sanders 1994). Situations from which drive-by shootings emerge are arguments between individuals and groups, groups that are "hanging out" and decide for challenging or retaliation purposes to do a drive-by, to ward off business competition, or as target shooting of non-humans such as mailboxes or parked unoccupied cars (Sanders 1994).

As demonstrated above there are very few studies conducted about drive-by shootings and only basic information is known about the phenomena. In a previous analysis of data from Chicago it was found that there were significant differences in the characteristics of drive-by shootings and all other forms of homicide (Polczynski 2008). Compared to other forms of homicide, drive-by shootings were more likely gang-motivated, the victim was more likely to be a gang rival, male and Latino than Black. Drive-bys were also more likely to occur in the summer than during the winter season. The strongest predictor of whether the homicide was a drive-by shooting from other forms of homicide was that the homicide was street gang-motivated.

The analyses for this investigation provide a more concentrated look at street gang-motivated crimes, specifically drive-by shootings compared to other types of gang-

motivated, firearm-related homicides. Additionally, the analyses and the results are focused on the difference in characteristics between drive-by shootings and other gang homicides perpetrated with a firearm.

CHAPTER THREE: THEORY

This study used two theories: routine activities theory and social disorganization theory. Bursik and Grasmick (1993) note that although Routine Activities and Social Disorganization have different emphases, they are similar in that they are both formed from ecology and concentrate on the neighborhood's effect on crime. In addition, Bursik and Grasmick claim that "routine activities and social disorganization approaches provide complementary frameworks" when studying at the neighborhood level, as presented in this report.

Routine Activities Theory

Routine activities theory, first presented by Cohen and Felson (1979) took a different approach to understanding crime than most of theories developed in the same time period, because other theories focused on the offender. The routine activities theory focus was different in that its pinnacle factor is the location of the crime. Cohen and Felson's theory accents the fact that the location is of importance because that is where all the required factors converge.

According to Cohen and Felson (1979) the required factors for a crime to occur are a motivated offender, an available target, and a lack of effective guardianship. The motivated offender is an individual who desires to commit a crime. The available target is any person or item on which a crime can be committed, ranging from stealing the target to harming the target. The final factor is the lack of effective guardianship, which may take forms, from a person to a barrier, such as a lock or the weight of the item. The theory is that in a location where these three variables converge, a crime will occur.

In the data proposed for this study, it is obvious that each of the three factors converged because a homicide occurred. The cases proposed to be analyzed for this investigation used gang motivation as the overall factor of a motivated offender, but other factors may also motivate the offender such as a rival gang, initiation into a gang, or protecting the gang's turf. It is anticipated that there is no difference in the motivation of drive-by shooting and other gang-motivated homicides; it is believed that the difference lies more in the target, guardian and location factors.

The targets in each of these cases were individual people. The reasons the individuals were targeted may have varied; perhaps the person was a gang rival or a drug seller who was cheating the gang out of money. The final factor, lack of guardianship, is much more difficult to pinpoint and usually must be based on investigations of the area or interviews of witnesses. The guardianship information may be contained in many different variables, such as the time of day when the homicide occurred, the weapon that was used, and the location of the homicide. The final variable in guardianship factor of routine activities, the location of the homicide, is what relates this theory with social disorganization theory (Bursik and Grasmick 1993).

Social Disorganization Theory

Social disorganization theory also aids in the understanding of homicides, but from a more macro-perspective by looking at the community characteristics. Social disorganization theory has been used in many different analyses for a better understanding of the community that the victim or offender was reared in or the community in which the crimes occurred (Barnett and Carson 2002; Mustaine,

Tewksbury, and Stengel 2006; Osgood and Chambers 2000; Sampson and Groves 1989; Warner and Pierce 1993).

Social disorganization theory was first used by Thrasher when he studied gangs in Chicago (Curry and Decker 1998). He strongly believed that gangs are an indication of a disorganized community (Thrasher 1963). Thrasher does not state that a disorganized community means there will be a presence of gangs, but that the disorganized community allows for the possibility of gangs forming. Some of the variables which Thrasher believed were indicative of a disorganized community and provide ample opportunities for gangs to emerge are poverty; deficient families and neighborhoods; and ineffective religious, educational, and/or recreational opportunities.

Shaw and McKay (1969 [1942]) expanded the idea of a disorganized community as it relates to delinquency. They originally based their study on data from Chicago, but later expanded the areas they tested to determine if their theory would persist in other communities, such as Philadelphia, Boston, Cincinnati, Cleveland, and Richmond. From their studies Shaw and McKay found that there is a relationship between community characteristics and delinquency rates, specifically, the more socially disorganized the community the greater the rate of crime a community will suffer.

Shaw and McKay (1969) compared areas that were socially organized to those which were socially disorganized—the inner city. The highest rates of crime were in the inner city and as one moved away from the inner city to the outer rings of the city the rates of crime decreased. Shaw and McKay based their study on many aspects of communities such as percent of families on welfare, rates of people with tuberculosis, residential mobility, ethnic/racial heterogeneity, rates of infant mortality, and rates of

insanity. They determined that there were three specific aspects in a socially disorganized community that directly related to higher rates of crime: low socioeconomic status, racial/ethnic heterogeneity, and high residential mobility.

It is not assumed that all low socioeconomic status communities, which contain people who are of non-White race/ethnicity or are recent immigrants to the United States, live in socially disorganized communities (Bursik 1988). It is assumed that the ability of a community to regulate itself does highly relate to socioeconomic status and levels of crime. Shaw and McKay did not consider the relationship between socioeconomics and rate of crime to be direct, but that low socioeconomic status, greater levels of population mobility, and heterogeneous race/ethnicity characteristics of community members cyclically interact to produce higher rates of crime. Higher rates of population mobility and racial/ethnic heterogeneity are just as likely to cause a community to have a generally low level of socioeconomic status and vice versa. Whatever the relationship between these predictor variables, however, all increase the likelihood of social disorganization in a community which in turn increases crime rates. Also, the heterogeneity of race/ethnicity and constant change in residents, therefore cause low socioeconomic status, which then often causes a community to lack common values leading to weak social controls and higher rates of crime (Sampson and Groves 1989).

The reasons can be numerous but with differences in values some community members may assume one action is not acceptable while other members see the action as acceptable. This causes members of a community to be less likely to intercede in stopping a crime because of differences in values and lower-level ties between community members. This aspect of social disorganization relates strongly to that of

routine activities theory in that a community with weaker social controls will have lower guardianship and more available targets, which allows for greater possibilities of motivated offenders and therefore higher rates of crime.

Bursik and Grasmick (1993) and other researchers found a flaw in social disorganization theory; communities that did not have social control issues were also witnessing gang and crime problems. Bursik and Grasmick have addressed this downfall and with their suggested change in the theory have revived the use of social disorganization theory in criminology. They explain that there are three levels in a community's social control: personal, parochial, and public. The personal level of control is determined by the individual ties of community residents, such as family members and neighbors. At the parochial level the controls are that of schools and businesses. The final level of control is that of the public, the amount of control that the community members have over the resources of the community, such as over law enforcement, and the justice and education systems (Bursik and Grasmick 1993). All of these levels affect the social organization of a community. It is also critical to point out that just because communities have low levels of social organization and are more likely to have higher levels of crime, it is difficult to identify that the low levels of social disorganization cause higher rates of crime (Bursik 1988).

Numerous variables have been used to study the levels of social disorganization in a community and much debate has ensued about the variables that should be used in measuring the levels of social organization within a community (Bursik 1988). Sampson and Groves (1989) have completed the most seemingly comprehensive test of social disorganization theory in Great Britain based on a survey, where they found strong

support for social disorganization theory. In the United States, Census data are most often used in the analysis of social disorganization or of studies based on social disorganization theory. Census data are often used because of its accessibility and pre-existing boundaries for communities based on census tracts, which is what was used in this research.

The most common measures that have been used in testing social disorganization theory from the U.S. Census are the percentage of people living below the poverty line and the percentage of people who have lived in the same residence for five or more years (Sampson and Groves 1989). Other scholars (Barnett and Carson 2002; Mustaine, Tewksbury, and Stengel 2006; Osgood and Chambers 2000; Warner and Pierce 1993) have used additional measures: percentage of female-headed households, ethnic/racial heterogeneity, income, and the percentage of people under 18 years of age. These and other variables were used in this study to better understand the community characteristics where gang homicides occur in Chicago.

Both routine activities and social disorganization theories are very important in research on homicides, and particularly for this study because they were utilized to determine the variables that were included in the analyses and why the locations of drive-by shootings and other gang-motivated, firearm-related homicides occurred in some census tracts that were the same and others that were not.

CHAPTER FOUR: QUESTIONS AND HYPOTHESES

Questions

Routine activities and social disorganization theories are the basis for understanding the importance of the variables in the analyses and provide the foundation for the hypotheses of the following two sets of research questions. The first set of questions relates to the homicide incident and individual characteristics:

a. Is there a difference in characteristics between a gang-motivated homicide involving a firearm perpetrated through a drive-by shooting versus other means?
b. Can the type of homicide be predicted based on incident characteristics; specifically can drive-by shootings be predicted from other types of gang-motivated homicides with a firearm?

The second set of questions relates to the community in which the homicide took place:

a. Do locations of gang-motivated homicides with a firearm—drive-by shootings versus other types of homicide—differ among the census tracts in Chicago?
b. Can gang-motivated homicides involving a firearm be predicted by location characteristics; specifically can drive-by shootings be identified from all other types of gang-motivated homicides involving a gun?
c. Is there a pattern to the spatial distribution of gang-motivated homicides involving a firearm perpetrated through a drive-by shooting versus other means?

Hypotheses

The analyses for this study are based on incident- and community-level data for homicide, so no conclusions about the individual gangs can be made. It has been previously determined that there were five significant characteristics between the differences of drive-by shootings and other forms of homicide (see above). Therefore, I hypothesize that there are differences between gang-motivated drive-by shootings and other forms of gang-motivated homicides that are perpetrated with a firearm. It is also assumed that the differences in gang-motivated homicides are fewer than the differences found between drive-by shootings and all other forms of homicide (Polczynski 2008), due to the narrowing of types of homicides to those which are gang-motivated and perpetrated with a firearm that there will be differences between the two types of homicide perpetration which is presented in this paper.

The second hypothesis, based on the first is that a smaller difference in the characteristics of gang-motivated drive-by shootings and other forms of gang-motivated homicide that are perpetrated with a firearm will reduce the ability to predict the two different homicides from one another. Yet, the second hypothesis is that the difference between drive-by shootings and other homicides will still exist, enough that statistically the cases of a gang-motivated homicide with a firearm will be able to be predicted as a drive-by shooting or not.

The third hypothesis addresses whether the communities in which the gang-motivated drive-by shootings and other forms of gang-motivated homicide perpetrated with a firearm will differ. Based on the analysis by Block and Block (1993) it was found that there were differences in locations between gang-motivated turf and drug-related

homicides. Therefore, I hypothesize that gang-motivated drive-by shootings and other forms of gang-motivated homicide that were perpetrated with a firearm differ significantly by their locations within the census tracts of Chicago.

The fourth hypothesis is much more difficult to determine because no other study has looked at the characteristics of gang homicides in a community to determine if different types of homicides perpetrated have different community characteristics. Yet, based on the previous hypothesis that the locations of the homicides will differ, I hypothesize that characteristics of drive-by shooting locations and other forms of homicide will differ. The differences in the locations of the homicides are assumed to be related to the differences in the characteristics of the community.

The final hypothesis is that a spatial pattern of clustering occurs both for gang-motivated homicides, which involve a firearm perpetrated by a drive-by shooting, and those not perpetrated by a drive-by shooting. This hypothesis is based on the understanding of geographic distribution and gangs. Tobler's principle of geography explains that areas that are closer to one another resemble each other more than areas farther away (Mitchell 2005). This has been found to be true not only in the geographical sense but also for the social characteristics of the areas. Block and Block (1993) found that not only do gangs congregate and commit crimes in particular areas of the city, but also the types of crimes committed through gang-motivation are differentially spatially clustered by reasons for the crime. Other researchers have found similar clusters of activities or characteristics of gang members (Bureau of Justice Assistance 1998; Bursik and Grasmick 1995; Decker and Curry 2002; Egley, Howell, and Major 2006).

CHAPTER FIVE: DATA

Homicide Data

In order to test the four hypotheses, homicide and community aspect data from Chicago were used. There are no national data on drive-by shootings; local data may be available but long term data are rarely possible to acquire (Dedel 2007). Fortunately, data on all the homicides in Chicago from 1965 to 1995 with a denotation of a drive-by shooting homicide are available from the Interuniversity Consortium for Political and Social Research (ICPSR) (Block, Block, and the Illinois Criminal Justice Information Authority 1998, number 6399). The data were acquired from the Chicago Police Department and entered into Statistical Package for the Social Sciences (SPSS) for public use by Rebecca Block of the Illinois Criminal Justice Information Authority. In addition to the availability of long term data, which denote drive-by shootings, Chicago is one of the gang-homicide capitals of the world making this dataset even more useful than data from other cities due to the large number of gang homicides. This allows for the analysis of drive-by shootings to be based on a large amount of data over a long period of time, making the dataset a key asset to the study.

The Chicago Police Department's definition of gang-related offenses was described in opposition to the Los Angeles Law Enforcement definition above. The definition used by the Chicago Police Department is the "evidence must indicate that the incident grew out of a street gang function" (Block, Christakos, Jacob, and Przybylski 1996). Gang membership by the victim or offender in the case of Chicago homicides is not enough to judge whether the homicide was gang related; it required evidence that the

homicide was perpetrated for the purpose of the gang in order for a gang homicide to be denoted as such in the dataset.

Two datasets were used for this research: one for victim variables and one for offenders. In each of the datasets the characteristics of the incident are included, such as weapon type, location, and time (See Appendix A). The datasets contain a wide range of information, from the characteristics of the victims and offenders to the motives and location of the homicide. The Chicago homicide dataset also identifies the location by the census tracts. The available data allow for separate analysis of gang-motivated homicides, as well as those perpetrated as a drive-by shooting.

The victim and offender datasets are capable of being merged based on an identifier variable, *Hominew*. The merging of the two datasets creates complications that cause the data to be less useful than if they are separately analyzed. The data can be merged based on the victim or the offender. For each case there is one victim and zero to 11 offenders. By merging the offenders onto the victims the individual offender data are lost and therefore the only way to analyze the offender variables is by creating indices or averages of the offenders' characteristics for the incident. If the victim variables are merged onto the offender variables then in cases in which there is more than one offender for the incident, the victim's variables are then analyzed multiple times, depending on how many offenders were identified in each incident. Therefore in this research the victim and offender datasets were separately analyzed.

There are a total of 23,187 cases in the victim dataset and 26,030 cases in the offender dataset. By narrowing the cases to gang-motivated homicides with a firearm, there are 2,042 cases in the victim dataset and 3,297 in the offender dataset. Of the

homicides 135 victim cases and 209 offender cases are perpetrated by a drive-by shooting. In the gang-motivated homicides with a firearm, drive-by shootings make-up approximately six percent of the total cases, which will allow for better statistical analyses, compared to the original datasets in which drive-by shootings comprised less than one percent of all the homicides in Chicago. As stated above, the data are based on police reports so the data contained in the datasets are based on the police officials' decision on the outcome of the homicide. Therefore, all the offenders identified in the dataset are those whom the police considered to be the offenders (Block and Block 1993).

The coding of each of the variables is very different (see Appendix A for the list of variables used in the analyses). The victim's and offender's age range from 0 to 85 years, with each interval being a five-year time span. The victim's and offender's gender are coded one for males and zero for females. The victim's and offender's race categories include Black, White, Latino, Asian, and other. The number of victims and offenders involved in the incident are each coded as ratio-level variables.

Drug and liquor involvement are coded as yes, no, or unknown. The relationship of the offender to the victim was compiled into family or friend, acquaintance, stranger, gang rival, or other. The type of gun is divided into categories of semi-/fully-automatic gun, non-automatic handgun, non-automatic rifle, non-automatic shotgun, and unknown type of gun. The location of the homicide is coded as residence/hotel, indoor other, vehicle/public transportation, street, and outdoor other. The time factors are time of day in military time, the day of the week, and the month of the year. Each of the categorical variables will be dichotomously coded for the proposed logistic regression analysis; the comparison variable is the value which is most common (see Appendix A).

Community Data

Additional variables were used from the U.S. Census data for 1970, 1980, and 1990. These variables were added to the Chicago homicide data in order to have community variables that could be analyzed (see Appendix A for a list of variables used in the analysis). The Census years used were dependent on the year that the incident was booked with the Chicago Police Department (Block, Block, and the Illinois Criminal Justice Information Authority 1998). Incidents that occurred between 1965 and 1974 were based on the 1970 Census data, for 1975 to 1984 the 1980 Census data was used, and for 1985 to 1995 the 1990 Census data was used. In order to merge the Census variables onto the homicide datasets with the correct Census year data the offender and victim homicide datasets were divided into three parts based on the *bookyear*, the year in which the case was booked by the Chicago Police Department (Block, Block, and the Illinois Criminal Justice Information Authority 1998).

The three divisions are before 1974, between 1975 and 1984, and 1984 through 1995. After homicide datasets' years were separated, each of the divisions were merged with the corresponding Census year data, based on the Census tract number available in the homicide datasets. When the Census year data were merged successfully, all the cases for each homicide dataset was then remerged to the original datasets, victims and offenders, with Census tract variables for each case. Only 12 cases in the offender dataset and six cases in the victim dataset have missing Census tract values and for those cases no Census variables were included in the dataset. Numerous variables from the Census were added to the homicide dataset to better understand the community and social aspects of the locations in which the homicides occurred (see Appendix A).

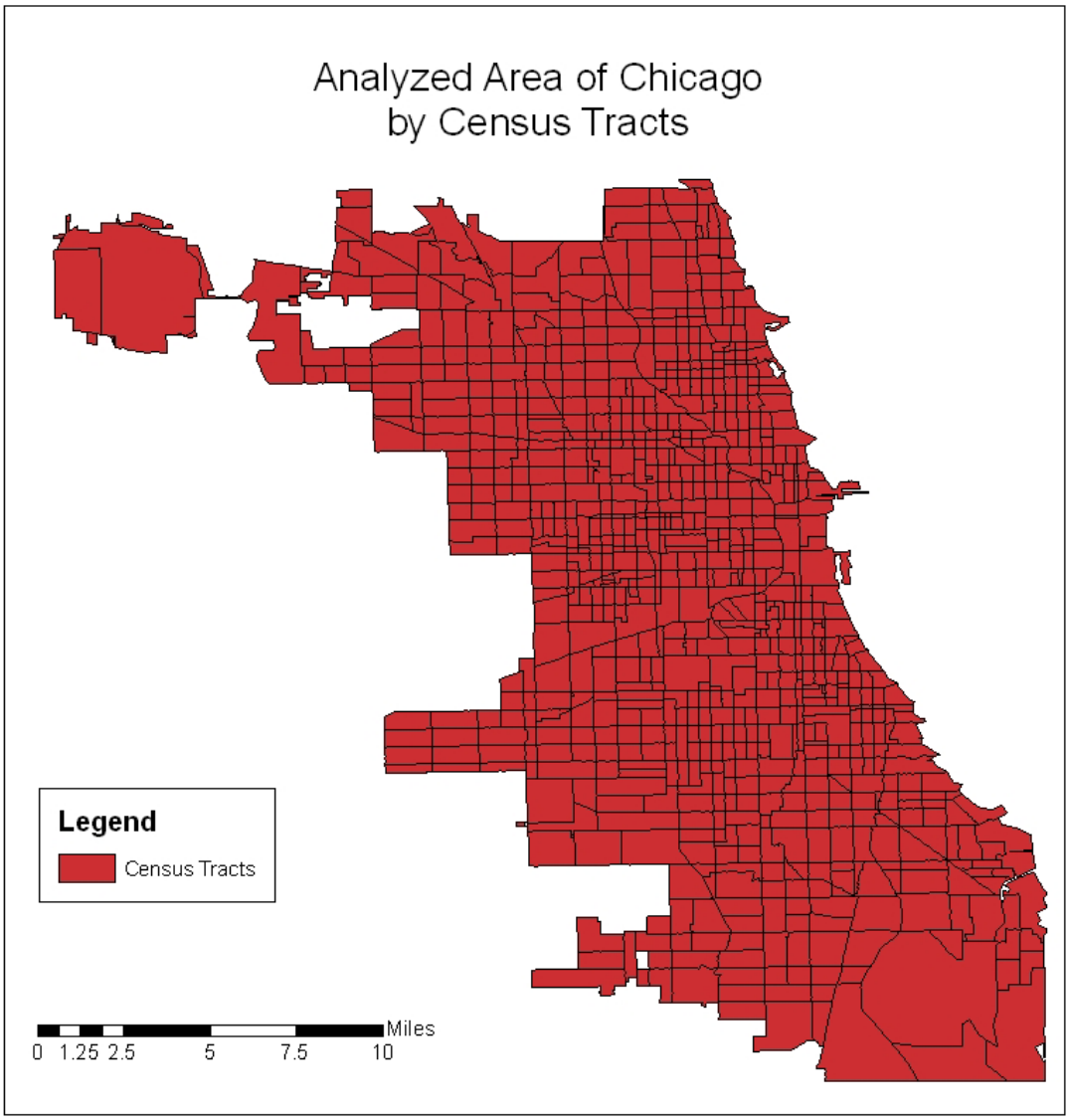

Figure 1. Map of Chicago
The map is of the Census tracts in Chicago which will be analyzed. (N = 873)

The usual variables used to determine the social disorganization of a community are residential instability, ethnic heterogeneity, and population living below the poverty line (Osgood et al. 2000). These and other variables were used to determine the social disorganization of the community and possible ties between the community aspects and the types of homicides that are perpetrated through gang motivation (See Appendix B for computation of variables from each Census year).

The residential instability of a community was measured by the proportion of households occupied by the same people five years previous to the Census collection (Osgood et al. 2000). In addition to the stability of living at the same residence for five years, the Census provides the percentage who have stayed within the same standard metropolitan statistical area (SMSA), meaning the percentage who have lived in the same metropolitan area for five years but in a different house. Both of these variables were used in the analysis. Similar to the vein of stability in rate of the population is the stability of the races in the population. The change in rate of race in a community may also indicate additional changes in a community and therefore a change in crime rates. To account for this possibility the rate of change for race of Whites, Blacks, and others were included in the analyzed variables.

Race/ethnic heterogeneity is based on the diversity of individuals within each census tract. The closer the value is to zero, the more homogenous the Census tract. The race/ethnicities used in the diversity index are three, because the 1970 Census only recorded Black, White, and other. Therefore, to make the data uniform the same categories were used with the 1980 and 1990 Censuses. The percentages of Black, White, and other are also variables that were used in the analysis. In keeping with the heritage of the community members, a variable for the percentage of Latino/Hispanics in each Census tract was included. In anticipation that the percentage of Latinos/Hispanics in a community may relate to the number of drive-by shooting homicides because it has previously been found that a significant proportion of gang homicides are by Latino offenders (Block 1993).

A commonly used variable in analyzing the social organization of a community is the percentage of people under the poverty line (Osgood et al. 2000). This variable is determined based on the poverty line for the year of each Census, therefore the percentages of those who live under the poverty line can be compared across the Census years.

Another variable that is often used is the percentage of female-headed households; Osgood et al. (2000) claim that female-headed households are one of the most often used variables to explain delinquency because of the difficulties of being a single parent. Specifically, it is more difficult for single parents to supervise children and earn money than it is for two parents. Thus the percentages of female-, male-, and all single-headed households are used in the analysis.

Other variables that are less often tested but may also relate to understanding the difference in location of drive-by shootings as opposed to other gang-motivated homicides with a firearm were included in the analysis. Before including the variables, frequencies and the variance inflation factors were tested to determine the best way to combine categories, based on the theories that are supporting the hypotheses of this paper. By determining the variance inflation factors between groups of variables problems of multicollenirarity were avoided.

The variables that were included from the Census by tracts are the percentages of: unemployed; foreign born; gender; age; one to five or more people living in a unit; educational attainment; structures with one to five or more units; the population with no vehicles to three or more vehicles, the median income; and the count of the total population, households/families, and building structures.

CHAPTER SIX: METHODS

Frequencies, t-tests, crosstabulations/chi-squares, correlations, and logistic regressions were completed using SPSS to better understand the differences between and the possibility of predicting gang-motivated homicides with a firearm perpetrated through a drive-by shooting versus other means. Frequencies were used to determine the projection of the data and errors in inputting data. At this point any coding and inputting errors were addressed, in a fashion that was best suited to the situation. The variables' frequencies also aided in determining how to collapse some of the community-level variables such as age groups or aided in determining which variables have statistical differences across the communities such as percent of persons who are 15-19 years old in a Census tract.

Bivariate Analysis

T-tests and crosstabulations/chi-squares were run on all variables included (see Appendix A) for both the victim and offender datasets to determine if significant differences existed among the characteristics. T-tests were run with interval and ratio level data, while crosstabulations/chi-squares were utilized with the categorical data. The dependent variable for both t-tests and crosstabulations is whether or not the homicide was a perpetrated through a drive-by shooting. The significance of the t-tests was determined by the F-statistic and for the crosstabulations, the chi-square test aided in the determination of the significance of the difference.

Correlations for all the interval- and ratio-level variables were run to determine the strength, direction, and significance of the relationship. In this part of the study, correlations were primarily used to avoid multicollinerarity issues; this was determined

based on the strength of the relationship (Meyers, Gamst, Guarino 2006; O'Rourke, Hatcher, and Stepanski 2005). The strength of the relationship ranges from -1.00 to 1.00. By taking the absolute value of the coefficient the strength can be determined; a perfect correlation is found when the coefficient equals one and no correlation is present when the coefficient equals zero. The strength of the relationship varies between these two extremes; it is commonly thought in the social sciences that a coefficient of 0.8 is strong, 0.5 is moderate and 0.2 is weak (O'Rourke, Hatcher, and Stepanski 2005). In this analysis any variables that approached a coefficient of 0.7 were carefully considered as a possible effect for multicollinerarity and watched closely for their influence on the results. As noted below the variance inflation factor was also utilized.

Mapping Analysis

An analysis of locations was completed using ArcGIS (Geographic Information System) Map. ArcGIS not only allows for visual representation of the data spatially displayed in a map, but also for statistical spatial tests. In this analysis, the gang-motivated drive-by shooting homicides and other gang-motivated homicides perpetrated with a gun were mapped to determine if the spatial distribution of the homicides was clustered, random, or dispersed. This was implemented by geocoding[7] each of the homicides, based on the Census tract provided in the victim dataset. Then the Census map was joined with the homicide dataset based on spatial location. The join was completed in summary fashion, to avoid complications of more than one homicide occurring in a tract. This way each incident of drive-by shooting or other form of homicide was tallied to a total count for each Census tract.

[7] Geocoding is the placement of known locations on a map. It is often done with street addresses to find a known location. In this case the known locations are the Census tracts in which the homicides occurred.

The victim dataset was used for this analysis because using the offender dataset would artificially inflate the number of homicides in each Census tract for which multiple offenders were involved. The map of the 1980 Census tracts was provided by the University of Chicago Library (Winters N.d.). It is possible to use the 1980 Census tracts map provided because the tracts from 1970 to 1990 did not change (Block N.d).

A visual representation based on a graduated color map was made to determine if each census tract had similar rates of drive-by shootings and other forms of gang-motivated homicides that were perpetrated with a firearm, and if the location of drive-by shootings differed from other gang-motivated homicides with a firearm. This visual representation was used to aid in understanding the findings of the statistical analysis, Global Moran's Index (I) and Local Moran's I. The Global Moran's I is a value for the total spatial dispersion of the overall area, whereas the Local Moran's I is a value calculated for each division—the Census tracts in this study—of the whole area. The Local Moran's I allows for closer scrutiny of area locations to determine where the significant clustering or dispersion of homicide counts were located.

Global Moran's I is a spatial autocorrelation test in which a pair of values of each feature, in this case Census tracts, were compared to the mean value of the dataset to determine if the Census tracts near each other were similar in feature in contrast to the mean value (Mitchell 2005). The equation for determining the Index value is as follows:

$$I = \frac{n\sum_i\sum_j w_{ij}\left(x_i - \bar{x}\right)\left(x_j - \bar{x}\right)}{\sum_i\sum_j w_{ij}\sum_i\left(x_i - \bar{x}\right)^2}$$, where n is the number of features, w_{ij} is the weight, x_i is the homicide count for the analyzed Census tract, x_j is the homicide count for the analyzed Census tract's neighbors, and $\bar{x}$ is the mean count of homicides. In this analysis the w_{ij} is

one because polygon contiguity was used as the conceptualized spatial relationship (explained below).

The Global Moran's I ultimately identifies whether the distribution of homicides by Census tract was random versus dispersed or clustered. Global Moran's I ranges from -1 to 1, with 0 being a random distribution (Mitchell 2005). A positive Moran's I indicates a cluster, while a negative value indicates a dispersed distribution.

The significance level of the spatial autocorrelation is determined by a Z-score (Mitchell 2005). The Z-score is determined by $\frac{I_e - I_o}{SD_I}$, where the expected I (I_e) is subtracted from the observed I (I_o) and divided by the standard deviation for the distribution of I (SD_I). If the z-score is between negative and positive 1.96 then the null hypothesis cannot be rejected and if it is beyond negative or positive 1.96 then the null is rejected. In both cases the confidence interval is based on the z-score to determine the significance level.

The expected value of the I is calculated by: $I_e = \frac{-1}{n-1}$, where n is the number of features (Mitchell 2005). Due to the equation, I_e is always a small negative number, and for most purposes it is considered to be zero indicating that the distribution is always assumed to be random. In this study there are a total of 885 Census tracts, so I_e is 0.00113.

When the data are in ArcGIS Map there are a number of choices for setting up the parameters for a Global Moran's I. The parameters used for this analysis are as follows. The analysis was run twice, for drive-by shootings and other forms of gang-motivated, firearm-related homicides; each parameter was the same for the analysis, except the input

field. The input feature[8] for this analysis was the joined data of the Census tracts and the victim incident data. The input field in the first analysis was the sum of drive-by shootings in each census tract and in the second analysis it was the sum of other forms of homicide.

