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Milan Udawatta April 17, 2013

Crime and Gangs: Achievement Gap in Chicago Public Schools

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An abstract of
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of Emory University in partial fulfillment
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Bachelor of Science with Honors

Department of Political Science

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Abstract

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Twenty-nine students from a neighborhood high school in Chicago were shot last year, eight of them fatally. Tragedy like this has played out in all major U.S. cities for decades. For hundreds of children, crime and gangs are an inescapable element in their life. Disadvantages from living in a violent environment are expected, but ill studied is whether crime rates and the prevalence of gangs are preventing students from succeeding academically. This study investigated whether schools in dangerous areas reported lower student performance statistics for their freshmen class than schools from safer neighborhoods. The ecological-transactional theory indicates that community factors such as violence can inhibit the development of cognitive functions necessary to learn. Accordingly, this study expected that greater crime rates and number of gangs would lower a school's percentage of students on-track to graduate, average GPA, and fraction of individuals with As and Bs. Twenty-two neighborhood Chicago high schools with publicly available academic statistics were selected with corresponding violence information compiled from the Chicago Police Department. Economic, familial, and racial differences were controlled using census tract data. Individual and multiple regression analyses found no statistically significant correlation between a school's performance and the crime per capita or number of gangs in the surrounding area. Given the undisputed body of literature showing a link between perception of violence and grades, this study indicates that actual levels of violence may be irrelevant. Instead, consequential to a student's success may be his or her ability to cope with traumatic proximal events.

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Acknowledgements

I would like to thank my family – ammi, thaththi, Viyan, Thiran, Risun, and our beloved dog Snowie – for their love and support. I owe my deepest gratitude to my adviser, Dr. Thomas Walker, for mentoring and believing in me. Without you, I have no doubt this would have ended unsuccessfully. Thank you for putting in the long hours and teaching me lessons both material and lifelong. I wish to thank Dr. Rob O'Reilly for relentlessly working with me on short notice and limited time to create the dataset necessary to conduct my study. I would also like to thank Dr. Jacobus de Roode and Dr. Randall Strahan for providing exceptional feedback and guidance. Finally, I could not have done this without my oldest brother, Viyan, who instilled the confidence and courage in me to tackle the most difficult endeavors.

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Chapter 1

Introduction

Twenty-nine students from Harper High School in Chicago, IL were shot last year (Carr 2013). Eight of them lost their life. Across the entire city, 500 murders were reported but the level of violence differed substantially by area. Police district 7, where Harper is located, has 22 known gangs operating. Further north in police district 19, however, residents enjoy a substantially lower level of criminal activity with a murder rate in the single digits. The considerable discrepancy in violence in Chicago neighborhoods poses serious questions. The issue is especially salient when considering the effects a violent environment may have on the younger members of our society. Are children disadvantaged when they are surrounded by persistent, egregious crime?

The political relevance is compounded when considering the effect on school performance. The latter has proven to be the tool of choice by the federal and state governments in evaluating and determining policy for teachers, administrators, and curriculum. If a violent environment is disadvantaging students to the extent that they perform less than otherwise in school, then existing practices and laws may need to be changed. The purpose of this study was to investigate whether a violent environment affects academic achievement. A number of scholars have investigated the effects of violence on children. A review of those articles is necessary to explain how certain community factors could affect metrics of academic success.

Violence in America

Beginning in the 1970s criminal activity across the United States rose (Levitt 2004). Murders, kidnappings, and rapes became a vexing problem for law enforcement.

Politicians campaigned on vows to rein in America's growing violence. Elected officials focused on enacting reforms to capture criminals more quickly and imprison them for longer (Haerens 2010). Institutions, such as public housing, seen as contributing to the issue were reexamined. However, one facet of society went overlooked during America's struggle to tame crime. The effects on children, who were growing up in a vastly different world than their parents, were ill studied for decades. During the early 1990s, however, researchers investigated the issue of violence and child development. Several studies published in 1993 served as groundwork for further study. (Bell & Jenkins 1993; Benoit 1993; Fitzpatrick & Boldizar 1993; Freeman, Mokros & Poznanski 1993; Garbarino, Dubrow, Kostelny & Pardo 19992; Groves, Zuckerman & Marans 1993; Lorion & Satlzman 1993; Lynch & Cicchetti 1998; Osofsky, Wewers & Hann 1993; Richters & Martine 1993; Schubiner, Scott & Tzelepis 1993).

The articles were released in a season of record breakers. In 1990, the homicide rate in New York City increased 11% from the previous year; 16% in Los Angeles; 20% in Chicago, Dallas, and New Orleans; 29% in Denver; and a startling 45% in Boston (Richters & Martinez 1993). Firearm-related mortalities eclipsed all natural causes of death for the first time in 1988. Washington, D.C., known as the "murder capital of the world" in the early 1990s, was the subject of research by Dr. Marilyn Benoit. She examined dozens of people undergoing treatment at the Children's National Medical Center and discovered that they were exposed to disturbingly high levels of community violence. A 9 year-old African-American boy she interviewed exhibited symptoms of sadness, "fear that someone could break into the house and hurt him," and "behavior problems in school and oppositional behavior at home" (Benoit 1993, 124). The boy also

"wish[ed] to be dead like his father;" his dad has been shot dead five months prior to his admittance to the hospital. The dozens of other children and teens she encountered confirmed her hypothesis that violence causes serious mental health issues in the youngest members of our society.

A thousand miles away in New Orleans, LA, Osofsky, Wewers and Hann (1993) found the same unsettling results. Elementary aged children exposed to chronic community violence expressed "worries about safety, difficulties sleeping, recurrence of upsetting thoughts and feelings of loneliness and upset" (Osofsky et al 1993, 40). Importantly, children who were exposed to greater levels of violence were found to have more serious mental health issues. The initial research by Osofsky's team, Dr. Benoit, and nearly a dozen other scholars in 1993 established that America's record high crime rate was negatively impacting the youngest members of our society. Further research confirmed that many children from high violent areas were suffering from post-traumatic disorder, a condition once thought to only afflict soldiers returning from war (Dempsey, Overstreet, & Moely 2000; Mazza & Overstreet 2000; McCloskey & Walker 2000; Slovak 2002).

In response to alarming crime rates and the documented negative effects on children, policy makers implemented methods to shield students from violence. Federal, state, and local governments passed numerous laws including ones establishing zero tolerance policies, allowing police to search lockers and student possessions, and adding metal detectors to schools. One such law, The Gun-Free School Zones Act of 1990, illegalized the possession of a firearm in a school zone, defined as the area within 1,000 feet of the property (Yell & Rozalski 2000). The law was later invalidated on

constitutional grounds, but subsequent laws continued the push towards protecting students from violence (Beger 2002). The Gun-Free Schools Act of 1994 required states receiving federal funds to expel students who bring guns to school (Yell & Rozalski 2000). Funding for violence prevention programs was allocated from the Safe and Drug Free Schools and Communities Act of 1994.

Congress additionally passed laws to stem the alarming crime rate including the Violent Crime Control and Law Enforcement Act of 1994 (Beger 2002). The bill allocated $30 billion for more police officers, and community-based crime prevention programs. The law also increased or established mandatory sentences for many violent federal crimes (Beger 2002). A few states enacted more stringent policy changes. California in 1994, recognizing the role clothing played in gang affiliations and conflict, passed Senate Bill 1269 allowing public schools to adopt dress codes (Furlong & Chung 1995). Assembly Bill 777 expanded school officials' ability to expel students by including harassment, threats, or intimidation as valid grounds for dismissal (Furlong & Chung 1995). The sweeping policy changes in the early 1990s were accompanied by a decline in crime rates, a trend that has continued to this day.

Despite the overall reduction in violence, children continue to observe and experience troubling levels of violence (Brener, Simon, Krug & Lowry 1999; Mathews, Dempsey & Overstreet 2009). Maladies such as post-traumatic stress disorder continue to appear in children growing up in violent neighborhoods, regardless of improvements in safety (Thompson & Massat 2005; Ozer & McDonal 2006). Therefore, further investigation into violence and its effects on adolescents is warranted.

Academic Achievement

Public education remains a critical and criticized core function of local government. Tools for measuring efficacy of teachers and curricula include student grades and test scores. The relevancy of them increased with the No Child Left Behind Act of 2001, which required the annual testing of students and outlined suspension of funds for schools with a substantial number of underperforming individuals. Recently, the federal government has encouraged states to enact performance-based standards for teacher and principal evaluations. In such cases, student achievement determines educators' promotions, salaries, and retention. Pegging a teacher's future to her students' success has met opposition from many unions and their supporters in public office. Criticism includes persistent discrepancies in student backgrounds. For example, administrators from stubbornly low achieving schools fault the environment. Family dysfunction bleeding into student focus and interest in studies at home and in the classroom have been blamed for disappointing grades.

