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RESIDENTIAL MOBILITY AND THE UNDERCLASS:

IMPACT OF MOVING IN THE 'HOOD

by

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ABSTRACT

RESIDENTIAL MOBILITY AND THE UNDERCLASS: IMPACT OF
MOVING IN THE 'HOOD

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Old Dominion University, 2019
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Studies of residential mobility amongst disadvantaged populations and juveniles in particular have attracted a great deal of attention with projects such as the Moving to Opportunity Study and policies aimed at reducing concentrated disadvantage by providing alternative housing assistance to low-income families. The results of these studies, however, have been inconclusive and have often not concentrated on the effects of this mobility on a broad spectrum of delinquent behaviors. Previous studies have found that residential mobility negatively affects juveniles, while other studies find that there is little effect after controlling for a wide variety of variables with scant theoretical considerations regarding modeling.

This dissertation sought to address these gaps and deficiencies in the literature by examining the effects of residential mobility on a sample of highly impoverished youth by analyzing a variety of delinquent behaviors with theoretically relevant variables in order to better understand the mechanisms driving delinquent behavior. In order to test hypotheses developed from these questions, longitudinal binary and ordinal mixed-effects logit models were utilized on data drawn from the Mobile Youth Survey, which was conducted in areas of extreme poverty.

The findings of the current research demonstrated that residential mobility has a weak and inconsistent effect between types of delinquent behavior. Theoretically relevant variables comprised of social bonding and strain constructs were found to mediate the significant relationship for several delinquent outcomes, indicating that these variables play a critical role in

predicting delinquent behavior rather than residential mobility. Low correlations between residential mobility and delinquent outcomes indicated that for this particular population, mobility has a differential effect compared to higher socioeconomic groups analyzed in previous studies.

Conclusions and implications of the current study suggested that residential mobility is not a particular concern regarding highly impoverished populations. Policies aimed at moving individuals to better neighborhoods would not have a negative effect due to the stress of moving. Addressing strain and the attenuation of social bonds would be more effective at preventing juvenile delinquency even if that means displacement of the individuals into environments that provide opportunities for the creation of stronger social bonds and lessened strain.

This dissertation is dedicated to my family, the research teams, and outstanding individuals I had

the pleasure of working with throughout my time with the Mobile Youth Survey.

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I owe a great debt to many people who have made the completion of this dissertation possible. It has been a long journey towards this goal, and I could not have completed it without the assistance of individuals who selflessly gave their time and support, provided mentorship, and encouraged me to keep going no matter what. This dissertation represents years of work as a researcher, assisting with the administration of the Mobile Youth Survey, as well as years of study as a doctoral student. Throughout this time I have had the pleasure of working with and studying under great people who have had a critical influence on my life. While the completion of the Ph.D. represents the culmination of a great deal of hard work, it was worth it simply for the sake of knowledge, the reward of becoming part of the academic guild, and the numerous people I interacted with along the way. This acknowledgement section cannot convey my deep appreciation of the people and experiences that have been part of my life throughout the process of higher learning.

I owe the most to God, who got me through the difficult and not so difficult times during my education and the dissertation process. I relied on God a great deal during comprehensive exams and the dissertation process. I also owe a great deal to my family. My mother, Susan Hollingsworth, provided unwavering support throughout my educational endeavors and never gave up on me. Without her help none of this would have been possible. My father, Mickey Hollingsworth, also provided complete support throughout all stages of my education. He is more of a role model than he knows. Much of my academic interests stem from the influence of what my father did as a pilot in the United States Air Force and the life we had as a family existing in that environment. I am truly blessed to have such wonderful and supportive parents who had faith in me and pushed me to complete the work I started so long ago. My sister also

had faith in me, and was always there for me when I needed her. While it might sound cliché, my family was a driving force in my success. The nature of the research presented in this dissertation and the years spent working in the housing projects make me all the more appreciative of my family.

The next most proximate group that assisted and influenced me were the faculty at Old Dominion University. My dissertation committee, in particular, helped me to succeed. Dr. Gainey taught me a lot at the school, and pushed me to complete the dissertation even after I left to work at South Alabama. His assistance and guidance was indispensable. He helped me and multiple other students to succeed, and truly cares about educating individuals as well as conducting research. His even demeanor and temperament is something I strive to emulate, and he provided a great role model of what an academic should be. I could not have had a better dissertation chair and I am honored that he agreed to take that role in this project. Dr. Maggard also taught me a great deal and provided excellent instruction in statistics and methods. Dr. Maggard was always a friendly face in the department and assisted with this project as well as others throughout my time at Old Dominion. His pragmatic perspective on things always helped, and I enjoyed working with him a great deal.

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Other individuals I would like to acknowledge include my colleagues in the Department of Political Science and Criminal Justice at South Alabama. David Bowers and Steve Costanza have been good colleagues over the years I have been at the college. Dr. Habel has always been supportive of the completion of this project. Corina Schulze and Sarah Koon-Magnin have also been good colleagues and Scott Liebertz offered timely advice on the dissertation and the statistics used in it. Ken Hudson has played a large role in my education and is a good friend. He is always willing to help and share knowledge. A long time ago he was one of the main reasons I pursued more of a quantitative track in education that I still work towards today. He taught me that statistical methods, as well as the scientific method in general were invaluable

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In closing, I am thankful for the support of so many people who have influenced by life in various ways and made the completion of the dissertation and my Ph.D. possible. It would not have been possible without this support. I'll always have great memories connected to working as part of the Mobile Youth Survey and attending Alabama and Old Dominion.

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CHAPTER I

INTRODUCTION

Residential mobility, and the consequences of this mobility on the behavior of juveniles has been the subject of a great deal of criminological research dating back to the Chicago School. Of particular concern is the consequence of this mobility on, as William Julius Wilson called them, "the truly disadvantaged" (Wilson 1987). Reasons for residential mobility, however, have not remained consistent. In the 1950s and 1960s, residential mobility was attributed to increased economic prosperity and social mobility as families were able to move out of disorganized neighborhoods and into better conditions (Park, Burgess and McKenzie 1967). Shortly after concentric zone models were first examined, mobility was determined to be the symptom of an inability to function within a given area, thus residential transiency was seen as a personal deficiency since individuals with mental problems, criminal careers, and a propensity for violence clustered in these areas of high transiency (Faris and Dunham 1939; Shaw and McKay 1942).

Further research and changing ideologies showed residential mobility to not be indicative of any particular pathology, but was a strategy of improving social capital and status, especially during prosperous economic times (Rossi 1955). This, unfortunately, does not always hold true for those locked into disadvantaged areas by structural characteristics of society (Valdimarsdóttir and Bernburg 2015; Wilson 1987; Wilson 1996). It is important to examine what is often forced residential mobility on the most vulnerable populations in order to inform public policy and to use resources in the most effective manner while preventing juvenile delinquency. If these relocations have criminogenic effects, it is imperative to limit them as much as possible.

This paper examines the effects of residential mobility on a sample of youth located within extremely impoverished areas in Mobile, Alabama (Bolland 2007). These individuals, ages 13 to 18, were surveyed during the Mobile Youth Survey (MYS), which was conducted from 1998 to 2011. The survey utilized a rotating panel design with individuals becoming eligible at age 10 and dropping out of the survey sample at age 18. The sample for the current research consisted of individuals who completed the survey at least three times and were between the ages of 13 and 18. The MYS represents an attempt to capture a picture of life in areas of concentrated poverty along with various delinquent behaviors.

This study focuses on a variety of delinquent behaviors including arrest, fighting, drug use, and gang behavior in order to ascertain the effect of lateral residential mobility on juveniles. These individuals did not move to better areas, but rather stayed within areas of concentrated poverty. They moved due to a variety of circumstances including economic problems, criminal problems, and governmental issues including renovation and the closure of housing projects (Wimberly 2012). The researcher spent six years as part of the research team conducting the MYS. Spending time in the neighborhoods and interacting with participants, their families, and neighborhood institutions provided unique insights into the data.

While focusing on residential mobility and the effect it had on delinquent behaviors, this study also takes into account other factors, notably strain and social bonding. Familial variables such as involvement in crime, rule setting, and monitoring were taken into account, as were social bonds to school, the community, peers, and family. Attitudes towards violence and the inevitability of violence were examined. Psychosocial variables associated with delinquency were explored including worry, past trauma, hopelessness, anger and self-worth. These are meant to measure strain as a theoretical construct (Agnew 2006). Finally, control variables were

included in the models. These included variables such as age and sex. The use of these clusters of variables helped in isolating the effect of residential mobility on delinquency, explored alternative causes of juvenile delinquency in the population of interest, and examined mediating effects.

There is a great deal of variance between neighborhoods, even in disadvantaged areas (Bursik and Grasmick 1993; Sampson 2012). Neighborhoods can also be difficult for researchers to define even if they spent a great deal of time in the specific neighborhoods. It is important to consider the participant's perspective of neighborhood (Sampson, Raudenbush and Earls 1997). A self-reported variable capturing the amount of time lived in a specific neighborhood was used to measure whether a juvenile had experienced residential mobility to the degree where it would affect delinquency. Moving within a neighborhood, which in the areas of interest constituted a relatively short displacement, and moving between neighborhoods has a distinctly different theoretical effect.

The current study focused on movement between neighborhoods. Neighborhood norms, levels of violence, levels of collective efficacy and other factors affecting the propensity for delinquency can change by neighborhood although the purpose of this study was not to measure variation in neighborhood, but rather measured the effect the displacement to a new neighborhood had on delinquency. The neighborhoods targeted in the MYS are relatively homogenous, which is advantageous from a methodological perspective in that variation at the neighborhood level is naturally limited by the homogeneity. Residential mobility is thus defined in this study as having moved between neighborhoods which was defined by the respondent. Methods and specific definitions of variables, as well as theoretical structures are fully explained in chapter three.

In order to explore the effects of residential mobility on juvenile delinquency, a series of longitudinal models were run. These consisted of models controlling for multiple responses within clusters, which represented individuals. This allowed for control of dependency that is by nature present within panel designs (Rabe-Hesketh and Skrondal 2012). Interactions were used to probe effects related to residential mobility, social bonding, and strain. One problem with longitudinal data and the MYS in particular is missing data. The problematic form of this is missing waves of data. While all participants had at least three waves of data collection, many dropped out of the survey for a year and then were picked back up. In order to account for this missingness, maximum-likelihood estimators were used. This particular technique is robust as long as the data is missing at random (MAR) (Enders 2010).

Theoretical constructs explored in the study included strain and social bonding theories. Strain theory can be traced back to Emile Durkheim, who discussed anomie on a societal level (Durkheim 1951 [1897]). Merton developed his own version of anomie and strain at the mezzo and micro level, which applies directly to the types of neighborhoods that were explored in this study (Merton 1938). Further expanding strain theory, Robert Agnew (2006) developed General Strain Theory (GST) which captures the particular difficulties faced by the population examined by this study. Negative affective state and specific types of salient strain, such as racism, undoubtedly affect the participants in this study (Arthurson 2013).

The second theoretical construct to be examined were social bonds. Originally posited by Travis Hirschi, Social Bond Theory states that there are four types of bonds that can prevent delinquency (Hirschi 1969). Attachment, commitment, belief, and involvement are all components that can be attenuated by moving to a new neighborhood (Coleman 1988; Crutchfield, Geerken and Gove 1982; Hagan, MacMillan and Wheaton 1996). It was important

to employ both theoretical frameworks to avoid simply answering the question of whether residential mobility results in a change in delinquency. That, by itself, is not a particularly scientific question. The current study addresses why changes in residential mobility result in more delinquency. A theoretical framework helps with this.

The consequences of a connection of residential mobility and delinquency are important to consider. Residential mobility involving an already vulnerable population can add yet another strain to strains already faced by the population, thus compounding problems. This represents another barrier to successful integration with society. Government programs such as the HOPE VI project, which proposes mixed income areas as opposed to housing projects, invariably displaces some residents (Clampet-Lundquist 2004; Popkin et al. 2004). Quasi-experimental programs such as the Moving to Opportunity (MTO) study relocated residents, which did not lead to decreased long-term delinquency (Sanbonmatsu et al. 2011). This is what makes the question important. This study was able to address the question with a particularly vulnerable population which has been largely ignored in prior research.