The conceptualization of spatial relationship has six options; for these analyses polygon contiguity was the parameter. Polygon contiguity means that only the tracts that border the currently analyzed tract are considered in the relationship; all the other tracts have no influence. Polygon contiguity was used as opposed to the other options because the rate of impact of non bordering tracts is unknown, due to unavailable data about the ease of access from one tract to another, over the 31 year period. We do not assume that non-bordering tracts do not affect each other, but their amount of affect is unknown; therefore in these analyses the affect of non bordering tracts will not be taken into account.

The distance method used was Euclidean, a straight-line from one polygon to another, as opposed to Manhattan, which measures distances on right angles, like driving around a city block. Euclidean distance was chosen because as stated above it is unknown where the access points of each Census tract is to another, but it is safe to assume that most Census tracts do not require access by going half way around the circumference of the tract for access to the tract. Standardization was not used in this analysis, meaning no weights were applied. No distance band was needed because polygon contiguity was specified as the spatial relationship. The setting of these

[8] The dataset included the projection of the data location on the map, which can be used to determine the neighbors to each Census shaped polygon.

parameters allowed for the analyses to be completed, and the results are provided in Chapter 7.

The second form of Moran's I, the Local, was also used in this analysis because a cluster distribution was found for both non drive-by shooting and drive-by shooting gang-motivated, firearm-related homicides (See Table 5). By conducting a Local Moran's I test the clusters of the types of homicide by Census tracts were more easily identifiable. The Local Moran's I is calculated in a similar way to the Global Moran's I, because it is a disaggregation of the Global Moran's I (Mitchell 2005). The equation to calculate Local Moran's I is: $I_i = \frac{(x_i - \bar{x})}{s^2} \sum_j w_{ij}(x_j - \bar{x})$, where w_{ij} is the weight, x_i is the homicide count for the analyzed Census tract, x_j is the homicide count for the analyzed Census tract's neighbors, $\bar{x}$ is the mean count of homicides, and s is the variance. There must be variance in the counts to complete the analyses otherwise each Local I would be zero, and consequently all tracts would be a random distribution.

In the Local Moran's I a large positive value indicates that the feature is surrounded by tracts with similar homicide counts (Mitchell 2005). A negative value indicates that the tract is bordered by tracts with dissimilar counts. The Local Moran's I test violates the assumption of the independence of test, because ArcGIS calculates a z-score for each tract, by using the surrounding tracts. Therefore tracts are used multiple times because they are each adjacent to two or more tracts (Mitchell 2005).

To address the violation of the test of independence the Bonferroni test was used as a more stringent criterion for the significance level, by adjusting the significance level and accounting for the number of tests completed. The Bonferroni test is dividing the significance level by the number of tests completed for an adjusted significance level. In

the case of this analysis the significance level is 0.05 and the number of tests completed was equal to the number of Census tracts in Chicago, 885. Therefore the adjusted significance level is $5.650e^{-5}$. The critical value of the adjusted confidence level is then compared to the calculated z-score. For an alpha level of a two-sided z-score of $5.650e^{-5}$ the critical value is 4.028 (McClelland 1999; Sauro 2007). This critical value was compared to the z-scores calculated from the Local Moran's I test to determine whether the findings were significant at the stringent significance level.

The parameters options in the Local Moran's I test are the same as those explained above, for the Global Moran's I test. The two tests were completed separately for drive-by shooting homicides and all other forms of gang-motivated, firearm-related homicides (see results below).

Multivariate Analysis

The final test conducted in SPSS was a logistic regression, which aided in the prediction of whether the gang-motivated homicide was a drive-by shooting or not based on the offender dataset. Logistic regression was used as opposed to other forms of predictability analysis because the dependent variable is categorical and there is a non-normal variance in distributions of the variables (Cleary and Angel 1984). Categorical independent variables for the analysis were coded into dichotomous variables. The ability to use categorical dichotomous independent variables in the regression analysis is due to the fact that the variable is coded in a dummy fashion, in which the interpretation of the results are based on the difference between two means (Meyers, Gamst, and Guarino 2006).

The equations used in predicting the dependent variable in logistic regression are many (Meyers, Gamst, and Guarino 2006). The unstandardized regression, based on the raw scores, equation is $Y_{group} = ln(odds\ ratio) = a + b_1X_1 ... + b_nX_n$, where Y_{group} is the predicted group, a is the constant/intercept, and b is the unstandardized weight for the X variable to the n^{th} term. The use of the natural log (ln) allows the equation to create a sigmoidal curve, which better describes the fit for most categorical dependent variables than a linear relationship. The values of the constant and the unstandardized weights are calculated by using the maximum likelihood estimation after the dependent variable is mathematically calculated into a logit variable (Meyers, Gamst, and Guarino 2006).

The odds ratio can be derived from the unstandardized equation by raising e to the unstandardized coeffieicent, $e^b = odds\ ratio$ (Meyers, Gamst, and Guarino 2006). Using the odds ratio allows for determining the relative strength of the relationship. An odds ratio for each variable can be interpreted while all other variables are held constant. An odds ratio of less than one is interpreted as the event is less likely to occur for the group coded as one than the group coded as zero. The odds ratio larger than one indicates that the group coded as one is more likely to be involved in the event than the group coded as zero. The relative strength of the relationship can be determined because the coefficients are standardized, which aids in indicating the variables that most strongly affect the dependent variable.

The percent of variance is explained by the independent variables in the logistic regression, which is indicated by a pseudo R^2, such as the Neglekerke (Knoke, Bohrnstedt, and Mee 2002; Meyers, Gamst, and Guarino 2006). The pseudo R^2 is

reported and interpreted with caution, because it is pseudo and not real or always accurate.

The variables of the logistic regression were separated by type of variable, incident and community. The community variables were further divided out by the theory into which they were best categorized; routine activities or social disorganization theory. It is noted that a variable may not be mutually exclusive to a theory, but each was categorized into the theory of best fit. For example, the percentage of individuals who are unemployed could theoretically be classified as either a routine activities or social disorganization theory variable; however variables that were not commonly used in social disorganization were included in the routine activities variables. Therefore four different logistic regressions were run; incident variables, incident and routine activities theory variables, incident and social disorganization theory variables, and a final model including all variables.

Additional tests for multicollinerarity were completed, to determine if the coefficients of the logistic regression were affected by multicollinerarity. The variance inflation factor (VIF) analysis was used to determine the multicollinerarity between the variables. If the VIFs were below four, multicollinerarity was not an issue. If the factors were above four, categories were collapsed or problematic variables were removed from the analysis. The type of action taken greatly depended on the variable and its relationship with the other variables.

CHAPTER SEVEN: RESULTS

Frequencies

In Tables 1 and 2 the descriptive characteristics of gang homicides with a firearm are displayed for nominal- and ordinal-level variables. Additionally, in Tables 1 and 2 the descriptives are separated by drive-by shooting perpetration or not, and the significance of the differences, which were tested through chi-square tests, is noted. In this chapter the frequencies of the total dataset are first addressed, and then in the bivariate section of this chapter the cross-tabulation and chi-square tests results are reported for the homicides perpetrated through a drive-by shooting and others mean of perpetration.

Offender Dataset

Table 1 contains the results of the offender database and Table 2 contains the results from the victim database. The frequencies of the variables from the offender and victim databases vary slightly due to the involvement of multiple versus single offenders and/or victims in a homicide. The multiple offenders or victims obviously will alter the frequencies. For example if there is a homicide that involves five offenders and one victim, then in the analysis of the offender database this case would have a greater effect on the frequency variables such as drug and liquor involvement, day of the week and month of the year of the occurrence than it would in the victim database. To avoid confusion of the differences in the frequencies on same variables in the offender and victim databases the offender frequencies of all the gang-motivated, firearm-related homicides will first be addressed, and then the victims frequencies.

The dependent variable, whether the homicide was perpetrated through a drive-by shooting or not, has a frequency of six percent of the incidents as drive-by shootings, in the offender dataset. The independent variables are as follows. Reports that males are more frequently involved in gang homicides as offenders than females corresponds to the results presented here, as 99.1% are male. The race of the offender is spread throughout four groups: White (5.5%), Black (60.5%), Latino (33.5%), and Asian (0.5%). Black offenders are the largest percentage, while Asians make up less than one percent. Due to the ethnicity of gang members differing throughout the United States, it is difficult to validate whether these findings are consistent with that of the ethnicity of gang members in Chicago (Howell 2007; Klein and Maxson 1989).

The majority of the offenders in the Chicago Homicide dataset have had prior offenses. Fifty percent of the offenders had a prior offense of violence, while 11.5% have non-violent previous offenses. There are 38.6% of the offenders in which it is unknown or missing as to whether they have a prior offense.

In the dataset the relationship of the victim and offender is coded into five possibilities: family, friend/acquaintance, gang rival, stranger, other/unknown. The most frequent relationship is, as expected, a gang rival (64.8%). The category with the least frequency is a family relation, resulting in none of the homicide cases.

The homicides in the data analyzed for this research occurred by the use of a firearm, as they were selected out of the total database with firearm use as a requirement. In knowing that all the homicides were committed with a firearm, it was thought pertinent to determine what type of firearm was used. The most frequently used firearm is a non-automatic handgun (39.5%) followed by any form (hand, shotgun, or rifle) of

fully- or semi-automatic gun (33.2%), with a non-automatic shotgun being used the least frequently (4.6%). According to McCorkle and Miethe (2002) the finding that non-automatic weapons are the most frequent is valid, because they report that gang members are less likely to own semi-automatic weapons than the general population.

The locations of the homicides vary, with the majority of the homicides having occurred on the street (61.5%), followed by other outdoor locations (15.5%) such as a park, yard, parking lot, public housing grounds, or a school yard. Places where the homicides occurred less frequently were in a residence (10.6%), a vehicle (9.5%), and other indoor locations (3.0%) such as lobby, restaurant, barber/salon, porch, tavern, church, school, and grocery store.

Drug and liquor involvement is determined by evidence of paraphernalia, intoxication by the offender or victim, or given by a witness (Block, Block, and the Illinois Criminal Justice Information Authority 1998). Most often it is unknown (75.6%) whether there was drug involvement in the homicide; in cases where it is known 24.1% of the homicides did not involve drugs and only 0.3% involved drugs. The findings from these data correspond with the findings of previous research (Block and Block 1993), in that gangs, drugs, and homicide do not often have an association. The liquor involvement had similar findings, although it is more often known whether liquor was involved. Of the incidents analyzed there were 80.5% of the gang homicides perpetrated with a firearm which had no liquor involvement, while 8.7% of the homicides were found to have liquor involved.

The time elements of gang homicides for day of the week and month of the year correspond to the general frequency of all homicides, occurring most often on the

weekends and in the summer months. The most common day of the week for gang homicides was Saturday (19.1%), followed by Sunday (16.9%) and Friday (14.0%). Wednesday (11.0%) was the day with the least frequency. The frequency of gang homicides by month is a Galician curve with August (12.6%) being the most frequent and January (5.1%) and December (5.6%) being the least frequent (See Table 1).

Table 1. Frequency Distributions and Cross-Tabulation of Offender Variables (N=3,297)

Variable	Frequency	Drive-By	
		No	Yes
Dependent Variable			
Drive-By Shooting (1= yes)	6.0% (135)		
Independent Variables			
Offender's Gender[a]			
Male	99.1% (3,183)	99.1% (2,977)	98.6% (206)
Offender's Race ***			
White	5.5% (175)	5.0% (149)	12.6% (26)
Black	60.5% (1,934)	62.9% (1,879)	26.6% (55)
Latino	33.5% (1,071)	31.6% (945)	60.9% (126)
Asian	0.5% (16)	0.5 (16)	0.0 (0)
Offender's Prior Offenses			
Non-Violent	11.5% (379)	11.6% (359)	9.6% (20)
Violent	50.0% (1,647)	49.7% (1,534)	54.1% (113)
Unknown	38.6% (1,271)	38.7% (1,195)	36.4% (76)

Variable	Frequency	Drive-By	
		No	Yes
Relationship of Victim and Offender ***			
Family	0.0% (0)	0.0% (0)	0.0% (0)
Friend/Acquaintance	10.6% (350)	11.3% (350)	0.0% (0)
Gang Rival	64.8% (2,136)	64.4% (1,989)	70.3% (147)
Stranger	5.4% (178)	5.6% (172)	2.9% (6)
Unknown/Other	19.2% (633)	18.7% (577)	26.8% (56)
Type of Gun Used *			
Automatic	33.2% (1,096)	34.0% (1,050)	22.0% (46)
Handgun Non-Automatic	39.5% (1,219)	46.4% (97)	39.9% (1,316)
Rifle Non-Automatic	7.0% (231)	7.0% (215)	7.7% (16)
Shotgun Non-Automatic	4.6% (151)	4.5% (140)	5.3% (11)
Firearm Unknown Type	15.3% (503)	15.0% (464)	18.7% (39)
Location ***			
Residence	10.6% (348)	11.0% (340)	3.8% (8)
Indoor Other	3.0% (99)	3.2% (99)	0.0% (0)
Vehicle	9.5% (312)	9.6% (296)	7.7% (16)
Street	61.5% (2,028)	60.1% (1,857)	81.8% (171)

Variable	Frequency	Drive-By	
		No	Yes
Outdoor Other	15.5% (510)	16.1% (496)	6.7% (14)
Drug Involvement **			
Unknown	75.6% (2,493)	76.1% (2,351)	67.9% (142)
Yes	0.3% (10)	0.3% (10)	0.0% (0)
No	24.1% (794)	23.5% (727)	32.1% (67)
Liquor Involved ***			
Unknown	10.8% (355)	11.3% (348)	3.3% (7)
Yes	8.7% (288)	8.8% (273)	7.2% (15)
No	80.5% (2,654)	79.9% (2,467)	89.5% (187)
Day of the Week ***			
Sunday	16.9% (557)	16.7% (515)	20.1% (42)
Monday	11.8% (390)	11.7% (361)	13.9% (29)
Tuesday	14.1% (466)	14.5% (447)	9.1% (19)
Wednesday	11.0% (364)	11.5% (355)	4.3% (9)
Thursday	13.0% (427)	13.1% (405)	10.5% (22)
Friday	14.0% (462)	13.8% (425)	17.7% (37)
Saturday	19.1% (631)	18.8% (580)	24.4% (51)

Variable	Frequency	Drive-By	
		No	Yes
Month of the Year **			
January	5.1% (167)	5.2% (162)	2.4% (5)
February	6.4% (210)	6.2% (192)	8.6% (18)
March	6.1% (202)	6.0% (185)	8.1% (17)
April	9.6% (318)	9.7% (301)	8.1% (17)
May	9.8% (322)	10.0% (309)	6.2% (13)
June	9.5% (314)	9.6% (296)	8.6% (18)
July	10.3% (338)	10.5% (324)	6.7% (14)
August	12.6% (416)	12.5% (386)	14.4% (30)
September	8.9% (295)	8.5% (263)	15.3% (32)
October	8.9% (295)	8.9% (274)	10.0% (21)
November	7.1% (234)	7.0% (216)	8.6% (18)
December	5.6% (186)	5.8% (180)	2.9% (6)

[a] – The assumption of expected frequency was not followed.
* $p \leq 0.05$ ** $p \leq 0.01$ ***$p \leq 0.001$

Victim Dataset

Table 2 contains the frequencies of the overall gang homicides for the victim dataset as well as the crosstabulation and chi-square test. The crosstabulation and chi-square test results are addressed in the bivariate analysis section of this chapter.

Almost seven percent of the homicide victims in the victim dataset were killed by a drive-by shooting. Similar to the results of the frequencies of the offenders, the victims are also more often male (94.6%) and Black (59.1%). The ethnicity of the victim second in frequency is Latino (33.7%) and least likely Asian (0.5%).

A slight majority of the victims have been documented as having committed a prior offense; this is different than what was found in the offender dataset. Just under a quarter of the victims (23.1%) committed violent offense in the past compared to 50 percent of the offenders. Yet the victims were identified as committing a non-violent offense (28.5%) more often than the offenders (11.5%). It is unknown whether 48.4% of the victims had committed an offense prior to this incident.

The relationship of the victim and offender consists of the same five possibilities as the offender database: family, friend/acquaintance, gang rival, stranger, or other/unknown. Just as in the offender database the victim database had gang rivals (65.6%) as the most frequent relationship and also no family relations resulted in a homicide.

Similar to what was found in the offender dataset the incident variables reflect the same findings when the victim dataset is used. The most frequently used firearm was a non-automatic handgun (39.0%) followed by any form of automatic gun (34.9%), with a non-automatic shotgun being used the least frequently (4.1%). The majority of the homicides occur on the street (60.8%), followed by other outdoor locations (14.0%). The location with the least occurrence of the homicides was an other indoor location than a residence (3.0%). The knowledge of whether drugs were involved in the homicide is frequently unknown (77.4%). In cases where it is known, 22.1% of the homicides did not

involve drugs and 0.4% involved drugs. This continues to support the findings by Block and Block (1993) that gangs, drugs, and homicide do not correlate. Liquor involvement follows in the same way; 75.2% of the gang homicides perpetrated with a firearm had no liquor involvement, while 8.2% of the homicides did have liquor involvement. The homicides occur most often on the weekend days with Saturday (19.6%) having the highest occurrence, followed by Sunday (17.6%). August (12.0%) once again is the month with the greatest occurrence of homicide and January (5.2%) is the least frequent.

Table 2. Frequency Distributions and Cross-Tabulation of Victim Variables (N=2,042)

Variable	Frequency	Drive-By	
		No	Yes
Dependent Variable			
Drive-By Shooting (1= yes)	7.0% (209)		
Independent Variables			
Victim's Gender *			
Male	94.6% (1,931)	94.9% (1,809)	90.4% (122)
Victim's Race ***			
White	6.7% (137)	6.5% (124)	9.6% (13)
Black	59.1% (1,207)	61.0% (1,164)	31.9% (43)
Latino	33.7% (688)	31.9% (609)	58.5% (79)
Asian	0.5% (10)	0.5 (10)	0.0 (0)
Victim's Prior Offenses **			
Non-Violent	28.5% (582)	29.2% (557)	18.5% (25)

Variable	Frequency	Drive-By	
		No	Yes
Violent	23.1% (472)	22.8% (434)	28.1% (38)
Unknown	48.4% (988)	48.0% (916)	53.3% (72)
Relationship of Victim and Offender ***			
Family	0.0% (0)	0.0% (0)	0.0% (0)
Friend/Acquaintance	10.4% (213)	11.2% (213)	0.0% (0)
Gang Rival	65.6% (1,340)	65.0% (1,239)	74.8% (101)
Stranger	5.2% (107)	5.5% (104)	2.2% (3)
Unknown/Other	18.7% (382)	18.4% (351)	23.0% (31)
Type of Gun Used			
Automatic	34.9% (712)	35.4% (675)	27.4% (37)
Handgun Non-Automatic	39.0% (797)	38.9% (741)	41.5% (56)
Rifle Non-Automatic	5.5% (112)	5.5% (105)	5.2% (7)
Shotgun Non-Automatic	4.1% (83)	4.0% (76)	5.2% (7)
Firearm Unknown Type	16.6% (338)	16.3% (310)	20.7% (28)
Location ***			
Residence	10.4% (213)	10.8% (206)	5.2% (7)
Indoor Other	3.0% (62)	3.3% (62)	0.0% (0)

Variable	Frequency	Drive-By	
		No	Yes
Vehicle	11.8% (241)	12.0% (228)	9.6% (13)
Street	60.8% (1,241)	59.6% (1,137)	77.0% (104)
Outdoor Other	14.0% (285)	14.4% (274)	8.1% (11)
Drug Involvement			
Unknown	77.4% (1,581)	77.9% (1,486)	70.4% (95)
Yes	0.4% (9)	0.5% (9)	0.0% (0)
No	22.1% (452)	21.6% (412)	29.6% (40)
Liquor Involvement			
Unknown	16.6% (339)	16.7% (318)	15.6% (21)
Yes	8.2% (167)	8.3% (159)	5.9% (8)
No	75.2% (1,536)	75.0% (1,430)	78.5% (106)
Day of the Week			
Sunday	17.6% (360)	17.6% (335)	18.5% (25)
Monday	11.9% (224)	11.7% (223)	15.6% (21)
Tuesday	12.6% (257)	12.6% (240)	12.6% (17)
Wednesday	11.2% (228)	11.6% (221)	5.2% (7)
Thursday	12.7% (259)	12.8% (244)	11.1% (15)

Variable	Frequency	Drive-By	
		No	Yes
Friday	14.3% (293)	14.2% (271)	16.3% (22)
Saturday	19.6% (401)	19.6% (373)	20.7% (28)
Month of the Year			
January	5.2% (106)	5.3% (102)	3.0% (4)
February	6.0% (122)	5.9% (113)	6.7% (9)
March	6.0% (122)	6.0% (115)	5.2% (7)
April	9.5% (195)	9.6% (184)	8.1% (11)
May	9.6% (197)	9.9% (188)	6.7% (9)
June	9.5% (195)	9.5% (181)	10.4% (14)
July	11.4% (232)	11.5% (219)	9.6% (13)
August	12.0% (245)	11.7% (224)	15.6% (21)
September	9.3% (190)	8.9% (170)	14.8% (20)
October	8.5% (174)	8.5% (162)	8.9% (12)
November	7.1% (145)	7.1% (135)	7.4% (10)
December	5.8% (119)	6.0% (114)	3.7% (5)

$p \leq 0.05$ ** $p \leq 0.01$ ***$p \leq 0.001$

Means and Standard Deviations

In Tables 3 and 4 the means, standard deviations, and T-test results are reported for the continuous independent variables. The independent variables are the age of the offenders and victims, the number of offenders and victims involved in an incident, the time of the occurrence, and all the Census tract variables (See Appendix A). First the means of some variables will be addressed, and then in the bivariate analysis section the results of the T-test will be reported.

Offender Dataset

Contained in Table 3 are the results of the offender's database variables, which are addressed here, followed by the means of the victim's database variables. The age of the offenders are in collapsed categories by five year increments. The mean age of the offenders in this dataset is 4.39; the value of 4 is between the ages 15 and 19 years old (S.D. = 0.82).

From the dataset it is determined that in all types of gang-motivated homicides there is a greater mean number of offenders (2.52) than the mean number of victims (1.05). This finding corresponds with the understanding that gang homicides are often completed by groups of offenders on a single victim.

The time of the occurrence is in military time so the count is from zero hundred hours to 24 hundred hours, with 12 hundred hours being noon. The mean time of the homicides in the offender data set was almost 3 p.m. (14:48). This signifies that the homicides occur more often in the latter half of the day than the earlier.

The mean total population of the Census tracts is 4,662 (S.D. = 2848), with a mean household population of 1,023 (S.D. = 639). It should be noted that there is great

variation in the Census tract characteristics. The variations can be attributed to many different reasons, but most particularly it should be attributed to the large range of population size, which ranges from zero to 18,125 people in a tract. The population density is a better indicator, because the size of the Census tract is factored in with the number. The average density is 10.59 per 1000 square meters (S.D. = 6.62) (Personal communication Winters, C. October 15, 2008).

The percentage of single-head households in tracts range from an average of female single-head households with 25.99% (S.D. = 18.09%) to male single-head households with 2.84% as the mean (S.D. = 2.11%).

The number of units in a building were recorded as one, two, three to four, or five or more units. The number of units with the highest mean frequency was that which contained five or more units in a building (37.19%, S.D. = 30.91%) to the lowest mean frequency of a one unit building (18.24%; S.D. = 21.35%). The number of people having lived in a unit ranges from one to six or more people. Units with one person in them has the highest mean of 21.17% (S.D. = 11.33%) and the percentage decreases as the number of people in a unit increases to the percentage of units with five people having lived in it at the lowest mean (10.85%, S.D. = 4.51%). The population who lived in the same house for five or more years is a mean of 54.38% (S.D. = 13.41), and the population who has lived in the same standard metropolitan statistical area for five or more years is 47.12% (S.D. = 24.05%) for the mean.

The economic means determined were the percentage unemployed, the percentage that live below the poverty line, percentage of difference from the U.S. median income, and frequency of car ownership. The mean percentage of people

unemployed was 14.31% (S.D. = 12.32%), and the percentage that live below the poverty line was 32.48% (S.D. = 19.66%), both much higher than the U.S. average percentage over all three decades of the Census. The percentage of difference of median income over the three Census years in all the tracts is zero (S.D. = 0.00). The mean frequency of car ownership decreases as the number of cars increase from zero cars (47.52%, S.D. = 22.22%) to three or more cars (3.42%, S.D. = 3.92%).

In considering the demographics of the individuals in the Census tracts, the mean indicates that there were more females (52.11%, S.D. = 4.60%) than males (47.73%, S.D. = 4.52%). The ages of the individuals range in each Census tract, but most age ranges have a mean of about 10% (see Table 3). The group with the lowest mean were people 75 years or older (2.87%, S.D. = 2.65%); the group with the highest mean were those 35 to 44 years old (11.70%, S.D. = 30.60%).

The homogeneity of race rate in the Census tracts has a mean of 0.23 (S.D. = 0.24). As indicated in Appendix B, the closer the rate is to zero the more homogeneous the Census tract. The mean percentage of White people in a Census tracts was 25.62% (S.D. = 31.03%), Black was 57.97% (S.D. = 44.11%), and the percent of population that claim to be of other race was 16.31% (S.D. = 22.82%). The mean percentage of Hispanics/Latinos[9] was 23.68% (S.D. = 31.51%). The average for the percent foreign born[10] was 15.36 (S.D.=18.59%).

The average rate of change of race for Whites was -0.16 (S.D. = 0.23), meaning that in general Whites throughout the 30 year time period moved out of the studied

[9] Individuals are not categorized separately as a race/ethnicity of Hispanic/Latino. This information is collected in addition to the individual's race, for example an individual may be a Hispanic Black.
[10] Foreign born or first generation U.S. born for the 1970 Census (see Appendix B).

Census areas. The average rate of change for Blacks (0.09, S.D. = 0.23) and other races (0.06, S.D. = 0.15) increased over the same time period.

The average rate of change of Hispanics was also calculated, but should be evaluated separately for two reasons. First it should be looked at separately from the White, Black, and other races rate of change because, as explained above an individual would be of one of the races, Black, White or other and could be counted as Hispanic/Latino ethnicity. The average rate of change for Hispanic/Latino is 0.08 (S.D. = 0.19). This indicates that on average over the 20-year period the number of Hispanics/Latinos increased in the analyzed area. Secondly, there was a difference in the count of years for average rate of change for Hispanic/Latino, because the Hispanic/Latino population was not comprehensively counted in the 1960 Census. Due to this difference the Hispanic/Latino race rate of change will not be included in higher-level analyses (see Appendix B).

The educational attainment of the studied Census tracts in Chicago average as a low attainment population; the educational attainment with the highest mean frequency of 29.03% (S.D. = 16.32%) is of those persons who achieved less than a ninth grade education. The lowest mean frequency is an educational attainment of the percentage of people with a college degree or higher (6.89%, S.D. = 8.56%).