More importantly, many believe high levels of community violence are responsible for poor academic performance in many struggling schools. Given the importance of the aforementioned metrics, an investigation into the effects of violence on academic achievement is especially important. A correlation between the two may require reviewing current policies. For the past few years, researchers have examined the impact of violence on grades and test scores. In order to put the current study in context, a review of all the significant publications on this topic is necessary. An analysis of the current research, which has been primarily done by psychiatric, medical and educational

scholars, reveals important political questions that have yet to be sufficiently investigated.

Bowen & Bowen (1999) are credited with the first study documenting the effect of violence on academic achievement. The researchers selected 93 public middle and high schools throughout the nation and sampled a representative number of students from each institution. Students were selected to achieve an adequate representation of the genders, races, geographic locations, and regions. Researchers relied exclusively on data from the School Success Profile (SSP), a survey administered to over 1,000 schools. The questionnaire asked respondents to assess their perception of the neighborhood environment by indicating whether in the past 30 days "someone they lived with was robbed or mugged, (b) someone broke into their home or the home of a neighbor, (c) someone tried to sell the student illegal drugs, (d) someone tried to get the student to break the law, (e) someone threatened the student with a weapon, and (f) someone offered the student an alcoholic beverage" (Bowen & Bowen 1999, 326).

No actual statistics on crime were compiled nor were the students' responses corroborated by other means. Similarly no official data on student performance was used. Instead, academic achievement was measured from student self-reporting of "the kinds of grades, the numbers of Ds and Fs they received on their last report card, and their grades relative to other students" (Bowen & Bowen 1999, 328). The researchers did not explain how students were supposed to answer the last question accurately. The entirely student self-reporting study found an inverse correlation between student perception of neighborhood danger and their perceived academic success. The research provided the

first evidence that as community violence increased, student performance decreased. However, the study did not rely on verifiable statistics.

Hurt, Malmud, Brodsky and Biannetta (2001) similarly measured levels of community violence through survey rather than records. Their study examined a much younger and smaller population: 7-year-old inner-city elementary school students from Philadelphia, PA. Using the *Things I Have Seen and Heard* cartoon survey, the researchers asked the children how often they have been exposed to violence in the community. Unlike the previous study, Hurt's team compiled the grade point averages of each student from the school's official record, using a verifiable metric of academic achievement. The study found a correlation between increased perceived exposure to violence and decreased grade point averages. The results were substantiated by a similar investigation of elementary students from a single school in Los Angeles County. Schwartz and Gorman (2003) justified their study by stating, "the availability of research examining associations between community violence exposure and direct assessments of academic functioning remains quite limited" (163). The researchers also obtained grade point average statistics from school officials and relied on a cartoon survey to gauge the level of community violence. As with Hurt's team, Schwartz and Gorman found a correlation between high levels of violence and poor academic achievement.

Unfortunately, the two studies were limited to elementary aged children. People's psychology changes substantially with age, especially during youth. Astor, Meyer, and Pitne (2001)'s study of elementary and middle school students' perception and corresponding responses to violence found notable differences between the two age groups. Middle school students were more severely impacted by community violence

and were more likely to identify "hallways, bathrooms, cafeterias and locker rooms as unsafe" (Astor et al 2001, 30). Therefore, studies on elementary school students would not necessarily reflect the situation with older children. Thompson and Massat (2005) first studied the relationship between violence and achievement in middle school students using academic records rather than a survey. The research examined sixth graders from four Chicago Public Schools and did *not* find a statistically significant correlation between perception of community violence and scores on the Iowa Test of Basic Skills.

Mathews, Dempsey and Overstreet (2009), however, did find a statistically significant inverse correlation between the two in their study of middle school students. In a similar investigation of 47 sixth graders, the researchers gathered results from the Iowa Test of Basic Skills and surveyed the level of community violence using *Things I Have Seen and Heard* questionnaire. Mathews et al (2009) found that test scores dropped as violence increased. However, as with all the previous studies, the researchers determined the level of community violence solely from survey results and did not verify them with government statistics. Nonetheless with these results, conclusive evidence existed that students' perception of violence negatively affected their academics in elementary and middle school.

Unfortunately, not a single study has linked violence to an actual drop in academic scores for high school students. Bowen and Bowen (1999) used survey results and not actual school records. The only publication on high school students subsequent to Bowen similarly did not use test scores or grade point averages but instead a survey (Patton, Woolley & Hong 2012). While such research is certainly informative and respected, relying on official statistics serves two important goals. First, it eliminates the

error and uncertainty in assuming students accurately answer a questionnaire. With respect to academic performance, some people may intentionally inflate their scores out of hubris. More likely, students may misreport due to poor memory or an over/underestimation of their performance. GPA and test reports are the best method of measuring academic achievement. For the psychologist studying violence and child behavior, gathering such incontrovertible data may be unnecessary. However, for the political scientist investigating whether current metrics of school evaluation are skewed by environmental factors, using those metrics is imperative.

Likewise, asking people about their perception of community violence does not indicate the actual level of violence in the community. Bowen and Van Dorn (2002) found that girls' perception of violence was not correlated with the community crime rate. Noting that exposure to other forms of violence such as familial can enhance or numb a child's emotional response to experiencing or witnessing crime, the researchers concluded that student-reported data may not accurately reflect the severity of community violence. Milam, Furr-Holden and Leaf (2010) recognized the issues with relying on subjective responses and conducted the first study using objective data on neighborhood violence. The researchers compiled observable data such as "blood in the street, presence of shell casings, police tape, memorials, people yelling, people swearing, and people fighting," to measure violence by area (Milam, Furr-Holden & Leaf 2010). Their research on elementary aged children confirmed that heightened perceptions of community violence were affecting academic performance.

While an important step forward, Milam et al (2010)'s metric for determining violence rates is not as effective as using police crime statistics. Data on the number of

especially egregious offenses would express the severity of the community violence. Furthermore, crime data's benefits extend to a study's political utility as well. The present studies sans Milam by themselves do not obviate reforms to reduce the crime rate because evidence of student fear could be remedied by a variety of means. In fact, many have focused on creating safer school zone and establishing counseling centers in the aftermath of this research rather than reforming government policy. However, if evidence suggests that a decrease in the community crime rate improves student achievement, the case for curbing violence would be stronger. Additionally, the current research does not indicate whether gangs, a pervasive public policy problem, influence student success. Certainly, gang activity contributes to students' thoughts of safety, but no evidence exists to suggest a causal link between gang prevalence in the community and academic achievement in the school. The lack of evidence on the two is disappointing since crime rate and gang activity remain two important metrics by which citizens evaluate their government, its policies, and the police.

Research into the direct effect of crime rates and gang prevalence on academic achievement, therefore, was necessary. It would be only the second investigation to move away from determining community violence by survey. Furthermore, the substantial majority of studies into violence and academic achievement has centered on elementary and middle school children. Given the known cognitive and behavioral differences between age groups, further research into high school students was necessary. Therefore, the purpose of the present study was to examine the effect crime rates and gang pervasiveness has on the academic achievement of high school students.

Chapter 2

Theory

Numerous theories have been proposed to explain causation between community violence and academic achievement. Three widely cited ideas are social learning, Bioecological Theory of Human Development (BTHD), and ecological-transaction. Albert Bandura developed the first principle decades ago in an attempt to explain human behavior (Bandura 1977). When he published his novel *Social Learning Theory*, few believed external factors substantially influenced conduct and development. Many thought internal causes such as impulse and passion solely governed them. Bandura rejected such ideas as circular since the inner forces at play were determined by "the behavior they supposedly caused" (Bandura 1977, 15). Instead, he argued people are influenced by their surroundings and cited a number of reasons why. Most relevant here is his argument on observational learning. Citing the attention, retention, motoric reproduction, and motivational processes at play in the brain, Bandura argued people are altered when they see sensational events. The social learning theory has been adopted by some educational scholars to claim children develop depressive and aggressive behavior in response to viewing egregious violence in their communities (Eron 1997; Huesmann 1988; Slovak 2002). Sustained exposure to criminal disorder causes children to believe disobedience and pride are normal and acceptable. According to a few educational scholars, such behavior translates into a mindset incapable of succeeding in a school environment (Eron 1997; Huesmann 1988; Slovak 2002).

While Bandura's research has been widely acclaimed as pioneering in the field of environmental influences on learning, many scholars rely on the subsequent two theories.

Urie Bronfenbrenner authored the Bioecological Theory of Human Development (BTHD) or the idea that we are guided by three ecosystems: macrosystem, exoystem, and microsystem. The first is defined as society's cultural values and beliefs; the second is the community setting a person lives in; and the third is the environment closest to the person such as family (Bronfenbrenner 1979). According to Bronfenbrenner, the three influence us and shape who we become, but to differing degrees. The exosystem, which community violence would belong to, does not affect us directly but can amplify the despair or happiness in our microsystem. Researchers have relied on this theoretical framework to argue community violence reduces student performance in school (Mayer 1997; Schubiner, Scott & Tzelepis 1993; O'Keefe 1997). Issues in their microsystem, such as family problems or difficulty making friends, more negatively affect children who live in a dangerous neighborhood. These immediate concerns detract from an individual's ability to focus and perform well in school. Therefore, violence does not directly cause lower grades, but under the right situations can push an at-risk student over the line.