Previous studies have examined the effect of residential mobility on nationally representative samples of individuals (Gasper, DeLuca and Estacion 2010; Lawrence, Root and Mollborn 2015; Porter and Vogel 2014). This does not capture the effect of residential mobility on socioeconomically disadvantaged groups. The MYS consists of a relatively homogenous group of respondents that suffer from compounded disadvantage. The sample is socioeconomically disadvantaged, mostly African American, and trapped in areas where they face economic, social, and environmental disadvantages (Bolland 2012; Bolland 2007). This unique feature of the survey allows the current study to add to the extant literature by exploring the effects of residential mobility on the truly disadvantaged. Those who are most vulnerable

were examined in this study, which is something that is unfortunately missing from the criminological literature. The study used a sample that differs significantly from previous studies and took into account the specific struggles faced by poor African American families in the Deep South.

RESEARCH QUESTIONS

This dissertation sought to answer three broad research questions divided into multiple hypotheses regarding each question. The research questions surround a common theme of investigating the effect of residential mobility on the behaviors and feelings of the respondents. Ultimately, these research questions inform policy and programmatic material for juveniles in high-risk areas that are at greater risk of forced residential movement throughout the life-course.

Research question one focused on the link between residential mobility and official action such as arrest, and also self-reported delinquent behaviors. More specifically, did recent residential mobility lead to an increased odds of arrest? This is separate from questions regarding specific types of deviant behaviors and focused on actions that, in any form, led to a formal reaction by police.

The shorter the amount of time that a juvenile has resided in the same neighborhood was predicted to be positively associated with the odds of being arrested in the previous year. Stated differently, the length of residence in the same neighborhood is expected to be inversely related to the odds of arrest within the previous year. It is important to note that residential mobility, as coded in the current study, leads to negative coefficients if delinquency is reduced and positive coefficients if it is increased. It is coded where higher values represent longer residential tenure in a given neighborhood.

Research question two focused on the effects of residential mobility on the odds of committing specific types of delinquency including fighting, using drugs, gang membership, or carrying a knife or gun. Each type of delinquency was analyzed in a separate model. This research question and the four sub-hypotheses that emerge from the overarching question served to delineate the effects of residential mobility on specific types of delinquent behavior. Much of the past research simply focuses on dichotomous outcomes of delinquency or no delinquency. This results in a loss of precision and inability to measure severity and frequency of delinquent acts such as fighting, drug use, and weapons carrying. The formal hypotheses can be divided into questions dealing with four specific domains and are discussed in chapter 3.

Research question three examined the mediating effects of two sets of theoretical variables on residential mobility. Social bonding variables and strain variables were both entered into models to ascertain whether they mediated any effect between residential mobility and the odds of engaging in more severe delinquent behavior. It was expected that these variables would not mediate the effect. In essence, any increased odds of engaging in delinquent behavior was not expected to work through these sets of variables rather than residential mobility, but it was important to test this as a robustness check on the effect of residential mobility. While there is not an attempt to establish causal links in the current research, the presence of mediation could eliminate residential mobility as a cause of increased odds of delinquent behavior, thus it is important to test these models.

Research question four dealt with possible interactions between residential mobility and two variables. It was predicted that interactions between residential mobility and neighborhood connectedness, and a similar interaction between mobility and the inevitability of violence would be significant, indicating that there was a moderating effect regarding neighborhood

connectedness and attitudes towards the inevitability of violence respectively, on the odds of arrest as well as the four types of delinquency discussed in research question two. The magnitude of the moderating variables was expected to be higher for those who had recently moved to a new neighborhood and also increase at an accelerating rate for that group compared to the group consisting of individuals who had lived in a neighborhood around a year or longer. These hypotheses are formally stated in chapter 3. This research was approved by the Old Dominion University Arts & Letters Human Subjects Review Committee, ID 782814-1.

CHAPTER II

EXTANT LITERATURE

Moving experiences can be disruptive for youth in a variety of ways (Glynn 1981; Herbers, Reynolds and Chen 2013; Jelleyman and Spencer 2008; Pettit and McLanahan 2003) . The extant literature regarding residential mobility has a long tradition, but from a criminological standpoint, Shaw and McKay's research (1942) represents some of the first exploration of residential mobility and transiency on youth. From this point the literature follows changes in American societal structure showing increasing optimism as the economy grew. The sociological literature then takes a more negative tone towards residential mobility as it again became apparent that moving might have criminogenic influences on youth. More recently, there have been developments that show that residential mobility by itself might not be criminogenic, but is often accompanied by criminogenic factors such as school change. As with most criminological subjects, the findings are mixed.

EARLY LITERATURE REGARDING RESIDENTIAL MOBILITY

Shaw and McKay, as part of Chicago School, were some of the first to explore early criminological theories related to neighborhoods and mobility (Lilly, Cullen and Ball 2011). What they found was that juvenile delinquency was concentrated in certain areas of the city, especially the zone of transition (Shaw and McKay 1942). By using official records, mapping, and interview techniques, they discovered that transiency was high in these areas and it seemed to have a negative impact on juveniles who resided there. Presence in these transient areas and transiency itself would be attributed to individual causes such as mental illness, criminal behavior, or a general inability to function in society (Faris and Dunham 1939). Social

disorganization became the dominate paradigm to describe the criminogenic urban landscape, and this would last for some time. Beyond the ecological, George Mead would describe this as personal disorganization although his writings came sometime before the full influence of the Chicago School (Mead 1934). His writings were some of the first, from a criminological perspective, to tie residential mobility and presence within disadvantaged areas to personal traits.

Attitudes towards mobility changed to some extent with Rossi's 1955 study on mobility, which demonstrated that residential mobility was often related to upward mobility. These individuals, however, were often moving to better neighborhoods and were not moving within the same basic geographical area or type of geographical area. Other studies showed that families and their children moved to better housing and better communities, which is congruent with Chicago School arguments that groups gradually achieve better economic status as they achieved better jobs (Blau and Duncan 1967). Blau and Duncan reported that residential mobility was being used to increase social capital and improve educational obtainment for children. This was in conjunction with the changing work structure of America which, during the 1950s, had seen a middle class grow and the economy accelerate after World War II.

Blau and Duncan, however, also stated that residential mobility was selective in nature. Only certain families were able to move and these were the successful ones. Later studies would find that up to one third of families that moved were not completely willing to move. They were either forced to move by the nature of their work or by other economic circumstances, not necessarily positive ones (Sell and DeJong 1983). While this represents possible positive outcomes associated with residential mobility, neither study examined delinquency as a main outcome and both assume that residential mobility was both desirable and planned on the part of

the families involved. Social capital would be the focal concern of later works on residential mobility with markedly different conclusions.

While Blau and Duncan (1967) rightly analyzed the work structure of the United States and saw that selective residential mobility was associated with increased social capital and increased life chances, research after this time period painted a different picture of residential mobility, especially concerning juveniles. As is often the case, research and theory are products of the time they were in and the economic downturn of the 1970s resulted in a different perception of residential mobility (Pfohl 2009). Mobility began to be associated with divorce and family instability. This in turn had negative impacts on the attachment of children as well as their educational outcomes. Residential mobility was also associated in the criminological literature with crime and delinquency, mainly due to lack of social integration at both the individual, family, and community levels. This lack of integration was posited to exist in areas with high levels of heterogeneity and dense urban areas were seen as places that fostered these types of environments (Angell 1974; Crutchfield, Geerken and Gove 1982; Speare, Frey and Goldstein 1975).

SOCIAL CAPITAL, BONDS, AND MOBILITY

Coleman's 1988 study on social capital stated that residential mobility would have detrimental effects on youth in several particularly important domains. He posits that mobility disrupts the ties that bind youth to their environment. In addition, it can limit a parent's ability to monitor their children, thus lessening social control. It did this in several ways. It limited a parent's individual ability to monitor a child and also limited their ability to depend on community monitoring. Residential mobility not only broke the ties of children, but the ties of

families to the community. Parents were less likely to know the friends of their children and the

parents of those friends. This in turn led to less indirect monitoring. In a more stable

community, adults in a neighborhood could monitor another family's child and report back to

that family. This became difficult when ties were attenuated. While Coleman would later focus

on not only social capital but closure of social networks, the primary theory he posits is closely

related to social bond theory. He emphasized number of school changes, the quality of the

parent-child bond, and the bond that the individual child had with other members of the family.

He also emphasized family structure, positing that having both parents in the home added to the

prospects of success for the child (Coleman 1988; Coleman 1990). These are all important

variables considered in the current study.

Coleman's (1988) study shows the importance of not only parental monitoring, but of

social bonds in general. Hirschi's theory (1967) predicted that the attenuation of any of four

social bonds would limit control of an individual and thus result in delinquency. The bonds

discussed in his theory, those of belief, involvement, commitment, and attachment, would lead to

increased delinquency as the assumption was that youth would commit delinquent acts since they

were naturally inclined to deviance and needed these controls to prevent this. Coleman's study

(1988) found that youth were more likely to drop out of school, which attenuates several of these

bonds. In addition, bonds with peers, parents, and the community in general could be attenuated

leading to a higher propensity for offending. Later research would confirm that youth had

difficulties adjusting to new schools and breaking into new social circles (Hagan, MacMillan and

Wheaton 1996; South and Haynie 2004). Residential mobility, however, was recognized as not a

simple process that could be classified as inherently good or bad. There were other factors that

had to be taken into account in addition to simple mobility and the relationships could be complex (Gasper, DeLuca and Estacion 2010; Shumaker and Stokols 1982).

Hagan, MacMillan, and Wheaton (1996), in their study on family migration, primarily employed a life course framework. This longitudinal study was based on the premise that the outcome or life chances of an individual were based partially on the decisions of previous generations (Elder 1994). It also applied, using a longitudinal design, more rigorous empirical analysis to the question of what actually caused problems for youth. It primarily focused on educational and occupational outcomes and was conducted in Toronto, Canada. At the time of the study, this was a rapidly growing area which provided a key opportunity to study residential mobility. The study used structural equation modeling to look at support from the mother and father and the effect on high school completion. They found significant effects for both parents individually on an adolescent's likelihood of graduating high school (Hagan, MacMillan and Wheaton 1996). The study also found support for parental involvement, including variables such as whether the parent generally knew where they child was most of the time and how much time was spent with the child. Parental support increased educational obtainment.

Hagen et al.'s study also examined the effects of being part of a delinquent subculture and partying a lot on the long-term effects of youth. These had a negative impact on educational achievement in a bivariate logit analysis, although these effects were attenuated with a full multivariate model. As with the MYS, self-reported achievement was taken into account as well as desire to graduate high school and whether to attend college or not. These were important predictors of academic success. While not measuring delinquency as directly as one might hope, an important finding of Hagen's study is the role of family structure and the interaction between residential mobility and parental support and involvement. High parental support and

involvement mitigates the negative effects of residential mobility and, conversely, low support and involvement greatly increases the negative consequences of movement controlling for a variety of other variables. This interaction is important to consider in the current study using the MYS. Hagen et al.'s study also shows the importance of ensuring that measurement is accurate and that interactions are properly specified. Later studies would expand on empirical methods to further isolate connections between delinquency and residential mobility.

South and Haynie (2005) conducted an important study using the National Longitudinal Study of Adolescent Health. This study, in exploring the friendship networks of juveniles who moved, examined the social bonds that were developed after moving. The study employs survey corrected logit and survey corrected ordinary least squares (OLS) regression, using a sample of individuals that completed two consecutive waves and also had complete data regarding social networks. An important aspect is the separation of school and residential mobility, indicating that school transition is a separate construct (South and Haynie 2004). The study found that juveniles who moved had smaller and denser friendship networks than those who did not move, but they also occupied less prestigious positions within those networks. They, in effect, lost social capital.

Parental monitoring was also affected for both those who moved and those who changed schools. Parents were less able to monitor their children and were less familiar with the juvenile's friendship network. The researchers found an interaction between the negative effects of moving and the amount of mobility present in the juvenile's school. The negative impacts of moving were attenuated if the school that the juvenile moved to had a large number of individuals who had recently moved. Put simply, they were in similar situations as a larger number of peers. Another important finding is that the negative impacts of residential mobility

persisted for several years. This indicates that residential mobility is all the more important to examine due to lasting impacts. If juveniles were able to establish themselves quickly within a new area, the negative impacts would not be as important from a criminological perspective as they would return to their previous state quickly. Mobility, however, seems to have a persistent impact on social capital and the social bonds that a juvenile was able to form. As with previous studies, parental effectiveness was diminished as well, attenuating the bond between the juvenile and the family.