Table 3. Means, Standard Deviations, and T-test from Offender Variables

Variable	Mean	Drive-By	
		No	Yes
Homicide Variables			
Age of the Offender (N=3,159)	4.39	4.39 (0.83)	4.41 (0.62)
Number of Offenders (N=3,297)	2.52	2.53 (1.57)	2.49 (1.39)

Variable	Mean	Drive-By	
		No	Yes
Number of Victims (N=3,297)	1.05	1.05 (0.22)	1.04 (0.19)
Time of Occurrence (N=3,297) (Military Time)	14:49	14:55 (8:46)	13:59 (9:44)
Census Tract Variables			
Total Population (N=3,285)	4,662	4,663 (2,830)	4,659 (3,103)
Population Density ** (N=3,285)	10.59	10.66 (6.73)	9.57 (4.81)
% Foreign *** (N=3,285) (Percent)	15.36	14.77 (18.48)	24.04 (17.95)
% Unemployed *** (N=3,285) (Percent)	14.31	14.50 (12.58)	11.45 (6.86)
% of Median Income * (N=3,285) (Percent)	0.00	-21.43 (35.80)	-17.56 (27.70)
% Below Poverty *** (N=3,285) (Percent)	32.48	32.92 (19.98)	25.92 (12.71)
% Own No Cars *** (N=3,285) (Percent)	47.52	48.20 (22.51)	37.59 (15.26)
% Own 1 Car *** (N=3,285) (Percent)	36.27	35.89 (15.55)	41.84 (10.35)
% Own 2 Cars *** (N=3,285) (Percent)	12.69	12.55 (10.86)	14.87 (8.34)
% Own 3 or More Cars *** (N=3,285) (Percent)	3.42	3.33 (3.88)	4.74 (4.16)
% Female *** (N=3,285) (Percent)	52.11	52.27 (4.46)	49.89 (5.81)
% Male *** (N=3,285) (Percent)	47.73	47.64 (4.41)	49.15 (5.75)

Variable	Mean	Drive-By	
		No	Yes
% Under 5 Years Old *	10.44	10.48	9.91
(N=3,285) (Percent)		(3.57)	(2.94)
% 5 to 9 Years Old ***	10.38	10.45	9.31
(N=3,285) (Percent)		(3.77)	(2.51)
% 10 to 14 Years Old ***	10.08	10.15	9.04
(N=3,285) (Percent)		(3.57)	(2.65)
% 15 to 19 Years Old	9.41	9.43	9.17
(N=3,285) (Percent)		(2.61)	(2.18)
% 20 to 24 Years Old ***	8.60	8.54	9.45
(N=3,285) (Percent)		(2.32)	(2.08)
% 25 to 29 Years Old ***	8.53	8.48	9.15
(N=3,285) (Percent)		(2.92)	(2.52)
% 30 to 34 Years Old	7.60	7.59	7.86
(N=3,285) (Percent)		(2.49)	(2.14)
% 35 to 44 Years Old **	11.69	11.66	12.24
(N=3,285) (Percent)		(3.09)	(2.51)
% 45 to 54 Years Old	8.53	8.52	8.62
(N=3,285) (Percent)		(2.87)	(2.74)
% 55 to 64 Years Old	6.90	6.90	6.89
(N=3,285) (Percent)		(3.65)	(2.92)
% 65 to 74 Years Old	4.83	4.84	4.69
(N=3,285) (Percent)		(3.14)	(2.62)
% 75 Years Old or Older	2.87	2.88	2.70
(N=3,285) (Percent)		(2.68)	(2.16)
% Same House for Five Years *	54.37	54.50	52.47
(N=3,285) (Percent)		(13.36)	(13.98)
% Same SMSA for Five Years ***	47.13	46.16	53.78
(N=3,285) (Percent)		(23.69)	(28.03)
Total Households	1,023	1,026	979.5
(N=3,285)		(638.3)	(655.3)

Variable	Mean	Drive-By	
		No	Yes
% Female Headed Households ***	25.99	26.54	17.81
(N=3,285) (Percent)		(18.37)	(9.96)
% Male Headed Households **	2.84	2.81	3.28
(N=3,285) (Percent)		(2.09)	(2.29)
% Single Parent Headed Households ***	28.80	29.32	21.10
(N=3,285) (Percent)		(18.23)	(10.47)
% 1 Person in a Unit	21.17	21.21	20.52
(N=3,285) (Percent)		(11.39)	(10.47)
% 2 People in a Unit	20.36	20.37	20.38
(N=3,285) (Percent)		(6.98)	(6.41)
% 3 People in a Unit ***	16.57	16.63	15.66
(N=3,285) (Percent)		(4.34)	(3.34)
% 4 People in a Unit	15.13	15.10	15.09
(N=3,285) (Percent)		(3.34)	(4.63)
% 5 People in a Unit ***	10.84	10.79	11.83
(N=3,285) (Percent)		(4.48)	(4.97)
% 6 or more People in a Unit	15.76	15.80	15.21
(N=3,285) (Percent)		(8.91)	(7.52)
Homogeneity of Race ***	0.23	0.22	0.38
(N=3,285)		(0.23)	(0.22)
% White ***	25.62	24.90	36.24
(N=3,285) (Percent)		(31.18)	(26.60)
% Black ***	57.97	59.93	29.16
(N=3,285) (Percent)		(43.77)	(38.73)
% Other ***	16.32	15.14	33.63
(N=3,285) (Percent)		(33.63)	(25.70)
% Hispanic ***	23.68	22.07	47.29
(N=3,285) (Percent)		(30.66)	(34.25)
% Less than a 9^{th} Grade Ed. ***	29.04	28.71	33.78
(N=3,285) (Percent)		(16.31)	(15.93)

Variable	Mean	Drive-By	
		No	Yes
% Less than a High School Ed. *** (N=3,285) (Percent)	26.17	26.49 (9.46)	21.43 (6.07)
% High School Graduate *** (N=3,285) (Percent)	23.39	23.52 (6.46)	21.34 (6.07)
% Some College Ed. (N=3,285) (Percent)	14.43	14.43 (8.90)	14.42 (8.72)
% College Degree or More * (N=3,285) (Percent)	6.90	6.81 (8.58)	8.07 (8.26)
Total Units (N=3,285)	1,601	1607 (1050)	1510 (985.1)
% with 1 Unit (N=3,280 (Percent)	18.25	18.33 (21.28)	20.03 (22.39)
% with 2 Units *** (N=3,280 (Percent)	24.18	23.91 (17.53)	28.19 (14.32)
% with 3-4 Units *** (N=3,280 (Percent)	20.19	19.80 (13.65)	25.86 (12.56)
% with 5 or More Units *** (N=3,280) (Percent)	37.19	38.02 (31.31)	24.94 (20.89)
White Race Rate of Change *** (N=3,285)	-0.16	-0.15 (0.24)	-0.21 (0.22)
Black Race Rate of Change * (N=3,285)	0.09	0.09 (0.23)	0.07 (0.16)
Other Race Rate of Change *** (N=3,285)	0.06	0.06 (0.15)	0.14 (0.19)
Hispanic/Latino Race Rate of Change *** (N=2,561)	0.08	0.08 (0.19)	0.16 (0.19)

* $p \leq 0.05$ ** $p \leq 0.01$ ***$p \leq 0.001$ Included are mean and standard deviation in parentheses.

Victim Dataset

The mean frequencies in Table 4 are the results of the victim's database variables; the means of the Census tract vary only slightly from the results presented above on the offender's database. Therefore only the incident data's means will be addressed, the Census tract means can be viewed in Table 4.

Just as the age of the offenders came in collapsed categories by five year increments, so did the ages of the victims. The mean age of the victims was 4.66, which is in the 4 range, so it is between 15 and 19 years old (S.D. = 1.42). In the victim dataset the number of offenders (2.52; S.D. = 1.82) and victims (1.07, S.D. = 0.28) involved in the incident are similar to that found in the results of the offender dataset. The mean time of the occurrence is earlier than found in the offender dataset (14:16, S.D. = 9:13), but just by 33 minutes. This indicates that gang homicides which include a greater number of offenders most likely occur in the hours from 15:00 to 24:00.

Table 4. Means, Standard Deviations, and T-test from Victim Variables

Variable	Mean	Drive-By	
		No	Yes
Homicide Variables			
Age of the Victim ***	4.66	4.68	4.33
(N=2,042)		(1.35)	(1.03)
Number of Victims	1.07	1.07	1.06
(N=2,042)		(0.28)	(0.24)
Number of Offenders	1.82	1.81	1.87
(N=1,897)		(1.15)	(1.07)
Time of Occurrence	14:16	14:17	13:95
(N=2,042) (Military Time)		(8:59)	(9:23)

Variable	Mean	Drive-By	
		No	Yes
Census Tract Variables			
Total Population (N=2,036)	4,710	4,714 (2,861)	4,652 (3,002)
Population Density * (N=2,036)	10.41	10.47 (6.53)	9.55 (4.80)
% Foreign *** (N=2,036) (Percent)	16.02	15.52 (18.59)	23.00 (18.39)
% Unemployed * (N=2,036) (Percent)	14.36	14.46 (12.03)	12.95 (8.05)
% of Median Income (N=2,036) (Percent)	0.00	-22.76 (34.84)	-20.99 (27.96)
% Below Poverty *** (N=2,036) (Percent)	32.24	32.55 (19.34)	27.92 (14.02)
% Own No Cars *** (N=2,036) (Percent)	46.55	47.15 (21.69)	38.20 (15.17)
% Own 1 Car *** (N=2,036) (Percent)	36.76	36.42 (14.87)	41.42 (10.43)
% Own 2 Cars ** (N=2,036) (Percent)	12.98	12.82 (10.38)	15.10 (7.93)
% Own 3 or More Cars ** (N=2,036) (Percent)	3.57	3.50 (3.86)	4.53 (3.64)
% Female *** (N=2,036) (Percent)	51.93	52.06 (4.87)	50.14 (5.38)
% Male *** (N=2,036) (Percent)	47.82	47.73 (4.77)	49.11 (5.31)
% Under 5 Years Old (N=2,036) (Percent)	10.27	10.29 (3.51)	9.97 (2.70)
% 5 to 9 Years Old *** (N=2,036) (Percent)	10.12	10.18 (3.65)	9.34 (2.29)

Variable	Mean	Drive-By	
		No	Yes
% 10 to 14 Years Old ***	9.83	9.88	9.06
(N=2,036) (Percent)		(3.50)	(2.61)
% 15 to 19 Years Old	9.34	9.34	9.06
(N=2,036) (Percent)		(2.60)	(2.61)
% 20 to 24 Years Old **	8.64	8.59	9.24
(N=2,036) (Percent)		(2.40)	(2.01)
% 25 to 29 Years Old	8.61	8.59	8.95
(N=2,036) (Percent)		(2.89)	(2.02)
% 30 to 34 Years Old	7.75	7.73	7.98
(N=2,036) (Percent)		(2.53)	(2.02)
% 35 to 44 Years Old	11.79	11.76	12.24
(N=2,036) (Percent)		(3.02)	(2.61)
% 45 to 54 Years Old	8.54	8.55	8.49
(N=2,036) (Percent)		(2.85)	(2.50)
% 55 to 64 Years Old	6.97	6.97	7.02
(N=2,036) (Percent)		(3.55)	(2.70)
% 65 to 74 Years Old	4.96	4.97	4.85
(N=2,036) (Percent)		(3.24)	(2.61)
% 75 Years Old or Older	2.96	2.98	2.81
(N=2,036) (Percent)		(2.84)	(2.25)
% Same House for Five Years	54.29	54.35	53.44
(N=2,036) (Percent)		(13.30)	(13.35)
% Same SMSA for Five Years *	47.69	47.26	53.51
(N=2,036) (Percent)		(23.82)	(27.75)
Total Households	1,035	1,040	971
(N=2,036)		(648.5)	(619.3)
% Female Headed Households ***	25.23	25.69	18.79
(N=2,036) (Percent)		(17.81)	(11.05)
% Male Headed Households **	3.00	2.96	3.59
(N=2,036) (Percent)		(2.19)	(2.55)

Variable	Mean	Drive-By	
		No	Yes
% Single Parent Headed Households *** (N=2,036) (Percent)	28.18	28.60 (17.71)	22.37 (11.86)
% 1 Person in a Unit (N=2,036) (Percent)	21.84	21.90 (11.94)	20.96 (10.30)
% 2 People in a Unit (N=2,036) (Percent)	20.36	20.38 (6.66)	20.08 (6.23)
% 3 People in a Unit (N=2,036) (Percent)	16.53	16.56 (4.29)	16.08 (3.39)
% 4 People in a Unit (N=2,036) (Percent)	14.98	14.95 (4.66)	15.40 (4.10)
% 5 People in a Unit * (N=2,036) (Percent)	10.75	10.69 (4.50)	11.61 (4.73)
% 6 or more People in a Unit (N=2,036) (Percent)	15.30	15.31 (8.64)	15.13 (7.25)
Homogeneity of Race *** (N=2,036)	0.24	0.23 (0.24)	0.37 (0.22)
% White *** (N=2,036) (Percent)	26.01	25.43 (30.46)	34.18 (26.37)
% Black *** (N=2,036) (Percent)	55.75	57.41 (44.22)	32.41 (40.48)
% Other *** (N=2,036) (Percent)	18.09	17.05 (23.26)	32.67 (25.55)
% Hispanic *** (N=2,036) (Percent)	25.85	24.45 (32.13)	45.56 (34.29)
% Less than a 9^{th} Grade Ed. ** (N=2,036) (Percent)	28.84	28.56 (16.94)	32.79 (16.23)
% Less than a High School Ed. *** (N=2,036) (Percent)	25.67	25.91 (9.42)	22.30 (7.63)
% High School Graduate * (N=3,285) (Percent)	23.25	23.35 (6.47)	22.06 (6.34)

Variable	Mean	Drive-By	
		No	Yes
% Some College Ed. (N=2,036) (Percent)	14.93	14.96 (8.95)	14.57 (8.32)
% College Degree or More (N=2,036) (Percent)	7.16	7.13 (8.76)	7.55 (8.32)
Total Units (N=2,036)	1,627	1634 (1052.9)	1536 (966.0)
% with 1 Unit (N=2,034) (Percent)	18.17	18.03 (21.05)	20.14 (21.40)
% with 2 Units ** (N=2,034) (Percent)	24.25	24.00 (17.43)	27.83 (14.30)
% with 3-4 Units *** (N=2,034) (Percent)	20.29	19.92 (13.51)	25.41 (12.41)
% with 5 or More Units *** (N=2,034) (Percent)	37.01	37.80 (30.74)	25.85 (21.15)
White Race Rate of Change *** (N=2,036)	-0.15	-0.15 (0.23)	-0.21 (0.22)
Black Race Rate of Change (N=2,036)	0.08	0.08 (0.21)	007 (0.16)
Other Race Rate of Change *** (N=2,036)	0.07	0.06 (0.15)	0.14 (0.18)
Hispanic/Latino Race Rate of Change *** (N=1,672)	0.09	0.08 (0.18)	0.19 (0.20)

* $p \leq 0.05$ ** $p \leq 0.01$ ***$p \leq 0.001$ Included are mean and standard deviation in parentheses.

Crosstabulations/Chi-Squares and t-Tests

The frequencies, means, and standard deviations vary in many cases for those homicides that were perpetrated through a drive-by shooting and those that were perpetrated through other means. Crosstabulations/Chi-squares and t-tests were used to

test the significance in the differences of the two methods of perpetration. The nominal and ordinal level variables will first be reported on; the information can also be seen in the Table 1 and 2 respectively for the offender and victim datasets.

Offender Dataset Crosstabulations

The frequency of offender's gender and their prior offenses in drive-by shootings and other forms of homicide are not significantly different. The complication of the gender variable is that an assumption for the crosstabulation/chi-square test was ignored. The drive-by shooting female cell contained a count of three, which does not meet the assumption of expected frequency of at least a count of five in each cell. Therefore, the insignificance of this variable may be caused by not abiding by the assumptions.

The race of the offender is significantly different for those perpetrated through a drive-by shooting to those that are not; it is significant to the $p \leq 0.001$ ($\chi^2 = 113.0$). Gang homicides not perpetrated through drive-by shootings were 62.9% of the time committed by a Black offender, compared to those that are perpetrated through a drive-by shooting which was committed 60.9% of the time by a Latino offender. This indicates that drive-by shootings are more often committed by Latino offenders than Black offenders.

It is demonstrated in the analysis that the relationship between the victim and the offender was more often a gang rival (70.3%) in homicides perpetrated through a drive-by shooting, than by other means of perpetration (64.4%). Drive-by shooting homicides had no frequency of friend/acquaintance relationships, where other perpetrations of homicides have 11.3% of the relationships consisted of friends/acquaintances. In addition the category of unknown/other relationships occurred 26.8% of the time in

drive-by shootings. Unknown/other relationships occurred less often in other forms of perpetration (18.7%). These differences are significant with a χ^2 of 20.9 at the significance level of less than one percent.

The firearms used in drive-by shootings and other forms of homicide are significantly different. Automatic guns are less often used in drive-by shooting homicides (22.0%) than other perpetrations (34.0%). It is more likely that a non-automatic handgun, shotgun, or rifle will be used in a drive-by shooting (46.4%, 7.7%, and 5.3%) than other types of homicide perpetration (39.5%, 7.0%, and 4.5%). It is also more likely that the type of gun used in a drive-by shooting (18.7%) is unknown than was found in other methods of perpetration (15.0%). The difference is significant with a chi-square of 12.9 ($p \leq 0.013$).

As it is commonly believed the majority of drive-by shooting homicides (81.8%) occur in the street more often than other types of gang homicides (60.1%). Drive-by shooting homicides occur less often in all other places than those homicides not perpetrated through a drive-by shooting (See Table 1). This difference is significant at less than 0.001 ($\chi^2 = 43.1$).

Drug and liquor involvement are significantly less likely for gang homicides that were perpetrated through a drive-by shootings (0.0% and 7.2%) than other forms of perpetration (0.3% and 8.8%). In the homicides not perpetrated through a drive-by shootings there were 23.5% with no drug and 79.9% no liquor involvement. The gang homicides perpetrated through a drive-by shooting have no drug involvement in 32.1% of the cases and no liquor involvement in 89.5% of the cases. These findings were significant for drug involvement ($\chi^2 = 8.3$, $p \leq 0.016$) and liquor involvement ($\chi^2 = 14.3$,

$p \leq 0.001$). These findings indicate that drive-by shootings were less likely to have drug and liquor involvement. Conclusions may be made that in drive-by shootings other factors are involved more than factors of intoxication or inebriation.

Both time variables, day of the week and month of the year, are significantly different for drive-by shootings and other types of homicide. Drive-by shooting homicides occur more frequently on Friday (17.7%), Saturday (24.4%), Sunday (20.1%), and Monday (13.9%), than other forms of homicide perpetrations (13.8%, 18.8%, 16.7%, and 11.7%, respectively). The months in which gang drive-by shooting homicides occur more often are August through November and occur less often from December to July, than gang homicides perpetrated through other means (see Table 1 for percents). This is most likely due the fact that in Chicago during the winter season the roads are not always conducive to drive on, which reduces the likelihood of a drive-by shooting. The day of the week and month of the year variables are significantly different, respectively, at less than 0.001 ($\chi^2 = 21.7$) and 0.004 ($\chi^2 = 27.4$).

Victim Dataset Crosstabulations

The victim dataset has less significant differences in the variables between the homicide perpetrated through a drive-by shooting and other forms of homicide than the offender dataset, as indicated in table 2. The variables without a significant difference are the type of gun used, drug and liquor involvement, day of the week, and month of the year. The variables that indicated a significant difference will be addressed below.

The frequency of male victims in drive-by shootings homicides (90.4%) are less frequent than that of other forms of homicide (94.9%). Therefore females are more likely involved in drive-by shootings both as the victim and offender than other forms of gang

homicides. The differences of the drive-by shootings and other forms of homicide for the gender of the victim are significant ($\chi^2 = 4.9$, $p \leq 0.026$).

The race of the victim differences correspond with the findings of the race of the offender. The victim of a drive-by shooting (58.5%) is more likely to be of Latino race than other forms of homicide perpetration (31.9%). The opposite is found for Black victims; they are less likely to be involved in a drive-by shooting homicide (31.9%) than other forms of homicide (61.0%). These results are significant at less than 0.001 ($\chi^2 = 47.2$). These findings again imply that Latinos are more often involved in drive-by shootings than in other forms of gang-motivated, firearm-related homicides.

Unlike the offender's prior offenses, a victim who has committed a violent prior offenses is significant. The victim of a drive-by shooting had a higher percentage of violent offenses (28.1%) than is found in the other forms of homicide (22.8%). This finding may support the conjecture that drive-by shootings are a safer form of homicide for the offender, because the offender would have the speed of the homicide and the protection of the car. Therefore the offenders may have been more likely to choose this method of homicide when they knew that their target was willing to fight back. Yet, the percentage of victims who have committed non-violent offenses was less for drive-by shooting incidents (18.5%) than another type of homicide (29.2%). These findings are significant ($\chi^2 = 7.4$, $p \leq 0.025$).

The relationship between the victim and the offender, just as in the offender dataset, was more frequently a gang rival or had an unknown relationship in drive-by shooting perpetrated homicides (74.8% and 23.0%) than in other forms of homicide (65.0% and 18.4%). The likelihood of a friend/acquaintance or stranger as a victim of a

drive-by shooting (0.0% and 2.2%) is less likely than in another form of homicide (11.2% and 5.5%). The relationships between the offender and victim are significantly different between the homicides perpetrated by a drive-by shooting and those that were not (χ^2 = 20.9, $p \leq 0.001$).

It is demonstrated that all forms of gang homicides occur most often on the street, but the frequency of drive-by shootings (77.0%) occurring on the street more often than other forms of homicide (59.6%). Drive-by shooting occurred less often in residences (5.2%) and in other indoor areas (0.0%) than other forms of gang homicide (10.8% and 3.3%). These findings are significantly different at less than 0.001 (χ^2 = 18.6).

Offender Dataset t-tests

The interval and ratio level data were analyzed by the t-test difference for the means; the results of the tests are included for the offender and victim datasets, respectively, in Table 3 and 4. All the independent variables in the offender dataset from the homicide data; as well as the number of total population, total households, and total units; some of the age categories, and number of people in a unit; having some college education, and percent of one person household from the Census data did not indicate significant differences for homicides committed through a drive-by shooting or another means. The significant variables will be addressed below.

The population density average in the areas where drive-by shooting homicides occurred were significantly different than the locations of other gang homicides ($t = 3.07$, $p \leq 0.01$). The locations of drive-by shootings had a slightly lower density (9.57) compared to the locations of other gang-motivated, firearm-related homicides (10.66). This indicates that on average areas where drive-by shootings occur has a lower

population per area, which may indicate better areas to drive through for open, easy access roads.

The percentage of single-head households is significant for female, male, and the combination of male and female of single-head households. In the cases of female-head households those tracts where drive-by shootings (17.81%) occurred had a lower percentage of families headed by single females than when the homicide was not a drive-by shooting (26.54%, $t = 11.42$, $p \leq 0.001$). The opposite is true for single male-head households, drive-by shootings (3.28%) often occur where more households are headed by single males (2.81%, $t = -2.906$, $p \leq 0.01$).

In the Census tracts where drive-by shootings occur there was a greater percentage of two unit buildings (28.19%, $t = -4.118$, $p \leq 0.001$) and three to four unit buildings (25.86%, $t = -6.707$, $p \leq 0.001$), than in Census tracts where other forms of gang homicide with a firearm were carried out. The findings for buildings which contain five or more units is the opposite; in locations where drive-by shootings occurred a lesser (24.94%) amount of these types of buildings were present compared to where the other forms of homicide occurred (38.02%, $t = 8.437$, $p \leq 0.001$).

Two of the six variables which tested the percentage of the numbers of people living in a unit were statistically significant. The percentage of three people living in a unit was significantly different in the locations where drive-by shooting (15.66%) and other homicides occurred (16.63%, $t = 3.973$, $p \leq 0.001$), in that there were fewer units with three people living in them where drive-by shootings occurred. In the percentage of units where there were five people living, drive-by shootings occurred more often (11.83%, $t = -3.206$, $p \leq 0.001$).

Interestingly, the differences in whether a drive-by shooting or other form of homicide occurs in a location where a characteristic is present often inverts when a similar or higher count characteristic is studied. This indicates that combining some of the counts of the community variables may cause the significant differences to be lost. Just as the number of units in a building and the number of people who lived in a unit demonstrate, the tracts where there is a greater percentage of two, and three or four units in a building had a higher frequency of drive-by shootings than other forms of gang-motivated, firearm-related homicides, and the opposite was true for buildings with five or more units. Drive-by shootings occurred less often in locations where there was a higher percentage of buildings with five or more units.

The inverting trend continues with the analysis of the percentage of people who live in the same house for five or more years and the percentage that live in the same metropolitan area for five or more years. The findings for the former indicated that, to the p less than or equal to 0.05, drive-by shootings occurred more often in locations where there was a lower percentage of people who live in the same house for five or more years (54.50%; $t = 2.123$). The findings switch when studying the percentage of people who lived in the same metropolitan area for five or more years. Drive-by shootings occur in locations where there is a higher percentage of stability (53.78%), compared to the communities that have a lower percentage of people who live in the same metropolitan area for five years (46.16%, $t = -3.578$, $p \leq 0.001$).

The economic characteristics point to the fact that the communities where drive-by shooting homicides occurred were slightly better-off than where another form of homicide was perpetrated. The results show that the percentage of unemployment is

higher where forms of homicide other than drive-by shootings occurred (14.50%) than in locations where drive-by shootings occurred (11.45%, $t = 5.798$, $p \leq 0.001$). The percent of the median income is significantly different for drive-by shooting homicide locations and other types of gang homicides ($t = -2.410$, $p \leq 0.05$). The findings indicate that in areas where drive-by shootings occurred the population had a mean of 17.56% below the U.S. median income, while in other homicide locations the population has a mean of 22.43% below the U.S. median income. These results correspond with the findings of the percentage of people that lived below the poverty line; where drive-by shootings occurred there was about a quarter of the population living below the poverty line (25.92%) compared to where other homicides occur there is about a third of the population living under the poverty line (32.92% , $t = 7.369$, $p \leq 0.001$).

As expected, the percentages of number of cars owned by the population follow the economic statistics, and there is need for having a car to commit a drive-by shooting. The percentage of the population that owned no cars is higher in the areas where homicides that are not drive-by shootings occurred (48.20%). The percentage of the population that owned no cars in the areas where drive-by shootings homicides occurred were 37.59%. The t is 9.375 and significant to the 0.001 level for the percentages of no car ownership. The frequency of where drive-by shootings occurred inverted when analyzing the percentages of the population who owned one or more cars, as was expected (see Table 3).

Although the drive-by shooting victims and offenders are more likely to be female than in other homicides, the percentages of females in the communities do not follow the same trend. In fact, drive-by shootings (49.89%) occurred in communities with a lower

percentage of females (52.27%, t = 7.290, p≤ 0.001). Therefore, the opposite is true for the percentage of males in the community; the higher percentage of males in the community is found in the locations of drive-by shootings.

Of the significant age variables, the groupings of those younger than 14 were in smaller percentages in the locations of drive-by shootings homicides, while the percentages of the population over 20 years old had a higher percent. For example the total population in the Census tracts is a mean of 9.04 percent for 10 to 14 year olds in areas where drive-by shootings transpired and 10.15 percent of the population was 10 to 14 years old in areas where there were other types of perpetrated homicides (t = 5.730, p≤ 0.001). Yet, the percentage of ages between 20 to 24 years old is the opposite. In communities where drive by shootings happened 9.45% of the population was 20 to 24 years old, but in communities where other forms of homicide transpired there was 8.54% of the population who was 20 to 24 years old. These findings are significant to 0.001 with t equal to -5.513. A significant difference was also found in the age rages of 25 to 29 and 35 to 44 years old, which follow the same pattern as the percentage of 20 to 24 year olds (see Table 3).

The ethnicity and race make-up of the communities are significantly different for locations of the two types of homicides committed. Drive-by shooting homicide locations consist of areas in which there is a higher concentration of percentage of the population which is foreign born (24.04%) and a more interracial community (0.38) compared to locations where other forms of gang homicides occur (14.77% , t = -7.025, p≤ 0.001 and 0.22 , t = -9.993, p≤ 0.001). The percentage of the race of people who are White (36.24%), other (33.36%), and Hispanic (47.29%) are larger in areas where drive-

by shootings transpire compared to other types of homicide (24.90% , t = -5.897, p≤ 0.001, 15.14% , t = -10.149, p≤ 0.001, and 22.07% , t = -10.365, p≤ 0.001). It is important to remember that Hispanic/Latino is classified separately from Black, White and Other, therefore individuals may be Hispanic White or non-Hispanic White. The findings of the percentage of the community that is Hispanic/Latino correspond with the findings that the victim and the offender of drive-by shootings are more likely Hispanic/Latino than Black. The findings of the percentage of the population that was Black also corresponds to the incident level data, in that there was a smaller percentage of Black victims and offenders involved in drive-by shooting homicides. There is a 29.16% mean for the percentage of the population which is Black in communities the drive-by shootings occur in, compared to the locations of other gang homicides consisting of 59.93% of the population, which was Black (t = 11.014, p≤ 0.001).

The rates of change of the races are also significantly different. The White race rate of change decreased significantly more in the locations where the drive-by shootings happened (-0.21), than in the locations where other forms of homicide occurred (-0.15, t = 3.475, p≤ 0.001). The population of the Black race and Other races increased in the locations of both types of homicide. The rate of change of the Black race is smaller in communities where drive-by shootings transpired (0.07), than where other types of homicides were located (0.09, t = 2.068, p≤ 0.05). The people who are of the Other race category have a greater increase in the communities where drive-by shootings happened (0.14), than where other homicides occurred (0.06, t = -6.367, p≤ 0.001). The change of rate of Hispanic/Latinos is twice the increase in areas where drive-by shootings occurred (0.16) than in areas where other forms of homicides happened (0.08, t = -5.46, p≤ 0.001).

The educational attainments of the populations in the Census tracts all have significant differences, except for the percentage of the population that had some college education. Surprisingly, the communities where drive-by shootings occurred there was a higher percentage of people who have less than a 9th grade education and a higher percentage of people with a college degree or more (33.78% and 8.07%) than where the other types of homicide occurred (28.71% , t = -4.351, $p \leq 0.001$ and 6.81% , t =--2.057, $p \leq 0.05$). The Census tracts where non drive-by shooting homicides happened there is a lower mean frequency of individuals with a high school degree or some high school education (26.43% and 23.52%) than in tracts where drive-by shootings occurred (21.43% , t = 9.351, $p \leq 0.001$ and 21.34% , t = 4.761, $p \leq 0.05$).

These findings from the offender dataset indicate that the locations where drive-by shootings occurred were where the higher percentages of people were slightly more well-off, had higher educational attainment, of Black race, older, had less units in a building and less people in a unit, and lived in the same community than the locations where other forms of homicide were perpetrated.

Victim Dataset t-test

There are less significant variables in victim dataset for the t-test results; as displayed in Table 4. The differences in the means are only slightly different in the victim dataset than was reported on from the offender dataset. All the incident variables from victim homicide dataset are insignificant except for the age of the victim. The age of the victim for those involved in a drive-by shooting (4.33) is younger than the victims of other homicides (4.68, t = 3.804, $p \leq 0.001$).

Many of the independent variables from the Census level data are also insignificant between the differences of perpetration: the total population, total number of households, and number of units; most of the age categories, and number of people in a unit; education levels greater the a high school graduate, having some college education, percent of one person living in a unit, percent of U.S. median income, percent lived in same house for five years, and the Black race rate of change. The significant variables will be addressed below.

The difference of population density between the locations of drive-by shootings (9.55) and other forms of homicide (10.47) happened to almost mirror the findings in the offender dataset ($t = 2.08$, $p \leq 0.001$). Just as was found in the offender dataset the homicides in Census tracts that had a lower percentage of single female-head households were where drive-by shootings (18.79) occurred than for other homicides (25.69, $t = 6.673$, $p \leq 0.001$). Male single-head households are just over half a percent higher in locations where drive-by shooting homicides transpired (3.59%, $t = -2.787$, $p \leq 0.001$). Therefore the larger number of single female-head households affects the overall percentage of single-parent households, which causes there to be a higher percentage of single parent households in locations where homicides were carried out by means other than drive-by shootings (28.60%, $t = 5.671$, $p \leq 0.001$).

The number of units in a building follows the same trend as in the offender dataset; the areas that had a higher percentage of buildings with two, three, or four units had a higher frequency of drive by shootings. The opposite was true for areas where there was a greater percentage of buildings with five or more units. The mean percentage of buildings with two units was 27.83% in areas where drive-by shootings occurred, and

where drive-by shootings do not occur there was a 24% mean of buildings with two units ($t = -2.962$, $p \leq 0.01$). There was a mean of 25.41% of three or four unit buildings in areas where drive-by shootings take place, and 19.92% of the buildings in Census tracts where other homicides occurred. These findings are significant at t equal to -4.583 and p less than or equal to 0.001. The mean of the percentage of buildings that contain five or more units is the opposite. Drive-by shootings (25.85%) occurred where there was a lower mean percentage of five or more unit buildings compared to where the other forms of homicides were perpetrated (37.80%, $t = 6.123$, $p \leq 0.001$).

The only variable that had a significant difference of the percentage of the number of people living in a unit was the units that had five people ($t = -2.288$, $p \leq 0.05$). Where drive-by shootings transpired there was a slightly larger percentage of units with five people living in it (11.61%) than where other homicides transpired (10.69%).