A relatively recent theory builds upon Dr. Bronfenbrenner's work, but deviates from BTHD in key aspects. The ecological-transactional philosophy agrees that a macrosystem, exosystem, and microsystem change children (Cicchetii & Lynch 1993). However, Cicchetii and Lynch believe an ecosystem exists within a person, which they call ontogenic, that represents the influential factors within someone. For example, ontogenic includes a person's view of the world, desires, motivations, and fears. Additionally, Cicchetii and Lynch disagree that the exosystem can only indirectly affect a person. Instead, they believe the community can directly influence someone, or in other

words the exoystem can alter the ontogenic ecosystem. The theory's applicability to violence and academics is unquestioned. Cicchetti and Lynch developed it specifically to explain how the former affects the latter. If a student's exosystem is compromised by violence, his or her ontogenic system will be disturbed as well (Cicchetti & Lynch 1993). More specifically, living in a dangerous neighborhood would distort a person's view of the world, promote antisocial behavior, and intensify . These behavioral modifications would likely depress academic competence. Cicchetti and Lynch found support for their theory, as did a few other scholars (Lynch & Cicchetti 1998; Garbarino, Dubrow, Kostelny & Pardo 1992).

The present study adopted the ecological-transactional theory to explain causation because it more clearly and convincingly reasons how violence would affect academics. However, since a substantial amount of evidence has been published since its initial inception, the theory must be updated. Incorporating recent information, community violence decreases academic performance because it severely traumatizes adolescents. A person's neighborhood is a type of ecosystem that can define his or her view of the world and relationships with others. When exposed to persistent violence, children can develop post-traumatic stress disorder, radically altering their perception of their surroundings and ability to function appropriately (Kliewer, Lepore & Oskin 1998; Mathew, Dempsey & Overstreet 2009; McCloskey & Walker 2000). These behavioral modifications negatively impact an individual's ability to focus, work hard, and be motivated. As a result, academic performance suffers.

Hypotheses

The modified ecological-transactional theory can be tested by examining measures of violence and academic achievement. This study calculated violence by the frequency of egregious crimes committed and number of gangs in a police district (see chapter 3). Academic achievement by school was measured through three variables: 1) number of students on-track to graduate, 2) average GPA, and 3) number of students with AB grades. This study tested the theory by examining whether the following were true:

Hypothesis 1: If crime per capita is higher, then a school's fraction of students on-track to graduate will be lower.

Hypothesis 2: If crime per capita is higher, then a school's average student GPA will be lower.

Hypothesis 3: If crime per capita is higher, then a school's fraction of AB students will be lower.

Hypothesis 4: If number of gangs is higher, then a school's fraction of students on-track to graduate will be lower.

Hypothesis 5: If number of gangs is higher, then a school's average student GPA will be lower.

Hypothesis 6: If number of gangs is higher, then a school's fraction of AB students will be lower.

Chapter 3

Source of data

High schools from the Chicago Public School (CPS) system were chosen for the study. Chicago has historically been a pioneer in education reform (Bryk, 1998; Hess 1991; Weele 1994). The city was one of the first to establish teachers' councils to promote discussion of strategic goals, and school sponsored community programs. More recently, the CPS has modified high school enrollment, breaking a decades-long trend in one-size-fits-all curriculum and matriculation by geography (Goldberger 2012). Instead of simply attending the closest school, CPS has allowed and encourages students to apply to specialized charter schools across the city to find a learning environment that better suits each child's needs. Chicago's unique governance of its public education allows it to implement changes quickly and fully. Unlike most other places in the country, an elected local board does not operate the schools. Former Mayor Richard M. Daley in 1995 convinced the state legislature to grant him exclusive authority over CPS (Pearson & Kass 1995). The mayor appoints the board members and selects a chief executive officer to oversee it. The governance structure allows the mayor to implement policy changes across the city quickly. The explosion in charter schools in Chicago, where only one existed in 1997 to nearly one hundred operating today, is a product of this unique arrangement (Goldberger 2012).

Chicago's openness to reform made research on it especially exciting. More importantly, its transparent school operations lent itself to meaningful and thorough experimentation. The city through the University of Chicago Consortium on Research provides data on academic performance at every school including grades and percentage

of students on-track to graduate. In addition, the city publishes the attendance boundaries of its neighborhood schools, revealing the community to which students belong. As mentioned, specialized charter schools are open to all residents and consequently do not have boundaries nor does the student body belong to a specific neighborhood. Furthermore, whether students from a school belong to a safe or dangerous community can be numerically ascertained by crime reports. The Chicago Police Department (CPD) publishes weekly reports on the number and nature of crimes by police district. In addition, statistics on currently operating gangs and their territories are publicly available. Chicago's issues with crime and gangs are not a secret. While the city has followed the nationwide trend of murder numbers declining since a peak in the early 1990s, Chicago's murder rate is still significantly higher than New York or Los Angeles. Gang violence continues to be a significant contributor to homicides and injuries. Most importantly, the city's predicament is not equally experienced among residents. Crime rates and gang prevalence differ substantially by area, with the more affluent neighborhoods largely immune from the violence.

Chicago was ultimately selected due to the two aforementioned reasons. The University of Chicago Consortium on Research's profile of school academic data is unmatched by the publicly available record from other cities. Furthermore, the city suffers from high levels of crime and gang activity, but more importantly the levels of violence differ throughout the city. Therefore, a study measuring the effect of different rates of crime and gang prevalence on academic achievement was possible. Additionally, the city's history with enthusiastically adopting empirically supported reforms indicates it would seriously consider the mounting evidence that violence is linked to poor student

performance. If a study in its own backyard confirmed the existing literature, it may push it towards enacting necessary policy changes.

Unit of Analysis

Neighborhood schools with restricted attendance zones served as the unit of analysis. Consistent with the study's need to analyze environmental contributors to academic success, a defined area was necessary to determine the environment in which the student body lives. While ideally violence data would reflect the same geographic boundary, crime rates and gang numbers are not reported by attendance zone, but by police district. Chicago has 25 police districts and 47 neighborhood high schools, complicating efforts to synthesize the two sets of data. Normally, schools for the analysis would be selected first with violence data reflecting the institute compiled subsequently. However, since there are more schools that police districts, the study could not first select schools and then assign a data set best reflected it. Instead, a school representative of each police district was selected. In other words, the study found a school that best "fit" the violence data.

Only one school was included from each police district. The study exercised such a limitation to ensure each school had a unique set of community violence data. In other words, if two schools were included from the same police district, the study would have two data entries with unique academic performance numbers but identical violence figures. While according to our theory, the environmental factors should cause similar academic performance across all schools within a single area, existing literature suggests otherwise. Even despite the best efforts to create the same learning experience in all schools, every institution has idiosyncratic differences that translate into different results.