QUASI-EXPERIMENTAL DESIGNS

Following Hagen et al.'s (1996) study, several quasi-experimental designs examined the effects of residential mobility on social capital and social bonds. These experimental designs depended on a relocation strategy, based partially on Wilson's (1987) hypothesis that those in the underclass and those in the middle class did not often bridge various spheres of existence. In order to assist families with residential mobility, programs were implemented to allow those living in public housing to move to better environments (Pettit and McLanahan 2003). These quasi-experimental designs had mixed results. The Gautreaux Project, launched in Chicago in 1976, was one of the first government programs to relocate individuals from housing projects to better areas with the hopes of improving their life chances. This experiment was brought on indirectly by the Kerner Commission and directly by the U.S. Supreme Court. Widespread problems with discrimination in housing were found with disparate impacts affecting minority and otherwise economically disadvantaged groups (Rosenbaum et al. 1992). This discrimination was based on race and the Kerner Commission's goal was racial integration (Kerner 1988).

The Gautreaux Project

Rosembaum et al.'s 1992 evaluation of the Gautreaux project showed that those who moved to better areas in the suburbs were more likely to find employment compared to those that moved and stayed within dilapidated areas in the city. They found that even those who had faced chronic unemployment were more likely to begin working. There was, however, no difference in wages or hours worked (Rosenbaum et al. 1992; Rosenbaum 1995). The outcomes for children were generally good. Although initially their academic performance was substandard, after three to six years it was significantly better than students who had stayed within the city. In addition, drop-out rates were lower, test scores were higher, and more of them would go on to attend college. Vocational outcomes were also better for the juveniles who moved to the suburbs. They were more likely to have jobs that payed a decent wage compared to those that moved and stayed within the city or did not move.

Social integration was also measured, with students who moved to the suburbs facing more racial harassment than those who stayed within the city (Rosenbaum et al. 1992). This took the form of verbal harassment. There was no real different in fighting or injury between the two groups. There was also no difference in feelings of being accepted at school. Juveniles who moved to the suburbs seemed to be more socially bonded to their schools despite the difficulties associated with integration (Rosenbaum 1995). This quasi-experiment compared two groups of individuals who had faced residential displacement, but the destinations seemed to make a great deal of difference. An important note regarding this study is that both groups improved. Those who moved within the city also benefited from residential mobility, just to a lesser degree. This would predict that individuals in the MYS would benefit from residential mobility, even if they stayed within the city but moved to better or at least different neighborhoods. One drawback of

the study related to the Gautreaux Project was the lack of extensive data collection, or any oversight to ensure there was random assignment. The only analyses conducted were chi-square tests and a comparison of descriptive statistics. While promising, the Gautreaux Project was far from definitive in its results. Lack of extensive follow-up also limited the usefulness of the project. The Gautreaux Project, however, would serve as a model for a much larger project conducted by the Office for Housing and Urban Development.

Moving to Opportunity Project

Another large quasi-experiment that is more recent is the Moving to Opportunity project. This project was inspired by the Gautreaux Project with the aim to move families from areas of concentrated poverty to areas of less concentrated poverty. Five cities were initially selected for the project: Los Angeles, Boston, Chicago, Baltimore, and New York City. The Moving to Opportunity Project (MTO), which began in 1994, was much larger than the Gautreaux project. During this time racial integration was theoretically more acceptable, which would possibly limit some of the adverse effects families involved in the Gautreaux project faced. Families in public housing and assisted housing areas were eligible. The MTO relied on random assignment, long-term follow up, and extensive data collection. Unlike the Gautreaux Project, the MTO involved extensive reports to Congress and the data collection strategy was designed to provide for cross-site comparisons. This quasi-experimental design allows for plausible causal estimates, regarding the impact of neighborhood, to be drawn (Cook, Shadish and Wong 2008).

The MTO randomly assigned families to one of three groups (Sciandra et al. 2013). The first group was the control group, which received no section 8 assistance but retained their current level of assistance. They received no further assistance or housing counseling. They

remained in housing projects with concentrated levels of poverty. The second group received section 8 assistance. This was the standard section 8 assistance which is unrestricted regarding geography, but they received no further help or counseling regarding housing choices. The third group received section 8 assistance, but was also given extensive support by non-profit organizations. These organizations actively recruited property owners in low-poverty areas to enroll in section 8 and assisted families in the experimental group with finding these properties and adjusting to their new environment. It was hypothesized that this group would benefit the most from residential mobility, as they were generally moving to the best areas. The second group who received just section 8 assistance, however, was hypothesized to benefit more than those who received no additional assistance beyond current housing assistance in a high-poverty housing project.

Most of the MTO participants were African-American families with children. The vast majority (94.6%) were female-headed households (Katz, Kling and Liebman 2001). Most were not employed at the time of their move. The driving force, and primary concern families expressed for participation in MTO, was fear of crime. The MTO was very successful at placing families in the experimental group in low-poverty areas. Extensive follow-up appointments using a variety of techniques allowed for consistent data collection. There were a number of small research grants issued which allowed various researchers to explore the effects of the MTO.

Pettit and McLanahan (2003) investigated the social capital of children. The overall results of residential mobility on social capital was mixed across the groups. Similar to previous research, residential mobility lowered the connections of parents with the parents of the children's friends (Hagan, MacMillan and Wheaton 1996; South and Haynie 2004). Children

did not seem to participate less in after-school activities, which is important for involvement and commitment (Hirschi 1969). Also congruent with other research was the conclusion that moving from the housing projects to middle class areas was no more difficult than staying within a lower-class area (Rosenbaum et al. 1992). Pettit and McLanahan's study (2003) takes into account the probability of moving using instrumental variable (IV) models. This has the advantage of controlling or eliminating the effect of any unobserved characteristics that might be correlated with moving. In this case the instrumental variables used were group assignment which works when there is random assignment. This is a more advanced technique than simple probit analysis which results in a correlation factor as used in Hagan, MacMillian, and Wheaton's 1996 study, but is probably not preferable to more advanced matching methods such as propensity score matching or genetic matching (Porter and Vogel 2014).

Studies conducted in Boston focused on economic outcomes as well as behavioral outcomes of juveniles (Katz, Kling and Liebman 2001). By using Intent to Treat (ITT) and Treatment on the Treated (TOT) effects estimation, the researchers were able to estimate the causal effects of moving. This was important since movement rates were significantly different between the section 8 group and the MTO experimental group, with the experimental group less likely to actually move than the section 8 group despite the aid provided to them. Behavioral problems dropped significantly for both the MTO experimental group and the section 8 group relative to the control group. These problem behaviors included disobedience at home and at school, bullying others, hanging around with troublemakers, inability to sit still, and depression (Katz, Kling and Liebman 2001). The decline in problem behaviors, however, was dependent on sex. The average decline for males was 42%, whereas it was only 5% for females. Juveniles in the groups that moved were also less likely to be injured and had overall better health. As

expected, families in the MTO experimental group managed to move to better neighborhoods but at least in Boston still attended schools that were substandard.

This is contradictory to results from New York focusing on mental health and problem behaviors again using ITT and TOT models. Overall, there was a reduction in depression and anxiety for the MOT experimental group, but much smaller reductions in the section 8 group compared to the control group. There was little difference in antisocial behaviors and defiance (Leventhal and Brooks-Gunn 2003). Results also differed by age and sex. Boys displayed no reduction at any age regarding antisocial behaviors and marginal reductions in depression and anxiety at ages eight to 13. Girls displayed no significant differences across any of the mental health outcomes in the study for any age sub-group. This might be due to lower base rates with females. This study did not note any behavioral change regarding deviant behavior in juveniles, although it did not measure delinquency directly.

This is contradictory to results found in the MYS where youth were found to show no improvement or poorer mental health outcomes when they moved into better neighborhoods (Byck et al. 2015). Byck et al.'s study used in depth interviews as well as statistical analyses to show that youth who moved from poor neighborhoods to slightly less poor neighborhoods as part of the HOPE VI project did not see any mental health benefits. There was also no improvement in behaviors although contrary to MTO studies there was no significant follow-up period thus adding an important limitation to the study. The study focused on families that moved as part of the HOPE VI project which, in this particular case, relocated families when a housing project was permanently closed in Mobile, Alabama.

The MTO was also used to study delinquency directly, with interesting results. The interim report on economic well-being of adults as well as risky behaviors by youth displayed no

difference between groups after five years regarding adult economic well-being (Kling, Liebman and Katz 2007). This is contradictory to previous evaluations and shows an attenuation of any benefit that might have been present during earlier time periods. This interim study also combined data from all five sites rather than concentrating on a single site, although no differences were found between sites. The findings of no economic benefit are contradictory to what Wilson (1987) predicts regarding a spatial mismatch between jobs and those who were part of the truly disadvantaged. There was simply no treatment effect for adults regarding welfare dependency, earnings, or amount of government assistance (Kling, Liebman and Katz 2007). There was, however, a reduction in obesity.

This study, similar to some previous studies, found differences by sex (Kling, Liebman and Katz 2007). Females, from an overall perspective, benefited from moving to less distressed neighborhoods. The experimental and section 8 groups both displayed substantial overall improvements. Specifically, females saw large improvements in mental health. They also displayed higher educational achievement and a decrease in risky behaviors. This particular study defined risky behaviors using National Longitudinal Survey of Youth (NLSY) measures, similar to the Mobile Youth Survey. Females displayed a smaller increase in physical health. Males, however, displayed the opposite effects when this group was analyzed separately. Males in the treatment groups displayed the highest magnitude of increase of devianvce in behavioral categories involving substance use and physical injuries (Kling, Liebman and Katz 2007).

Males in the treatment groups were also more likely to have been arrested, while females in treatment groups displayed a lowered propensity for this. This was confounded by neighborhood characteristics. Neighborhoods with high residential segregation were more likely

to result in arrests (Ludwig and Kling 2007). This was attributed in the study to the prevalence of drug markets in high-minority neighborhoods even if they were not housing projects. This was determined by using treatment site interactions as instrumental variables. Males also suffered more mental health issues in the treatment groups as well as overall increases in risky behavior. Male rates for these behaviors and problems were higher at the baseline measurement, but the effect size of the increase was still large.

The difference between outcomes for males and females is difficult to explain and the authors even question some of the injury reporting in the control group. The results, however, are relatively robust after being adjusted for familywise comparisons due to the measurement of multiple treatment effects. The main effect seems to have come from the neighborhood effects with an effect contribution from school change and school characteristics. It is clear that analyses need to take sex into account since the generally negative impacts on males nullify many of the gains made by females if they were analyzed as one group. It is also clear that mental health characteristics, especially depression and anxiety, should be taken into account as residential mobility can affect these characteristics.

Further analysis of juvenile delinquency in the MTO examined juvenile delinquency after ten years (Sciandra et al. 2013). While there were strong effects during the interim evaluation, analysis of juveniles who had been very young during the interim evaluation showed that many of the effects had attenuated over time. While there was an immediate drop in violent crime arrests for males in the MTO experimental group and the section 8 group, this had attenuated by year 10 despite these families still living in better neighborhoods. Property crime arrests increased within the five year interim period, but this effect had diminished by year ten. There was also no evidence that younger juveniles benefited more than older juveniles leading to the

conclusion that situational neighborhood effects are more important than age at which an individual moves. This is in contrast to developmental neighborhood effects which would imply that growing up in a poor neighborhood could cause some kind of lasting problems for a child (Margolin and Gordis 2000; Sampson 2012). One explanation for increased property crime offending is that there are more valuable items to steal in better neighborhoods. Neighborhoods occupied by the experimental group and control groups converged to some extent over ten years due to improvements in areas occupied by the control group, but this is a questionable explanation and would not be a function of residential mobility but rather macro-economic changes within a city and implementation of policies aimed at improving poor neighborhoods.