As stated above the percentages of difference for the number of people who lived in the same house for five years is not significantly different in the types of homicides. Although, the percentage of people who live in the same metropolitan area for the past five years is significantly different at t equal to -2.544 and p less than or equal to 0.05. The difference is that in locations where drive-by shootings took place there was a 53.51 mean percentage of the population that had lived in the same metropolitan area, compared to 47.26 percent mean for locations that other forms of homicide transpired of the population that lived in the same metropolitan area.

Both the percentage unemployed and people living below the poverty line are smaller for locations were drive-by shootings happened. The percentage of unemployed where drive-by shootings occurred was 12.95 compared to 14.46 where other forms of

homicide were carried out. The percentage below the poverty line was just under a five percent difference between the locations of drive-by shootings (27.92%) and other homicides (32.55%). These differences are both significant ($t = 2.033$, $p \leq 0.05$ and $t = 3.600$, $p \leq 0.001$).

As found in the offender dataset the percentage of number of cars owned by the population follows the common thought of the areas in which drive-by shooting happened; there would be more cars owned. The percentage of the population that owned no cars was higher in the areas where homicides that were not drive-by shootings occurred (47.15%) compared to areas where drive-by shootings did occur (38.20). The t is 6.401 and significant to the 0.001 level. Once again the percentage of the population that owned one to three or more cars flips to where drive-by shooting homicides occurred; there was a greater percentage of car ownership. For locations where drive-by shootings transpired the percentage of population that owned one car was 41.42, two cars was 15.10 and three or more cars was 4.53. Compared to locations where homicides were committed in a different way there was a lower number of cars; the percentage of population that owned one car was 36.42 ($t = -5.208$, $p \leq 0.001$), two cars was 12.82 ($t = -3.139$, $p \leq 0.01$), and three or more cars was 3.50 ($t = -3.023$, $p \leq 0.01$).

Similar to the offender dataset, in the victim dataset there were fewer females living in the locations where drive-by shootings occurred. It was found that 50.14 mean percent of the population was female in drive-by shooting homicide locations, and 52.06 percent of the population was female in the areas where other homicides are located ($t = 4.380$, $p \leq 0.001$). The opposite was true for males ($t = -3.227$, $p \leq 0.001$; see Table 4).

In the victim dataset only the variables of people from five to nine, 10 to 14 and 20 to 24 years old are significant. Still the percentages follow the same pattern found in the offender dataset. Of the significant age variables the groupings of those younger than 14 had lower percentages in the locations of drive-by shootings, while the percentages of the population over 20 years had a higher percent. The population in the Census tracts where drive-by shootings occurred was a mean of 9.34 percent for five to nine year olds, compared to 10.18 percent in areas where homicides were perpetrated by other means ($t = 3.895$, $p \leq 0.001$). And the percentage of population that was 10 to 14 years old in areas where drive-by shootings happened were 9.06% compared to 9.88% ($t = 3.456$, $p \leq 0.001$). Yet, the percentage of ages between 20 to 24 years old was the opposite, where drive-by shootings occurred there was 9.24% of the population made up of this age group. In communities where other forms of homicide occur 9.34% of the population was 20 to 24 years old. These findings are significant to 0.01 with t equal to -3.053.

The finding of the percentage of the population that was foreign-born in areas where drive-by shootings (23.00%) transpired persisted to be a higher percentage, than in areas where other forms of homicides occurred (15.52%, $t = -4.519$, $p \leq 0.001$). The ethnicity and race make-up of the communities were significantly different for the locations of the types of homicides committed. The communities were also more inter-racial, the homogeneity of race in the areas where drive-by shootings occurred was 0.37 compared to 0.23 level of homogeneity in areas where the homicide was committed another way ($t = -6.719$, $p \leq 0.001$).

The percentages of race follow the findings in the incident variables as well as those in the offender dataset. The locations where drive-by shootings occurred had a

higher White (34.18%), Other (32.41%), and Hispanic (45.56%) population ($t = -3.685$, $p \leq 0.001$, $t = -6.902$, $p \leq 0.001$, and $t = -6.938$, $p \leq 0.001$). The opposite is true for the percentage of Black, which was 57.41 percent in areas where other forms of homicide occurred, and was 32.41% in areas where drive-by shootings happened ($t = 6.889$, $p \leq 0.001$). The results of the percent Hispanic/Latino and Black are important in that they support the findings at the incident level that the victims and offenders of drive-by shootings are more likely Latino then Black.

The rates of change of the races are also significantly different for White and Other. The White race rate of change was significantly larger in the locations where drive-by shootings happened (-0.21). The rate of change for people who were White declined at a slower rate for non drive-by shooting homicides (-0.15, $t = 3.206$, $p \leq 0.001$). The people who are of the Other races category have a greater increase in the communities where drive-by shootings happened (0.14), than where other homicides occurred (0.06, $t = -4.829$, $p \leq 0.001$). The rate of change for people who were Black was insignificant. The areas where drive-by shootings occurred had an average of 0.19 rate of change for Hispanic/Latinos, which is just slightly higher than what was found in the offender dataset. The rate of change of the location of other forms of homicide was exactly the same as in the offender dataset (0.08, $t = -4.19$, $p \leq 0.001$).

Unlike the offender dataset only some of the educational attainments of the populations in the Census tracts have significant differences. The communities that have a higher percentage of people who have less than a 9^{th} grade education were more likely to have drive-by shootings (32.79%) happen in their tracts ($t = -2.864$, $p \leq 0.01$). The areas that have a higher percentage of people with less than a high school education and

higher percent of the population who have a high school degree are less likely to have gang drive-by shooting homicides (22.30% and 22.06%) compared to locations where drive-by shootings occurred (25.91% , $t = 5.220$, $p \leq 0.001$ and 23.35% , $t = 2.259$, $p \leq 0.05$).

Mapping Analysis

Analyses of the locations by type of homicide were executed in ArcGIS Map. As explained above the maps were generated through geocoding and joining of the Census tract map and the homicide incident data. The first maps that were created are the mapping of the locations of the homicides. In Figure 2 the counts of drive-by shooting homicides in each Census tract area over the 31 year period, from 1965 to 1995, are displayed. The divisions of the frequency of shootings are determined by the natural breaks.

Most tracts on the map have no incidents of drive-by shootings. Yet, the locations where there were incidents of drive-by shootings happened are not in one clustered area, but seem to be in a few clusters, or randomly located. Only four of the Census tracts had a total of four or five drive-by shooting homicide incidents, which are the highest count over the 31 year period. Three of the four tracts with the highest frequency of drive-by shootings are concentrated in north-central Chicago, with only a 2 mile distance between them. The fourth tract with the highest drive-by shooting frequency is a bit further from the others and is only somewhat surrounded by tracts that have any frequency of drive-by shooting homicides. Tracts numbered one and three had counts of five drive-by shootings and tracts numbered two and four had a count of four drive-by shootings.

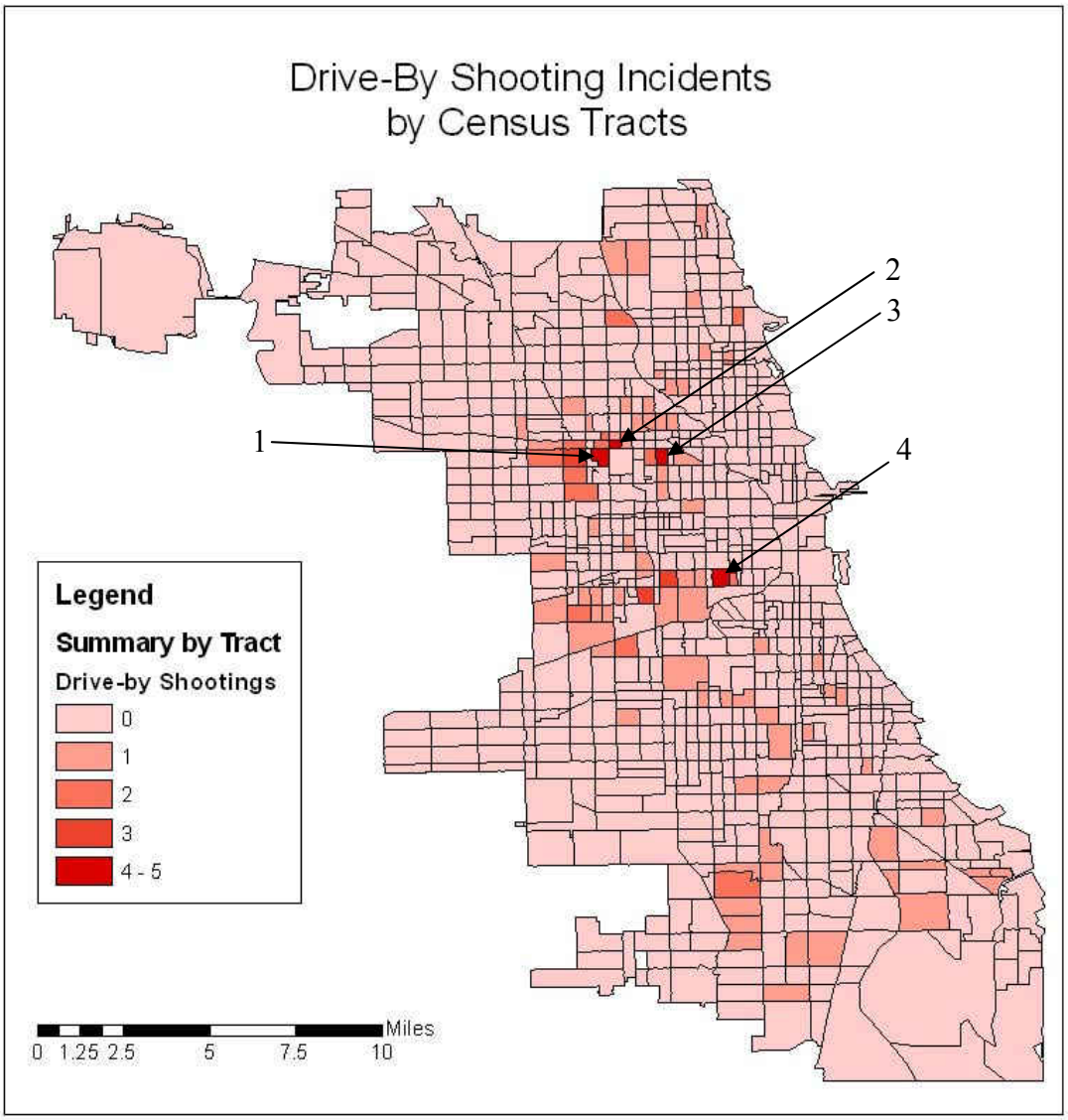

Figure 2. Drive-by Shooting Incidents in Chicago

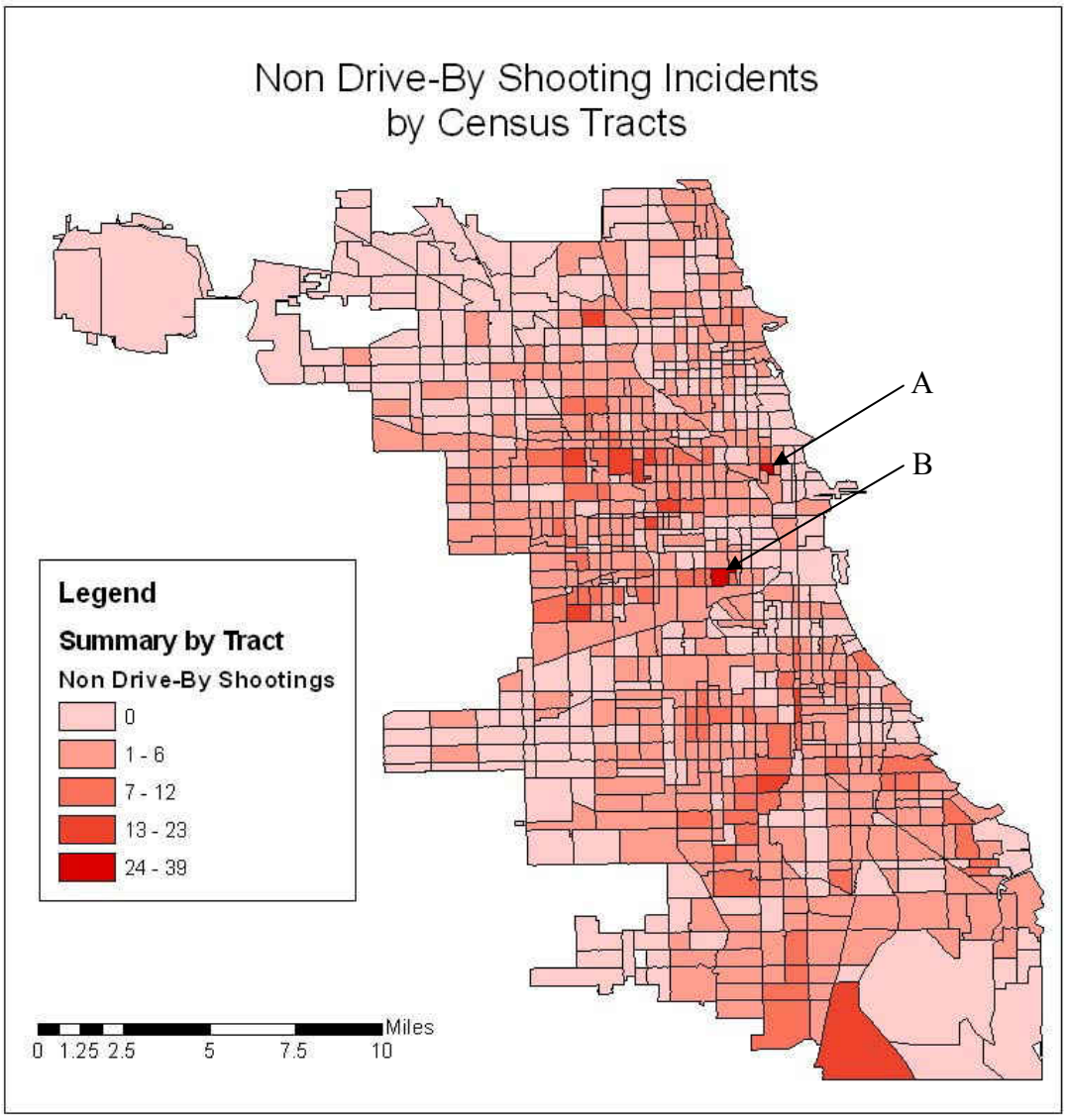

Figure 3. Non Drive-by Shooting Incidents in Chicago

The second map (Figure 3) displayed is the counts of non-drive-by shooting homicides in each Census tract. Unlike the map of drive-by shooting homicides, the map of non-drive-by shooting gang-motivated, firearm-related homicides shows that the majority of the census tracts had at least one incident of homicide. Two of the Census tracts, identified as letter A and B have a high count of 39 homicides having occurred over the 31 year period. Unlike the high count tracts of drive-by shootings, both of these

tracts are surrounded by tracts that have a count of gang-motivated, firearm-related homicides.

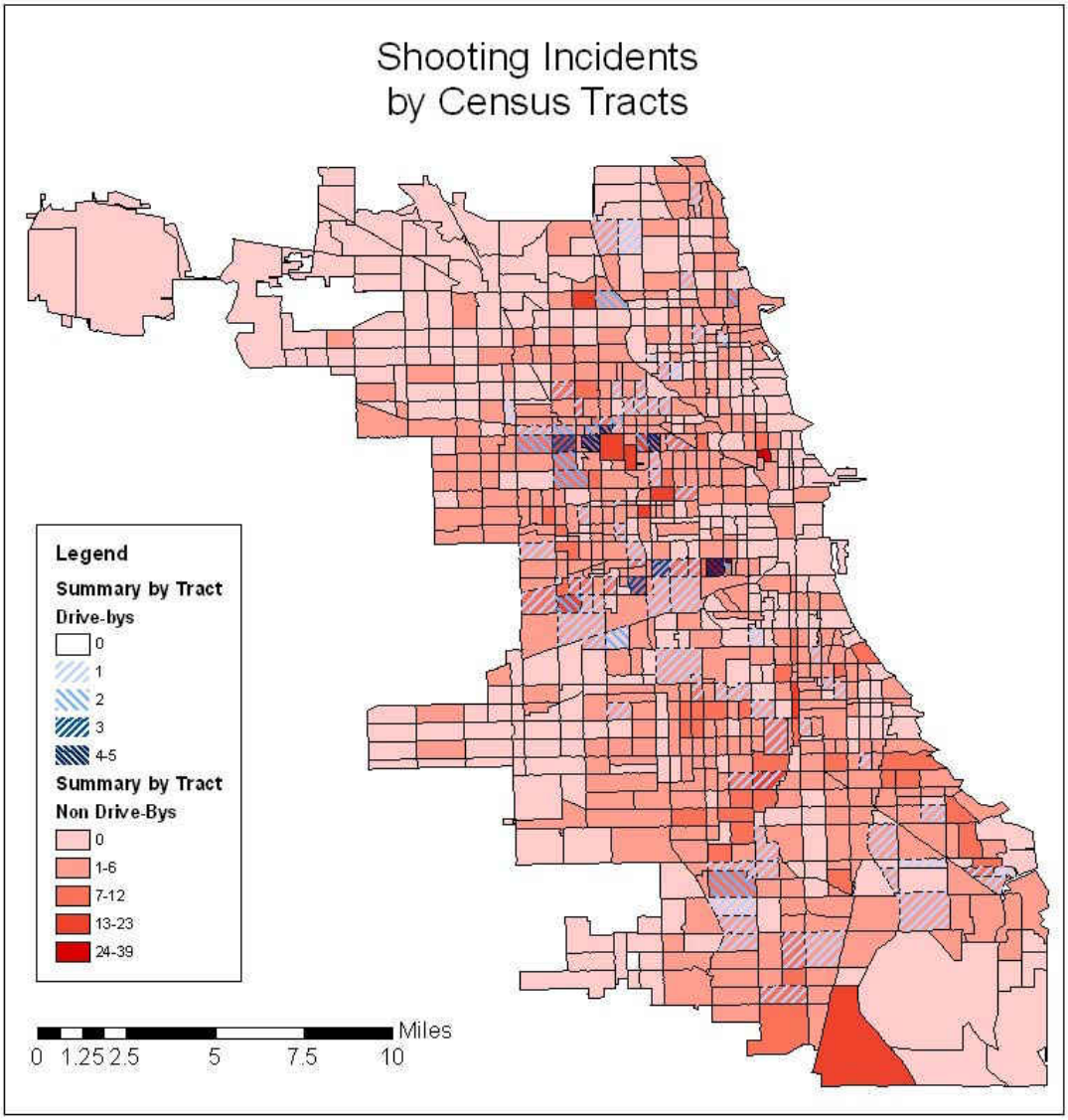

Figure 4. Drive-by Shooting and Non Drive-by Shooting Incidents in Chicago

The third map (Figure 4) shows an overlay of the two types of homicides. In most tracts there seems to be little correlation in the locations of both types of homicide. It is often that there are census tracts with a frequency of non drive-by shooting homicides and no frequency of drive-by shooting homicides and vice-versa. Yet, central Chicago is

a higher concentration area for both types of homicides, this area is more easily viewed in Figure 5.

One tract has the highest rate for both types of homicide in central Chicago, as indicated by the corresponding number and letter from Figures 2 and 3, 4B. This tract is located in the Lower West Side area, near the intersection of South Ashland Avenue and West Cermak Road. This tract should be considered an important tract as both forms of homicide were in high concentration. Other than the tract identified as 4B, the other high frequency tracts for drive-by shootings are fairly low frequency tracts for other forms of gang-motivated, firearm-related homicides. Yet the tracts with a high frequency of drive-by shootings are adjacent to tracts with a higher frequency of other forms of gang-motivated, firearm-related homicides, especially in the central Chicago area.

After mapping the data the Global Moran's Index test was conducted separately on drive-by shooting homicides and non drive-by shooting homicide locations. The Global Moran's Index value for both non drive-by shooting homicides and drive-by shooting homicides was higher than the expected. This test determined that both drive-by shooting homicide and non drive-by shooting homicide locations form cluster patterns (See Table 5). To reiterate the analyses were based on polygon contiguity, which tests the counts of the boundary-sharing neighbors to the current analyzed tract. The z-scores indicate that the null hypothesis of randomization should be rejected, and that the spatial relationships are significant to the 0.01, which is the highest significance level identified by ArcGIS.

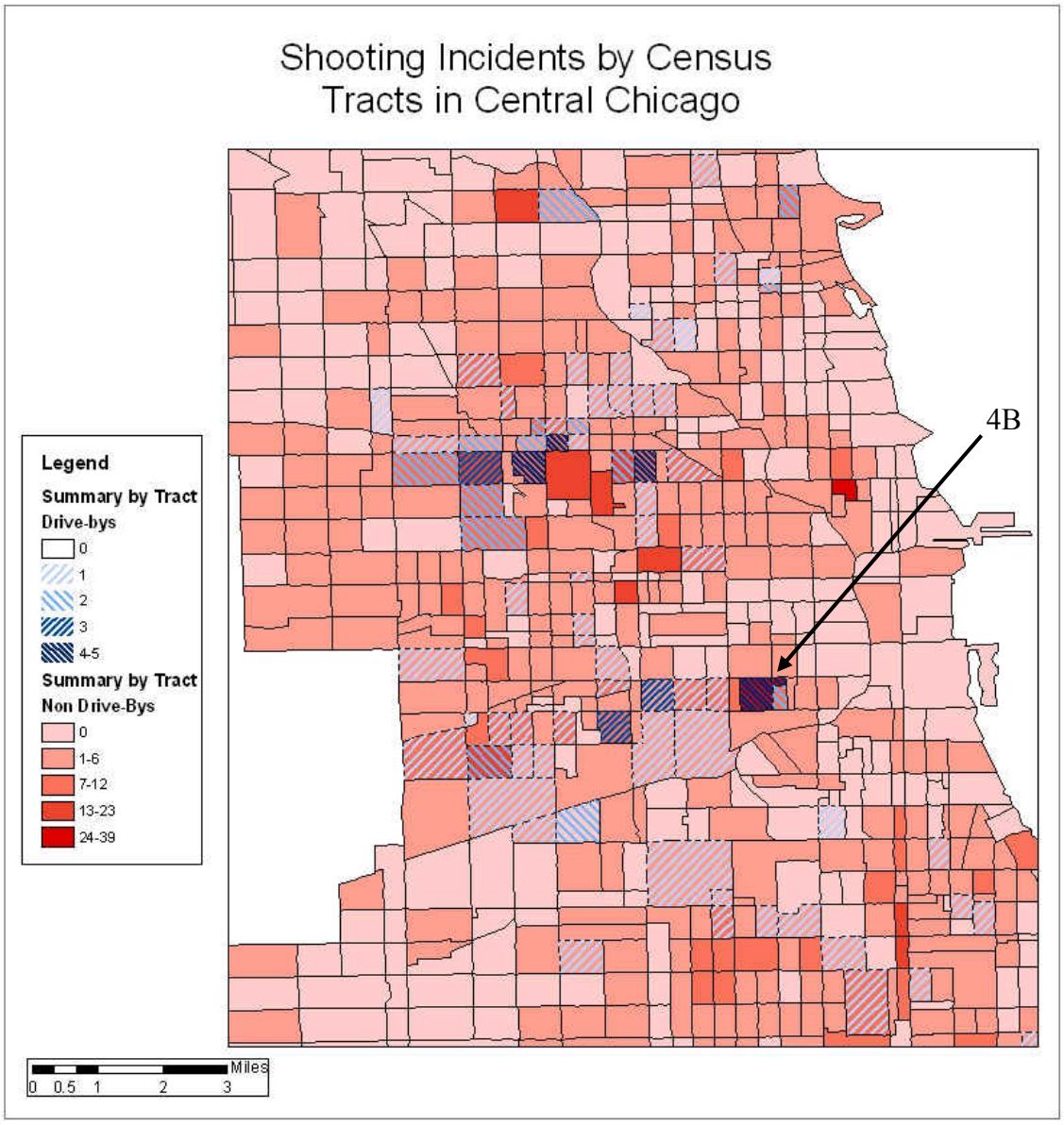

Figure 5. Drive-by Shooting and Non Drive-by Shooting Incidents in Central Chicago

Due to the finding of overall cluster patterns for drive-by shootings and other forms of homicide additional analyses were completed. The next step was to identify where the clusters of the homicides transpired. In Figures 6 and 7 the Local Moran's Index for each Census tract is classified based on natural breaks in index rate of the homicides in the Census tracts. Figure 6 is a map of drive-by shooting homicide indexes based on polygon contiguity.

Table 5. Moran's Index Test
Moran's Index Test of Homicide Frequency by Census Tract (N=887 tracts)

Polygon Contiguity	Drive-By	
	Yes	No
Moran's I	0.194	0.294
Expected I	-0.001	-0.001
Variance	0.001	0.001
Z-Score	8.90[a]	13.47[a]
Significance	0.01[b]	0.01[b]

a-Clustered pattern
b-Highest significance level given in the Moran's I test.

The positive values for Figures 6 and 7 are identified in the darker colors, these tracts have a homicide count that are similar to that of the tracts which border it. The greater the positive number the more similar are the bordering tracts. The areas in medium colors have an index between -0.1 and 0.1, which means there was a slight difference in the analyzed tract and the tracts that border it or have a zero count of homicides. The negative values are identified in lighter colors; the tracts in lighter colors are dissimilar in homicide count to those which border them.

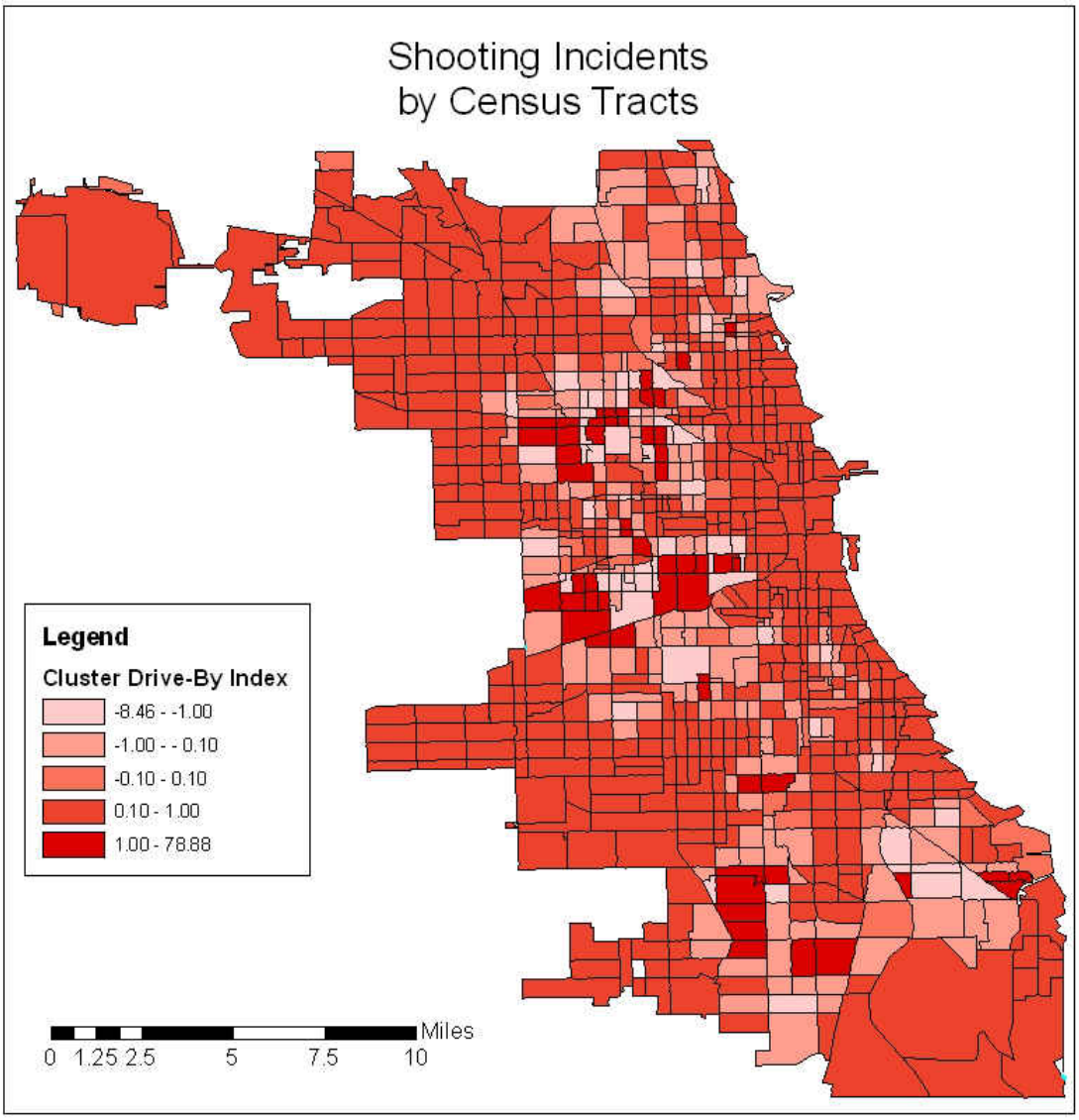

Figure 6. Moran's Index of Drive-by Count for Census Tracts.

In both, Figures 6 and 7 there are well-clustered areas in bright red mostly throughout the center of the city. When a comparison is made between the clustered areas in Figures 6 and 7 one finds they are fairly different from each other. The areas of clusters are more easily identified in Figures 8 and 9.