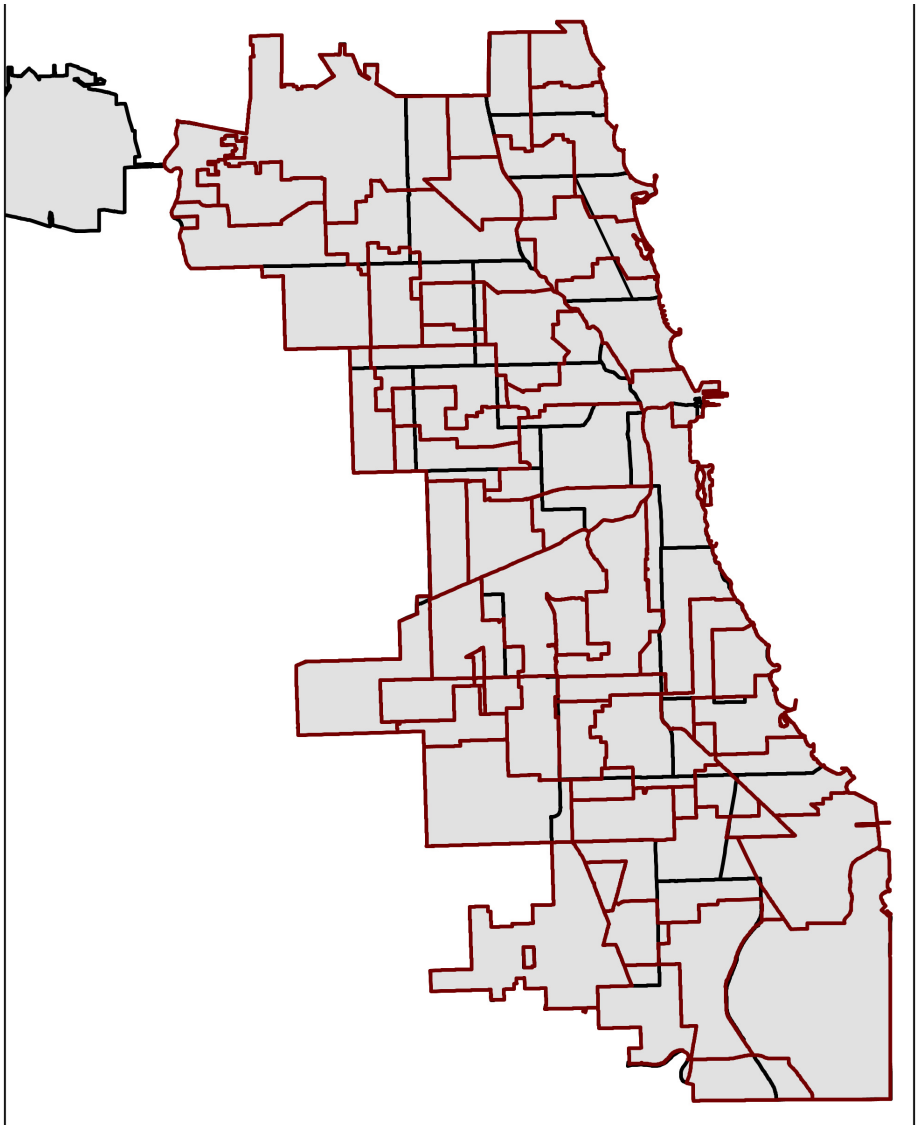
Whether those discrepancies would be significant enough to skew results was not investigated, but in order to eliminate experimental error, the study only allowed one school per police district.

The following rules were followed when determining which school to select for each police district:

1. If a school's attendance zone is completely within the district, choose the school
2. If **two or more** schools meet the requirement in (1), choose the school with a larger student population
3. If **no** schools meet the requirement in (1), choose the school whose attendance zone has the greatest proportion within the district

Police district boundaries from 2002 were used for the study. Chicago changed area lines in 2002 to better reflect law enforcement needs. The city followed the 2002 map until 2012, when they were revised in the aftermath of station closings. In pursuance of uniformity, map of 2002 school attendance zones was used. Minor changes have been made to the boundaries since then; however, no substantial redrawing has occurred. ArcGIS, a mapping and spatial analysis tool often employed to compile and analyze geographic data, was used to juxtapose the attendance zones of the forty-seven neighborhood high schools with a map of the Chicago police districts (Figure 1). Shape files necessary to operate the program were downloaded from the City of Chicago's data repository at data.cityofchicago.org. With the resulting ArcGIS figure, schools for the study were selected in accordance with the aforementioned rules. For 21 of the police districts, identifying a representative school was straightforward. However, four of the law enforcement areas posed unique dilemmas that warranted exceptions to the rules.

Figure 1. Map of school attendance zones and Chicago police districts.



Red lines represent the 2002 zones for all neighborhood high schools and black lines indicate the 2002 police district boundaries.

First, the attendance zone for Lake View High School split almost evenly between police districts 19 and 23. The attendance zone, furthermore, encompassed most of the land in each police district. In other words, students attending Lake View all came from

either district 19 or 23. And for nearly all the adolescents in 19 and 23, Lake View was their neighborhood high school. In the interest of having school and crime data correspond as closely as possible, the two police districts were merged and the violence statistics were aggregated. Ironically, in 2012 the police department decided to merge the two as well, labeling the new district simply 19. This study adopted the same nomenclature. Second, districts 1 and 2 only had one school within their borders, Phillips Academy. Neither law enforcement area accurately depicted the community students from Phillips belong to, since the attendance zone spanned four districts. Furthermore, merging the two districts was not possible since they were not contiguous. Simply aggregating the data was additionally ruled out because the data still would not accurately reflect the environment in which Phillips students live. Therefore, districts 1 and 2 were excluded from the study. The schools ultimately selected for the study and their respective police districts are listed in Table 1 and illustrated in Figure 2.

Dependent variables

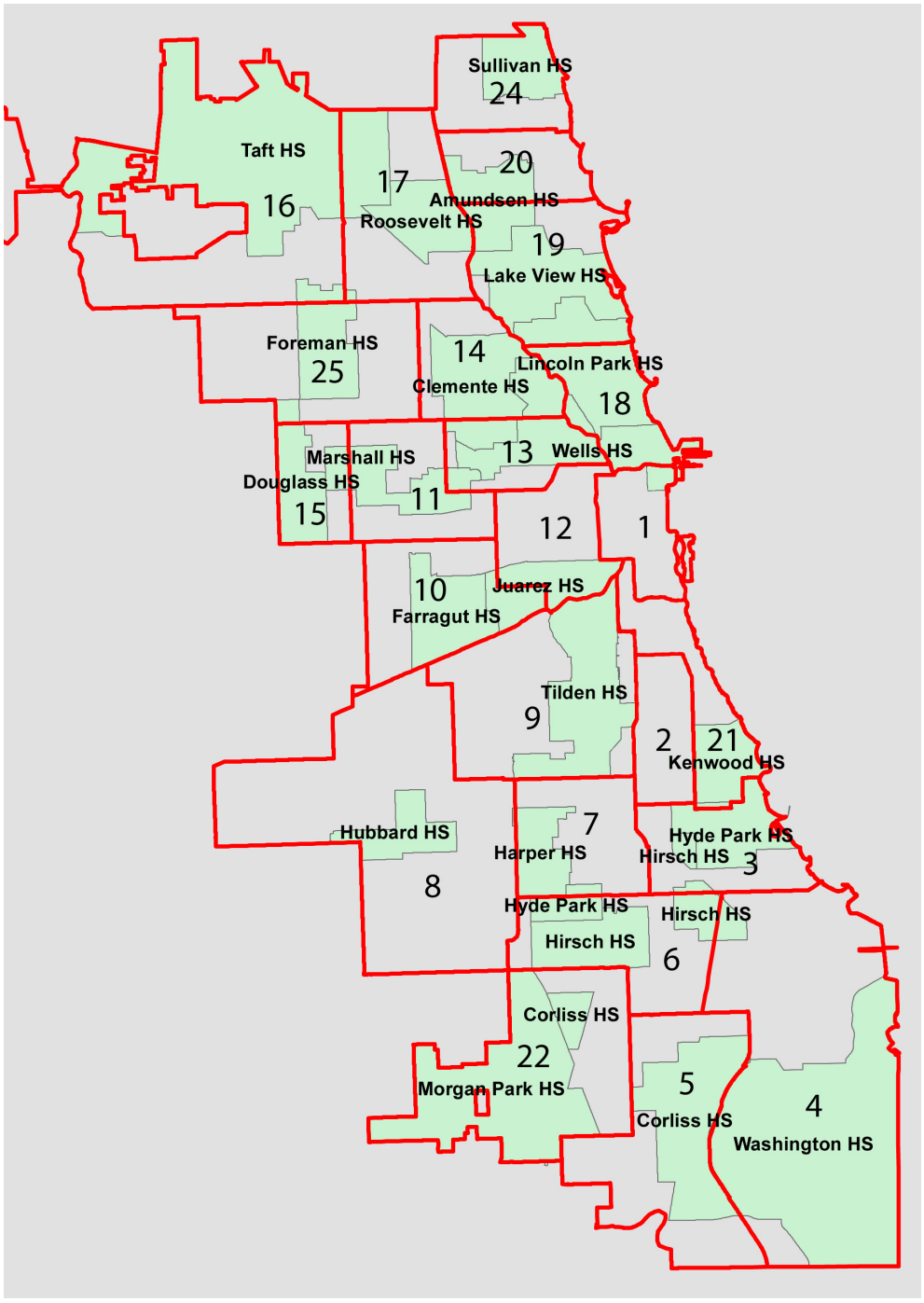
Academic achievement data was compiled from *Getting on Track* reports, publicly accessible from the University of Chicago Consortium on Research. The publications reveal key performance metrics for every Chicago public school during each academic year. For secondary institutions, information is limited to the freshmen class. Therefore, this study only examined the academic achievement of ninth graders. The reports publish data on the number of freshmen "on-track" to graduate, percentage of individuals who received Fs in their classes, student grade point averages, and attendance. CPS classifies a ninth grader as on-track to graduate if during the academic year they "received no more than one semester F in a core subject (English, math, social

science, or science during the school year and had enough credits (5) to advance to the next grade on time" (Allensworth & Easton 2007 4). Performance during summer school is not counted towards on-track status. Students who do not meet this threshold are marked "off-track."

Table 1. Selected schools, their encompassing police district, and rule that governed their inclusion.