It is clear that the MTO provides mixed results regarding the effect of residential mobility on juveniles. There tends to be an increase in property crime but decrease in violent crime by males and overall, males tend to respond worse to residential movement than females. Mental health is an important aspect to measure with juveniles, as this can be affected by residential mobility. The MTO at best offers mixed results from a very expensive experiment. Youth in the Mobile Youth Survey do not have the benefit of a structured program to move them to better neighborhoods and instead, stay in disadvantaged neighborhoods. One thing the MTO makes clear is that situational neighborhood characteristics are more impactful than a child and adolescent developmental model. Current, rather than past, conditions are what affect juveniles. Given that many of the neighborhoods in the MYS are similar regarding demographics and poverty levels (see chapter 3), the MYS accounts for many neighborhood effects through simple homogeneity between neighborhoods.

STRAIN AND RESIDENTIAL MOBILITY

A less common theoretical explanation for deviance and residential mobility is strain placed on juveniles who are forced to move. The primary focus of the literature on residential mobility and delinquency focuses on ecological theories of crime related to the Chicago School (Hagan, MacMillan and Wheaton 1996; Kling, Liebman and Katz 2007; Leventhal and Brooks-Gunn 2003; Ludwig and Kling 2007; Pettit and McLanahan 2003). While this is a useful framework, strain is tacitly present in ecological theories, as moving causes stress, and this can attenuate social bonds to school, friends, and family (Haynie, South and Bose 2006; South and Haynie 2004; Wimberly 2012).

Merton originally posited strain theory as an adaptation of Durkheim's anomie theory, but on a micro and mezzo level (Merton 1959; Merton 1938; Merton 1968). Merton did not necessarily agree with the Chicago school interpretation that poor, high crime neighborhoods were disorganized. Coming from a poor neighborhood himself, he considered them differentially organized (Pfohl 2009). He also posited that individuals adapted to strain in one of five ways: conformity, innovation, ritualism, retreatism, or rebellion. Criminologists have primarily been concerned with innovation and retreatism since these often involve deviant behavior and rebellion is relatively rare. High levels of strain in Merton's classical strain theory were caused by blocked opportunities, similar to what Wilson discussed regarding the spatial availability of jobs and education within areas on concentrated disadvantage (Wilson 1987; Wilson 1996). These blocked opportunities prevented individuals from achieving the American Dream, which was focused on consumerism and consumption. Merton, however, did not specify any additional types of strain or elaborate on causes of strain beyond blocked opportunities in his original writings (Merton 1938; Merton 1968). Robert Agnew would expand upon classical

strain theory to develop General Strain Theory (GST), where different types of strain are taken into account and includes the specification of risk and protective factors (Agnew 1985; Agnew 2001; Agnew 2002; Agnew 2006).

Agnew's theory built, to a certain degree, on Albert Cohen's notion of status frustration (Cohen 1955). Cohen believed that this status frustration was the cause of juvenile delinquency, which tended to be non-utilitarian, random, and often just spiteful. Cohen thought juvenile delinquents committed delinquent acts for the hell of it in order to invert middle class norms which they could not hope to meet. Agnew built upon this framework by expanding the types of strain that were considered. He also generalized classical strain theory beyond a simple desire for economic gain (Agnew 2001). Agnew proposed that strain could be the failure to achieve any positively valued goal. Strain could also stem from the removal of positively valued stimuli, meaning an individual loses something they value. This could happen in a residential move where an individual loses their friendship network. They could also lose family members or status. A third type of strain is the presentation of negative stimuli. This can take many forms and Agnew mentions that strains seen as unjust are particularly salient for an individual. Often this can take the form of racial discrimination or discrimination based on socioeconomic status.

There are other exacerbating factors in GST. Strains that are seen as unjust are one factor and strains that are high in magnitude are also more likely to lead to delinquent behavior (Agnew 2006). Strain combined with low self-control can also cause criminal coping, thus combining strain principles with the principles in control theories. Strain can also create some particular pressure to engage directly in criminal conduct. Protective factors, or factors that "condition" strain, include the presence of self-control, availability of other valued goals, coping resources such as a high level of social bonding, internal resources, fear of the law, or simple lack of access

to illegitimate opportunities (Agnew 2001). A final addition to strain theory was that strains could be experienced, vicarious, or anticipated (Agnew 2002). Agnew's GST does not exclude other theories from consideration and tacitly incorporates control theories such as social bond theory (Hirschi 1969). This makes it a flexible theory with many applications to juvenile delinquency.

Research regarding residential mobility and strain has found that moving can often strain peer networks, thus removing a source of support from children (Haynie, South and Bose 2006). This is no guarantee of increased delinquency, however, and depends more on the quality of peer networks (Pettit and McLanahan 2003). Research conducted with the MYS has shown that anticipated strains actually had a higher likelihood of resulting in deviant behavior relative to experienced strains (Jaggers et al. 2014). This finding, while congruent with Agnew's GST, is contradictory to what Merton (1968) would have predicted. Those with the highest expectations regarding education and adulthood had lower levels of delinquency. Negative peer influences, quantified as experienced strain, also had an effect on delinquency, but not to the extent of anticipated strains quantified as educational and adult expectations.

Another study, examining more long-term outcomes, found that high levels of residential mobility led to decreased levels of well-being for adults, but only among introverts (Oishi and Schimmack 2010). This might indicate that the individual ability to form social networks quickly limits negative effects associated with residential mobility and proposes that psychological characteristics can impact the effect of residential mobility on juveniles. Some were just able to blend into their new surroundings better, according to Oishi and Schimmack (2010).

Strain, at a macro-level, can be used to predict community levels of violence (Agnew 1999). There can be a reciprocal relationship between residential mobility at the community level and community level strain (Warner and Fowler 2003). Low levels of informal social controls combined with concentrated disadvantage can lead to higher levels of neighborhood violence. High levels of social support within neighborhoods, however, can condition the strain and lead to lower levels of violence than would be expected in a neighborhood without collective efficacy according to Agnew (1999). Warner and Fowler (2003), however, found that informal social control did not have the expected conditioning effect which leads to relatively mixed findings at the community level of analysis.

Finally, strain tends to have a strong effect for the truly disadvantaged. Relative deprivation, rather than absolute deprivation, can lead adolescents into a feeling of normlessness and anger (Bernburg, Thorlindsson and Sigfusdottir 2009). This in turn increases deviance and delinquency. Oddly enough, Bernburg, Thorlindsson, and Sigfusdottir's study found that this was limited to school community and not necessarily Icelandic society as a whole. This would indicate that residential moves to higher income areas while a juvenile remains poor would result in the most strain and the greatest amount of delinquency. Macro-level studies confirm this result. Resource deprivation had less effect on crime in areas with high welfare participation, but a higher impact on areas with low welfare participation (Hannon and DeFronzo 1998). Overall, this indicates that the relative deprivation of those in the MYS sample should not greatly exacerbate their crime rates, but it is important to take this into account during the analysis.

ISOLATING RESIDENTIAL MOBILITY

Much of the literature on residential mobility and delinquency has concentrated on neighborhood effects rather than individual characteristics of the juveniles. Beyond that, there has been omissions in calculating school effects. The families most likely to move are often the most disadvantaged, and controlling for selection effects is important in this context (Gasper, DeLuca and Estacion 2010; Kling, Liebman and Katz 2007). In this sense, random effects models are one solution to control for selection bias on observed and unobserved characteristics between individuals (Gasper, DeLuca and Estacion 2010; Hox, Moerbeek and van de Schoot 2018). Random or fixed effects models can be used, but the choice is often due to assumptions the researcher is willing to make. If the assumption is that there is some underlying cause for both delinquency and mobility, then random effects models are not appropriate since independent variables should not be correlated with any omitted or unobserved variables. Fixed effects models are often preferred for panel data since they control for unmeasured individual characteristics that are stable over time (Singer and Willett 2003).

Gasper, DeLuca, and Estacion (2010) propose the use of a "hybrid" random effects model that allows for the benefits of a fixed effects model while allowing for the estimation of coefficients for time-invariant characteristics such as sex (Raudenbush and Bryk 2002). This is accomplished by decomposing the time-varying independent variables into two components, one of which is the mean of the variable for an individual across time. The second part is the difference in the value of the variable at any given time point and the group mean for that individual. This helps to isolate mobility as a cause. Another important factor in the study is the inclusion of change in school, which was often neglected in previous studies.

Using strain and social control as a theoretical basis, Gasper, DeLuca, and Estacion (2010) argue that delinquency and residential mobility have a common cause. School change is taken into account as another source of strain, although this is not hypothesized to cause delinquency. This is similar to a prediction made by Travis Hirschi that school mobility and delinquency are not causally related, with those with low self-control likely to perform poorly at school and possibly be the subject of expulsion or transfer to alternative schools (Gottfredson and Hirschi 1990).

Using conventional logistic regression models which included just covariates to control for selection, the researchers found that there was a connection between both school mobility and residential mobility and delinquency. A random-effects logistic regression model also shows a significant relationship between both types of mobility and delinquency at the between-person level. The within-person coefficients were not significant, indicating that residential and school mobility might not cause an increase in delinquency. Their study indicates that youth who are more delinquent are more likely to move. This was also true for substance use (marijuana, alcohol, and tobacco). Youth who displayed a variety of problem behaviors were more likely to move therefore the difference after moving cannot be attributed to the residential or school mobility itself.

The use of hybrid random effects models is not the only way to isolate the effects of moving. Another technique used is propensity score matching (Porter and Vogel 2014). This focuses on the individual propensity to move and helps to control for any selection bias that is present whenever there is not a control and experimental group. With experimental and control groups, ITT and TOT models are often used in order to calculate not only the more conservative

intent to treat models, but also the actual treatment effects on those who took advantage of housing vouchers in the case of the Moving to Opportunity experiment.

Porter and Vogel (2014) address gaps in the literature caused by the use of a series of covariates to control for selection effects. While they claim a clear link in past literature between residential mobility and delinquency, without estimating the propensity to move and thus control for selection effects, no real attribution can be made to residential mobility itself. Their study used the National Study of Adolescent Health (ADD HEALTH) which is a nationally representative sample. The characteristics of this sample are substantially different from the MYS, although the importance of neighborhood conditions is stressed in the study (Porter and Vogel 2014). Porter and Vogel argue that background characteristics rather than the actual residential mobility are what lead to delinquency and control for a variety of covariates. The propensity score matching is appropriate because temporal order can be maintained and there are a number of established predictors that can be used to estimate the propensity score (Guo and Fraser 2014).

This has advantages over fixed and random effects in that it is not based on controlling for other factors (Porter and Vogel 2014). It estimates a probability of receiving a treatment, which in this case is moving. Instead of adjusting coefficients for confounding variables, it allows for the development of a statistically created control group that is equally as likely to have undergone the treatment, allowing for a type of quasi-experimental design using data collected in a naturalistic setting. Negative binomial models indicated that residential mobility was associated with higher levels of violence and general delinquency, but the effect size was not large. Nearest neighbor matching using one-to-one and three-to-one algorithms were used with a .001 caliper size. This exposed differences in groups of movers vs. non-movers. Sensitivity

analyses and other diagnostics were acceptable, and kernel-density models were eventually used to prevent data loss. These models did not indicate that mobility directly associated with increases in general delinquency or violent behavior. This was true across multiple model specifications including local linear regression, two types of matching, and kernel-density models.

The findings of the previous two studies discussed indicate the importance of accounting for differences between the distribution of covariates between those who move and those who do not in order to isolate the effects of residential mobility. The MYS is particularly good for this given the homogeneity of the sample, and the lack of difference between those surveyed and those missed during the study (Bolland 2012). Subjects in the current study who missed waves or had missing data present within a wave did not differ significantly from one another and, overall, the sample in the MYS was representative of the target population, which resided in the target areas. There was also little difference between those who moved and those who did not move regarding past delinquent behavior. This is most likely due to the somewhat random chance of moving in the target areas. The researcher for the current study observed housing units being closed on a regular basis for renovation or permanent closure and this led to displacement for no other cause than maintenance and policy adjustments on the part of the Mobile Housing Board.

MOBILE YOUTH SURVEY LITERATURE

While the prior literature regarding residential mobility is mixed, it is important to briefly examine literature associated with the MYS in order to determine what covariates are associated with increased likelihood of delinquency in order to develop a properly specified model. No

previous studies examine residential mobility in this population with the exception of a single study focused on mental health (Byck et al. 2015). Since the MYS was primarily conducted out of a public health paradigm, delinquency has not been the subject of most of the research connected with the survey. Studies examine various facets of delinquency while others concentrate on the representativeness of the sample. While delinquency has been examined to some extent, residential mobility, which is more common in these distressed areas, has not.