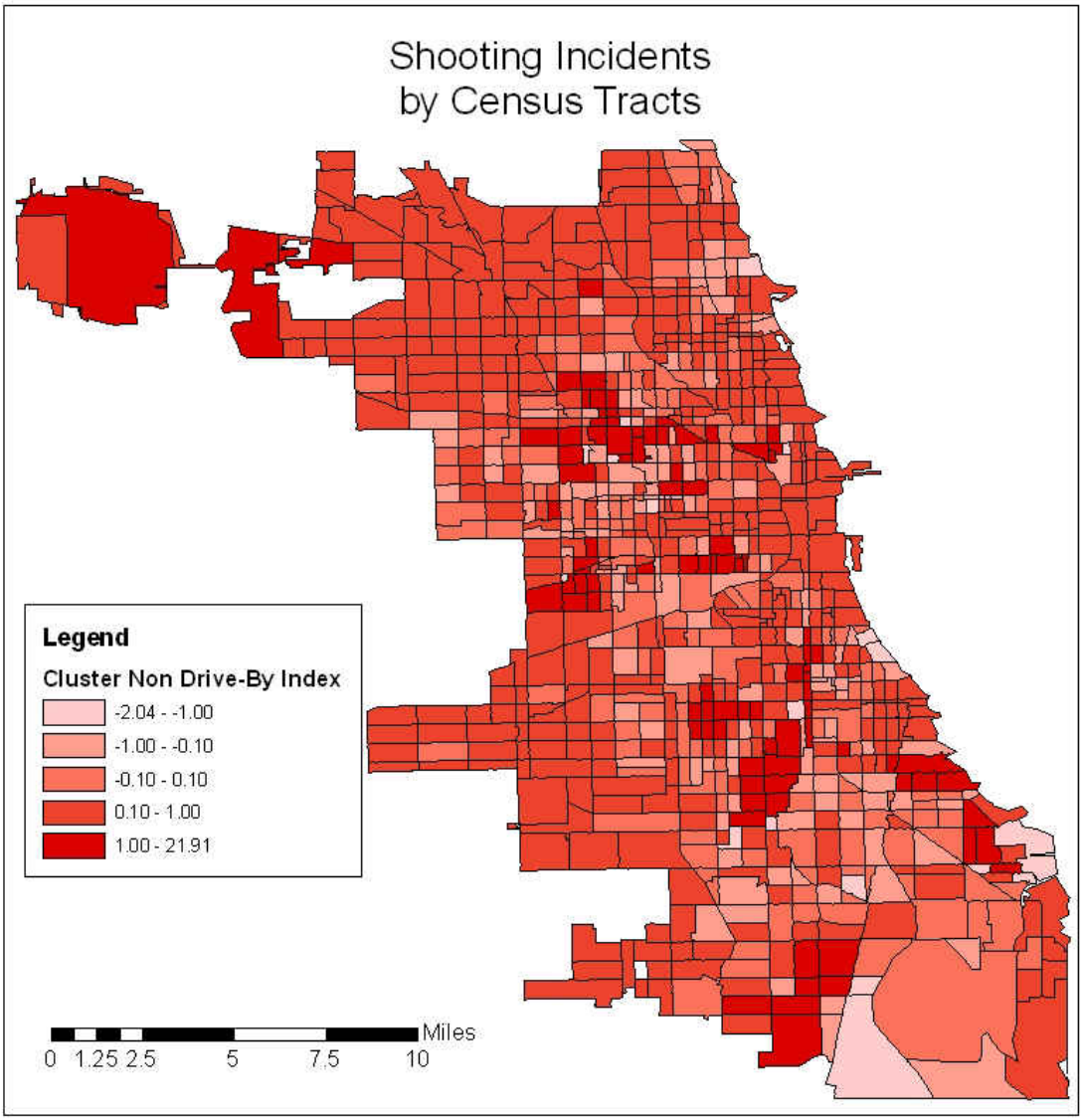

Figure 7. Moran's Index of Non Drive-by Count for Census Tracts.

Figures 8 and 9 have similar division for colors on the map. The counts of homicides are divided by natural breaks, and the distribution is divided by significance. The Census tracts in yellow have a z-score of less than -1.645, indicating that these tracts are dissimilar from surrounding tracts. The Census tracts in gray have a z-score between -1.645 and 1.645, which indicated that they have no significance. The tracts in pink have

a z-score of greater than 1.645; this indicates that the analyzed tract borders areas which are similar to it.

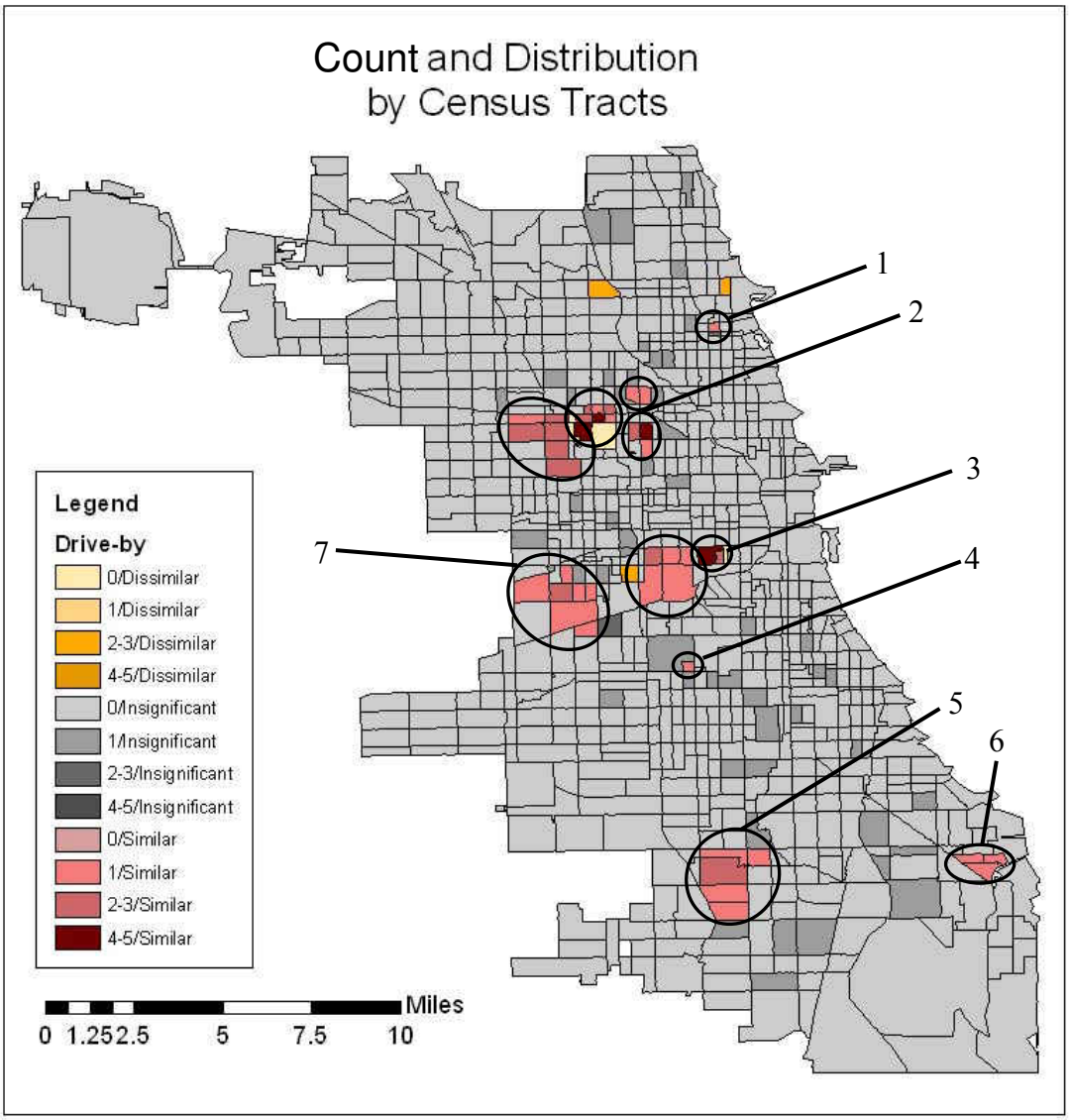

Figure 8. Count and Distribution of Drive-bys in Census Tracts

In Figure 8 there are six tracts that are identified as being dissimilar from the tracts on which they border. The two northern and the central tracts that are darker yellow are surrounded by areas having lower homicide counts. The three tracts of pale yellow are surrounded by tracts that have a higher count of drive-by shooting homicides.

The gray tracts in Figure 8 are those in which the z-score is not significant, therefore a comparison cannot be made.

The pink tracts are those of most importance. In Figure 8, there are 42 tracts colored in a shade of pink, indicating that they are bordered by tracts that are similar. In most cases, the pink tracts are clustered together; there are only two tracts, denoted as area one and two, which are pink and are not bordered by a pink tract. These two tracts are similar in count to the tracts in gray bordering, but the bordering gray tracts are insignificantly related to their surrounding tracts.

The first cluster of tracts circled and denoted by the number two, is an area of high concentration of gang-motivated drive-by shooting homicides. In fact these clusters may be considered as one cluster. The circled clusters are not more than one tract of a small area apart, when using Euclidian distance. Whether this area is viewed as a large cluster or as multiple clusters, it contains three of the four tracts which had the highest drive-by shooting homicide counts. Therefore we assume that these tracts are a high concentration area for drive-by shooting homicides.

The third area denotes two other clusters of homicides and contains the fourth of the highest count tract for drive-by shooting homicides. The tracts to the southwest of the highest count tract in this cluster are areas with low counts of drive-by shooting homicides. The fifth, sixth, and seven areas circled are easily identified clusters as all the tracts that are pink border one another and are completely bordered by areas that are gray.

Similar to Figure 8, Figure 9 has only a few yellow tracts and many gray tracts. The three yellow tracts are spread throughout the city of Chicago. The dark yellow tract in the center of the city has a high count of homicides that were gang-motivated and

firearm-related, is surrounded by tracts that have a low count. The light yellow tract, in area "D" cluster three is amid a cluster of tracts in which the homicide counts are similar to each other but the yellow tracts have a count of zero. Obviously, the light yellow tract was an anomaly in this area. The third yellow tract in south Chicago is one of the largest tracts and was noted as having a high gang-motivated, firearm-related homicide count, but is immediately surrounded by tracts with low counts, causing it to be dissimilar.

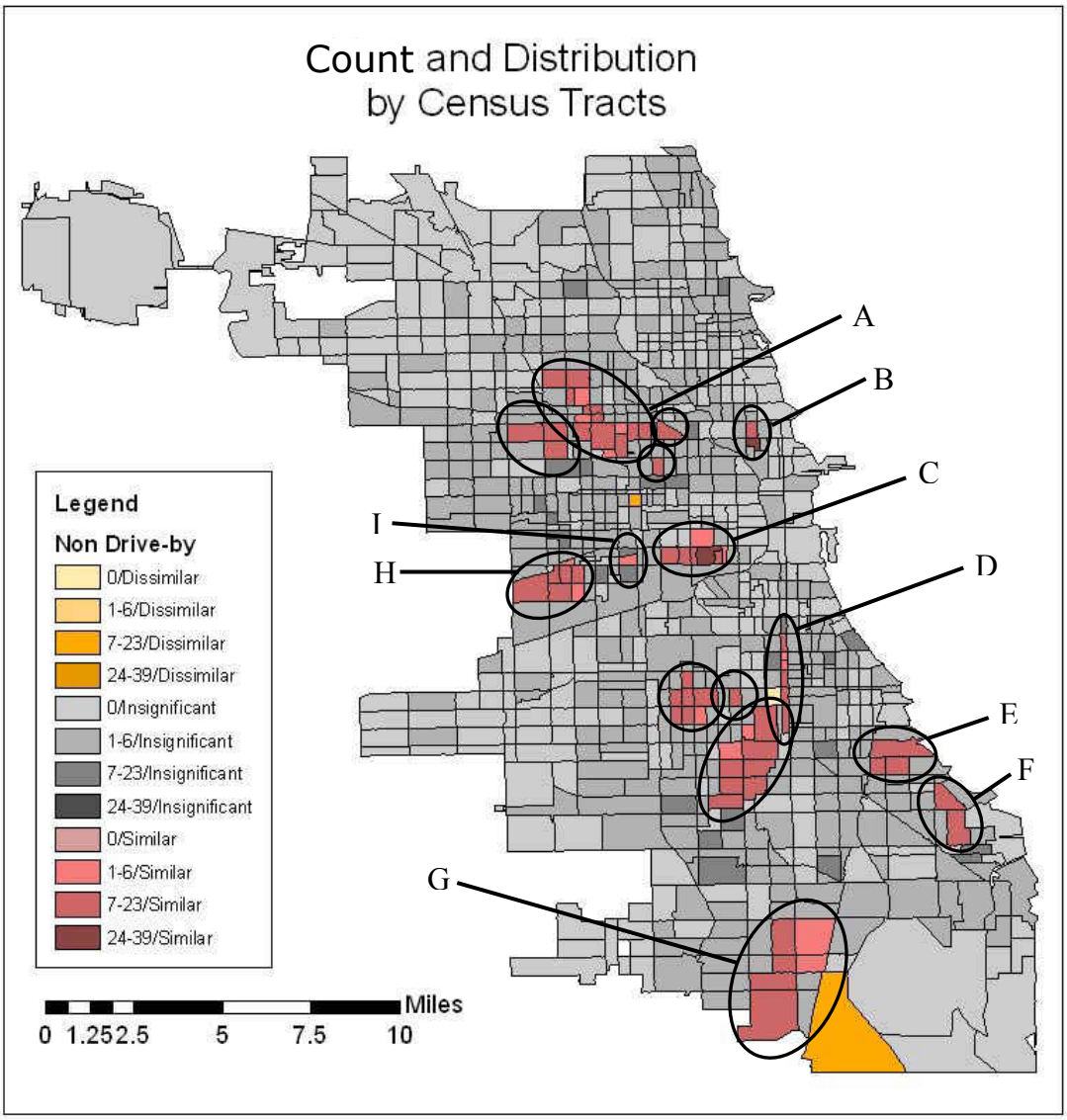

Figure 9. Count and Distribution of Drive-bys in Census Tracts

The Local Moran's I gang-motivated, firearm-related non drive-by shooting count per tract analysis identified 71 tracts that are similar to the tracts bordering, as indicated by the tracts shaded pink. The 71 tracts make 15 clusters, four of which contain only one tract and two of which contain two tracts together surrounded by tracts with similar homicide count tracts. The clusters in the area labeled "A" are fairly close together and create an area of the city in which non drive-by shooting gang-motivated homicides occurred. Although they are smaller clusters, areas "B" and "C" contain the two tracts with highest homicide counts. Area "D" is much like area "A" in that there are many clusters close together, which may denote a cluster of many Census tracts of gang-motivated homicides. Areas "E", "F", "G", and "H" are well-defined clusters of gang-motivated homicides. Using this map it is easier to identify that although the gang homicides are clustered they are spread throughout the city, except for the very northern area of Chicago.

By comparing the clusters of homicides from Figures 8 and 9 it is determined that only a few locations of the clusters are apparent in both types of homicides. Area 2 in Figure 8 and Area A in Figure 9 are similar although some of the tracts in the other map are not included in the cluster of homicides. Area 7 in Figure 8 is a larger cluster of tracts than area H in Figure 9, but three of the pink tracts are the same. The one tract, which had the highest count of homicides for both types of perpetration, is part of a cluster in both maps, in Figure 8 area 3 and Figure 9 area C.

The rest of the cluster areas seem not to match in location in Figures 8 and 9, yet a few of the tracts do border one another. In Figure 8 cluster area 6 is just one tract south of cluster area F in Figure 9. By comparing the maps we find that some of the clusters of

tracts are similar while others are different; this indicates that from a location perspective the two types of homicide are not mutually exclusive; there are a few locations where both homicides have occurred. The Bonferroni test will narrow down the significant locations of these homicides and aid in the understanding of how the locations of the homicides relate.

The issue of violating the assumption of independence was addressed by using the stringent confidence level calculated based on the Bonferroni test. These findings indicate at the stringent confidence level 24 of the Local Moran's Index scores for the drive-by shooting homicide counts and 27 of the non drive-by shooting homicide counts within the Census tracts were significant at the alpha level of $5.46e^{-5}$. In Figure 10 the significant Census tracts based on the drive-by tracts are identified by the red filled in tracts and the significant non drive-by shooting tracts are those outlined in thick Black.

When separately looking at the Bonferroni significant tracts the drive-by shooting count homicide tracts are located in the center of the city, with the exception of one tract in the southwest area of the city. The lone significant tract was flanked to its north and south by tracts that had similar counts, but not its east and west. This is the only tract that is not bordered by another significant tract for either drive-by shooting or non drive-by shooting homicides. The other tracts that are significant for the locations of drive-by shootings at the stringent level of the Bonferroni test are in small clusters throughout central Chicago. The four high count Census tracts for drive-by shooting homicides are still significant and each is bordered by one or two other significant tracts. These areas where there are two to seven tracts clustered together are determined to be areas of drive-by shooting homicides that occurred frequently, respective to areas where there was no

occurrence and clustered so they are areas where drive-by shootings are occurring purposefully.

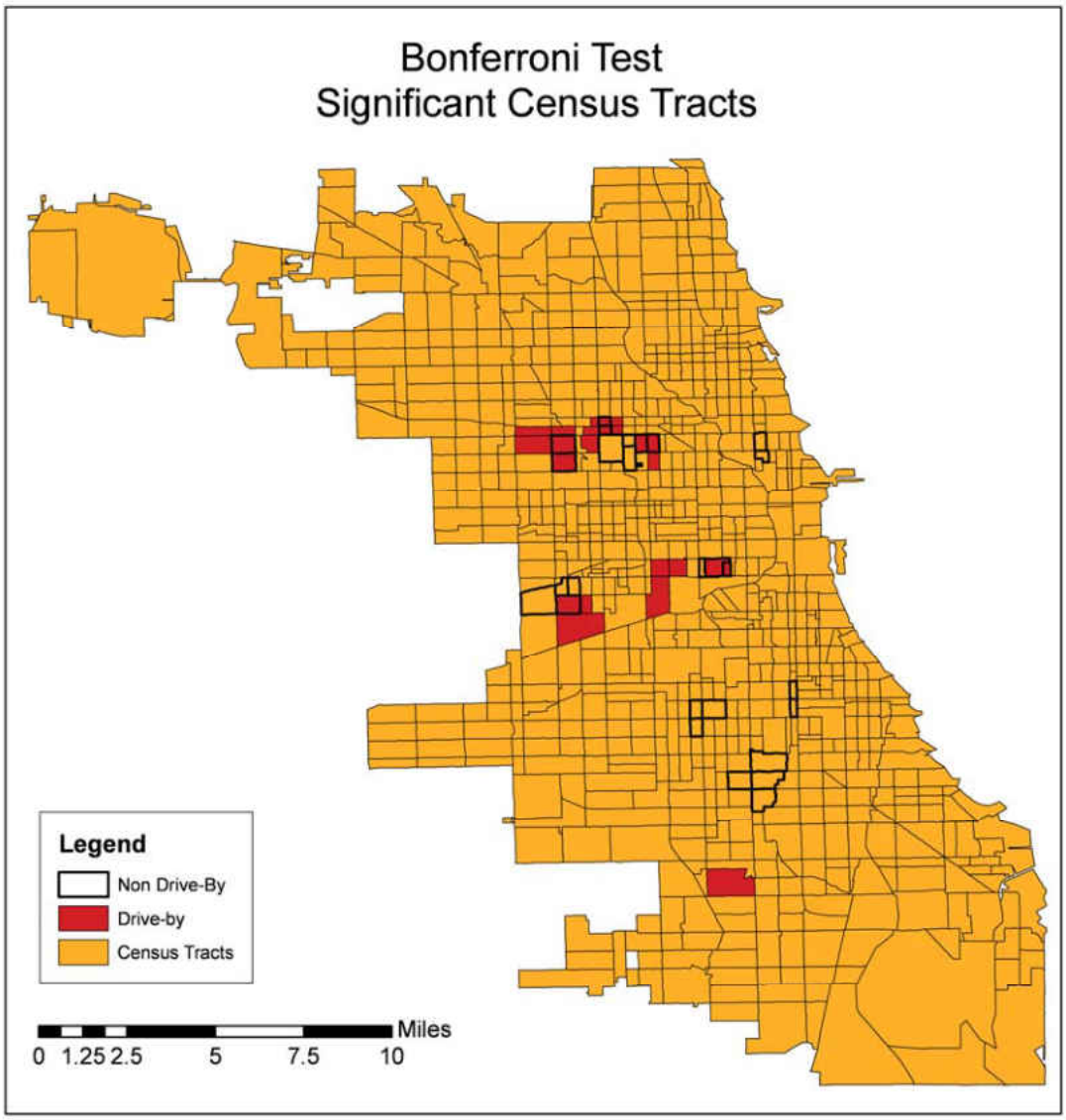

Figure 10. Map of Bonferroni Significance Test on Census Tracts

The areas where gang-motivated, firearm-related non drive-by shooting homicides occurred are more diverse than the locations of drive-by shooting homicides. There are eight clusters of tracts where the Moran's I was significant based on the Bonferroni test. Of the significant cluster areas, the two highest count tracts are still

significant in the Bonferroni test. Although the tracts where non drive-by shooting homicides occurred are clustered with one or more tracts that are significant, we find that the drive-by shooting homicides are more spread out through the center of Chicago than the locations of drive-by shooting homicides.

In analyzing the locations of the homicide types together, the significant locations for the homicides overlap in nine places. Seven of the Census tracts that are significant for non drive-by shooting homicides border significant tracts for drive-by shooting homicides, and 11 of the significant tracts for drive-by shooting locations border non drive-by shooting locations. The locations of homicides sometimes do overlap or are adjacent to one another; however there are also occasions where each type of homicide that are not close in location to tracts that frequent the other type of homicide. Eleven of the significant tracts that have a frequency of non drive-by shooting homicides are not bordered by tracts that are significant for drive-by shooting homicides, and for drive-by shooting homicide locations there are four tracts.

By specifically looking at the Census tracts that meet the requirements of the stringent critical value determined from the Bonferroni test, it is shown that almost twice as often the locations of each type of homicide either overlap or border one another, than locations where the types of homicides are not bordering each other. As stated above the next analysis aided in determining that there are some location characteristics that are different for drive-by shooting and other forms of homicide.

The Bonferroni significant Local Moran's I are mostly in tracts that are generally in the center of the clusters of tracts with similar homicide counts. These tracts are the locations where the homicides are not random, but the homicides occurred in those

locations for a reason. The next analysis will not point to the reason that the homicides are occurring in these locations, but it will aid in determining if the homicides are occurring in areas of different characteristics.

Multivariate Analysis

Before inputting the variables to run a logistic regression, both correlations and tests of variance inflation factors (VIF) were completed. Many variables inflated the variance of other variables, but in the incident model (Model 1) only the relationship status of gang rival had a factor above four. By replacing stranger as the comparison category with gang rival all of the VIFs were then reduced to below four. In addition there were no problems with the Routine Activities Theory Model, Model 2's variance inflation factors. The greatest difficulties were found in the Social Disorganization models (Models 3a and b), and the final models (Models 4a and b). The greatest VIF values were on the race variables: the homogeneity of race, the rate of race changes for Black, White and other, and the percentage of Hispanic/Latinos. The decision was made that two sets of models should be run, so that both effects of race may be captured in the analyses. The first set of analyses included the homogeneity of race and the rate of race changes for White and other (Models 3a and 4a), and the second set included the percentage of Hispanics/Latinos in the communities (Models 3b and 4b). The first model set excludes Black's race rate of change, because when all three race rate of changes were included, the VIF scores were above 4. The race rate of change for Black was removed because it was the only race rate of change that was not significantly different for the types of homicides based on the t-test. In addition to the race variables having high VIFs when the percentage of Hispanics/Latinos variable and the percentage

of foreign born are included in the same model, the VIF score is above the desired threshold; therefore the percentage of foreign born was only included in model set "a" with the race homogeneity variable.

The second set of variables that had high VIF scores from the social disorganization model were economic variables—such as percent below poverty, percent unemployed, and median household income—and the percentage of female-headed households. It was determined that the percentage of female-headed households variable would be included in the Social Disorganization models (Models 3a and 3b), but not the final models (Models 4a and 4b) where the percentage of people unemployed and the median household income would be included in the models. In this aspect all the variables could be included in the models and their affects on the models could be determined. A logistic regression was also run for Model 3b without the variable of the percent of female-headed households, but it was found that there was no effect on the significance or direction the other variables, and had only a slight affect on the strength of the other variables in the model.

Other variables are collated with variables of their own kind due to the findings that the variables had high VIFs and correlations. For example variables such as the age percentages of the populations, were collated into the percentage of the population between zero and 19 years old or above 19 years old. The combinations of the variables were based on their direction and significance found in the t-tests. Having addressed all the issues of high VIFs and correlations the logistic models were tested.

When Model 1 was run, it was found that the relationship of acquaintance (350), the race of the offender as Asian (16), the place of the injury occurring in an indoor

setting other than a residence (99), and the finding of drug involvement (10) all had very high standard errors, because of the low count of these variables. Therefore each of these variables was excluded from the logistic regression models, which reduced the total number of cases to 2,744, but reduced the drive-by shooting cases by only a count of two. The reduction of drive-by shooting cases was due to the removal of offenders who were Asian.

The combination of the logistic regression variables presented in model 1, Table 6 and 7, based on the pseudo R^2 of Nagelkerke, determine 18.1 percent of the variance of drive-by shooting homicides and other homicides. The model chi-square is statistically significant ($\chi 2 = 206.94$; df = 38; $p<0.001$). Model 1 is the results for the variables that were provided from the homicide incident data set. In Model 1 there are eleven variables that are significant in the determination of whether the homicide is a drive-by shooting or some other form of homicide. In this model the strongest predictors are the type of firearm used in the homicide. Tables 6 and 7 show that while controlling for all other variables the homicides where a non-automatic shotgun, non-automatic handgun, or unknown firearm is used are respectively 2.31, 1.94, and 2.11 times more likely to be a drive-by shooting than another form of homicide in comparison to any form of an automatic gun. Surprisingly, this seems to indicate that in drive-by shootings it is less likely that an automatic or semi-automatic gun will be used, or it may be due to the fact that individuals who use automatic and semi-automatic guns in drive-by shootings are not as accurate, and fewer fatalities occur from the uses of these guns in a drive-by shooting (Libby & Corzine 2007).

The location of the homicide variables also aid in the determination of the type of homicide. The locations were compared to the homicide occurring on the street. It is determined by the results in Tables 6 and 7 that the occurrences of the homicide in a residence, in a vehicle, or at a location outside other than on the street is less likely to be a drive-by shooting. If the homicide occurs in a residence there is a 62% decrease in the odds that the homicide is a drive-by shooting. The findings indicated that if a homicide occurs in a vehicle there is a 50% decrease in the odds of the homicide being a drive-by shooting, and if the homicide occurred outside in a place other than the street then there is a 62% decrease that the homicide was a drive-by shooting. This finding is as expected and is what is often portrayed in the media—that drive-by shootings are most likely to occur on the street.

The offender being Black compared to Latino decreases the likelihood of the homicide being a drive-by shooting by 72%. This indicates that drive-by shootings are less often committed by Black individuals, but more often by Latinos. If the involvement of drugs and liquor was unknown in the homicide as opposed to when it is known that there was no drug/liquor involvement then, respectively, there is a 39% decrease and a 52% decrease in the likelihood that the homicide is a drive-by shooting. This finding seems to complement what Sanders (1994) found in his research: that gang members did not need intoxication to instigate a drive-by shooting, but that the shootings most often seemed to be results of target practice, boredom, or retaliation.

The final variables that aid in prediction of the form of homicide in Model 1 are temporal variables. It is found that if the homicide occurred on a Wednesday in comparison to Saturday there is a 67% decrease in the odds of the homicide being a

drive-by shooting. It was also determined that if the homicide occurred in January compared to August that there is a 71% decrease that the homicide was a drive-by shooting. These temporal variables are similar to what is found in all homicides, in that they occur more often on the weekend and in the summer months, but in this case drive-by shootings more commonly parallel general homicide characteristics than other forms of gang-motivated homicide.

In the Routine Activities Theory Model, Model 2, the combination of the logistic regression variables, based on the pseudo R^2 of Nagelkerke, aids in determining slightly more than Model 1 with 19.2 percent of the variance between drive-by shooting homicides and other homicides. The model chi-square is statistically significant ($\chi 2 = 219.93$; $df = 43$; $p<0.001$). However, there is no significant change in the variables' direction or significance from Model 1 and practically no change in the strength of the variables. Additionally, no more variables aid in the prediction of drive-by shooting homicides from other forms of homicide.