High School	**Police District**	**Rule**
Hyde Park	3	3
Washington	4	2
Corliss	5	3
Hirsch	6	3
Harper	7	1
Hubbard	8	2
Tilden	9	2
Farragut	10	2
Marshall	11	3
Juarez	12	3
Wells	13	3
Clemente	14	3
Douglass	15	3
Taft	16	3
Roosevelt	17	1
Lincoln Park	18	3
Lake View	19	1
Amundsen	20	3
Kenwood	21	1
Morgan Park	22	1
Sullivan	24	1
Foreman	25	3

Figure 2. Map of police districts and selected school attendance zones.



Red lines denote police district boundaries while green shaded areas indicate school attendance zones. Schools appearing more than once have a noncontiguous zone.

This study included the percentage of students "on-track" to graduate as a measure of academic achievement because it was the strongest indicator of success in high school. In addition, average student GPA per institution served as this study's second dependent variable because it has historically been used to evaluate academic performance. In fact, most of the research on violence and learning has measured the latter by student grades (see Chapter 1). *Getting on Track* reports student GPAs, but does so by rounding it to the nearest whole number and listing the number of individuals with A (4.0), B (3.0), C (2.0), D (1.0), and F (0.0) GPAs. While not ideal, the data still describe the actual performance of students in each school by year. Therefore, this study used the statistics to calculate the average student GPA per school, but also to measure a third variable: fraction of well performing students. The latter was simply the percentage of students per school who had an A or B GPA, and accordingly was labeled AB students. A list of all the dependent variables and descriptive statistics of the data can be found in Table 2.

Table 2. Mean, range, and standard deviation of the three dependent variables

Dependent Variable	**Mean**	**Range**	**Standard Deviation**
Fraction of on-track students	0.554	0.383 – 0.789	0.106
Grade point average	1.87	1.44 – 2.51	0.272
Fraction of AB students	0.302	0.168 – 0.553	0.0999

Independent variables

As postulated in Chapters 1 and 2, this study sought to measure community violence by the more politically relevant statistics on crime per capita and gang prevalence. The Chicago Police Department publishes the former through a variety of

mediums but most importantly in its *Annual Report: A Year in Review*. The *Annual Report* provides a breadth of information, including advancements in its policing strategies, budget and other administrative facts, and officers who have received honors. Most importantly, it reports the numbers of violent crimes by police district, specifically the following: murder, criminal sexual assault, robbery, aggravated assault and battery, burglary, theft, motor vehicle theft, and arson. This study accepted CPD's assessment of these illegal actions as violent and tabulated the totals by district. Crime per capita was calculated by dividing total crime by the population, with the latter also published in the *Annual Report*. Since district 23 was merged with 19 its data were simply added to 19's.

The *Annual Report* does not publish information on gangs, however, and nor does the city. Data for the second independent variable, instead, were compiled from *The Gang Book*, a recently published book by the Chicago Crime Commission. The commission is a non-profit organization funded by business leaders and private citizens and founded to educate the public on the city's organized crime. *The Gang Book* reports the history, colors, leadership, locations, and territorial boundaries of Chicago's gangs. It relied on testimony, sometimes anonymous, from dozens of law enforcement agents, city officials, and former gang members. This study used the book's maps on gang territories to tabulate the number of syndicates per police district. The veracity of the information was confirmed when the Chicago Police Department released internal maps of gang territories in response to an order by the attorney general in 2012 (Ramos 2012). Gang prevalence by area could have been determined by one of two methods: number or geography. This study chose the former for two reasons. First, existing literature suggests that when there are more gangs operating, the likelihood of a war breaking out between

them increases (Decker 1996; Howell & Decker 1999; Rosenfeld, Bray & Egley 1999). Gang number and violence have found to be correlated.

Second, sufficient data did not exist to calculate the portion of a police district inhabited by gangs. *The Gang Book* provides maps of gang territories, but it is meant to generally illustrate a syndicate's area of operation. The lines are by no means boundaries. While the maps were sufficient to determine the number of gangs operating in an area, to use them to calculate a precise percentage of inhabitance in a police district would have been improper. Therefore, gang prevalence was measured by number of gangs operating in a police territory. A list of all the independent variables and descriptive statistics of the data can be found in Table 3.

Table 3. Mean, range, and standard deviation of the two independent variables

Independent Variable	**Mean**	**Range**	**Standard Deviation**
Crime per capita	0.0799	0.0354 – 0.126	0.0276
Number of gangs	7.59	2 – 18	3.63

Control

Existing studies on environmental conditions that affect academic performance indicated that economic, racial, and familial factors should be controlled. Students from low-income areas typically perform worse in school than their peers in more affluent areas (Elias & Haynes 2008; Hill 2001, Mayer 1997). The proposed reasons for the discrepancy are many, but a list of them is unnecessary. Evidence that economic wellbeing affects grades was sufficient to include it as a control variable. This study included two methods of measuring wealth: mean income and poverty. The former is simply the average household income in a police district, while the latter is the

percentage of families with an income below the poverty line. In order to calculate the two variables, this study relied on U.S. Census information. Unfortunately, the census does not tabulate their data by police district, but by tracts, a smaller, geographic area. Therefore, in order to calculate the mean income and poverty variables, census tract data had to be aggregated to the police district level.

ArcGIS was used to overlap maps of Chicago census tracts and police districts. Unsurprisingly, the geographic boundaries did not line up, resulting in census tracts with portions in two or more districts. Fortunately, the number of split tracts was few. A substantial majority of tracts were completely within a police district's boundaries owing to their much smaller size. However, in order to determine which district a split tract should be assigned to or whether to include it at all, this study adopted an 80% rule. Census tracts with 80% of their area in a police district were considered part of that district. ArcGIS was programmed to determine which tracts met this threshold. Once a list of the tracts belonging to each district was figured, mean income and poverty variables were compiled. Adding the number of families below the poverty line in all the tracts and dividing it by the total number of families calculated poverty. Mean income was tabulated using weighted averaging. Not every census tract has an equal number of people, so simply adding up the mean incomes and dividing it by the number of tracts was not possible. Instead, the incomes were weighted by a tract's population and averaged accordingly.

Race was also controlled in this study due to literature indicating a strong relationship between race and academic achievement (Herrnstein & Murray 1994; Neisser 1986; Ogbu 1992; Rumberger & Willms 1992; Caldas & Bankston 1997). The

Chicago Police Department's *Annual Report* includes racial composition by district. Percentage of white residents determined the race variable. Finally, this study controlled for family structure. The verdict on familial effects on academic achievement is mixed. A few studies indicate strong parentage improves children's grades, while others have concluded the effect to be negative (Bodovski & Youn 2010; Coley & Hoffman 1996; Greenman, Bodovski & Reed 2011; Gorman-Smith & Tolan 1998; Kliewer, Lepore, Oskin & Johnson 1998; Miller, Wasserman, Neugebauer, Gorman-Smith & Kamboukos 1999; Overstreet & Braun 1999; Proctor 2006). For example, Coley and Hoffman (1996) found that children with parental supervision did better in school only in safe neighborhoods, while in violent areas unsupervised children performed better. On the other hand, Gorman-Smith and Tolan (1998) found children from single-parent homes to suffer more academically when exposed to violence than their peers with mothers and fathers. Regardless of the conflicting evidence, the existing literature indicates there is likely a correlation between violence and family structure. In order to eliminate the possibility that such a relationship is at play, this study controlled for family structure by including a variable on the percentage of families in a district with two parents. The factor was calculated using the same method and data source for compiling the mean income and poverty variables.

Experimental Design

Consistent with this study's goal of determining whether environment affects academics, a cross-sectional analysis was conducted. A review of the data revealed sufficient variation in academics and violence to measure whether areas with more crime and gangs were correlated with lower grades. However, instead of simply analyzing data

from a single year, the study used figures from 5 years. Relying on only one year would have reduced the research's veracity and exposed it to error. For example, if a district experienced lower crime one year due to a temporary truce between warring gangs, the data would not accurately reflect violence in the environment. Likewise, school figures would be distorted if a momentary shortage in teaching staff eliminated tutoring for a month. By observing five years, any unusual, temporary trends would be significantly minimized. Half a decade, in other words, would better reflect the violence in an area and the performance in a school.

This study's family structure, income, and poverty variables were calculated from the census, which reflected the area's demography in 2000. In order to preserve the controls' validity, the study had to use figures as close to this date as possible. Ideally, the school and crime numbers would have been from 2000-2005. However, the city altered the police district lines in 2002. Therefore, this study used figures from the years 2002-2007. For the dependent variables, freshmen year statistics from the five academic years was totaled. A school's percentage of on-track individuals, average GPA, and percentage of AB students was calculated using the half-decade sums. In other words, the dependent variables reflected the academic performance of five freshmen classes. Crime per capita, furthermore, expressed the five-year mean delinquency rate. Finally, the publicly available information on gang numbers per district did not span the years 2002-2007. Maps only existed for 2004 and 4006; therefore the number per district was averaged between these two datasets. Helpfully, the numbers were not different between the two maps, suggesting our gang data were nonetheless accurate.