Studies on Mobile Youth Survey cohorts indicate that parental supervision and parental style have influences on delinquency with permissiveness being positively related to delinquency and parental knowledge positively related to delinquency, sometimes in a bi-directional fashion (Church et al. 2015; Harris, Vazsonyi and Bolland 2017). Parental warmth is another factor that can affect delinquency, although the warmth of the biological father tends to decrease with age (Jaggers et al. 2017). Parental effects also extend to maternal attachment and self-worth. These were predictive of substance use and violent behavior, with higher levels of attachment and self-worth predicting lower levels of substance use and violent activity as well as defensive and offensive strategies such as weapons carrying (Lockhart et al. 2017; Spano et al. 2012). Youth do seem to become more resilient as they become older, where the effects of lack of parental monitoring are partially attenuated. Overall, the relationship between the parent and juvenile, as well as the perceived stability of this relationship, is an important factor that should be taken into account (Lian and Bolland 2014). Hypervigilant parental monitoring, however, does not completely shield the adolescents from violence within their neighborhood, but can affect exposure to high levels of violence (Spano, Rivera and Bolland 2011).

Connectedness with other non-familial institutions is also important. This is predicted by Social Bond Theory (Hirschi 1969). Beyond the connection between parent and juvenile, the

connection to school, the neighborhood, and peers is important at limiting delinquency and is also connected to parental monitoring. Parental monitoring promotes prosocial connectedness in a variety of ways (Jaggers et al. 2015). Like many effects with this population, there are gender differences, showing the importance of possibly running separate models or at least taking gender into account. Social connectedness beyond the family can also affect hopelessness. High levels of hopelessness, which can increase with age, predict higher levels of violent behavior (Stoddard et al. 2011). Self-worth and connections to friends can also affect high-risk behaviors such as gang membership which, unfortunately, is common within this particular population (Jaggers et al. 2013). Overall, social bonds and the effect these bonds have on delinquent and deviant behaviors has not been fully explored in the MYS with the exception of a plethora of studies on parental attachment and various other parental behaviors such as monitoring.

Gang membership and weapons carrying is a problem with the population examined in the MYS. Exposure to violence can lead to gang membership, which in turn leads to defensive measures such as carrying a weapon (Spano and Bolland 2011). In a similar fashion, proximal exposure to violence predicts weapons carrying as well as violent delinquency, which supports Agnew's GST (Spano, Rivera and Bolland 2006). Hopelessness also leads to a variety of behaviors consistent with Anderson's Code of the Street hypothesis (Anderson 2000; Drummond, Bolland and Waverly 2011). Hopelessness seems to lower internal constraints that might act as a protective factor regarding violent behavior and neighborhood norms can contribute to a juvenile feeling that it is necessary to fight and carry a weapon (Drummond, Bolland and Waverly 2011). While the Code of the Street hypothesis is a viable theoretical framework with which to analyze juveniles in the MYS, the current study does not address this theoretical framework. Gang membership and weapons carrying is also mediated by

employment status, with those who work more likely to become victimized (Spano, Freilich and Bolland 2008). This does not, however, predict involvement in violence congruent with Social Bond Theory. Rather, it would be predicted by Routine Activities Theory (Cohen and Felson 1979).

Overall, most of the research with the MYS does not thoroughly examine delinquency and deviance as an outcome considering residential mobility and is often focused of the role of the parental warmth, monitoring, and psychosocial factors such as peer influence, self-worth, and hopelessness. Both Social Bond Theory and a Strain theory paradigm have been ineffectively applied to this particular dataset, partially due to the public health nature of the survey. The current study adds to the MYS literature by applying these theories and also incorporating covariates not present in previous studies that are related to delinquency as well as focusing on residential mobility as the primary variable of interest. Neighborhood effects, as measured by participant perceptions of their environment, are also missing for many analyses and have been shown in previous literature to be an important factor in not only the likelihood of engaging in violence, but moving in the first place (Katz, Kling and Liebman 2001; Kling, Liebman and Katz 2007; Leventhal and Brooks-Gunn 2003). The MYS is particularly suited to control for neighborhood effects since the target areas were selected based on criteria that makes them homogenous (Bolland 2007). The researcher involved in the current study observed all of the target areas and noted that they are each distinct but, overall, the conditions are very similar, thus these effects are to some extent considered fixed in the current study.

While there is a large amount of literature on deviance and residential mobility, much of the literature is focused on neighborhood effects using an ecological framework congruent with a social disorganization perspective. While this is important, there is a critical lack of literature

that examines residential mobility from an individual perspective using individual level characteristics such as hopelessness, bonding to non-familial institutions, and the strain related to living in extremely disadvantaged areas. In addition, while there is some literature that employ adequate methods to account for within-individual and between-individual variation or match those who moved with those who would have a high propensity to move, there are no studies that employ rigorous methods with a group of what Wilson would refer to as the truly disadvantaged. The current study adds to the literature by analyzing a truly disadvantaged population and the effect that residential mobility, often forced by housing project closures and restructuring, has on these vulnerable but often resilient youth.

CHAPTER III

METHODS

This methods section will begin by examining the hypotheses examined in this study in-depth along with the sources of data and provide details on how the data was collected. With longitudinal studies, it is important to consider methodological issues such as missing data between and within waves and the representativeness of the sample. Given that the Mobile Youth Survey was a community survey, it is particularly important to establish that a representative sample was obtained given the design of the survey. Characteristics of the variables used for the current study are examined along with the analytical strategy that addresses various hypotheses in the study. The handling of missing data as well as statistics used to analyze model fit are discussed in the chapter as well as the treatment of the residential mobility as a predictor variable and the composition of the full sample and subsamples that were used for each series of models in the current study.

FORMAL HYPOTHESES

The formal hypotheses tested in the current study consist of six sets of hypotheses. Each set of hypotheses deals with the outcomes for five dependent variables of interest. For the purposes of the current research, the research hypotheses were stated rather than the null hypothesis which is actually tested with the statistical tests performed in the current research. Each hypothesis contains sub-hypotheses for each outcome variable that is tested in the current research. The outcome variable arrest has a single hypothesis while the other outcome variables are investigated under hypothesis two. Hypothesis three and four deal with the mediating relationships between the social bonding variables and the strain variables respectively, while

hypotheses five and six deal with interaction effects with residential mobility and neighborhood connectedness and violent expectations. Hypotheses are also stated as directional and are intended as such although statistical tests used in the current research relied on two-tailed hypothesis testing and probabilities. It is important to note that while hypotheses one and two state that there will be a positive relationship between the outcome variable of interest and residential mobility, due to coding this positive relationship would be indicated by a negative coefficient. The hypotheses tested as part of the current research are stated below:

Hypothesis One

1a: There will be a positive relationship between residential mobility and arrest within a given year.

Hypothesis Two

2a: There will not be a positive relationship between residential mobility and severity of fighting behavior in a given year

2b: There will be a positive relationship between residential mobility and severity of weapons carrying behavior in a given year

2c: There will be a positive relationship between residential mobility and severity of drug use in a given year

2d: There will be a positive relationship between residential mobility and severity of gang membership in a given year

Hypothesis Three

3a: There will be a mediating relationship between social control variables and residential mobility regarding arrest

3b: There will be a mediating relationship between social control variables and residential mobility regarding severity of fighting behavior

3c: There will be a mediating relationship between social control variables and residential mobility regarding severity of weapons carrying behavior

3d: There will be a mediating relationship between social control variables and residential mobility regarding severity of drug use

3e: There will be a mediating relationship between social control variables and residential mobility regarding severity of gang membership

Hypothesis Four

4a: There will be a mediating relationship between strain variables and residential mobility regarding arrest

4b: There will be a mediating relationship between strain variables and residential mobility regarding severity of fighting behavior

4c: There will be a mediating relationship between strain variables and residential mobility regarding severity of weapons carrying behavior

4d: There will be a mediating relationship between strain variables and residential mobility regarding severity of drug use

4e: There will be a mediating relationship between strain variables and residential mobility regarding severity of gang membership

Hypothesis Five

5a: There will be a significant interaction between residential mobility and neighborhood connectedness regarding arrest in a given year.

5b: There will be a significant interaction between residential mobility and neighborhood connectedness regarding severity of fighting

5c: There will be a significant interaction between residential mobility and neighborhood connectedness regarding severity of weapons carrying behavior

5d: There will be a significant interaction between residential mobility and neighborhood connectedness regarding severity of drug use

5e: There will be a significant interaction between residential mobility and neighborhood connectedness regarding severity of gang membership

Hypothesis Six

6a: There will be a significant interaction between residential mobility and attitudes towards violence regarding likelihood of arrest in a given year

6b: There will be a significant interaction between residential mobility and attitudes towards violence regarding severity of fighting in a given year

6c: There will be a significant interaction between residential mobility and attitudes towards violence regarding severity of weapons carrying behavior in a given year

6d: There will be a significant interaction between residential mobility and attitudes towards violence regarding the severity of drug use in a given year

6e: There will be a significant interaction between residential mobility and attitudes towards violence regarding gang activity in a given year.

DATA SOURCES: THE MOBILE YOUTH SURVEY

The Mobile Youth Survey (MYS) was conducted in Mobile and Prichard, Alabama from 1998 to 2011. The 14-year longitudinal study was initially designed to capture information regarding conditions faced by juveniles in extremely impoverished areas (Bolland 2012). The survey itself began with a broad spectrum of questions designed to measure a variety of public health, mental health, and criminological elements in youth ages 10 to 18 (although youth from 9 to 19 were allowed to participate if their birthdates fell within the data collection time-frame from May to Early August). In total, over 12,000 individuals participated in the survey over the 14-year time frame. Most completed multiple waves. The data was collected by a team of research assistants recruited from universities throughout the country. All research team members received a week of training on survey procedures before beginning survey work. The author of this study worked as part of these teams from 2005 to 2010 and spent a great deal of time in each of the target areas and many of the initially untargeted areas. The author of the study, being from the Mobile MSA, is also familiar with the history of these areas and spent time in quite a few of the areas before joining the research project. The MYS and the sample was used for a variety of additional projects related to the fields of genetics, education, and psychology.

The areas of operation for the survey and the target population consisted of youth who lived in the most disadvantaged areas in the Mobile Metropolitan Statistical Area (MSA). The selection criteria was simply based on which neighborhoods had the lowest median income in the MSA. Thirteen neighborhoods were selected which had a range of poverty rates from 31.5% to 81.4%, with a median of 57.2%. The median rate of extreme poverty, which is defined as less than 50% of the established poverty rate was 30.5% (Bolland 2007). Not all of the

neighborhoods were public housing. Seven of them were public housing while six were private

housing often containing large amounts of section 8 housing. Five of the neighborhoods were

located in Prichard while eight were in Mobile. Later, more neighborhoods, such as Trinity

Gardens were added. Some neighborhoods were removed over time, such as Orange Grove

when it was closed in 2005.

The MYS began as a multiple cohort study or rotating panel design where new

individuals entered the study each year, while some left as they aged out of the sample. Youth,

once they entered the survey, were followed even if they left designated target areas. When the

MYS began, participants were recruited by selecting half of the households within housing

projects using housing authority data. In non-housing projects, half of the addresses were

selected since there was no way of knowing if juveniles lived in a specific location (Bolland

2007). Address lists were developed by patrolling the neighborhoods. Other recruitment

methods included posting flyers around target neighborhoods encouraging youth to come to

survey administrations at community locations such as churches or a Boys and Girls Club.

Research assistants would accompany anyone who responded to these flyers to their home,

where they would have a parent or guardian sign a consent form.

This was the procedure throughout the survey, although by 2005 over 3,000 youth were

being surveyed each summer. This led to adoption of somewhat different procedures. Eligible

youth within neighborhoods were recruited with flyers and information from the housing

authority, but numerous checks were implemented to ensure individuals did not take the survey

twice during the same summer. All previous participants who were eligible were placed on a list

available at a survey site. They had to know their address, date of birth, and full name in order to

take the survey. After this they were removed from the list. This reduced the number of

individuals who were successful at taking the survey twice and individuals who did take it twice were taken out of the sample during the data cleaning process. The researcher conducting the current study implemented these procedures and feels that they were effective.