Table 6. Logistic Regression Models for Rate of Race Change
Logistic Coefficients for the Likelihood of Drive-by Shootings among Gang-motivated, Firearm-related homicides Model Set A

Variable	Model 1 (Incident)		Model 2 (RAT)		Model 3a (SDT)		Model 4a (Final)	
	Odds Ratio	b (S.E.)	Odds Ratio	b (S.E.)	Odds Ratio	B (S.E.)	Odds Ratio	b (S.E.)
Offender's Gender (Male = 1)	0.73	-0.32 (0.80)	0.80	-0.23 (0.81)	0.73	-0.32 (0.81)	0.69	-0.38 (0.81)
Offender's Race								
White	1.55	0.44 (0.26)	1.43	0.36 (0.26)	1.81*	0.60 (0.27)	1.83*	0.60 (0.28)
Black	0.25***	-1.40 (0.19)	0.28***	-1.29 (0.20)	0.40***	-0.91 (0.28)	0.42**	-0.87 (0.28)
Offender's Age	1.05	0.05 (0.11)	1.08	0.08 (0.11)	1.07	0.07 (0.11)	1.08	0.08 (0.11)
Number of Offenders	1.01	0.01 (0.06)	1.00	<0.01 (0.06)	1.03	0.03 (0.06)	1.04	0.04 (0.06)
Number of Victims	0.76	-0.28 (0.39)	0.72	-0.33 (0.40)	0.69	-0.37 (0.40)	0.69	-0.37 (0.40)
Relationship								
Stranger	0.52	-0.66 (0.44)	0.54	-0.62 (0.44)	0.53	-0.62 (0.45)	0.57	-0.56 (0.45)
Unknown/Other	1.31	0.27 (0.19)	1.29	0.25 (0.19)	1.20	0.18 (0.19)	1.19	0.17 (0.20)

Variable	Model 1 (Incident)		Model 2 (RAT)		Model 3a (SDT)		Model 4a (Final)	
	Odds Ratio	b (S.E.)	Odds Ratio	b (S.E.)	Odds Ratio	B (S.E.)	Odds Ratio	b (S.E.)
Type of Gun								
Handgun Non-Automatic	1.94***	0.66 (0.20)	1.95***	0.67 (0.20)	1.84**	0.61 (0.20)	1.90**	0.64 (0.21)
Rifle Non-Automatic	1.74	0.56 (0.37)	1.87	0.63 (0.38)	2.10	0.74 (0.38)	2.29*	0.83 (0.39)
Shotgun Non-Automatic	2.31*	0.84 (0.41)	2.36*	0.86 (0.42)	2.01	0.70 (0.43)	2.16	0.77 (0.44)
Firearm Unknown Type	2.11**	0.75 (0.25)	2.23***	0.80 (0.25)	1.93**	0.66 (0.26)	2.05**	0.72 (0.26)
Location								
Residence	0.38*	-0.97 (0.39)	0.46*	-0.77 (0.39)	0.43*	-0.84 (0.39)	0.52	-0.65 (0.40)
Vehicle	0.50*	-0.70 (0.29)	0.47**	-0.76 (0.30)	0.47*	-0.75 (0.31)	0.49*	-0.72 (0.31)
Outdoor Other	0.38***	-0.97 (0.30)	0.41**	-0.90 (0.30)	0.41**	-0.88 (0.31)	0.43**	-0.85 (0.31)
Drug Involvement								
Unknown	0.61**	-0.49 (0.18)	0.69*	-0.37 (0.18)	0.53**	-0.63 (0.20)	0.56*	-0.58 (0.21)

Variable	Model 1 (Incident)		Model 2 (RAT)		Model 3a (SDT)		Model 4a (Final)	
	Odds Ratio	b (S.E.)	Odds Ratio	b (S.E.)	Odds Ratio	B (S.E.)	Odds Ratio	b (S.E.)
Liquor Involvement								
Unknown	0.38*	-0.96 (0.44)	0.36*	-1.02 (0.45)	0.46	-0.77 (0.45)	0.46	-0.78 (0.45)
Yes	0.79	-0.24 (0.30)	0.84	-0.17 (0.31)	0.84	-0.18 (0.31)	0.87	-0.14 (0.31)
Day of Week								
Sunday	0.92	-0.08 (0.24)	0.91	-0.10 (0.24)	0.95	-0.05 (0.25)	0.91	-0.10 (0.25)
Monday	1.16	0.15 (0.28)	1.20	0.18 (0.28)	1.17	0.16 (0.28)	1.15	0.14 (0.29)
Tuesday	0.65	-0.44 (0.30)	0.66	-0.41 (0.30)	0.69	-0.37 (0.30)	0.68	-0.38 (0.31)
Wednesday	0.33**	-1.09 (0.39)	0.33**	-1.11 (0.39)	0.31**	-1.16 (0.39)	0.30**	-1.20 (0.40)
Thursday	0.69	-0.38 (0.31)	0.69	-0.37 (0.31)	0.76	-0.28 (0.31)	0.75	-0.29 (0.31)
Friday	1.27	0.24 (0.26)	1.28	0.25 (0.26)	1.30	0.27 (0.26)	1.31	0.27 (0.26)
Month of the Year								
January	0.29*	-1.26 (0.52)	0.32*	-1.15 (0.52)	0.27*	-1.30 (0.53)	0.26*	-1.34 (0.53)

Variable	Model 1 (Incident)		Model 2 (RAT)		Model 3a (SDT)		Model 4a (Final)	
	Odds Ratio	b (S.E.)	Odds Ratio	b (S.E.)	Odds Ratio	B (S.E.)	Odds Ratio	b (S.E.)
February	1.19	0.18 (0.35)	1.13	0.13 (0.36)	1.28	0.25 (0.36)	1.15	0.14 (0.37)
March	1.35	0.30 (0.35)	1.44	0.36 (0.35)	1.25	0.23 (0.36)	1.31	0.27 (0.36)
April	0.84	-0.18 (0.35)	0.84	-0.18 (0.35)	0.93	-0.07 (0.36)	0.96	-0.05 (0.36)
May	0.60	-0.51 (0.37)	0.64	-0.45 (0.37)	0.63	-0.47 (0.37)	0.64	-0.45 (0.38)
June	0.77	-0.27 (0.34)	0.79	-0.24 (0.34)	0.73	-0.32 (0.34)	0.74	-0.30 (0.345
July	0.49	-0.71 (0.37)	0.51	-0.68 (0.37)	0.50	-0.70 (0.38)	0.50	-0.69 (0.38)
September	1.33	0.29 (0.30)	1.35	0.30 (0.31)	1.32	0.28 (0.31)	1.34	0.29 (0.32)
October	0.86	-0.15 (0.33)	0.87	-0.14 (0.33)	0.84	-0.17 (0.33)	0.84	-0.18 (0.33)
November	0.75	-0.29 (0.36)	0.75	-0.28 (0.37)	0.82	-0.20 (0.37)	0.83	-0.19 (0.37)
December	0.41	-0.90 (0.48)	0.42	-0.87 (0.48)	0.41	-0.88 (0.49)	0.43	-0.83 (0.49)

Variable	Model 1 (Incident)		Model 2 (RAT)		Model 3a (SDT)		Model 4a (Final)	
	Odds Ratio	b (S.E.)	Odds Ratio	b (S.E.)	Odds Ratio	B (S.E.)	Odds Ratio	b (S.E.)
Time of Occurrence (Military Time)	1.00	0.00 (0.00)	1.00	0.00 (0.00)	1.00	0.00 (0.00)	1.00	0.00 (0.00)
Offender's Prior Offenses								
Non Violent	0.90	-0.11 (0.28)	0.88	-0.12 (0.29)	0.95	-0.05 (0.29)	0.97	-0.03 (0.29)
Violent	1.30	0.26 (0.19)	1.27	0.24 (0.19)	1.33	0.29 (0.19)	1.27	0.24 (0.19)
% Unemployed			1.00	<0.01 (0.01)			1.01	0.01 (0.01)
% 0-19 Years Old			0.99	-0.01 (1.12)			0.98	-0.02 (0.01)
% Buildings with 1-4 Units			1.00	<0.01 (0.01)			1.01	0.01 (0.01)
% Own Car(s)			1.01	0.01 (0.01)			1.02**	0.02 (0.01)
Population Density			1.00	0.00 (0.00)	1.00	0.00 (0.00)	1.00	0.00 (0.00)
Homogeneity of Race					1.01	0.01 (0.01)	1.00	0.01 (0.01)

Variable	Model 1 (Incident)		Model 2 (RAT)		Model 3a (SDT)		Model 4a (Final)	
	Odds Ratio	b (S.E.)	Odds Ratio	b (S.E.)	Odds Ratio	B (S.E.)	Odds Ratio	b (S.E.)
White Rate of Race Change					1.00	-<0.01 (0.00)	1.00	-<0.01 (0.01)
Other Rate of Race Change					1.00	<0.01 (0.01)	1.00	0.00 (0.01)
% Same House for 5 Years					1.01	0.01 (0.01)	1.01	-0.01 (0.01)
% Same SMSA for 5 Years					1.01*	0.01 (0.00)	1.01**	0.01 (0.01)
% Foreign					0.99	-0.01 (0.01)	0.99	-0.01 (0.01)
% Females					0.96*	-0.04 (0.02)	0.96*	-0.04 (0.02)
% High School Graduates					0.97*	-0.03 (0.02)	0.95**	-0.05 (0.16)
% Female-headed Households					0.99	-0.01 (0.01)		
% Male-headed Households					1.01	0.01 (0.04)		
Median Income							0.70	-0.35 (0.41)

Variable	Model 1 (Incident)		Model 2 (RAT)		Model 3a (SDT)		Model 4a (Final)	
	Odds Ratio	b (S.E.)	Odds Ratio	b (S.E.)	Odds Ratio	B (S.E.)	Odds Ratio	b (S.E.)
Constant	0.27	-1.22 (1.10)	0.16	-1.86 (1.24)	2.40	0.88 (1.46)	0.92	-0.88 (1.46)
-2 Log Likelihood	1,210.17		1,195.06		1,172.54		1,156.76	
R^2	0.181		0.192		0.221		0.224	
N	2,709		2,695		2,700		2,695	

*p ≤ 0.05 **p ≤ 0.01 ***p ≤ 0.001 Included are Odds ratio, the unstandardized coefficient (b), and the standard error (S.E.).

In the Social Disorganization Theory model with Rate of Race Change (Model 3a) a higher pseudo R^2 was found than in the models prior; 22.1 percent of the variance is determined in this model. The model chi-square is significant ($\chi 2 = 243.21$; df = 49; $p<0.001$). Unlike Model 2 there are significant differences between Model 3a and the two prior models. Two variables lost their significance with the addition of social disorganization variables: the variables in which the significance was lost are the unknown involvement of liquor and the use of a non-automatic shotgun. The incident variable that gained significance is the offender as Caucasian in that if the offender is White there was a 1.81 times more likely chance that the offense was a drive-by shooting in comparison to Latino offenders. In this model there is still the significance that if the offender was Black the homicide was less likely (0.42) to be a drive-by shooting than if the offender was Latino. In all, Blacks are less likely and Whites are more likely to be offenders in a drive-by shooting than a Latino offender. None of the other incident variables change in their significance or direction, and only minor changes in strength occurred.

In this Model (3a) there are social disorganization variables that aid in the calculation of whether the homicide was a drive-by shooting or not. It was found that the percentages of people living in the same SMSA, of females, and of high school graduates aid in the determination of the type of homicide. The percentage of people living in same SMSA increased the odds that the homicide was a drive by shooting by 1.01 times. This finding has very little effect, but indicates that in locations where individuals have lived in the Chicago area for at least five-years there is a greater chance of a drive-by shooting;

however, this finding cannot be extrapolated to the percentage of people who live in the same house for five or more years, because it is not significant.

Both a one percent increase in the percentage of females and of high school graduates in the population decrease the likelihood of the homicide being a drive-by shooting, respectively, by 14% and 13%. In areas where there is a higher percentage of males and/or individuals with lower academic achievement there was a greater likelihood of drive-by shootings. However, with the aid of the Social Disorganization Theory variables added in Model 3a, it is determined by looking at Table 6 that the incident variables are still greater predictors than the community variables. More specifically the type of gun used and the race of the offender are the strongest variables when the type of homicide is being determined.

In the final model, Model 4a, the amount of variance accounted for is 22.4 percent. The model chi-square is significant ($\chi 2 = 258.23$; df = 52; $p<0.001$). For this final model (4a in Table 6) the significance of the location at a residence variable is lost, but for the first time we find that the significance of the use of a non-automatic rifle is gained. It can be determined from the results in Table 6 that the likelihood of a drive-by shooting increases 2.29 times if a non-automatic rifle was used compared to an automatic gun. This finding must be due to the combination of variables, or the addition of the median income variable, because it was not significant before the theoretical variables were combined in a model or the median income variable was included.

In addition to the change in significance of incident variables we find that the percentage of the population who owned one or more cars is significant. Each additional percent of the population owning a car increases the likelihood of the homicide being a

drive-by shooting by 1.02 times; this prediction is not as strong as would be expected. However, this finding is in the direction expected because most often, it is believed that, drive-by shootings occur in areas where streets are more easily drivable. This indicates that the population who own cars generally live in areas where the streets are better maintained and accessible to other areas. The significance of the variable must be due to the combination of variables that allows this variable to be significant because when the variable, percentage of population who own one or more cars was first included in the Routine Activities Model, 3a, we find that it is not significant in the calculation of the type of homicide.

This final model (Model 4a, Table 6) confirms what was indicated all along, that the type of weapon used gives the most predictability, followed by the race of the offender and then the community characteristics. By removing the heterogeneity of race and the rate of race change variables, and adding in the percent of Hispanic/Latino we find slightly different prediction results.

The Social Disorganization Model with the percentage of Hispanic/Latinos, 3b, (Table 7) is a slight improvement on the Routine Activities Theory Model, 2, and the other Social Disorganization Model, 3a, in calculating the type of homicide based on the pseudo R^2, which is 22.5. The model chi-square is significant ($\chi 2 = 259.26$; df = 47; $p<0.001$). With the addition of the percent of Hispanics/Latinos and removal of the other race variables and the percentage of foreign born we found that the significant prediction of Black offenders is lost; however the prediction based on a White offender is still present. The interaction of the percentage of Hispanics/Latinos affects the outcomes of the offender's race. From the results presented in Table 7 we find a similar outcome to

what was found in Model 3a—that a White offender in comparison to a Latino offender increased the likelihood of the homicide to have been a drive-by shooting by 1.92 times. It should be noted that the race of the offender is filled out by police investigators, using available information; some investigators may clarify race/ethnicity by asking a person when arrested (Personal Communication, Rebecca Block November 18, 2009). Because the police investigator is filling out the racial/ethnic background of the offender, it can be assumed that this variable is not always accurate, most especially when Latino is a value. It is not easy to interpret an individual's appearance as Black and White or Latino.

The significance of the firearm and location variables are similar to the results found in Model 4a. The significance of the non-automatic shotgun is lost from Model 2, but the significance of the non-automatic rifle is gained. If a non-automatic rifle is used in the homicide it is 2.40 times more likely to have been a drive-by shooting than some other form of gang-motivated, firearm-related homicide, this finding is supportive of the reports compiled by McCorkle and Miethe (2002). In addition, the location of the injury occurring in a residence is lost in Model 3b, but the likelihood that the homicide occurred in a vehicle, or other outdoor location is significant compared to the homicide having occurred on the street. The decrease in the strength of both the location of the homicide in a vehicle or an outdoor location other than on the street (6% and 2%) was found compared to Model 2. Therefore, when accounting for the percentage of Hispanics/Latinos the location of the homicide variables are affected in significance and strength.

The unknown involvement of drugs is similar to that found in all the models, in that it is more likely that a drive-by shooting has occurred when it is known that there

was no drug involvement. The variable, liquor involvement, was once again lost with the addition of the social disorganization variables. The temporal variables of significance, Wednesday and January are steadily significant throughout all six models. Each predicts that if the homicide occurs on that day of the week or month of the year there is a 70% decrease in the likelihood that the homicide was a drive-by shooting.

The variables that are different between the "a" Model set and the "b" Model set are those found in the Social Disorganization Models (3a and 3b). The variable that is constant in its ability to predict in both models is the percentage of people living in the same SMSA although its strength is minimal. We find that once again in Model 3b that for every percentage increase of the people living in the same SMSA there is a 1.01 times increase that the homicide is a drive-by shooting.

There are some variables different than those that are significant in the prediction of Model 3a—the percent Hispanic/Latino, the percent of people who are between zero and 19 years old, and the percentage of buildings with 1 to 4 units are significant in Model 3b. Based on the percent of Hispanics/Latinos in the community it is calculated that for every percentage increase, it is 1.02 more likely that the homicide was a drive-by shooting. The percentage of buildings with one to four units also increased the likelihood of the homicide being a drive-by shooting by 1.01 times. This finding indicates as believed that the buildings that have fewer units are more likely to have a drive-by shooting occur. This is most likely due to the fact that in areas where buildings have a high number of units, it is less likely to have outside areas for congregation.

However, the percentage of zero to 19 year olds in the community decreases the likelihood that the homicide is a drive-by shooting by 4% for every percentage increase.

These findings indicate that in communities where there is a larger percentage of Hispanics/Latinos, buildings with one to four units, and people who have lived in the same SMSA for over 5 years, and a smaller population of individuals between zero and 19 year olds, there will be a greater likelihood of a drive-by shooting than another form of gang-motivated, firearm-related homicide. Yet, none of the community variables are strong in their prediction.

Table 7. Logistic Regression Models For Percent of Hispanics
Logistic Coefficients for the Likelihood of Drive-by Shootings among Gang-motivated, Firearm-related homicides Model Set b

	Model 1 (Incident)		Model 2 (RAT)		Model 3b (SDT)		Model 4b (Final)	
Variable	Odds Ratio	b (S.E.)	Odds Ratio	b (S.E.)	Odds Ratio	B (S.E.)	Odds Ratio	b (S.E.)
Offender's Gender (Male = 1)	0.73	-0.32 (0.80)	0.80	-0.23 (0.81)	0.64	-0.45 (0.81)	0.68	-0.39 (0.81)
Offender's Race								
White	1.55	0.44 (0.26)	1.43	0.36 (0.26)	1.92*	0.65 (0.28)	1.90*	0.64 (0.28)
Black	0.25***	-1.40 (0.19)	0.28***	-1.29 (0.20)	0.68	-0.39 (0.28)	0.67	-0.40 (0.28)
Offender's Age	1.05	0.05 (0.11)	1.08	0.08 (0.11)	1.07	0.07 (0.11)	1.09	0.09 (0.11)
Number of Offenders	1.01	0.01 (0.06)	1.00	<0.01 (0.06)	1.04	0.04 (0.06)	1.05	0.05 (0.06)
Number of Victims	0.76	-0.28 (0.39)	0.72	-0.33 (0.40)	0.74	-0.30 (0.40)	0.71	-0.34 (0.40)
Relationship								
Stranger	0.52	-0.66 (0.44)	0.54	-0.62 (0.44)	0.53	-0.64 (0.45)	0.54	-0.62 (0.45)
Unknown/Other	1.31	0.27 (0.19)	1.29	0.25 (0.19)	1.15	0.14 (0.20)	1.14	0.13 (0.20)

Variable	Model 1 (Incident) Odds Ratio	Model 1 (Incident) b (S.E.)	Model 2 (RAT) Odds Ratio	Model 2 (RAT) b (S.E.)	Model 3b (SDT) Odds Ratio	Model 3b (SDT) B (S.E.)	Model 4b (Final) Odds Ratio	Model 4b (Final) b (S.E.)
Type of Gun								
Handgun Non-Automatic	1.94***	0.66 (0.20)	1.95***	0.67 (0.20)	1.86**	0.62 (0.20)	1.92***	0.65 (0.20)
Rifle Non-Automatic	1.74	0.56 (0.37)	1.87	0.63 (0.38)	2.40*	0.88 (0.39)	2.36*	0.86 (0.39)
Shotgun Non-Automatic	2.31*	0.84 (0.41)	2.36*	0.86 (0.42)	2.23	0.80 (0.44)	2.27	0.82 (0.44)
Firearm Unknown Type	2.11**	0.75 (0.25)	2.23***	0.80 (0.25)	1.94**	0.66 (0.26)	1.98**	0.68 (0.26)
Location								
Residence	0.38*	-0.97 (0.39)	0.46*	-0.77 (0.39)	0.55	-0.59 (0.40)	0.57	-0.57 (0.40)
Vehicle	0.50*	-0.70 (0.29)	0.47**	-0.76 (0.30)	0.53*	-0.64 (0.30)	0.54*	-0.62 (0.30)
Outdoor Other	0.38***	-0.97 (0.30)	0.41**	-0.90 (0.30)	0.43**	-0.85 (0.31)	0.43**	-0.84 (0.31)
Drug Involvement								
Unknown	0.61**	-0.49 (0.18)	0.69*	-0.37 (0.18)	0.59**	-0.54 (0.20)	0.57**	-0.56 (0.20)

Variable	Model 1 (Incident) Odds Ratio	b (S.E.)	Model 2 (RAT) Odds Ratio	b (S.E.)	Model 3b (SDT) Odds Ratio	B (S.E.)	Model 4b (Final) Odds Ratio	b (S.E.)
Liquor Involvement								
Unknown	0.38*	-0.96 (0.44)	0.36*	-1.02 (0.45)	0.45	-0.79 (0.45)	0.46	-0.78 (0.45)
Yes	0.79	-0.24 (0.30)	0.84	-0.17 (0.31)	0.85	-0.16 (0.31)	0.86	-0.15 (0.31)
Day of Week								
Sunday	0.92	-0.08 (0.24)	0.91	-0.10 (0.24)	0.90	-0.10 (0.25)	0.90	-0.11 (0.25)
Monday	1.16	0.15 (0.28)	1.20	0.18 (0.28)	1.20	0.18 (0.29)	1.16	0.15 (0.29)
Tuesday	0.65	-0.44 (0.30)	0.66	-0.41 (0.30)	0.72	-0.33 (0.31)	0.71	-0.34 (0.31)
Wednesday	0.33**	-1.09 (0.39)	0.33**	-1.11 (0.39)	0.30**	-1.22 (0.40)	0.30**	-1.20 (0.40)
Thursday	0.69	-0.38 (0.31)	0.69	-0.37 (0.31)	0.74	-0.30 (0.32)	0.74	-0.31 (0.32)
Friday	1.27	0.24 (0.26)	1.28	0.25 (0.26)	1.33	0.28 (0.26)	1.34	0.30 (0.26)
Month of the Year								
January	0.29*	-1.26 (0.52)	0.32*	-1.15 (0.52)	0.30*	-1.22 (0.53)	0.30*	-1.22 (0.53)

Variable	Model 1 (Incident)		Model 2 (RAT)		Model 3b (SDT)		Model 4b (Final)	
	Odds Ratio	b (S.E.)	Odds Ratio	b (S.E.)	Odds Ratio	B (S.E.)	Odds Ratio	b (S.E.)
February	1.19	0.18 (0.35)	1.13	0.13 (0.36)	1.24	0.22 (0.37)	1.27	0.24 (0.37)
March	1.35	0.30 (0.35)	1.44	0.36 (0.35)	1.39	0.33 (0.36)	1.42	0.35 (0.36)
April	0.84	-0.18 (0.35)	0.84	-0.18 (0.35)	0.99	-0.01 (0.36)	1.03	0.03 (0.36)
May	0.60	-0.51 (0.37)	0.64	-0.45 (0.37)	0.66	-0.41 (0.38)	0.66	-0.42 (0.38)
June	0.77	-0.27 (0.34)	0.79	-0.24 (0.34)	0.87	-0.14 (0.34)	0.86	-0.15 (0.34)
July	0.49	-0.71 (0.37)	0.51	-0.68 (0.37)	0.51	-0.68 (0.38)	0.53	-0.64 (0.38)
September	1.33	0.29 (0.30)	1.35	0.30 (0.31)	1.51	0.41 (0.31)	1.51	0.41 (0.31)
October	0.86	-0.15 (0.33)	0.87	-0.14 (0.33)	0.96	-0.05 (0.33)	0.92	-0.08 (0.33)
November	0.75	-0.29 (0.36)	0.75	-0.28 (0.37)	0.94	-0.06 (0.37)	0.94	-0.06 (0.37)
December	0.41	-0.90 (0.48)	0.42	-0.87 (0.48)	0.48	-0.73 (0.49)	0.47	-0.77 (0.49)

Variable	Model 1 (Incident)		Model 2 (RAT)		Model 3b (SDT)		Model 4b (Final)	
	Odds Ratio	b (S.E.)	Odds Ratio	b (S.E.)	Odds Ratio	B (S.E.)	Odds Ratio	b (S.E.)
Time of Occurrence (Military Time)	1.00	0.00 (0.00)	1.00	0.00 (0.00)	1.00	0.00 (0.00)	1.00	0.00 (0.00)
Offender's Prior Offenses								
Non Violent	0.90	-0.11 (0.28)	0.88	-0.12 (0.29)	1.00	<0.01 (0.29)	1.02	0.02 (0.29)
Violent	1.30	0.26 (0.19)	1.27	0.24 (0.19)	1.25	0.23 (0.19)	1.24	0.21 (0.19)
% Unemployed			1.00	<0.01 (0.01)			1.01	0.01 (0.01)
% Own Car(s)			0.99	-0.01 (1.12)			1.02	0.02 (0.01)
% 0-19 Years Old			1.00	<0.01 (0.01)	0.96**	-0.05 (0.02)	0.97*	-0.03 (0.01)
% Buildings with 1-4 Units			1.01	0.01 (0.01)	1.01*	0.01 (0.01)	1.01	0.01 (0.01)
Population Density			1.00	0.00 (0.00)	1.00	0.00 (0.00)	1.00	0.00 (0.00)
% Hispanic/Latino					1.02***	0.02 (0.01)	1.01*	0.01 (0.01)
% Same House for 5 Years					1.00	<0.01 (0.01)	1.00	<0.01 (0.01)

Variable	Model 1 (Incident) Odds Ratio	b (S.E.)	Model 2 (RAT) Odds Ratio	b (S.E.)	Model 3b (SDT) Odds Ratio	B (S.E.)	Model 4b (Final) Odds Ratio	b (S.E.)
% Same SMSA for 5 Years					1.01***	0.01 (0.01)	1.02***	0.02 (<0.01)
% Females					0.97	-0.03 (0.02)	0.97	-0.03 (0.02)
% High School Graduates					0.98	-0.02 (0.02)	0.97	-0.03 (0.02)
% Female-headed Households					1.01	0.01 (0.01)		
Median Income							0.79	-0.24 (0.41)
Constant	0.27	-1.22 (1.10)	0.16	-1.86 (1.24)	0.66	-0.42 (1.47)	0.34	-1.07 (1.53)
-2 Log Likelihood	1,210.17		1,195.06		1,155.73		1,153.65	
R^2	0.181		0.192		0.225		0.226	
N	2,709		2,695		2,695		2,695	

*p $\leq$ 0.05 **p $\leq$ 0.01 ***p $\leq$ 0.001 Included are Odds ratio, the unstandardized coefficient (b), and the standard error (S.E.).

The final Model 4b is the most effiecient predictor of gang-motivated, firearm-related homicides between drive-by shootings and other forms of homicide. The pseudo R^2 is 22.6%, and the model chi-square is significant ($\chi 2 = 261.34$; df = 49; $p<0.001$). In this model there is only one variable that is different from Model 3b, the percentage of buildings with one to four units is no longer significant. All other variables have no change in the significance or direction of the variables from Model 3b, and only a slight difference in the strengths of the other variables.

In conclusion the full models, Model 4a and 4b, which include incident, routine activities theory, and social disorganization theory variables offer the strongest results analyzing the differences between drive-by shootings and other forms of homicide. However the two different models have differences in the variables that significantly aid in the calculation. To reiterate the significant incident variables between the two full models, 4a and 4b are the same except that the offender is Black. In reference to this variable it seems that the percentage of Hispanics/Latinos in the community affected its significance. The difference between the two full models, 4a and 4b, in the community characteristics is vastly different. Model 4a (Table 6) determined that the percentage of cars, people who lived in the same SMSA for 5 years, females, and high school graduates determine the likelihood of a drive-by shooting. From Model 4b it was found that the percentage of people who lived in the same SMSA for 5 years, zero to 19 year olds, and Hispanics/Latinos aid in the calculation of whether the homicide was a drive-by shooting or not. In noting all the variables that were analyzed in the models, and all the variations of models that were tested, we find that the incident variables of the race of the offender

and the type of weapon that was used are the best predictors of whether the homicide was the result of a drive-by shooting or not.

CHAPTER EIGHT: CONCLUSION

Summary

While information available on gangs and gang homicides is plentiful, research on drive-by shootings is greatly lacking. Previous studies have found that about 90 percent of drive-by shootings are gang-related (Sanders 1994; Polczynski 2008); in this study the focus was on the differences between gang-motivated, firearm-related homicides perpetrated through a drive-by shooting and those that did not involve a drive-by shooting. The differences were analyzed in two ways: by examining incident and community characteristics, and by considering the location of both types of homicides by Census tract within the city of Chicago and through mapping determining if the locations of the homicides were random, dispersed, or clustered. The final analysis type was a logistic regression, which was utilized to determine if the characteristics analyzed could aid in the prediction of the type of homicide, and therefore determine the most prominent characteristic difference between homicides of drive-by shootings and others that were firearm-related.

The first hypothesis, that there would be differences between gang-motivated drive-by shootings and other forms of gang-motivated, firearm-related homicides, was shown to be correct. It was determined that there were multiple variables that were different between the two types of homicide. There were many and significant differences between the two types of homicides, in the variables of both the incidents that occurred and the communities within which they took place. One of the most surprising differences was the race of the offender, in that the percentages of offenders in drive-by shootings was much higher for Latinos, than in non-drive-by shooting homicides where

the majority of the offenders were Black. As for community characteristics it was surprising to find that in the locations where a higher percentage of drive-by shootings occurred the socio-economics were higher than in locations where other forms of homicide happened. Of course, this may be because in lower income areas most people did not have a vehicle.

Based on the first hypothesis, it was stated in the second and fourth hypotheses that if differences were found between the two types of homicide, then logistic regressions would aid in predicting whether or not the homicide was a drive-by shooting. The results of the analyses determined that the type of homicide could be predicted in each of the regression models. From the two final models, 4a and 4b, it was determined that the incident characteristics, particularly the type of firearm and race of the offender, were better predictors than community characteristics. It is important to reiterate that the communities that were compared in this study were all places in which a gang-motivated, firearm-related homicide occurred, meaning that the communities may not have been significantly different enough from each other to aid in prediction, as a comparison of communities where homicides occurred to other locations where homicides did not happen.

The third and fifth hypotheses addressed the questions of the physical locations of the two types of homicide. The third hypothesis stated that gang-motivated, firearm-related homicides perpetrated through drive-by shootings versus non-drive-by shootings would differ significantly by the location of their occurrence within the census tracts of Chicago. However, the locations of the homicides were not exclusive. In fact, the locations of drive-by shooting and non drive-by shooting homicides either overlap or

border one another almost twice as often as those which do not border each other. This could be further investigated by knowing the gang that the offender was a member of, it is conceivable that each type of homicide is not mutually exclusively used by a gang. But that the gang uses the type of homicide which would best benefit the current situation.

The fifth and final hypothesis was that a spatial pattern of clustering would occur for gang-motivated homicides which involve a firearm perpetrated by a drive-by shooting and those not perpetrated by a drive-by shooting. This hypothesis was correct: based on the Global Moran's Index, both types of homicide occurred in areas that produced a cluster effect for the locations of incidents. Although both types of homicides created a clustering effect the effects were not located in the same places, but the clusters often bordered each other or slightly overlapped.