This study performed three regression analyses, one for each dependent variable. Researchers typically used regression to determine whether variables are significantly correlated. Bowen and Bowen (1999), Hurt, Malmud, and Brodsky (2001), Thompson and Massat (2005), Patton, Woolley and Hong (2010), etc. all used regression to determine whether violence and academics are correlated. Using it here, therefore, seemed appropriate.

Chapter 4

Initial individual regression analyses were performed to ascertain whether a statistically significant relationship existed between all the dependent variables and the factors thought to influence them. Tables 2, 3, and 4 present the results of these analyses for each dependent variable. Since existing literature suggests income, poverty level, race, and family structure influence academic performance, a statistically significant correlation was expected between them and this study's three measures of school achievement (see Chapter 3). Furthermore, low income and high poverty have been found to decrease academic performance. Accordingly, mean income was expected to have a positive relationship and poverty a negative one. In other words, as average household wealth increased a school's fraction of on-track students, average GPA, and fraction of AB students were expected to increase. On the other hand, as the proportion of households in poverty increased the three dependent variables were expected to decrease.

Tables 4, 5, and 6 show the two predictions to be true. As income increased, the three academic achievement metrics also increased by virtually the same magnitudes. The p-values for all three regressions are 0.000, indicating that we can be 99.999% confident this relationship is correct. While the coefficients are very small, this does not mean the correlation is irrelevant. Instead, the unit is small because of exponential discrepancy between the variables. On-track and AB students are fractions with numbers all below 1.0. GPA is a similarly tiny figure capped at 4.0. Mean income, however, is in the thousands, translating into a 10 to 100,000-fold difference between the two numbers. Therefore, any unit correlating the two would be small. Furthermore, the correlation between poverty levels and academics was found to be significant, as was expected. As

proportion of households in a community increased, school performance decreased. P-values were all well below 0.05, indicating we can be confident in this relationship.

Existing literature, in addition, suggests predominantly white areas enjoy higher student achievement (see Chapter 3). Therefore, we expected the three dependent variables to increase as the ratio of whites to total population increased. The regression analyses found this to be true with 99.999% confidence. Finally, while scholars disagree on whether family structure has a positive or negative effect on academics, they universally agree it influences school success. This study confirmed existing evidence by finding a statistically significant relationship, with 99.994 and 99.999% confidence. In addition, the regression found a positive correlation. In other words, academic achievement was better when the proportion of families with two-parents was higher. The results of the individual statistical analyses affirmed the validity of this study's experimental design by equating with prevailing evidence.

Unfortunately, the relationship between this study's independent and dependent variables was not found to be statistically significant. Individual regressions between every dependent and independent variable found no correlation to meet the 95% threshold of confidence. Four of the relationships had a p-value of less than 0.10 which is encouraging. However, the link between on-track and crime per capita was only 75% confident to exist. Figures 3 through 8 present the regression results as graphs. The diagrams illustrate a general drop in academics as crime and gang numbers increase, with a more pronounced effect in the latter. The larger effect that gangs have on achievement is fairly surprising considering the regression calculated a smaller coefficient, and for two of the variables expressed a lower degree of confidence. The graph may appear to be

clearer due to the greater variation in gang numbers. Furthermore, the figures demonstrate the uniformity between this study's metrics of academic achievement. The graphs of on-track, GPA, and AB students are nearly indistinguishable because the variables are highly correlated, as they should be when explaining the same concept.

Most importantly, the graphs explain the regression analyses' inability to find a correlation with confidence. The data points are scattered too sparsely to say with certainty that a trend exists. Nonetheless, the individual regressions are by no means conclusive; in order to determine whether an actual connection exists a multi-analysis with all control variables must be done. However, individual tests are performed as a precursor to see whether we should expect to see a correlation. These results strongly suggest no relationship exists.

Table 4. Results of individual regression analyses of fraction of students on-track to graduate with independent and control variables

Variable	**Coefficient**	**P Value**
Crime per capita	-0.996	0.243
Number of gangs	-0.011	0.083
Mean household income	4.53E-06	0.000
Ratio of households in poverty	-0.721	0.004
Ratio of whites in population	0.291	0.000
Ratio of families with two-parents	0.409	0.005

Table 5. Results of individual regression analyses of average GPA with independent and control variables

Variable	**Coefficient**	**P Value**
Crime per capita	-3.82	0.074
Number of gangs	-0.027	0.097
Mean household income	0.0000127	0.000
Ratio of households in poverty	-1.97	0.002
Ratio of whites in population	0.830	0.000
Ratio of families with two-parents	1.26	0.000

Table 6. Results of individual regression analyses of fraction of AB students with independent and control variables

Variable	**Coefficient**	**P Value**
Crime per capita	-1.31	0.097
Number of gangs	-0.010	0.108
Mean household income	4.82E-06	0.000
Ratio of households in poverty	-0.726	0.002
Ratio of whites in population	0.311	0.000
Ratio of families with two-parents	0.471	0.000

Figure 3. Graph of fraction of students on-track to graduate versus crime per capita

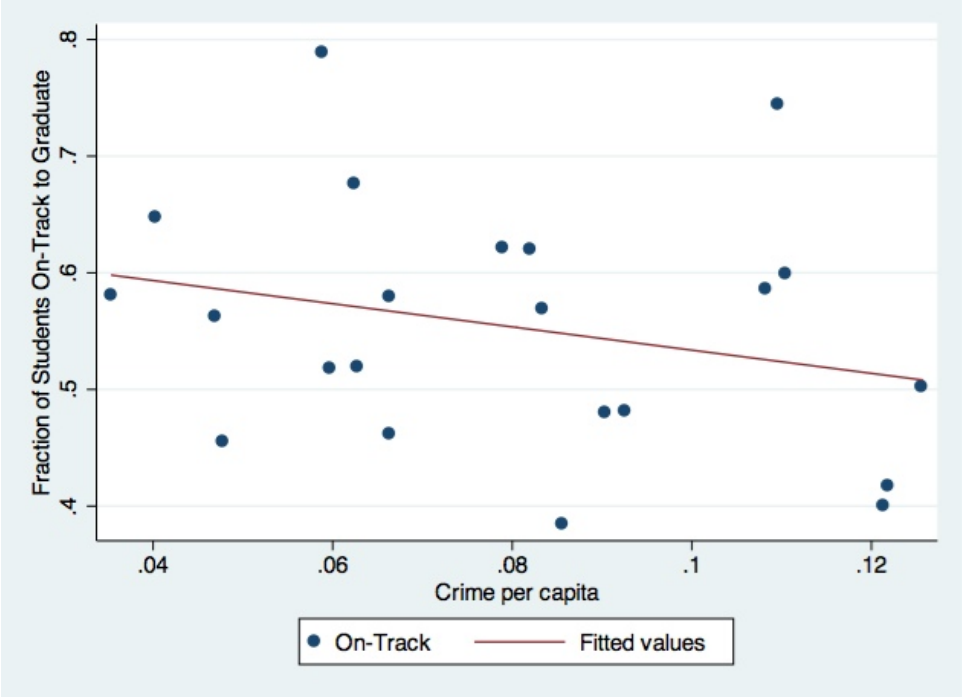


Figure 4. Graph of fraction of students on-track to graduate versus number of gangs