Surveys were given in both group and individual settings with multiple research assistants present to assist participants with completing surveys successfully. The survey was read aloud to the participants and they were paid 10 dollars before 2005 when it was changed to 15 dollars (Bolland 2007; Spano, Rivera and Bolland 2006). Untargeted neighborhoods also presented a problem. This increased the number of surveys given in homes rather than at community centers. The privacy of the respondent was always critical and research assistants were instructed to make sure that no one else, such as a brother, sister, or parent, was in the room while the respondent was filling out the survey. The survey, conducted every summer, gained traction in the targeted areas resulting in a response rate of over 88% after the second year of the research project (Bolland 2012; Bolland 2007). There is, however, no way to justify the survey as a random sample. Research teams surveyed any youth who came to a survey point as long as parental consent could be obtained. The lack of a random sample is mitigated by the coverage of the survey as discussed in the next section on survey representativeness.

Mobile Youth Survey Representativeness

Any survey that does not use some form of random sampling can contain crippling selection bias that make any inferences untenable. While the MYS did not use random sampling throughout the 14-year survey, it can still be considered representative and the data can be considered missing at random (Bolland 2012; Spano, Rivera and Bolland 2006). This can be inferred because there were other datasets with which to compare the MYS sample. Information

was collected from Mobile County Public School System (MCPSS) records as well as Mobile

Housing and Urban Development records (Mobile HUD). Mobile County Juvenile Court

(MCJC) records were also available. These datasets allowed the research team to determine how

much coverage had been obtained by MYS sampling, and whether there were any differences

between those who were surveyed and those who were not.

Two types of missing data are of concern. Some missing data comes from youth who

were never contacted or never took the survey. There is also between-wave missing data and

within-wave missing data. Within-wave missing data is not as large a problem in longitudinal

studies as between-wave missing data. Many times participants would miss a wave and then be

contacted in a future wave and complete survey data at that point. As long as data can tenably be

considered missing at random (MAR), various techniques can be used to impute data that is

missing from the dataset. While it is untenable to consider the data missing completely at

random (MCAR), the missing at random assumption is indeed tenable with this particular

population and the MYS data in general (Bolland 2012).

Representativeness and missing data patterns for the MYS were explored by Bolland and

found to be consistent with the total population living in target and expansion neighborhoods

(2012). When the MYS first started in 1998, only 13 of the poorest neighborhoods were

targeted. As participants moved, 35 additional "neighborhoods" were included in the sampling

frame to some extent. There was some active recruiting in these neighborhoods, but many of the

respondents were simply followed to the expansion neighborhoods. The 13 target

neighborhoods were larger and also had more consistent representation in the MYS.

The representation of students who were enrolled in the MYS compared to those who

lived in the area but did not participate can be compared since there were multiple datasets

available to researchers (Bolland 2012). These included public housing records as well as records from the Mobile County Public School System (MCPSS). This allowed researchers to compare participants and non-participants based on several factors including race, gender, and free and reduced cost lunch status. Additional analyses were run comparing those enrolled compared to those not enrolled regarding performance on standardized tests. Even with a large sample with 20,000 data points, there were only significant findings for three years and this was localized to the expansion neighborhoods. Findings indicated that there were no practically significant findings regarding differences between those enrolled in the MYS and those who were not. There were slight variations by wave regarding the age of respondents relative to the target population. Earlier in the survey younger respondents were slightly overrepresented and later waves showed an overrepresentation of older adolescents. The effect size, however, was weak, indicating that an assumption of missing at random (MAR) is tenable with the MYS. The missingness in the MYS is ignorable and meets the assumption of MAR (Bolland 2012).

The second missing data issue with the MYS, and longitudinal data in general, is missing waves. There are several reasons individuals might miss specific waves within the MYS. Some are gone for the summer and some were incarcerated but this was rare. Others were simply not available or moved to a location where they were not contacted for a specific year (Bolland 2012; Moore 2015). In these cases, bias can be introduced into the data if the individuals who miss waves are significantly different from those who do not miss waves. Those who were available for more waves would have a larger impact on any statistical analysis if they significantly differed from those with less waves. In the case of the MYS, it is tenable to assume that individuals missed waves at random, as they do not significantly differ from those who

completed more waves (Bolland 2012; Spano, Rivera and Bolland 2006; Spano, Rivera and Bolland 2011).

In summary, the MYS is representative of the target population of adolescents from ages 10 to 18 who lived in impoverished neighborhoods. They were also representative of youth who lived in expansion neighborhoods which were included as the MYS progressed through 14 years of data collection. Even though random sampling was not conducted after the initial stages of the project, the wide coverage of the recruiting and high visibility of the survey within the targeted areas ensured that enough individuals were surveyed to form a representative sample. The was confirmed through the availability of secondary datasets (Bolland 2012). The assumption of missing at random is tenable, which allows for several strategies for handling missing data to be employed which are discussed later in this chapter (Enders 2010).

DEPENDENT VARIABLES

Delinquency can be measured multiple ways using the MYS. Multiple dependent variables were used in separate models to estimate the effects of residential mobility on different types of delinquency. Some types of delinquency are more common, such as fighting, while others are observed less frequently, such as arrest or weapons carrying. To obtain a full understanding of how residential mobility and disruption affects delinquency, it is necessary to estimate the effects of a variety of behaviors. Disparate types of deviant behaviors might be related to different causal structures. Residential mobility, with the possibility of causing feelings of insecurity, vulnerability, or despair might lead to an increased perception of the need for protection, resulting in the carrying of weapons. A respondent might also feel that they have to prove themselves. This could lead to increased fighting (Anderson 2000).

The first dependent variable is arrest in the previous year measured as a dichotomous variable. This consists of a self-reported arrest. This variable, over time, is compared to a measure of whether the respondent has ever been arrested and any inconsistency is excluded from the analysis. If a respondent states that they were arrested one year, then in future waves does not respond affirmatively to the question regarding any arrest history, this was recorded as an inconsistency. Arrest did not include any follow-up questions regarding conviction, but this variable served as a measure of formal delinquency that was severe enough to result in the involvement of authorities to some extent. It should be noted that with self-reported results of arrest, it is important to take into account the domain of what is being measured (Hindelang, Hirschi and Weis 1979). Arrest, to the respondent, could simply mean a formal detention by authorities rather than formal processing at a juvenile detention center. Despite the different definitions that individuals might have, self-reported arrest serves as a good indicator that the respondent did something noticeable enough to attract negative attention from the police

A second dependent variable used in this analysis examined the extent of physical fighting. This measure is ordinal in level and measures the frequency and temporal proximity of physical fights. Levels of this variable include "0" for never, "1" for none in the last 90 days, "2" for once in the last 90 days, "3" for more than once in the last 90 days, and "4" and "5" for once in the last 30 days and more than once in the last 30 days respectively. This variable was collapsed into four categories by combining categories for never having been in a fight and not fighting for the last 90 days and combining the categories for fighting once and more than once in the last 90 days. This was appropriate given the distribution of the data for the variable. Fighting is a common activity and there is no measure of the severity of fighting in the MYS. Other variables, not used in this analysis, were used to measure more severe forms of

interpersonal conflict such as shooting at other people. Fighting was commonly observed by the researcher while gathering data in the field, and a notable increase in somewhat organized fighting was observed after the dissolution of large housing projects. This dependent variable empirically tests that observation.

A third dependent variable used in this study was weapons carrying. Carrying of a weapon, which for this variable was defined as a knife or gun, can occur for a variety of reasons. These reasons include gang membership, drug dealing, or peer weapon ownership (Lizotte et al. 2000). An increase in perceived threat can also lead to carrying weapons. Respondents theoretically might be responding to real or perceived threats which might be exacerbated by moving to a new environment (Brown and Benedict 2004). Weapons carrying, as with adults, can become common with juveniles, where they always feel the need to carry a weapon. This variable was measured as an ordinal variable where "0" indicated never, "1" and "2" indicated never and once during the last 90 days, "3" indicated more than once in the last 90 days, while "4" and "5" indicated once and more than once in the last 30 days. In addition, "6" and "7" indicated once and more than once in the last seven days to indicate the habitual carrying of a weapon. Categories "0" and "1" were collapsed, as well as categories "2" and "3" and "4" and "5", forming a five level ordinal variable.

An additional dependent variable that was analyzed in this research involves drug and alcohol use. While there is concern over any use of intoxicating substances with juveniles, this variable measured "getting drunk or high" rather than the simple use of a substance. It did not focus on any particular substance although other items in the survey included questions regarding the use of tobacco, alcohol, crack, methamphetamines, and marijuana. This indicator acts as a more global assessment that takes into account other substances that might have been

used by the respondent. The variable is ordinal and ranges from zero to seven, with "0"

indicating no use at all, while "1" indicates no use in the past year. Values of "2" and "3"

indicated once or more than once within the last year. Values of "4" and "5" indicate once or

more than once in the last 30 days, while "6" and "7" indicate once or more than once in the last

seven days. The last two categories represent habitual use of drugs or alcohol and were left as

individual categories. Categories for no use at all and no use during the last year were combined

and categories related to use in the last year and use in the last 30 days were combined, which

resulted in a five level ordinal variable.

The last dependent variable of interest in the research was gang affiliation. Gang

affiliation was originally measured as an ordinal variable with "0" representing no involvement

with gangs, "1" representing former involvement, but no current involvement, and "2"

representing no past or current involvement but an association with gang members. Other

categories included "3" which represented former involvement in a gang and current association

with gang members, and "4" which represented current gang membership. The dependent

variable was collapsed into a dichotomous variable by merging "0" and "1", as well as "2" and

"3" into a category representing no current gang membership and a category, "1", which

indicated current gang membership. This simplifies not only the analysis but captures the nature

of the desired outcome. Either an individual is in a gang or they are not.

Gang membership can be hard to define using a self-report survey such as the MYS in

that no clear definition of gang is provided. Gang membership is also sporadic (Esbensen and

Huizinga 1993). Juveniles tend to move into and out of gangs fluidly from year to year. While

individuals who are more prone to delinquency are more likely to join gangs, there is a direct

effect of gang membership on level of delinquency (Gordon et al. 2004). There is also the

possibility of joining a gang in order to receive protection, which can be connected to instability

associated with residential mobility within impoverished areas (Cloward and Ohlin 1960;

O'Brien et al. 2013; Sharkey et al. 2011)

INDEPENDENT VARIABLES

The main independent variable of interest in this analysis was residential mobility,

measured as self-reported amount of time the respondent had lived in the same neighborhood.

This was measured on a scale ranging from less than a year, around a year, up to five years or

more with increments of one year. A self-report measure was used to measure residential tenure

within a neighborhood since, often, neighborhoods are defined best by those who live in the area

and can be difficult for researchers to define accurately (Bursik and Grasmick 1993; Hipp, Faris

and Boessen 2012; Sampson 2012). This form of measurement has several advantages as

members of the particular population of interest tend to use multiple addresses. If multiple

addressed were used, these were usually the addresses of relatives well within the survey area.

But the self-reported neighborhood is more reflective of what the respondent feels their

neighborhood is and does not depend on official data such as the address obtained from the

school system, which might or might not be where they stay most of the time. The researcher's

observations while collecting the data indicated that, for the vast majority of residents, the

address provided was where they stayed. This was confirmed by visits to the residences of many

of the survey participants and the consistency of the addresses over the years of survey

administration.

The variable ranged from 0 to 5, with higher values representing residential stability

rather than mobility. The coding scheme originally employed in the survey was kept since it is

more intuitive that higher values indicated a longer term of residence in a particular neighborhood. It is important to consider the effect this had on the direction of the expected coefficients and the interpretation of these coefficients. If residential mobility contributed to delinquency, these coefficients would be negative rather than positive and were interpreted in this manner throughout the current research. In summary, an inverse relationship between the residential variable and the outcome was interpreted as a positive relationship between residential mobility and the delinquent outcome.