Limitations

The major limitation of this study is that since it is based on data from only one city, Chicago, the information reported here may only be valid in Chicago. While there are numerous findings reported in this paper, caution must be taken against using them to generalize the results onto other communities. Additional studies in other locations is recommended, especially in areas, like Los Angeles, which have a large presence of gangs and perpetration of gang homicide. By studying other locations the results in this study would aid in determining if these findings of the differences of drive-by shootings are multi-locational or specific to Chicago. The difficulty of studying other locations is that reliable data are rarely available. National datasets such as the Uniform Crime Reports or the National Incident-Based Reporting System do not contain separate

variables identifying whether the crime was perpetrated through a drive-by shooting or not. In addition, it is often difficult to obtain data from local agencies. If data were more accessible the understanding of gang-motivated, firearm-related homicides could be vastly improved. It is hoped that in the near future data that catalogues gang-motivated and firearm-related homicides separately will be readily available. A step in this direction has been made by the Center for Disease Control's National Violent Death Reporting System. Datasets collected in the year 2007 and beyond are supposed to contain drive-by shooting as a variable, although this information will not be available for a number of years.

Returning to the limitations of the analyses presented in this paper, in reference to the location it would be beneficial to have the address of location of the homicide. This would allow for a higher resolution study of the locations of the homicides through the use of ArcGIS Map and would also permit a study to determine whether the homicides occurred at or around specific locations, such as schools or parks.

The time frame of the data that were available for these analyses also created limitations, especially in relationship to policy implementations. Because the data only extended to 1995, these analyses can only point to what occurred in that time period and what may have been an appropriate way to address the issues then. By acquiring more recent data in Chicago it could be determined whether these findings remain significant and whether the policy implementations suggested below would make a positive impact in reducing the number of gang-motivated, firearm-related homicides in Chicago. More recent data would also aid in determining if the theories that provided a foundation for this research are still relative.

Theory and Policy Implications

The findings reported above indicate that there are both theoretical and policy implications that can be addressed. Routine activities and social disorganization theories were used in this study as a basis for determining the hypotheses and formations of the logistic regression models. The combination of routine activities and social disorganization theories, as was suggested by Bursik and Grasmick (1993), allows for the determination that in socially disorganized communities, routine activities allow for higher rates of crime. More specifically, where there are higher levels of population mobility and racial/ethnic heterogeneity, and lower levels of socio-economics, there will be lower levels of social bonding, therefore lower levels of effective guardianship, which allows for higher frequency of motivated offenders and available targets. The effect would then be higher rates of crime.

Based on this study it was found that the common social disorganization variables and the moderately understood community-level routine activity variables, such as the percent of the population unemployed, do not have the expected effects on the prediction of the type of homicide which occurred. In fact it was found that very few community characteristics aid in the determination of the type of homicide. In addition, in relation to the locations of gang-motivated, firearm-related drive-by shooting homicides it was found that the communities were slightly better-off economically, had smaller percentages of people unemployed, lower levels of female-headed households, and had higher levels of heterogeneity, than in the locations where other forms of gang-motivated, firearm-related homicides happened. This seems to indicate that drive-by shooting

homicides occurred more often in areas where social disorganization was less compared to the locations where other forms of homicide perpetration ensued.

Due to the findings it seems that although the use of routine activities theory and social disorganization theory aided in determining the hypotheses for the analyses, the theories are not supported by the findings presented in this paper, because they do not aid in the prediction of the type of homicide. Although it is difficult to understand the effect of the routine activities members of the community from a community perspective on crime incidents (Messner & Tardiff 1985), the effects of a socially disorganized community on crime incidents is better understood. Yet, even analyses of social disorganization theory have had controversial findings on whether social disorganization theory is measured correctly when using U.S. Census data (Bursik 1988; Sampson & Groves 1989). Therefore, the fact that the findings do not support social disorganization theory or routine activities theory at the community level is not too surprising.

Even though the theories may not be supported in the analyses, there are policy implications that can be suggested to reduce gang-motivated, firearm-related homicides, specifically based on the findings in this report. Strategies and programs to reduce and prevent youth gang membership and violence are based on a plethora of different stages from prevention to intervention and suppression (Howell 2000). Not only are the programs and strategies addressed at different times they also are implemented by different agencies (police, courts, etc.) and groups (community, religious, etc.) in forms of legislation, initiatives, and activities. The varied use of strategies and programs, as well as the numerous studies completed on the programs, allows a community facing a

particular problem to begin their reaction from what has been tried and what has succeeded in different locations.

Prevention often seems the best way to reduce gang involvement, but in relation to the cases studied here, it seems more pertinent that programs and strategies are aimed at reducing gang-related crimes. From intervention and suppression programs from detached worker (i.e. New York City Youth Board and Ladino Hills Project) and improving conditions (Homeboy Industries) to police and law enforcement response and multi-agency legislative efforts, programs vary in the ability of the workers and the program set-up to reduce crime by gang members (Howell 2000). Some programs do not work at all and others work only in certain locations; that is why it is suggested here that a number of programs be combined for a better ability to reduce the number of gang-motivated, firearm-related homicides in Chicago.

There are three programs that will be addressed and are suggested for use in reducing the gang-motivated, firearm-related homicides similar to those analyzed in this paper: the Operation Ceasefire of the Boston Gun Project, the Kansas City Gun Experiment, and Operation Cul de Sac utilized in Los Angeles. The Boston Gun Project had three key areas of focus: to reduce gun trafficking, to lower the levels of fear youth feel, and to reduce the number of gang and repeat offenders (Kennedy, Braga, and Piehl 2001). Each of these seem to address issues found in Chicago; although the study reported here does not address the spectrum of fear youth felt, it has been studied before (Venkatesh 2008), and therefore it is known that it exists in Chicago.

Each of these three key areas was researched thoroughly, regarding how other groups responded to the problems and the success of their response. Once an

understanding of possible policy implementations was analyzed, the locations of the crimes and gang turfs in Boston were mapped to determine from an informed intellectual standpoint what strategy would be best qualified to address the issues in Boston (Kennedy, Braga, and Piehl 2001). The leaders of the project took a four-level approach. First a warning was given to members of gangs stating the consequences they would receive for their violent actions. Second, police presence was made more noticeable, which caused disruptions of street selling, particularly of drugs, and enforced the consequences of misdemeanor behavior. If the violent behavior continued then levels three and four were used, although these levels were only used on occasion because the violence often declined during the implementations of levels one and two. Level three was a state-level, interagency operation that targeted the offending gang by using warrants to more efficiently pick up gang members, charge them with misdemeanor crimes, and take a group of the gang members to a presentation on what the next level, Operation Ceasefire, would encompass. The fourth level of the operation involved federal officials and federal sanctions to permanently end the gangs which continued to use violence and whose members were unsalvageable.

Having only to use level one and two in most cases, the individuals who helped implement Operation Ceasefire learned that many of the gang members were involved in violence in order to aviod further victimization, which is a continuous spiral of retaliation (Kennedy, Braga, and Piehl 2001). Therefore by reducing the amount of violence it heightened the safety of gang members and reduced other violent offenses in turn.

In later analyses it was found that the intervention was significant in reducing youth homicides, gun assaults, and the number of shots fired (Baraga, Kennedy, Piehl,

and Waring 2001). The thrust of the program was a problem-oriented policing, which focused on gang violence, in which law enforcement officials and individuals from other entities personally addressed the groups of individuals where the violent crimes occurred. Operation Cease Fire is a deterrence strategy in total as Baraga et al. stated, but beginning at level two it is also a strategy that changes the routine activities of the gang members and other members of the society who are behaving illegally. This is accomplished by making police presence more obvious, and therefore changing the behavior of the individuals who commit crimes in the area where police are frequenting. While any type of intervention often leads to crime displacement, it was found in all the interventions suggested here no crime displacement was observed.

The Kansas City Gun Experiment and Operation Cul de Sac were simpler ways of addressing crime issues, but I think that by combining these three programs a greater impact will be made. In the Kansas City Gun Experiment additional police presence, as in the Ceasefire's level two, was placed in the area where a large scale of homicides occurred in Kansas City, Missouri (Sherman & Rogan 1995; Sherman & Rogan 1995). In the Kansas City Gun Experiment the action of the police officers was to identify individuals who carried guns. The officers were not to respond to calls of service, but were to only make routine traffic stops. In the commission of the traffic stops and conversations with individuals the officer was to deduce whether the individual was carrying a weapon. It was found that there was a 65 percent increase of guns found during these traffic stops (Sherman & Rogan 1995). In the area where there were extra patrols, there was a 49 percent decrease in gun crimes, including a decrease in the number of homicides and drive-by shootings, during the same period. It was also found

in a community survey that the individuals in the community were less fearful of crime after the intensive patrols where implemented. The affect of this intervention in reducing firearm-related crimes and easing the fear of community members could have a similar affect in the areas of Chicago where there are numerous firearm-related homicides.

Operation Cul de Sac (OCDS) took a different approach than the two previously described interventions, although the objective was similar. The objective was to reduce gang violence which had greatly increased in a neighborhood of Los Angeles (Lasley 1998). Throughout the 50 plus years of gang violence in Los Angeles numerous interventions had been implemented; some were successful while others were not. Operation Cul de Sac was one intervention that succeeded beyond expectation. This operation is often is overlooked when possible implementations are studied, this possibly due to the controversies, person and monetary issues in which the operation was ended.

The operation involved the placement of traffic barriers on the streets of neighborhoods where gang violence had significantly increased (Lasley 1998). The idea was that by placing the traffic barriers in strategic locations the ease of entrance and exit from these neighborhoods would be lessened, therefore increasing guardianship and reducing opportunity for crime. The operation seems simple, but required strategic planning in reference to the crime locations and the entrance and exits routes of those locations, while still allowing the residents of the neighborhood access to their houses. The placement of the barriers generally only allowed one unrestricted entrance and exit to the neighborhood, therefore reducing the access points to the neighborhood and adding difficulty to leaving the area without notice by community members.

The program was implemented for two years (Lasley 1998). In that two-year time period the number of homicides, perpetrated through a drive-by shooting or not, and assaults that occurred on the street were reduced, and once again increased when the barriers were removed. The crimes were not displaced to other areas during the same time period; in fact the level of violent crime decreased in areas surrounding the neighborhood where OCDS was implemented. Lansley (1998) attributes this reduction to the possibility that rival gangs were cautioned to stay clear of traffic closure areas and their surrounding neighborhoods in order to avoid being apprehended. The reduction of violent crimes of surrounding areas can also be attributed to the reduction of violent crimes in the OCDS areas, which can often lead to a reduction of retaliatory crimes in the surrounding neighborhoods.

The OCDS implementation seems the best solution for areas that have ease of access and lower levels of the population using public transportation; it is surprising that other communities have not tried this program. It is highly suggested that this program be implemented in areas that have high levels of gang homicides, specifically drive-by shootings where one of the reasons for using that type of homicide relates to the ability to approach and quickly escape from the scene of the crime without much notice. Of course strategic planning must precede the placement of the barriers, with a close analysis of the locations of the homicides and the streets leading to and from the location.

Incorporating a careful analysis of the crimes, their locations, and affects on the community members with the combined implementation of the programs suggested above should reduce violent crime in the target areas of Chicago. The efforts of the activist members of the community and officials who were involved in Operation

Ceasefire in Boston allowed the law-abiding and non law- abiding citizens to know that a change was going to happen. Boston became a place of less violent crime, and therefore the fear of the youth was reduced. This encouraged the individuals of the community to support the program and enforce the idea to those who were causing the problems that their actions would no longer be tolerated, continuing a cycle of reduced violence. The Kansas City Gun Experiment and Operation Cul de Sac programs could add to the action of the community members by physically demonstrating that measures are being taken to reduce the possibilities of crime, by removing guns and creating barriers to access locations of crimes. Gang-motivated, firearm-related homicides can be reduced, but reduction requires time, money, and a sense of community not only between the members who live in the community, but also from those who enforce the laws and make decisions for the community.

In summation the findings presented here comprise one of the few studies that have been completed on drive-by shootings. Although in some parameters drive-by shootings are similar to other forms of firearm-related homicides, there are also significant differences. As demonstrated in the results of these analyses the drive-by shootings that occurred in Chicago from 1965 to 1995 have some differences from all other types of gang-motivated, firearm-related homicides. The type of firearm used, the victims' and offenders' demographics, the occurrence on the street, and the economic well-being of the communities in Census tracts where these crimes occur are different for homicides perpetrated by a drive-by shooting and those that are not.

This study is just the beginning of the numerous issues and body of information that needs to be understood about drive-by shootings and all forms of gang-motivated,

firearm-related homicides. Studies that are similar in nature to the one presented here are suggested and should be based in other cities that have high-levels of homicide, specifically those that are gang-motivated, firearm-related. Secondly, greater investigation of the type of weapon that is being used in the homicides is recommended. Third, a stronger focus on the offenders through interviews would add to the understanding of the individual's background, and what their motivation and goal was in the crime. It is the hope of the author that these findings will initiate the interest of others in the quest of better understanding the issues surrounding gang culture, and phenomenon of gang-motivated, firearm-related homicides that are perpetrated through a drive-by shooting.

APPENDIX A: LIST OF VARIABLES

The following variables are in the Victim/Offender Chicago Homicide datasets. Where applicable the original variable is identified, as well as the variable values and comparison category. Variables are available in the offender and victim datasets unless noted otherwise.

Dependent Variable:

1. Drive-by Shooting (*DriveBy*)
    a. Coded base on *CAUSFACT* and *CAUSFAC2*
    b. Values are Yes =1 and No=0

Independent Variables:

2. Victim's Gender (*VICSEXr*)
    a. Coded base on *VICSEX*
    b. Values are Male =1 and Female=0
    c. Available only in the victim dataset
3. Victim's Race (*vicrace_White vicrace_Black vicrace_Asian*)
    a. Coded base on *VICRACE*
    b. Available only in the victim dataset
    c. Values are Asian, Black, Latino, and White
    d. Each are dichotomously coded, Latino is the comparison value
4. Victim's Age (*VICAGE*)
    a. Available in victim dataset
    b. Values are in interval categories of five years, starting with zero to five years old and ending with 85 years old or older
5. Victim's Prior Offenses (*Priorv1_Violent Priorv1_NonViolent*)

    a. Coded based on PrioirVic
    b. Available only in the victim dataset
    c. Values are Unknown, Violent, and Non-Violent
    d. Each are dichotomously coded, Unknown is the comparison value

6. Number of Victims (*NUMVIC*)
    a. Values are from zero to three
7. Offender's Gender (*OSEXr*)
    a. Coded base on *OSEX*
    b. Available in offender dataset
    c. Values are Male =1 and Female=0
8. Offender's Race (*Orace_White Orace_Black Orace_Asian*)
    a. Coded based on *ORACE*
    b. Available only in the offender dataset
    c. Values are Asian, Black, Latino, and White
    d. Each are dichotomously coded, Latino is the comparison value
9. Offender's Age (*OAGE*)
    a. Available only in the offender dataset
    b. Values are in interval categories of five years, starting with zero to five years old and ending with 85 years old or older.
10. Offender's Prior Offenses (*Priorofr_Violent Priorofr_NonViolent*)
    a. Coded based on PrioirOf
    b. Available only in the offender dataset
    c. Values are Unknown, Violent, and Non-Violent

d. Each are dichotomously coded, Unknown is the comparison value

11. Number of Offenders (*NUMOFF*)
    a. Values are from zero to ten.
12. Relationship of Victim and Offender(s) (*relation_fam relation_Aqu relation_Other relation_Stranger relationr*)
    a. Coded based on *RELATION*
    b. Values are Family, Acquaintance, Gang Rival, Stranger, and Other
    c. Each are dichotomously coded, Gang Rival is the comparison value
13. Type of Gun Used (*GUN_handnonauto, GUN_rifle, GUN_shotgun, GUN_unknown)*
    a. Coded based on *WEAPON*
    b. Values are semi-/fully-automatic gun, non-automatic handgun, non-automatic rifle, non-automatic shotgun, and unknown type
    c. Each are dichotomously coded, semi-/fully-automatic gun is the comparison value
14. Location of the Homicide (*Place_res, Place_inother, Place_vehc, Place_street, Place_outother)*
    a. Coded based on *PLACE*
    b. Values are residence/hotel, indoor other, vehicle/public transportation, street, and outdoor other
    c. Each are dichotomously coded, street is the comparison value
15. Drug Involvement (*Drug_Unknown, Drug_Yes, Drug_No*)
    a. Coded based on *DRUG*

b. Values are Unknown, Yes, and No

c. Each are dichotomously coded, no is the comparison value

16. Liquor Involvement (*liquor_Unknown liquor_Yes, Liquor_No*)

a. Coded based on *LIQUOR*

b. Values are Unknown, Yes, and No

c. Each are dichotomously coded, no is the comparison value

17. Day of the Incident (*injday_Sunday, injday_Monday, injday_Tuesday, injday_Wednesday, injday_Thursday, injday_Friday, injday_Saturday*)

a. Coded from *injday*

b. Values are Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, and Saturday

c. Each are dichotomously coded, Saturday is the comparison value

18. Month of the Incident (*injmonth_Jan, injmonth_Feb, injmonth_Mar, injmonth_Apr, injmonth_May, injmonth_June, injmonth_July, injmonth_Aug, injmonth_Sep, injmonth_Oct, injmonth_Nov, injmonth_Dec*)

a. Coded from *injmonth*

b. Values are January, February, March, April, May, June, July, August, September, November, and December

c. Each are dichotomously coded, August is the comparison value

19. Hour of the Incident (*injtime*)

a. Values are in military time

The following variables are from the U.S. Census data, each is explained in Appendix B as to how the variable was computed based on the original Census variables.

20. Percentage of lived in the same house five years earlier (*SameHouseFiveYrs*)
21. Percentage of lived in a different house, but in the same SMSA five years earlier (*SameSMSA5Yrs*)
22. Race/Ethnic heterogeneity (*HomogenietyofRace*)
23. Percentages of people who are Black (*Black*)
24. Percentages of people who are White (*White*)
25. Percentages of people who are of other race/ethnicity (*Other*)
26. Percentage of people who are Latino/Hispanics (*HispanicLatino*)
27. Rate of change of White race in a 10 year period (*WRateRace*)
28. Rate of change of Black race in a 10 year period (*BRateRace*)
29. Rate of change of other races in a 10 year period (*ORateRace*)
30. Rate of change of Hispanic/Latino in a 10 year period (*HRateRace*)
31. Percentage of people under the poverty line (*BelowPoverty*)
32. Percentage of female-headed households (*FHH*)
33. Percentage of male-headed households (*MHH*)
34. Percentage of single-headed households (*SingleHH*)
35. The percent of the population who is unemployed (*Unemployed*)
36. The percent of the population who is foreign born/1st Generation (*Foreign*)
37. Percent of females in the population (*Female*)
38. Percent of males in the population (*Male*)
39. The percentages of people in particular age groups

a. Percentage of under 5 years old (*AgeUnder5*)

b. Percentage of 5-9 years old (*Age59*)

c. Percentage of 10-14 years old (*@1014*)

d. Percentage of 15-19 years old (*@1519*)

e. Percentage of 20-24 years old (*@2024*)

f. Percentage of 25-29 years old (*@2529*)

g. Percentage of 30-34 years old (*@3034*)

h. Percentage of 35-44 years old (*@3544*)

i. Percentage of 45-54 years old (*@4554*)

j. Percentage of 55-64 years old (*@5564*)

k. Percentage of 65-74 years old (*@6574*)

l. Percentage of 75 plus years old (*@75*)

40. The percentages of people living in a unit from one to six or more

a. Percentage of 1 person live in unit/Household (*@1personoinunit*)

b. Percentage of 2 people live in unit (*@2personinunit*)

c. Percentage of 3 people live in unit (*@3personinunit*)

d. Percentage of 4 people live in unit (*@4personinunit*)

e. Percentage of 5 people live in unit (*@5personinunit*)

f. Percentage of 6 plus people live in unit (*@6personsinunit*)

41. The percentage of the population at different levels of educational attainment

a. Percentage of under 9^{th} grade education (*Under9thEd*)

b. Percentage of 1-3 years of a high school education (*UnderHSEd*)

c. Percentage of high school degree (*HSGrad*)

d. Percentage of less than 4 years of college (*SomeCollege*)

e. Percentage of college degree or more (*CollegeDgr*)

42. The percentage of structures with one to five or more units

a. Total Units (*TotalUnits*)

b. Percentage of structures with 1 unit (*@1Unit*)

c. Percentage of structures with 2 units (*@2Units*)

d. Percentage of structures with 3-4 units (*@34Units*)

e. Percentage of structures with 5 plus units (*@5Units*)

43. The percentage of the population with no vehicles to three or more vehicles

a. Percentage of no vehicles (*NoCars*)

b. Percentage of 1 vehicle (*@1Car*)

c. Percentage of 2 vehicles (*@2Cars*)

d. Percentage of 3 plus vehicles (*@3Cars*)

44. The count of the total population (*TotalPop*)

45. The count of households/families (*TotalHH*)

46. Population density of the Census Tract (*Density)*

47. The Percent of the U.S. Median Income (*%MedIncome*)

APPENDIX B: COMPUTATION OF CENSUS VARIABLES

In this appendix, it is explained how each Census variable was computed based on the original Census variables. Depending on what variables were available in the Census, it is possible that the variables used in the analysis were computed differently for each of the three Censuses. For example, the homogeneity of race variable – the variables are different for each of the Census years, because the count of races by each year were collected differently. In 1970 only Black, White, and other were collected, where as in 1990 the basic categories were Black, White, Native American, Asian Pacific, and Other. The explanation for each year of the Census is recorded for each variable including the title of the original variable(s) (in italics) from the Census data, for easy duplication of the study.

1. Tract Number

   1970. Each Census tract identification number, *AreaKey* was left as it originally was.

   1980. In the 1980 three Census tracts, *TRACT4* were divided to lessen the number of people in each tract; 3201, 5104, and 5202. These tracts were divided by adding a decimal of .00 or .99. To combine the Census tracts to the original 1970 tracts each split tract variables were added for total numbers, or averaged and divided by the total population for variables that are percentages.

   1990. Each Census tract identification number, *AreaName* was left as it originally was, because they are exact replicas of the 1970 Census tracts.

2. Total Population

1970. The number of people in each age group was added to achieve the total number of people. The variables are all the possibilities in the Age and Sex category beginning with *AGESE051* to *AGESE104*.

1980. The number of people by gender, *1aMale and 1aFemale* were added together to obtain the total number of people.

1990. The number of people by gender, *Males and Females* were added together to obtain the total number of people.

3. Population density of the Census Tract

   1970. The total population divided by the area of the Census Tract supplied by ArcGIS map of 1980 Chicago Census Tracts (Winters N.d.), and based on the number of people per 1000 square meters (Personal communication Winters, C. October 15, 2008).

   1980. The total population divided by the area of the Census Tract supplied by ArcGIS map of 1980 Chicago Census Tracts (Winters N.d.), and based on the number of people per 1000 square meters (Personal communication Winters, C. October 15, 2008).

   1990. The total population divided by the area of the Census Tract supplied by ArcGIS map of 1980 Chicago Census Tracts (Winters N.d.), and based on the number of people per 1000 square meters (Personal communication Winters, C. October 15, 2008).

4. Percentage of the population who are Foreign Born or are 1st Generation US Citizens

1970. The number of people foreign born or natives of foreign or mixed heritage, *NATIP002* divided by total population. The 1970 Census does not divide just foreign born, it is a compilation of foreign born or 1st generation born native.

1980. The number of people foreign born, *3aBrnFor* divided by total population.

1990. The number of people foreign born, *S_ForBrn* divided by total population.

5. Percentage of the population unemployed

1970. The number of the population 16 years old and older who are unemployed, *PYOOES_U* divided by the total number of 16 years old and older (*AGESE016, AGESE018, AGESE020, AGESE022, AGESE024, AGESE026, AGESE028, AGESE030, AGESE032, AGESE034, AGESE036, AGESE038, AGESE040, AGESE042, AGESE044, AGESE046, AGESE048, AGESE050, AGESE052, AGESE068, AGESE070, AGESE072, AGESE074, AGESE076, AGESE078, AGESE080, AGESE082, AGESE084, AGESE086, AGESE088, AGESE090, AGESE092, AGESE094, AGESE096, AGESE098, AGESE100, AGESE102, and AGESE104).*

1980. The number of males and females unemployed (*3aMaUe and 3aFeUe)* over the age of 15 divided by the total number of people over 15 years of age (*1aPop16, 1aPop17, 1aPop18, 1aPop19, 1aPop20, 1aPop21, 1aPop24, 1aPop29, 1aPop34, 1aPop44, 1aPop54, 1aPop59, 1aPop61, 1aPop74, 1aPop84, and 1aPop85*).

1990. The original variable is percent unemployed, so *L_PctUmp* was copied over.

6. Median Income (Family or Household)

   1970. Divide the aggregate family income, *AGFAINFA* by the aggregate number of families in the census tract (by adding *FTPAO03, FTPAO02, FTPAO04, FTPAO07, FTPAO06, FTPAO08, FTPAO011, FTPAO010, and FTPAO012*).

   1980. The original variable was median household income (*3aMedInc*).

   1990. The original variable was median household income (M*edFamIn*).

7. Percentage of the population living below the poverty line

   1970. Divide the aggregate number of people in families below the poverty level (*ANPFBPL*) by the total population.

   1980. Divide the number of people in poverty, *3aPoPv* by the total population

   1990. Divide the number of people in poverty, *PovBelow* by the total population

8. Percentage of the population with no vehicles

   1970. The number of no vehicles, *ALFON051* by the aggregate number of zero to three plus vehicles (*ALFON051, ALFON048, ALFON050, ALFON052*).

   1980. The number of no vehicles, *3aNoVeh* by the aggregate number of zero to three plus vehicles (*3aNoVeh, 3aVeh1, 3aVeh2, 3aVeh3*).

1990. The number of no vehicles, *Veh0* by the aggregate number of zero to three plus vehicles (*Veh0, Veh1, Veh2, Veh3p*).

9. Percentage of the population with one vehicle

1970. The number of one vehicles, *ALFON048* by the aggregate number of zero to three plus vehicles (*ALFON051, ALFON048, ALFON050, ALFON052*).

1980. The number of one vehicles, *3aVeh1* by the aggregate number of zero to three plus vehicles (*3aNoVeh, 3aVeh1, 3aVeh2, 3aVeh3*).

1990. The number of one vehicles, *Veh1* by the aggregate number of zero to three plus vehicles (*Veh0, Veh1, Veh2, Veh3p*).

10. Percentage of the population with two vehicles

1970. The number of two vehicles, *ALFON050* by the aggregate number of zero to three plus vehicles (*ALFON051, ALFON048, ALFON050, ALFON052*).

1980. The number of two vehicles, *3aVeh2* by the aggregate number of zero to three plus vehicles (*3aNoVeh, 3aVeh1, 3aVeh2, 3aVeh3*).

1990. The number of two vehicles, *Veh2* by the aggregate number of zero to three plus vehicles (*Veh0, Veh1, Veh2, Veh3p*).

11. Percentage of the population with three or more vehicles

1970. The number of three plus vehicles, *ALFON052* by the aggregate number of zero to three plus vehicles (*ALFON051, ALFON048, ALFON050, ALFON052*).

1980. The number of three plus vehicles, *3aVeh3* by the aggregate number of zero to three plus vehicles (*3aNoVeh, 3aVeh1, 3aVeh2, 3aVeh3*).

1990. The number of three plus vehicles, *Veh3p* by the aggregate number of zero to three plus vehicles (*Veh0, Veh1, Veh2, Veh3p*).

12. Percentage of males in the population

1970. The number of males (*AIPYO001*) divided by the total population.

1980. The number of males (*1aMale*) divided by the total population.

1990. The number of males (*Males*) divided by the total population.

13. Percentage of females in the population

1970. The number of males (*AIPYO002*) divided by the total population.

1980. The number of males (*1aFemale*) divided by the total population.

1990. The number of males (*Females*) divided by the total population.

14. Percentage of the population who are under 5 years old

1970. The number of people under five years old (*AGESE051, AGESE002, AGESE103,* and *AGESE054*) divided by the total population.

1980. The number of people under five years old (*1aPop1, 1aPop2,* and *1aPop4*) divided by the total population.

1990. The number of people under five years old (*Ageu1, Age1_2,* and *Age3_4*) divided by the total population.

15. Percentage of the population who are between 5 and 9 years old

1970. The number of people between five and nine years old (*AGESE004, AGESE006, AGESE008, AGESE056, AGESE058,* and *AGESE060*) divided by the total population.

1980. The number of people between five and nine years old (*1aPop5, 1aPop6,* and *1aPop9*) divided by the total population.

1990. The number of people between five and nine years old (*Age5, Age6,* and *Age7_9*) divided by the total population.

16. Percentage of the population who are between 10 and 14 years old

1970. The number of people who are ten to fourteen years old (*AGESE010, AGESE012, AGESE062,* and *AGESE064*) divided by the total population.

1980. The number of people who are ten to fourteen years old (*1aPop13* and *1aPop14*) divided by the total population.

1990. The number of people who are ten to fourteen years old (*Age10_11, Age12_13,* and *Age14*) divided by the total population.

17. Percentage of the population who are between 15 and 19 years old

1970. The number of people between fifteen and nineteen years old (*AGESE014, AGESE016, AGESE018, AGESE020, AGESE022, AGESE066, AGESE068, AGESE070, AGESE072,* and *AGESE074*) divided by the total population.

1980. The number of people between fifteen and nineteen years old (*1aPop15, 1aPop16, 1aPop17, 1aPop18,* and *1aPop19*) divided by the total population.

1990. The number of people between fifteen and nineteen years old (*Age15, Age16, Age17, Age18,* and *Age19*) divided by the total population.

18. Percentage of the population who are between 20 and 24 years old

1970. The number of people from twenty to twenty-four years old aggregated (*AGESE024, AGESE026, AGESE028, AGESE076, AGESE078,* and *AGESE080*) and divided by the total population.

1980. The number of people from twenty to twenty-four years old aggregated (*1aPop20, 1aPop21,* and *1aPop24*) and divided by the total population.

1990. The number of people from twenty to twenty-four years old aggregated (*Age20, Age21,* and *Age22_24*) and divided by the total population.

19. Percentage of the population who are between 25 and 29 years old

1970. The number of people from twenty-five to twenty-nine years old aggregated (*AGESE030,* and *AGESE082*) and divided by the total population.

1980. The number of people from twenty-five to twenty-nine years old (*1aPop29)* divided by the total population.

1990. The number of people from twenty-five to twenty-nine years old (*Age22_29*) divided by the total population.

20. Percentage of the population who are between 30 and 34 years old

1970. The number of people between thirty and thirty-four years old aggregated (*AGESE032,* and *AGESE084*) and divided by the total population.