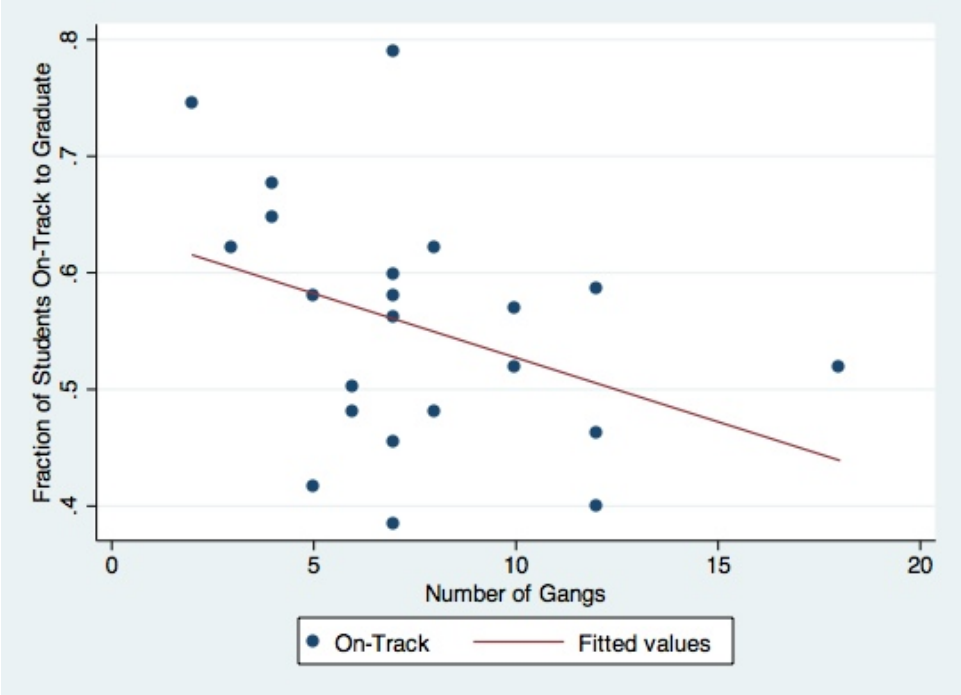


Figure 5. Graph of fraction average student GPA versus crime per capita

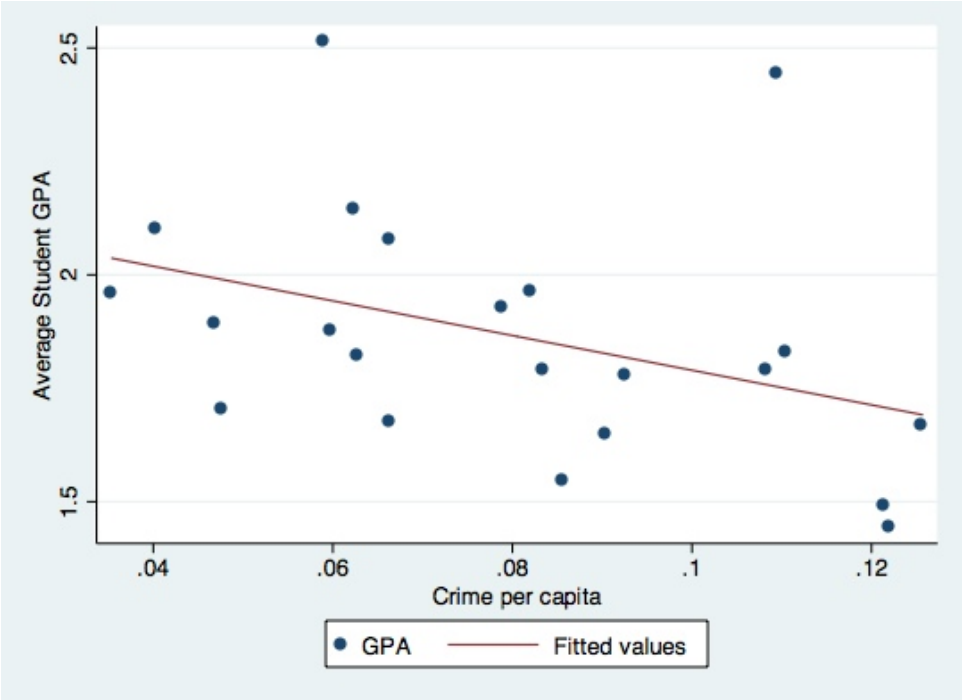


Figure 6. Graph of average student GPA versus number of gangs

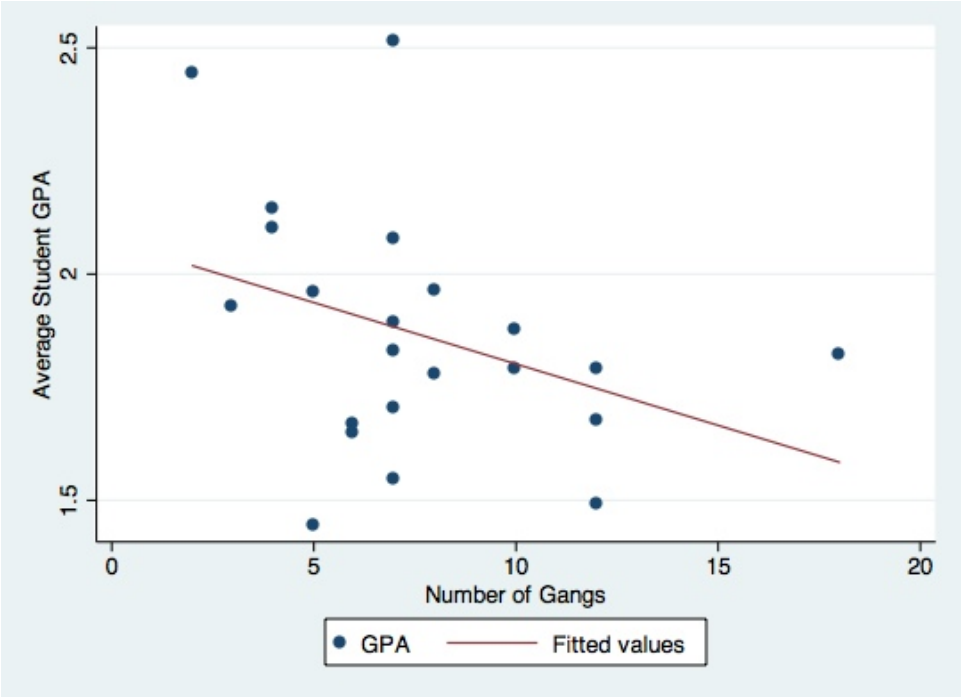


Figure 7. Graph of fraction of AB students versus crime per capita

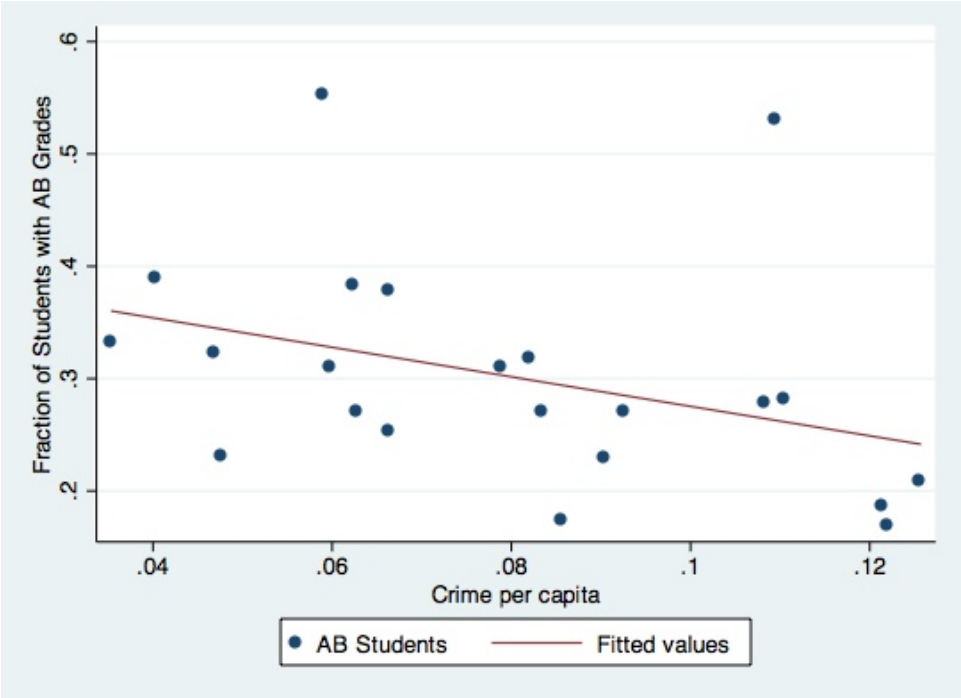
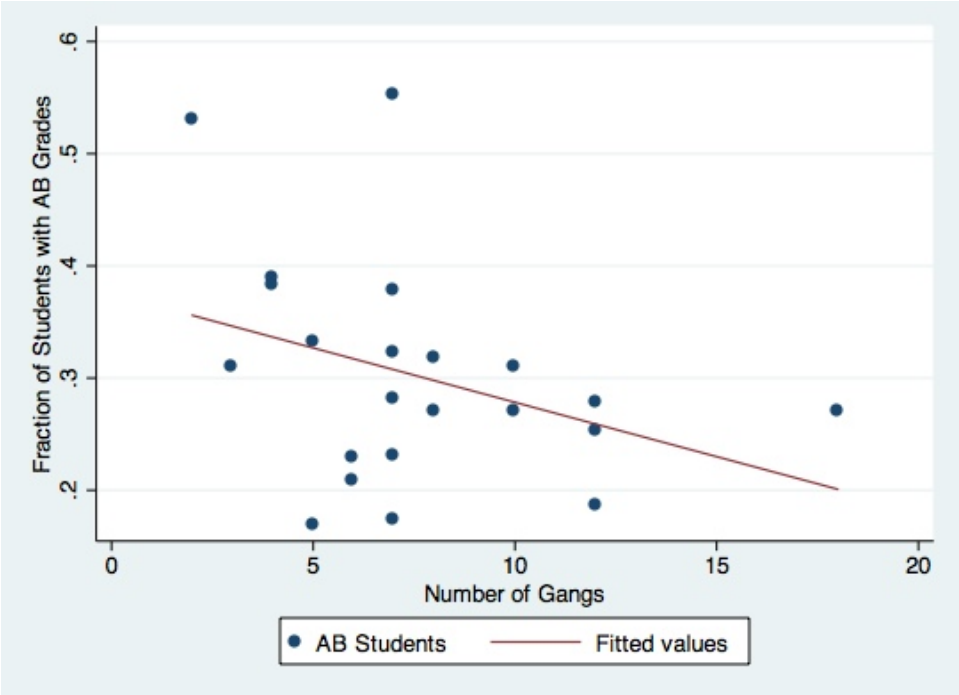