Other independent variables of interest include variables related to development. These include scales measuring self-worth and hopelessness. The scale measuring hopelessness is constructed from six items drawn from Kazdin's scale for hopelessness, depression, and suicidal ideation (Kazdin et al. 1983). This scale ranges from zero to six with higher scores indicating more hopelessness. Self-worth is measured using a nine-item scale adapted from Harter's perceived competence scale, which included a scale for self-worth (Harter 1982). This scale ranges from zero to nine with higher scores indicating greater self-worth. Both of these constructs have been shown by the extant literature to be related to delinquency and can also be related to a hypothesized negative impact regarding residential mobility on internal beliefs of juveniles (Byck et al. 2015; Coleman 1988; Drummond, Bolland and Waverly 2011). It is also theoretically applicable, according to GST, that high levels of self-worth would act as a protective factor while high levels of hopelessness would act as a risk factor (Agnew 2001; Agnew 2006).

Social Control Variables

While the variables measured in the MYS preclude an actual test of any control theory, there are several scales that allowed for components of Hirschi's Social Bond Theory (1969) to be examined as they affect outcomes related to residential mobility and delinquency (See *Appendix B* for social bond MYS variables used). Neighborhood connectedness is one such 11-item scale with agree or disagree options that measures attachment to the neighborhood and includes factors such as whether a respondent feels that they can talk to people in their neighborhood, if there are people they depend on in their neighborhood, and whether they feel they are a part of their neighborhood (Glynn 1981; Perkins et al. 1990). Feeling connected to the neighborhood and feeling that they are an important part of the neighborhood was predicted to lower the chance that a juvenile engaged in delinquent behavior. This scale ranges from zero to 11 with higher scores indicating higher levels of connectedness to the neighborhood. Similarly, warmth towards the mother or figure that was most like a mother to the respondent was measured using a six-item scale ranging from zero to six (Lamborn et al. 1991). This scale deals with help and support the mother provides for the juvenile and is a component of attachment as defined by Hirschi (1969). This served as a measure of attachment to the family.

Parental monitoring was measured using a six-item scale that measured what parents knew about different aspects of the juvenile's life (Lamborn et al. 1991). These questions examined how much the parents knew by the juvenile's estimation regarding who they associated with, where they spent most of their time, and where, if anywhere, they went at night. Questions also addressed how much the parents attempted to know these things, so even if the juvenile underestimated or overestimated the knowledge parents actually had, they might be more accurate in measuring effort. This scale ranges from zero to 17, with higher levels

indicating more parental monitoring. Parental monitoring would theoretically act as a control and a deterrent to juvenile deviance, and perception is critical for any deterrent effect to manifest itself (Stafford and Warr 1993).

Other aspects of Social Bond Theory were also measured. Inevitability of violence, measured as an 8-item scale, examined the belief of a juvenile regarding the usefulness of violence and how inevitable violence was in their life (Bandura 1973). Callousness and caring, an 8-item scale ranging from zero to eight, measured general beliefs about the importance of others and utility of manipulation (Frick et al. 2003). High levels of this trait were expected to increase the likelihood of delinquency. Expectations about adulthood was also examined as a measure of commitment. This 4-item scale, ranging from zero to 4, represents expected outcomes the juvenile planned to have as an adult such as getting a good job or getting married. This is related to the construct of commitment and represents the level of future orientation the juvenile has regarding life outcomes. Higher expectations were expected to reduce propensity for delinquency (Hirschi 1969).

The quality of bonds, while never explicitly addressed by Hirschi (1969), were addressed in this study by including a peer support/peer-pressure scale developed for the MYS. This scale measured self-reported values indicating what peers would think of activities such as having sex, using drugs, getting in a fight, and engaging in other deviant activities. Questions were also asked regarding peer opinion of doing well in school, not fighting, and not using drugs or carrying a weapon, thus the questions were worded positively and negatively to form the 15-item three point scale. Subscales regarding whether friends think activities are cool or if someone is a punk if they do or fail to do a particular act range from zero to 12 each. The association between

peer values, or delinquent friends is well established (Miller 2010; Thornberry et al. 1994; Warr and Stafford 1991).

Strain Variables

While it is clear there is a certain amount of strain placed on respondents of the MYS based on the areas they live in, several variables were used to estimate exacerbated strain in respondents. The extant literature, while primarily focusing on neighborhood effects and not addressing strain directly, includes theoretical ideas related to strain (Byck et al. 2015; Cotton and Schwartz-Barcott 2016; Hagan, MacMillan and Wheaton 1996; Herbers, Reynolds and Chen 2013; Kling, Liebman and Katz 2007). Other studies address strain directly, and find mixed results regarding the effect on delinquency (Jaggers et al. 2014; Kirk and Sampson 2013; Spano et al. 2012; Warner and Fowler 2003). Given that youth in the MYS lived in high-strain environments rife with poverty and crime, it was important to estimate the effects of this on the propensity for delinquency as well as account for the effect of the strain on an individual as they move (See *Appendix C* for strain variables).

Agnew's General Strain Theory (GST) incorporates psychological concepts such as worry, stress, negative affective state, and peer pressure to explain why some individuals might choose deviant activities (Agnew 2001; Agnew 2006). Self-worth and hopelessness are important concepts explained above, while the presence of traumatic stress is also important when measuring the level of strain experienced in areas of high delinquency (Dierkhising et al. 2013). Dierkhising et al. found that 30% of incarcerated youth met the criteria for Post-Traumatic Stress Disorder (PTSD), with 70% meeting the criteria for some stress-related mental health disorder. Traumatic stress can also cause family dysfunction, thus compounding the strain

that an individual faces (Burton et al. 1994). Traumatic stress was measured using a nine-item scale developed for the Mobile Youth Survey which ranges from zero to 14, with higher levels indicating higher levels of traumatic stress.

Worry is another important aspect of stress and includes constructs like financial insecurity, ability to get along with other groups of people, and worries about being pressured by others to commit deviant acts (Small and Rodgers 1995). Worry has been shown to contribute to a variety of negative outcomes with youth in disadvantaged areas (Church et al. 2012; Stoddard et al. 2011). Hopelessness and worry can both contribute to negative affective states. Worry about peers seems to have a particularly strong impact on adolescents and thus warrants consideration (Brown, Clasen and Eicher 1986). High levels of financial insecurity or worry are predicted to cause strain and possibly lead to antisocial adaptations (Merton 1968). In Classical Strain Theory (CST), adaptations such as innovation are used to remedy financial stress by developing alternative means to achieve conventional ends such as buying nice clothes, or even purchasing necessary food. The level of financial worry combined with social worries impacts youth and might lead to higher levels of delinquency. In this study, worry was measured with a 10-item, three point scale which ranges from zero to 18, with higher levels indicating higher levels of worry (Small and Rodgers 1995). Higher levels of worry were predicted to increase the likelihood of delinquency in this study.

Anger, as measured by a five question, three point scale, captured self-reported behaviors when a particular individual was angry (Spielberger and Sydeman 1994). Negative affective states can be created by anger and an individual's personal style of internalizing and externalizing anger is important to consider when looking at deviant and delinquent acts (Agnew 2006). Maladaptive anger coping mechanisms can lead to both short-term and long-term

negative outcomes. This can be linked with impulsivity, but is a separate construct (Colder and Stice 1998; Ireland and Culpin 2006). Higher levels of anger, measured by Spielberger and Sydeman's scale (1994), were predicted to increase the likelihood of delinquency in this study.

Other Covariates

Several other covariates were included in the model to control for relevant variables. Age was included, as well as gender. Age ranges included in this analysis ranged from 13 to 18, with 13 coded as 0 and 18 coded as 5. Age was simply centered on 13. Gender was measured as male or female with female coded as 1. Arrests within the past year for anyone in the household other than the survey participant was used as a proxy for deviance of close relatives. This is a dichotomous variable with values of 0 for no arrest of a household member and 1 for arrest of a household member in the past year. An additional family variable was included regarding the existence of rules in the family. Questions were asked of the respondent regarding the existence of rules regarding the completion of homework, the extent to which the respondent was allowed to stay out (i.e. after dark, on weekends, during the week), and a question regarding rules about school work and hitting other people. This variable ranged from 0 to 7, with higher values indicating more rules.

SAMPLE SELECTION AND ADEQUACY

The sample for the analysis was drawn from all 14 waves of the MYS. Only individuals who had taken the survey three or more times when they were within ages 13 to 18 were selected. This led to a total sample of 3,837 individuals or clusters, with 15,588 completed waves. While all completed at least three waves, the maximum number of waves completed was

six. The majority of respondents completed more than three waves, with 28.8% completing four waves and 19.9% completing five waves. Only 12.6% completed all six waves and thus had complete data from age 13 to 18. To obtain the ages used to select cases, the date of survey administration was set to the first of July for the given year of survey administration and age was computed using this date and the birthdate listed on official government records (school district, housing board, juvenile courts) to obtain a consistent birthdate as well as age.

Missing data existed within completed waves, but never exceeded 4.7% for a given variable. Missing values were below 1.5% for the majority of variables. Variables with higher levels of missing values were subject to response sets that counted the variable as missing if, for example, the person did not have anyone like a mother to them.

Sample adequacy was tested using G*Power 3.1 to obtain an estimated appropriate a priori sample size (Faul et al. 2013). The sample size necessary to detect an odds ratio of 1.2, which is considered a low to slightly moderate effect, with an α error probability of .05 was 2454 person-years. While it is difficult to calculate effective sample size for longitudinal models with random effects, the sample appears to have adequate sample size to detect low to moderate effects. With a sample size of 3,837 individuals and 15,588 person-years of data, the sample is adequate even considering the addition of random effects and the number of predictors, and thus parameters, in the model.

MISSING VALUE ANALYSIS

Longitudinal studies are often plagued with missing data problems in the form of missing within-wave and missing between-wave data (Enders 2010; Van Buuren 2018; Young and Johnson 2015). These datasets often require specialized techniques to accurately impute data

when large amounts of data are missing or when missing waves are imputed. While datasets with complete cases on all variables are desirable, this is often not practical or leads to biased results. This study used single imputation to impute the small amounts of missing data present in the dataset. Missing waves were not imputed. Patterns of missingness and the overall representativeness of the MYS did not warrant imputation of missing waves (Bolland 2012; Moore 2015). Additional imputed waves have been used in previous studies with some success (Gasper, DeLuca and Estacion 2010). This is a legitimate method with more usefulness when lagged variables are used in the estimation models. In the current study, lagged variables were not used. In addition, there is evidence that there is no significant difference between those respondents who missed waves and those who did not based on a variety of demographic factors as well as responses on completed waves of the MYS (Bolland 2012).

This is acceptable to an extent and when there are variables available for an adequate imputation model, but ultimately the goal of imputation is to improve on estimates and not to change the outcome of an analysis (Allison 2000). There were, however, advantages gained by imputing within-wave missing data in this particular study. There are small amounts of missing data per variable with only two variables having more than three percent missing. The data is also considered MAR which was established with prior research (Bolland 2012). Missing Completely at Random (MCAR) is a strong assumption to make and was not met by the data used in the analysis according to statistical tests. The tests for this standard are sensitive to larger sample sizes and any slight departure normality often results in a significant statistic, implying the null hypothesis of MCAR should be rejected (Fielding, Fayers and Ramsay 2009). From a practical standpoint, single imputation using an Expectation-Maximization (EM) algorithm is acceptable for the input variables although this is often not recommended (Tsiatis et al. 2015).

The reason this technique, while once popular, is no longer often used is that it fails to account for variability in the imputed values. Imputing over multiple datasets is preferable since these estimates can be pooled and the variability of the imputed values taken into account. While preferable, and more statistically rigorous, it was unnecessary in the current study due to low amount of missing data. EM algorithms are still preferable to ad hoc techniques such as mean replacement or carrying the last observation forward (Enders 2010; Tsiatis et al. 2015). A simple EM algorithm is easy to implement and provides a completed dataset. This was beneficial in the current study given that multiple statistical programs were used. The danger of using this approach is that an EM algorithm places values close to the regression line of the imputation equation, possibly biasing standard errors downward. This was accounted for by employing robust standard errors during the analyses.

Missing Data Imputation

EM algorithms are often used in the course of multiple imputation procedures. Single imputation can involve an EM algorithm where values are obtained after the last step and substituted for the missing values in the dataset. This is acceptable when the data are MCAR, but the data for this study was not MCAR according to Little's MCAR test ($\chi^2_{38252} = 49734.52$, $p < .001$). This test is known to be extremely conservative and especially sensitive to large sample sizes (Little 1988; Peugh and Enders 2004). Often, missing data in surveys can be similar to missing data in educational instruments, in which poorer reading skills can lead to fewer answered questions. This is approximately unbiased in large samples (Peugh and Enders 2004). It can be difficult to justify the assumption of MCAR. While not ideal, single imputation was acceptable in the current study due to low amounts of missing data on most

variables and the availability of lagged variables which correlate highly with values of the variables in future waves. This provided a good imputation model.