1980. The number of people between thirty and thirty-four years old (*1aPop34)* divided by the total population.

1990. The number of people between thirty and thirty-four years old (*Age30_34*) divided by the total population.

21. Percentage of the population who are between 35 and 44 years old

1970. The number of people between thirty-five and forty-four years old aggregated (*AGESE034, AGESE036, AGESE086,* and *AGESE088*) and divided by the total population.

1980. The number of people between thirty-five and forty-four years old (*1aPop44)* divided by the total population.

1990. The number of people between thirty-five and forty-four years old aggregated (*Age35_39* and *Age40_44*) and divided by the total population.

22. Percentage of the population who are between 45 and 54 years old

1970. The number of people from forty-five to fifty-four years old aggregated (*AGESE038, AGESE040, AGESE090,* and *AGESE092*) and divided by the total population.

1980. The number of people between forty-five to fifty-four years old (*1aPop54)* divided by the total population.

1990. The number of people between forty-five to fifty-four years old aggregated (*Age45_49* and *Age50_54*) and divided by the total population.

23. Percentage of the population who are between 55 and 64 years old

1970. The number of people from fifty-five to sixty-four years old aggregated (*AGESE042, AGESE044, AGESE046, AGESE094, AGESE096,* and *AGESE098*) and divided by the total population.

1980. The number of people between fifty-five to sixty-four years old aggregated (*Pop59, Pop61,* and *Pop64,)* and divided by the total population.

1990. The number of people between fifty-five to sixty-four years old aggregated (*Age55_59, Age60_61,* and *Age62_64*) and divided by the total population.

24. Percentage of the population who are between 65 and 74 years old

1970. The aggregate number of people from sixty-five to seventy-four years old (*AGESE048, AGESE050, AGESE100,* and *AGESE102*) divided by the total population.

1980. The number of people from sixty-five to seventy-four years old (*Pop74)* divided by the total population.

1990. The aggregate number of people from sixty-five to seventy-four years old (*Age65_69,* and *Age70_76*) and divided by the total population.

25. Percentage of the population who are 75 years or older

1970. The aggregate number of people who are seventy-five years or older (*AGESE052* and *AGESE104*) divided by the total population.

1980. The aggregate number of people who are seventy-five years or older (*Pop84, and Pop85p)* and divided by the total population.

1990. The aggregate number of people who are seventy-five years or older old (*Age75_79, Age80_84,* and *Age85p*) and divided by the total population.

26. Percentage of the population who lived in the same house five years earlier

1970. Population five years or older who lived in the same house in 1965, *PYOOR017* divided by the total population that is five years old or older.

1980. Population five years or older who lived in the same house in 1975, *3aResSam* divided by the total population that is five years old or older.

1990. Population five years or older who lived in the same house in 1985, *Rs85Same* divided by the total population that is five years old or older.

27. Percentage of the population who lived in a different house, but in the same SMSA five years earlier

1970. The number of people five years or older who lived in the same central city of SMSA (*PYOOL011*) or in other part of same SMSA (*PYOOL002*) for five years aggregated and divided by the total population that is five years old or older.

1980. The number of people five years or older who lived in the same central city of SMSA (*3aResCit*) or in the remainder part of same SMSA (*3aResRem*) for five years aggregated and divided by the total population that is five years old or older.

1990. The number of people five years or older who lived in the same central city of SMSA (*RsMsSame*) or in the remainder part of same SMSA (*RsMsRem*) for five years aggregated and divided by the total population that is five years old or older.

28. Total Number of Households/Families

1970. The number of all types of households added together (*FTPAO003, FTPAO002, FTPAO004, FTPAO007, FTPAO006, FTPAO008, FTPAO011, FTPAO010,* and *FTPAO012).*

1980. The original variable was all household types (*1aHH).*

1990. The original variable was all types of families (*Families).*

29. Percentage of households which are single female-headed

1970. Divide the number of female-headed households with children (*FTPAO002,* and *FTPAO004*) by the total number of households.

1980. Divide the number of female-headed households with children (*1aCHHFNS*) by the total number of households.

1990. Divide the number of female-headed households with children (*FnHChu18*) by the total number of households.

30. Percentage of households which are single male-headed

1970. Divide the number of male-headed households with children (*FTPAO010,* and *FTPAO012*) by the total number of households.

1980. Divide the number of male-headed households with children (*1aCHHMNS*) by the total number of households.

1990. Divide the number of male-headed households with children (M*nHChu18*) by the total number of households.

31. Percentage of households which are single-headed

1970. Aggregate the percentage of female- and male-headed households with children.

1980. Aggregate the percentage of female- and male-headed households with children.

1990. Aggregate the percentage of female- and male-headed households with children.

32. Percentage of the population who live one person in a unit

1970. Divide the number of one person living in a unit, *NPUTR017* by the aggregate number of people living in one to six plus people in a unit, *NPUTR018*.

1980. Divide the number of one person living in a unit, *1aOcc1* by the aggregate number of people living in one to six plus people in a unit; *1aOcc1, 1aOcc2, 1aOcc3, 1aOcc4, 1aOcc5,* and *1aOcc6p.*

1990. Divide the number of one person living in a household, *PerHs1* by the aggregate number of people living in one to six plus people in a unit; *PerHs1, PerHs2, PerHs3, PerHs4, PerHs5, PerHs6,* and *PerHs7p.*

33. Percentage of the population who live two people in a unit

1970. Divide the number of two people living in a unit, *NPUTR002* by the aggregate number of people living in one to six plus people in a unit, *NPUTR018*.

1980. Divide the number of two people living in a unit, *1aOcc2* by the aggregate number of people living in one to six plus people in a unit; *1aOcc1, 1aOcc2, 1aOcc3, 1aOcc4, 1aOcc5,* and *1aOcc6p.*

1990. Divide the number of two people living in a household, *PerHs2* by the aggregate number of people living in one to six plus people in a unit; *PerHs1, PerHs2, PerHs3, PerHs4, PerHs5, PerHs6,* and *PerHs7p.*

34. Percentage of the population who live three people in a unit

1970. Divide the number of three people living in a unit, *NPUTR004* by the aggregate number of people living in one to six plus people in a unit, *NPUTR018*.

1980. Divide the number of three people living in a unit, *1aOcc3* by the aggregate number of people living in one to six plus people in a unit; *1aOcc1, 1aOcc2, 1aOcc3, 1aOcc4, 1aOcc5,* and *1aOcc6p.*

1990. Divide the number of three people living in a household, *PerHs3* by the aggregate number of people living in one to six plus people in a unit; *PerHs1, PerHs2, PerHs3, PerHs4, PerHs5, PerHs6,* and *PerHs7p.*

35. Percentage of the population who live four people in a unit

1970. Divide the number of four people living in a unit, *NPUTR006* by the aggregate number of people living in one to six plus people in a unit, *NPUTR018*.

1980. Divide the number of four people living in a unit, *1aOcc4* by the aggregate number of people living in one to six plus people in a unit; *1aOcc1, 1aOcc2, 1aOcc3, 1aOcc4, 1aOcc5,* and *1aOcc6p.*

1990. Divide the number of four people living in a household, *PerHs4* by the aggregate number of people living in one to six plus people in a unit; *PerHs1, PerHs2, PerHs3, PerHs4, PerHs5, PerHs6,* and *PerHs7p.*

36. Percentage of the population who live five people in a unit

1970. Divide the number of five people living in a unit, *NPUTR008* by the aggregate number of people living in one to six plus people in a unit, *NPUTR018*.

1980. Divide the number of five people living in a unit, *1aOcc5* by the aggregate number of people living in one to six plus people in a unit; *1aOcc1, 1aOcc2, 1aOcc3, 1aOcc4, 1aOcc5,* and *1aOcc6p.*

1990. Divide the number of five people living in a household, *PerHs5* by the aggregate number of people living in one to six plus people in a unit; *PerHs1, PerHs2, PerHs3, PerHs4, PerHs5, PerHs6,* and *PerHs7p.*

37. Percentage of the population who live six or more people in a unit

1970. Divide the aggregated number of six plus people living in a unit (*NPUTR010, NPUTR012, NPUTR014, NPUTR016,* and *NPUTR018*) by the aggregate number of people living in one to six plus people in a unit, *NPUTR018*.

1980. Divide the number of six plus people living in a unit, *1aOcc6p* by the aggregate number of people living in one to six plus people in a unit; *1aOcc1, 1aOcc2, 1aOcc3, 1aOcc4, 1aOcc5,* and *1aOcc6p.*

1990. Divide the aggregated number of six plus people living in a unit (*PerHs6* and *PerHs7p*) by the aggregate number of people living in one to six plus people in a unit; *PerHs1, PerHs2, PerHs3, PerHs4, PerHs5, PerHs6,* and *PerHs7p*.

38. Race/Ethnic Heterogeneity - is determined by 1- ($\sum p_i^2$), where p_i is the proportion of each race with in a census tract (Osgood et. al. 2000). Each proportion is then squared, summed, and then subtracted from one to create a fraction which indicates the heterogeneity of race in the Census tract.

1970. Proportion used were Black (*RACE_NG*), White (*RACE_W*), and other (*RACE_O*).

1980. Proportion used were Black (*1aBlack*), White (*1aWhite*), and an aggregated of other (*1aAmerIn, 1aEskimo, 1aAleut, 1aJapan, 1aChines,*

1aFilip, 1aKorean, 1aAsInd, 1aViet, 1aHawaii, 1aGuam, 1aSomoan, and *1aRacOth*).

1990. Proportion used were Black (*PopBlack*), White (*PopWhite*), and an aggregate of other categories (*PopNatAm, PopAsPac,* and *PopOther*).

39. Percentage of the population who is of Black race

1970. The number of Black, *RACE_NG* divided by the total race population.

1980. The number of Black, *1aBlack* divided by the total race population.

1990. The number of Black, *PopBlack* divided by the total race population.

40. Percentage of the population who is of White race

1970. The number of White, *RACE_W* divided by the total race population.

1980. The number of White, *1aWhite* divided by the total race population.

1990. The number of White, *PopWhite* divided by the total race population.

41. Percentage of the population who is of other race or ethnicity

1970. The number of other, *RACE_O* divided by the total race population.

1980. The number of other aggregated (*1aAmerIn, 1aEskimo, 1aAleut, 1aJapan, 1aChines, 1aFilip, 1aKorean, 1aAsInd, 1aViet, 1aHawaii, 1aGuam, 1aSomoan,* and *1aRacOth*) and divided by the total race population.

1990. The number of other aggregated (*PopNatAm, PopAsPac,* and *PopOther*) and divided by the total race population.

42. Percentage of the population who is of Hispanic/Latino ethnicity

1970. The aggregate number of native Americans of foreign or mixed parents and foreign born from Mexico (*COUOR054* and *COUOR120*), Cuba (*COUOR056* and *COUOR122*), and Other America (*COUOR058* and

COUOR124) divided by the total population. This is the only measurement of Hispanics or Latinos from the 1970 Census.

1980. The aggregate number of Mexican (*1aMexica*), Puerto Rican (*1aPuerto*), Cuban (*1aCuban*) and other Hispanics (*1aHisOth*) are divided by the total population. This is the only measurement of Hispanics or Latinos from the 1980 Census.

1990. The aggregate number of people of Hispanic origin (*HisWhite, HisBlack, HisNatAm, HisAsPac,* and *HisOther*) are divided by the total population. This is the only measurement of Hispanics of Latinos from the 1990 Census.

43. Rate of change for the population who is White

1970. The rate of change for the population of Whites was calculated from the percentage of Whites (*RACE_W*) in the 1970 Census tract minus the percentage of Whites (*V0000001: NBT5: White*) in the 1960 Census tract (Minnesota Population Center, 2004) divided by one for the difference in the number of Census Years. See Appendix C for matching of the 1960 Census tracts to the 1970 Census tracts.

1980. The rate of change for the population of Whites was calculated from the percentage of Whites (*1aWhite*) in the 1980 Census tract minus the percentage of Whites (*RACE_W*) in the 1970 Census tract divided by one for the difference in the number of Census Years.

1990. The rate of change for the population of Whites was calculated from the percentage of Whites (*PopWhite*) in the 1990 Census tract minus the

percentage of Whites (*1aWhite*) in the 1980 Census tract divided by one for the difference in the number of Census Years.

44. Rate of change for the population who is Black

1970. The rate of change for the population of Whites was calculated from the percentage of Blacks (*RACE_NG*) in the 1970 Census tract minus the percentage of Whites (*V0000002: NBT5: Negro*) in the 1960 Census tract (Minnesota Population Center, 2004) divided by one for the difference in the number of Census Years. See Appendix C for matching of the 1960 Census tracts to the 1970 Census tracts.

1980. The rate of change for the population of Whites was calculated from the percentage of Whites (*1aBlack*) in the 1980 Census tract minus the percentage of Whites (*RACE_NG*) in the 1970 Census tract divided by one for the difference in the number of Census Years.

1990. The rate of change for the population of Whites was calculated from the percentage of Whites (*PopBlack*) in the 1990 Census tract minus the percentage of Whites (*1aBlack*) in the 1980 Census tract divided by one for the difference in the number of Census Years.

45. Rate of change for the population who is a race other than White or Black

1970. The rate of change for the population of Whites was calculated from the percentage of Whites (*RACE_O*) in the 1970 Census tract minus the percentage of Whites (*V0000003: NBT5: Other*) in the 1960 Census tract (Minnesota Population Center, 2004) divided by one for the difference in the

number of Census Years. See Appendix C for matching of the 1960 Census tracts to the 1970 Census tracts.

1980. The rate of change for the population of Whites was calculated from the percentage of Whites (*1aAmerIn, 1aEskimo, 1aAleut, 1aJapan, 1aChines, 1aFilip, 1aKorean, 1aAsInd, 1aViet, 1aHawaii, 1aGuam, 1aSomoan,* and *1aRacOth*) in the 1980 Census tract minus the percentage of Whites (*RACE_O*) in the 1970 Census tract divided by one for the difference in the number of Census Years.

1990. The rate of change for the population of Whites was calculated from the percentage of Whites (*PopNatAm, PopAsPac,* and *PopOther*) in the 1990 Census tract minus the percentage of Whites (*1aAmerIn, 1aEskimo, 1aAleut, 1aJapan, 1aChines, 1aFilip, 1aKorean, 1aAsInd, 1aViet, 1aHawaii, 1aGuam, 1aSomoan,* and *1aRacOth*) in the 1980 Census tract divided by one for the difference in the number of Census Years.

46. Rate of change of Hispanic/Latino in a 10 year period (*HRateRace*)

1970. The rate of change can not be determined for the homicides that occurred between 1965 and 1974 because the 1960 Census data is not comprehensive in classifying Hispanic (Gibson and Jung 2002).

1980. The rate of change for the population of Hispanic was calculated from the percentage of Hispanic/Latinos (*COUOR054*, *COUOR120 COUOR056, COUOR122, COUOR058,* and *COUOR124*) in the 1970 Census tract minus the percentage of Hispanic/Latinos (*1aMexica, 1aPuerto, 1aCuban,* and

1aHisOth)) in the 1980 Census tract divided by one for the difference in the number of Census Years.

1990. The rate of change for the population of Hispanic was calculated from the percentage of Hispanic/Latinos (*1aMexica, 1aPuerto, 1aCuban,* and *1aHisOth*) in the 1980 Census tract minus the percentage of Hispanic/Latinos (*HisWhite, HisBlack, HisNatAm, HisAsPac,* and *HisOther*) in the 1990 Census tract divided by one for the difference in the number of Census Years.

47. Percentage of the population with less than a 9th grade education

1970. The aggregate number of male and females age 25 years or older with no education (*PYOOY037* and *PYOOY020*), and males and females age 25 years or older who completed elementary 1st through 4th (*PYOOY002* and *PYOOY022*), 5th through 6th (*PYOOY0004* and *PYOOY024*), 7th (*PYOOY006* and *PYOOY026*) or 8th (*PYOOY008* and *PYOOY028*) grade only and divide by the total population 25 years or older.

1980. The number of people age 25 years or older who completed zero to eight years of school (*3aCmElm*) divided by the total population 25 years or older.

1990. The number of people age 25 years or older who less than a 9th grade education (*Edu0_8*) divided by the total population 25 years or older.

48. Percentage of the population with 1-3 years of a high school education

1970. The aggregate number of male and females age 25 years or older with one to three years of a high school education (*PYOOY010* and *PYOOY030*) and divide by the total population 25 years or older.

1980. The number of people age 25 years or older who completed one to three years of a high school education (*3aCmHS3*) divided by the total population 25 years or older.

1990. The number of people age 25 years or older who completed less than a high school diploma (*Edu9_12*) divided by the total population 25 years or older.

49. Percentage of the population with a high school degree

1970. The aggregate number of male and females age 25 years or older with four years of high school education (*PYOOY012* and *PYOOY032*) and divide by the total population 25 years or older.

1980. The number of people age 25 years or older with four years of high school education (*3aCmHS4*) divided by the total population 25 years or older.

1990. The number of people age 25 years or older with a high school diploma (*EduHsGED*) divided by the total population 25 years or older.

50. Percentage of the population with less than 4 years of college

1970. The aggregate number of male and females age 25 years or older with one to three years of a college education (*PYOOY014* and *PYOOY034*) and divide by the total population 25 years or older.

1980. The number of people age 25 years or older who completed one to three years of a college education (*3aCmCo3*) divided by the total population 25 years or older.

1990. The number of people age 25 years or older who completed some years of a college education (*EduSmCol*) and an associates degree (*EduAssDg*) divided by the total population 25 years or older.

51. Percentage of the population with a college degree or more

1970. The aggregate number of male and females age 25 years or older with four or more years of college (*PYOOY016, PYOOY018, PYOOY036* and *PYOOY038*) and divide by the total population 25 years or older.

1980. The number of people age 25 years or older who completed four or more years of a college education (*3aCmCo4*) divided by the total population 25 years or older.

1990. The number of people age 25 years or older who earned a Bachelor's degree (*EduBchDg*) and graduate-level degree (*EduGrPrf*) divided by the total population 25 years or older.

52. Number of Structures

1970. All structures containing any number of units aggregated (*USTT213, UNSTT002, UNSTT004, USTT006, UNSTT008, UNSTT010, USTT012, UNSTT014, UNSTT016, USTT180, UNSTT182, UNSTT184, USTT186, UNSTT188, UNSTT190, USTT192, UNSTT194, UNSTT196, USTT198, UNSTT200, UNSTT202, USTT204, UNSTT206, UNSTT208, USTT210, UNSTT212,* and *UNSTT214*).

1980. All structures containing any number of units aggregated (*3aHu1d, 3aHu1a, 3aHu2, 3aHu4,* and *3aHu5*).

1990. All structures containing any number of units aggregated (*HuStr1de, HuStr1at, HuStr2, HuStr3_4, HuStr5_9, HuStr19, HuStr49, Hu50p, HuMobHom,* and *HuOther*).

53. Percentage of structures with 1 unit

1970. Structures containing one unit (*USTT213, UNSTT002, USTT180, UNSTT182, USTT198,* and *UNSTT200*) are aggregated and divided by the total number of structures.

1980. Structures containing one unit (*3aHu1d* and *3aHu1a*) are aggregated and divided by the total number of structures.

1990. Structures containing one unit (*HuStr1de* and *HuStr1at*) are aggregated and divided by the total number of structures.

54. Percentage of structures with 2 units

1970. Structures containing two units (*USTT004, USTT184,* and *UNSTT202*) are aggregated and divided by the total number of structures.

1980. Structures containing two units (*3aHu2*) are divided by the total number of structures.

1990. Structures containing two units (*HuStr2*) are divided by the total number of structures.

55. Percentage of structures with 3-4 units

1970. Structures containing three or four units (*USTT006, USTT186,* and *UNSTT204*) are aggregated and divided by the total number of structures.

1980. Structures containing three or four units (*3aHu4*) are divided by the total number of structures.

1990. Structures containing three or four units (*HuStr3_4*) are divided by the total number of structures.

56. Percentage of structures with 5 plus units

1970. Structures containing five or more units (*UNSTT008, UNSTT010, USTT012, UNSTT014, UNSTT188, UNSTT190, USTT192, UNSTT194, UNSTT206, UNSTT208, USTT210, UNSTT212,* and *UNSTT214*) are aggregated and divided by the total number of structures.

1980. Structures containing five or more units (*3aHu5*) are divided by the total number of structures.

1990. Structures containing five or more units (*HuStr5_9, HuStr19, HuStr49,* and *Hu50p*) are aggregated and divided by the total number of structures.

48. The Percent of the U.S. Median Income (*%MedIncome*)

1970. Computed by subtracting the 1970 U.S. Median Income (U.S. Census Bureau 2007) from the Census Tracts median income divided by the U.S. median Income for 1970.

1980. Computed by subtracting the 1980 U.S. Median Income (U.S. Census Bureau 2007) from the Census Tracts median income divided by the U.S. median Income for 1980.

1990. Computed by subtracting the 1990 U.S. Median Income (U.S. Census Bureau 2007) from the Census Tracts median income divided by the U.S. median Income for 1990.

APPENDIX C: MATCHING OF THE 1960 AND 1970 CENSUS TRACTS

Unlike the 1970, 1980 and 1990 Census tracts which are of the same boundaries, the 1960 Census tracts were slightly different. In this Appendix, it is explained how the 1960 and 1970 Census tracts were matched.

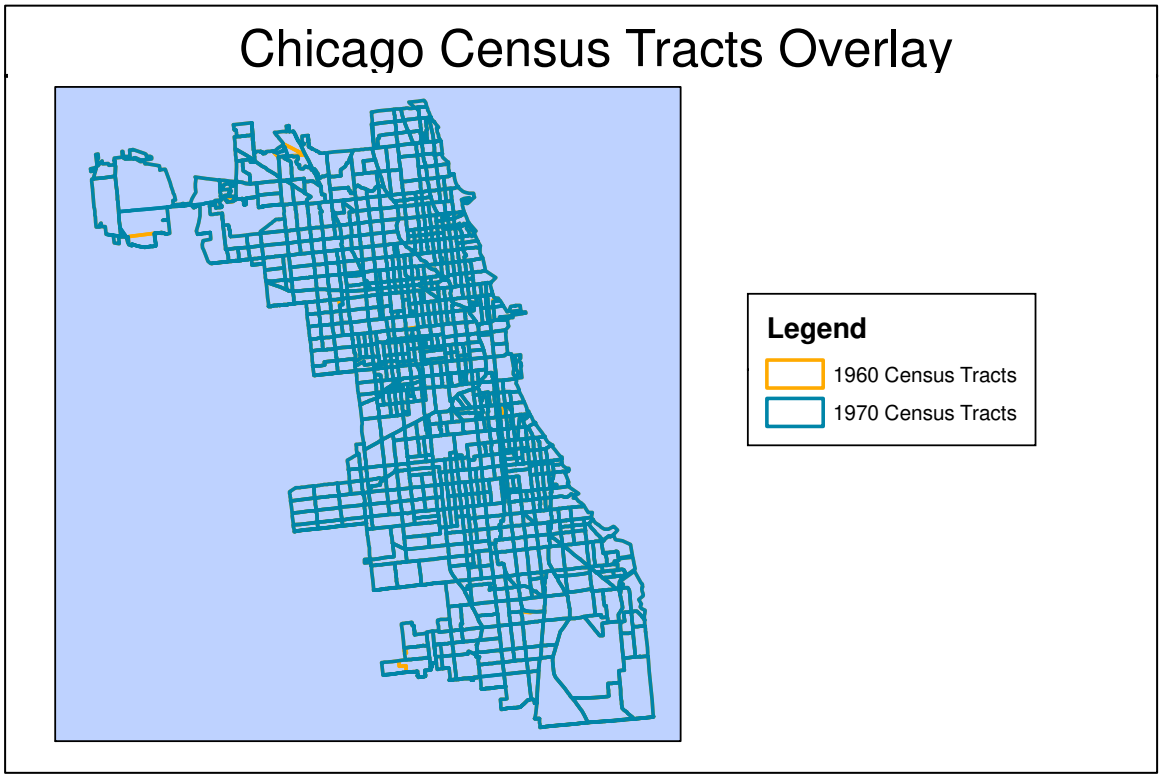

Figure 11. Chicago Census tract overlay of 1970 onto 1960 of split tracts

The matching for the Census tracts was done through ArcGIS mapping. The shape files for the 1960 and 1970 Census tracts were acquired through the National Historic Geographic Information System (Minnesota Population Center, 2004). The shape files then were joined by spatial location the 1960 Census tracts onto the 1970 Census tracts and vice-a-versa. The tracts were joined both ways in order to account for tracts in 1960 Census that were combined to create a 1970 Census tract (See Figure 2) as well as account for tracts from the 1960 Census that were split in the 1970 Census (See Figure 3). After joining the 1960 and 1970 Census tracts spatially their attribute tables

were exported to Excel. In Excel the attribute tables for the 1970 to 1960 Census and the 1960 to 1970 Census were combined. Then "if" statements were used to identify the combined Census tracts that were duplicates, duplicates were then deleted.

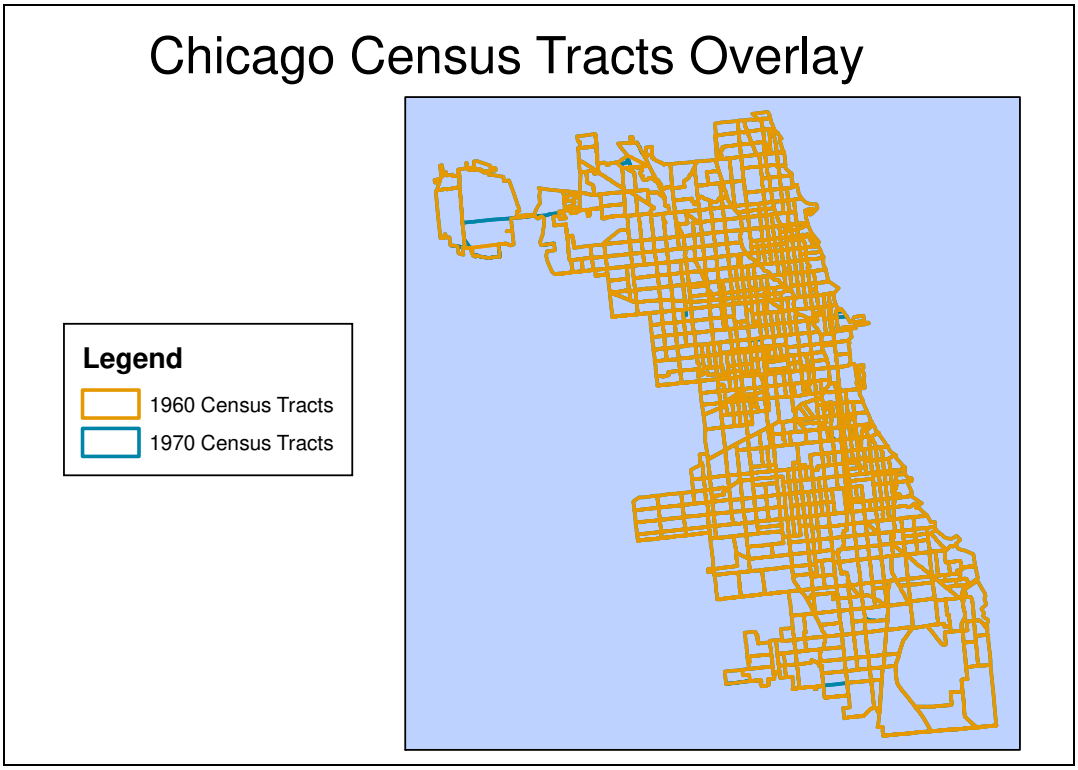

Figure 12. Chicago Census tract overlay of 1960 onto 1970 of combined tracts

In three cases the 1960 Census tracts were split each into two tracts for the 1970 Census (See Table 8). To determine the values of the variables for each of the split 1960 Census tracts ArcGIS was used to identify the total area of the 1960 Census tract and the individual areas of the 1970 Census tracts which made up the 1960 Census tract. The area of the 1970 Census tract were converted into percentages of the total 1960 Census tract area. The percentage of the 1970 Census tracts' area were then multiplied by the value of the variables to determine the values for each of the 1970 Census tracts.

Eight Census tracts from the 1960 Census were combined to create three 1970 Census tracts (See Table 9). Two of the 1970 Census tracts are each a combination of

three 1960 Census tracts and one of the 1970 Census tracts is a combination of two 1960 Census tracts. The values of the variables from each of the 1960 Census tracts were combined to match the 1970 Census tracts.

Table 8. Splitting 1960 Census tracts into 1970 Census tracts

Splitting 1960 Census tracts into 1970 Census tracts

1960 Census tracts	Total Area of the 1960 Census tracts	1970 Census tracts	1970 Census tracts Percentage of the 1960 Census tracts
0132	243830	0813	8%
		0814	92%
0711	2627361	5303	49%
		5304	51%
WOT0201	14101329	7404	90%
		8233	10%

Table 9. Combining 1960 Census tracts into 1970 Census tracts

Combining 1960 Census tracts into 1970 Census tracts

1960 Census tracts	1970 Census tracts
0152 0360 NIT0041	2701
0544 0545 0546	3506
0929B WOT0200	7403

Additionally there were 12 Census tracts between the 1960 and 1970 Census that had boarders, which were slightly changed (See Table 10). In Table 3 the tracts that have differing boarders are identified, and are grouped with those which they share their changed boarders. These slight changes are insignificant in that they may have an added curve or corner to the 1970 Census tract than what it was in the 1960 Census tract, some of which can be seen in Figure 2 and 3.

Table 10. Borders that slightly differ for the 1960 and 1970 Census tracts
Boarders that slightly differ for the 1960 and 1970 Census tracts

1960 Census tracts	1970 Census tracts
682Z	4905
687Z	4908
534Z	3406
0781	6016
0287	2428
0367Z	2806
0360	2701
LDT0090	8117
LDT0090	7606
LDT0092	7607
NPT0085	7603
0139	0801

By matching the 1960 Census tracts to the 1970 Census tracts through ArcGIS mapping program it allows for a more accurate depiction of the tracts to one another. Therefore a more accurate use of the variables for the 1960 Census with those of the 1970 Census as they are used in the rate of change of White, Black, and other races over the 10 year period.

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