Figure 8. Graph of fraction of AB students versus number of gangs



Multi-variable regressions were conducted for the six pairs of dependent and independent variables. As predicted by the individual tests, when including the effect of control variables, no correlation exists between academic achievement and the crime rate and gang number. Tables 7 through 12 display the results of the experiments. Coefficient explains the nature of the relationship; individual P-values reflect whether that specific variable has a statistically significant correlation; the model p-value indicates if the model has dependable information; and model r-squared states the proportion of data variability that is explained by the model. The models provide dependable information about on-track students, average GPA, and AB students due to p-values lower than 0.05.

For the first dependent variable, the model finds that when controlling for all other variables, crime per capita and gang numbers have no relationship to a school's fraction of students on-track to graduate. In fact, the only variable with predictive power is mean household income. The test reveals that as an area's income increases, the academic success of its children does as well. All the other variables, however, had p-values greater than 0.05 indicating no statistically significant correlation. Likewise the models for a school's average student GPA and fraction of AB students found no effect from crime rate and gang numbers, or any variable except mean household income. As a result, this study's experiment finds no statistically significant relationship between violence as measured by crime and gang figures and academic achievement.

Table 7. Result of multiple regression analysis of fraction of students on-track to graduate with crime per capita and control variables

Variable	**Coefficient**	**P Value**
Crime per capita	-0.6353627	0.621
Mean household income	3.59E-06	0.140
Ratio of households in poverty	-0.037502	0.928
Ratio of whites in population	0.1660773	0.368
Ratio of families with two-parents	-0.2180246	0.549
Constant	0.5092995	0.061
	Model P Value	**0.014**
	Model R-squared	**0.561**

Table 8. Result of multiple regression analysis of fraction of students on-track to graduate with number of gangs and control variables

Variable	**Coefficient**	**P Value**
Number of gangs	-0.0031741	0.584
Mean household income	2.59E-06	0.170
Ratio of households in poverty	-0.0625523	0.878
Ratio of whites in population	0.1435374	0.451
Ratio of families with two-parents	-0.0422206	0.890
Constant	0.4454605	0.054
	Model P Value	**0.0137**
	Model R-squared	**0.5621**

Table 9. Result of multiple regression analysis of average GPA with crime per capita and control variables

Variable	**Coefficient**	**P Value**
Crime per capita	-3.715177	0.180
Mean household income	1.26E-05	0.019
Ratio of households in poverty	0.6630425	0.452
Ratio of whites in population	0.3123676	0.419
Ratio of families with two-parents	-0.3497413	0.647
Constant	1.513797	0.012
	Model P Value	**0.001**
	Model R-squared	**0.706**

Table 10. Result of multiple regression analysis of average GPA with number of gangs and control variables

Variable	**Coefficient**	**P Value**
Number of gangs	-0.0083896	0.511
Mean household income	7.54E-06	0.076
Ratio of households in poverty	0.4453655	0.619
Ratio of whites in population	0.272236	0.515
Ratio of families with two-parents	0.4722663	0.487
Constant	1.128818	0.029
	Model P Value	**0.0014**
	Model R-squared	**0.680**

Table 11. Result of multiple regression analysis of fraction of AB students with crime per capita and control variables

Variable	**Coefficient**	**P Value**
Crime per capita	-1.066161	0.271
Mean household income	4.52E-06	0.018
Ratio of households in poverty	0.2823481	0.366
Ratio of whites in population	0.1184999	0.386
Ratio of families with two-parents	-0.0580097	0.829
Constant	0.1057701	0.581
	Model P Value	**0.0004**
	Model R-squared	**0.7294**

Table 12. Result of multiple regression analysis of fraction of AB students with number of gangs and control variables

Variable	**Coefficient**	**P Value**
Number of gangs	-0.0024016	0.589
Mean household income	3.07E-06	0.041
Ratio of households in poverty	0.2198386	0.483
Ratio of whites in population	0.1070368	0.463
Ratio of families with two-parents	0.1777648	0.453
Constant	-0.0047157	0.977
	Model P Value	**0.0006**
	Model R-squared	**0.7129**

Chapter 5

This study did not find support for a relationship between community violence and academic achievement. The six hypotheses were rejected, questioning the validity of the ecological-transactional theory. According to its proponents, problems in the exosystem such as community violence should negatively affect components of the ontogenic ecosystem including grades. This study rationalized the relationship by noting that the well-documented psychological complications from exposure to criminal behavior are known to prevent students from concentrating on course work. However, in this study's examination of aggregate academic data in twenty-two schools, no statistically significant relationship was found between school performance and two measures of violence. While the current literature suggests a correlation should exist, those studies relied exclusively on people's perception of violence as measured by survey responses (Bowen & Bowen 1999; Hurt, Malmud, Brodsky & Biannetta 2001; Schwartz & Gorman 2003; and Mathews, Dempsey & Overstreet 2009). The only study to rely on objective data to measure violence did *not* use crime data, the statistic widely referenced when assessing the safety of an area (Milam, Furr-Holden & Leaf 2010). Therefore, while the literature has argued there is a correlation between the two, no evidence links objective violence data to school performance.

While the six hypotheses were rejected, this study does not necessarily reject the ecological-transactional theory. The idea that the exosystem can directly affect the ontogenic ecosystem may still be true, but in a different form. If further research confirms these findings, the true predictor of academic success may be a student's ability to cope with negativity. In other words, the actual level of criminal activity does not prohibit

school achievement, but whether a student allows him or herself to be affected by the surrounding violence. Students who do not perceive themselves to be suffering from an adverse situation would still have the potential to excel in school. Such a finding would indicate that the exosytem is still influencing people, but that the perception rather than the actuality of the exosystem is important. The veracity of these ideas would have to be tested in future studies, but if the discrepancy in objective and subjective violence data is confirmed, it may reveal a key to improving student performance: counseling. Helping students erase the perception of violence may serve to be a powerful tool in primary and secondary education.

The results, however, necessitate a reflection of this study's experimental design. Was a systemic flaw(s) responsible for every regression finding no statistically significant result? Unlike other research, this study examined the dependent variables at the school level rather than the individual. Ideally, an investigation into factors affecting whether someone succeeds would analyze persons. Given differences between institutions, examining schools rather than students may have subjected this study to error. Furthermore, R-squared values of the six multiple regression tests reflect an inability to explain all the variation between the variables even when the model's predictive power is certain. This is most likely due to the disappointingly low number of data points. Given the nature of the publicly available information, this study was maxed at 25. The tally was reduced to 22 as a result of unacceptable circumstances. Generally, an experiment with three dependent, two independent, and four control variables should have substantially more data points. With more information the models would have likely better explained the variation between all the factors. Therefore, an acknowledgeable

flaw in this study is its limited data set. However, initial investigations into untested evidence are often modest; nonetheless, future research should gather more information.

Regardless of the aforementioned flaws, this study's findings are most likely accurate. First, the results on the control variables were consistent with the existing literature. Income, poverty, race, and family structure were significantly related to the academic metrics. Mean income, furthermore, predicted better school performance even when the other variables were factored in, underscoring its substantial relationship to academics. Finally, this study's results are consistent with the most recent relevant research on Chicago Public Schools. Thompson and Massat (2005) found there to be no statistically significant correlation between community violence and scores on a national standardized test. The consistency confirms the validity of this study's experimental design but also poses some interesting questions. Is there simply no relationship between violence and academics in Chicago? Conversely, are other factors in this city diluting the effect of violence on grades? In other words, Chicago may be unique among our nation's urban locales and immune to the relationship. The possibility suggests that future researchers should avoid relying on data from Chicago until the question is answered.

Consistent with the results, the six hypotheses outlined in Chapter 2 must be rejected, but the ecological-transactional theory is not necessarily false. This study finds no relationship between objective community violence trends and success in school, indicating that perception of neighborhood safety may be the only factor that directly affects behavior. Future research should investigate whether subjective and objective metrics for violence have different predictive powers, and if Chicago is an appropriate location to continue studies on this topic.

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