The imputation model consisted of all dependent and independent variables, as well as variables lagged a single wave. The imputation procedure was conducted using SPSS version 25 (IBM 2017). The overall means and standard deviations of the imputed dataset were similar to the original dataset and did not change the results of the analyses. The patterns of missing data showed very little data missing on any given case. When taken as a whole, listwise deletion would have eliminated 6.8% of the total cases, often because of a single missing value on an independent variable. This would have resulted in an unnecessary loss in sample size and information. Rounding was conducted for categorical values using traditional methods where .5 and above was rounded to the next highest value. These categorical variables included the dependent variables for fighting, weapons carrying, drug use, arrest, and gang participation as well as the variable for residential mobility. Rounding was conducted before the variables were recoded or collapsed. Rounding causes some error to be introduced into the imputation. For this reason, discrete continuous variables, such as scales, were not rounded during the imputation process.   It is important to note that sex was imputed by taking the most common response per individual and filling in any missing data. Age was computed from known dates of birth and a standard date in the middle of the survey window. Table 1 contains the relevant statistics related to the variables that were imputed during the EM imputation process.

Table 1: Summary of Missing Data and Multiple Imputation Results

	Missing		Mean		SD	
	Count	Percent	Non-Imputed	Imputed	Non-Imputed	Imputed
Dependent Variables						
Arrest	329	2.1	0.17	0.17	0.37	0.37
Fighting	180	1.2	1.94	1.94	1.63	1.63
Weapons Carrying	302	1.9	2.14	2.13	2.72	2.71
Drug Use	283	1.8	1.59	1.59	2.56	2.56
Gang Involvement	158	1.0	0.81	0.81	1.37	1.37
Control Variables						
Age (Centered)	0	0.0	2.37	2.37	1.60	1.60
Sex	0	0.0	0.49	0.49	0.50	0.50
Residential Mobility	85	0.5	3.59	3.59	1.79	1.78
Social Bonding						
Neighborhood	92	0.6	6.92	6.92	2.48	2.48
Family Knowledge	525	3.4	9.19	9.16	2.76	2.77
Family Rules	618	4.0	2.67	2.66	1.86	1.86
Violent Beliefs	74	0.5	3.58	3.58	2.26	2.26
Adult Expectations	112	0.7	3.37	3.36	0.96	0.96
Positive Support	90	0.6	5.28	5.28	4.16	4.16
Maternal Closeness	738	4.7	5.24	5.22	1.26	1.26
Strain						
Self-Worth	73	0.5	6.48	6.47	2.01	2.01
Traumatic Stress	57	0.4	6.01	6.01	3.05	1.05
Hopelessness	66	0.4	1.30	1.30	1.73	1.74
Callousness	101	0.6	3.28	3.28	1.60	1.6
Anger	57	0.4	4.61	4.61	2.59	2.59
Family Arrest	155	1.0	0.24	0.25	0.43	0.43
Worry	44	0.3	5.76	5.76	3.81	3.81
Negative Support	90	0.6	2.35	2.35	3.09	3.09

The multiple imputation model resulted in standard deviations very close to that of the original dataset. Error terms, which were added into the equation during the imputation process, were drawn from a normal distribution rather than observed residuals, resulting in estimates that

were accurate and less likely to bias any standard errors in the analyses (Peugh and Enders 2004; Zhang 2016).

DATA ANALYSIS

Data analysis in this dissertation consists of logistic random effects models (sometimes referred to as hierarchical linear models or multilevel models) to investigate research questions one, two, and three. Both binary logistic and ordered logistic regression in a random effects form differ significantly from standard multilevel modeling with continuous outcomes in that they involve high-dimensional integrals and are thus computationally intensive (Rabe-Hesketh and Skrondal 2012; Wang and Tsodikov 2010). These longitudinal methods allowed intercepts to vary across individuals. This accounted for lack of independence that is present with multiple observations from the same individual. These techniques also allow for flexibility regarding the assumptions of the statistical models. This is an advantage over ANCOVA or repeated measures models (Hox, Moerbeek and van de Schoot 2018).   The models in this dissertation assumed an underlying latent variable for the binary and ordinal responses, η.

Estimation methods vary for what can be called cumulative multilevel regression models (Hox, Moerbeek and van de Schoot 2018). Since these methods are computationally intensive, simulated maximum likelihood (SML) is an option, as well as Taylor series linearization. While these options provide plausible estimates, numerical integration using Means and Variance Adaptive Guassian Quadrature is preferable although it requires more computing power (Rabe-Hesketh and Skrondal 2012). An additional option was expectation-maximization (EM) algorithms because of the stability with complex models with multiple random effects (Wang and Tsodikov 2010). Other methods include transforming the computations into quasi-EM

algorithms at the maximization phase, thus reducing the mathematical computations to low-dimensional problems which can be completed more quickly by computers and lead to convergence.

More modern methods, such as Mean and Variance adaptive Gauss-Hermite Quadrature have superior performance compared to models using penalized maximum likelihood and other quasi-maximum likelihood estimators and were chosen for the current research (Hox, Moerbeek and van de Schoot 2018; Wolfinger and O'connell 1993). The analyses in this dissertation used a conditional maximum likelihood approach (Hedeker 2003). This allowed for the Means and Variance Gauss-Hermite Quadrature numeric integration methods to be utilized, and assumed no underlying distribution of the latent construct that underlies the categorical response (Rabe-Hesketh and Skrondal 2012). This assumption is important since the outcome variables do not follow a normal distribution, which warrants an analytical strategy oriented towards categorical variables rather than continuous variables.

Treatment of the Dependent Variables

Ordinal variables with five or more categories are often treated as continuous variables in statistical analysis. This can be appropriate if the distribution is relatively normal and does not lead to a great deal of bias if this distributional assumption is met. There is little effect on the coefficients and standard errors by using these variables as "quasi-continuous" variables (Norman 2010). This treatment of variables, within reason, allows for flexible analysis using standard statistical techniques with little loss of regarding the validity of the results (Moore 2015).

In this dissertation, treating the dependent variables such as fighting, weapons carrying, drug use, and gang affiliation as continuous variables would not have been tenable even if the distribution of the categories was relatively normal due to the construction of the variables (Norman 2010; Rabe-Hesketh and Skrondal 2012). Each variable measured not only whether a particular behavior was exhibited, but measured whether the individual had ever engaged in the activity and also the frequency during different time periods within the previous year. This warranted categorical approaches to the data analysis rather than models appropriate for continuous variables. The outcome variables in the current research were not normally distributed. Each variable was positively skewed, meaning that there was a disproportionately large number of respondents that reported little to no deviant behavior. This is expected, as deviant behavior is not expected to be normally distributed in the population of interest, which requires models that accommodate the distribution, such as Poisson and logit models (Osgood, McMorris and Potenza 2002). Treating the variables as continuous would bias the coefficients and standard errors downward. The techniques employed in the current research did not assume a distributional form for the outcome variable, but rather assumed a continuous underlying latent variable, consistent with categorical variable approaches (Agresti and Kateri 2011)

The main problem with treating the outcome variables as continuous was their construction. They were constructed to measure deviant behavior in an ordered manner with no semblance of equal intervals. They measure the commission of acts at differing intervals such as at any point in life down to the frequency within the last 90 days which violates the basic assumptions regarding the construction of continuous variables. Their construction makes them useful since there are distinct ordered categories, and it is important not to discard the ordered nature of the variables. In order to limit bias in the estimates and utilize the ordered nature of the

data, it was necessary to utilize longitudinal proportional odds models. An ordinal proportional odds model is preferable to a multinomial model since the ordering can be taken into account with the analysis by assuming no specific distribution of the underlying latent variable. The information regarding order is not lost. This leads to an appropriate methodological and statistical approach to the problem, especially compared to models that treat ordinal variables as continuous in nature (Carrière and Bouyer 2006; Hedeker 2003; Hedeker and Gibbons 2008).

PLAN OF ANALYSIS

For research question one, the dependent variable is binary, with the reference category coded as no arrest in the previous year. The overall model that was estimated to answer the research question was a panel adjusted logit model with random effects. This is an extention of the General Linear Latent and Mixed Model (GLAMM). These models were run in Stata 15.1 (StataCorp 2017b). There were multiple ways to implement various models in Stata, but the melogit command was chosen since it accounts for the panel design of the MYS while allowing for random effects with binary outcomes. It accounts for clustering that is present in panel data, or the repeated observations for each individual. A series of five models were run. The first model was a null model, where the time covariate, age, is entered in the model with no predictor variables present. The second model includes the complete set of covariates as a fixed effects model. The third model included random effects that allow for the intercept to vary for each individual. The final model included random effects that allowed the slope and intercept to vary for each individual.

Each model's Akaike Information Criteria (AIC) was examined and compared to ensure that each step represented a better fitting model since models were considered nested within each

other. Likelihood-ratio tests were run to ascertain the statistical difference in each model when parameters were added. All time-varying covariates were treated as random effects.

Results from this model can be interpreted as log-odds of changing from one category to another. In this case changing from no arrest to arrest. These log-odds, when exponentiated, provided the odds ratio associated with a one unit increase in the predictor variable as it related to likelihood of arrest. Random effects were interpreted as the amount of inter-individual variance over time. Estimation for the model involved maximum likelihood estimation, with mean and variance adaptive Guass-Hermite quadrature as the integration method. The number of integration points was set at 30 (Rabe-Hesketh and Skrondal 2012). The predicted probabilities were calculated at each level of the input variable of interest, which was the amount of time an individual had lived in the same neighborhood.

Research question two was addressed by using an extention of the model used to answer research question one. A generalized ordered logit model, or proportional odds longitudinal model, was implemented to capture the ordered nature of each dependent variable (Rabe-Hesketh and Skrondal 2012). Coefficients are the ordered log-odds of change in the odds of falling into a higher category with a one-unit change in the predictor variable. Exponetiating these values gave the odds-ratio This provided the probability of classification into a specific category relative to classification in other categories of the outcome variable. A series of four models were run to obtain the final full model of interest. The first model consisted of residential mobility entered with no covariates and with random intercepts. The second model incorporated control variables which included age, age squared, and gender and allowed random intercepts. The third model incorporated the control variables and added the social bonding variables. The fourth model contained the control variables and the strain variables but not the

social bonding variables. The fifth and final model included social bonding variables and strain

variables with random intercepts. Mean and variance adjusted Guass-Hermite quadrature was

used for numeric integration (Rabe-Hesketh and Skrondal 2012). After each model, the AIC,

BIC, and McKelvey and Zaviona R^2 statistic was examined to ensure added parameters led to

better model fit.

The model selected involved the use of the meologit command, which fits random effects

models to panel data. A likelihood ratio test was conducted to ensure this model fit better than a

standard ordinal logit model with clustered standard errors (Rabe-Hesketh and Skrondal 2012;

StataCorp 2017b). A standard ordinal logit model with clustered standard errors relys on

statsitical correction of the standard errors to account for clustering and represents a population-

averaged model. In all models tested in the current research, a model with random intercepts

was superior to an ordinal logit model without random intercepts. The use of random intercepts

to account for clustering represents a subject-specific model, which is of more interest in the

current research. It also uses model generated corrections for the standard errors rather than

simply accounting for clustering with Huber-White sandwich errors. This was the preferred

modeling strategy (Snijders and Bosker 2012).

The specific models in this study using ordinal mixed effects regression were estimated

using the following equation:

Equation 1:
$$\Pr(y_{ij} > k | x_{ij}, \kappa, u_j) = H(x_{ij}\beta + z_{ij}u_j - \kappa_k)$$

In this equation, $j = 1,...,M$ clusters which consist of $i = 1,...,n_j$ observations each. Each

cluster in the analysis had between three and six observations. Cut points are represented by κ and

can be labeled κ_1 through κ_{k-1} where k is the number of possible outcomes or levels of the ordinal

variable (StataCorp 2017a). $H(\cdot)$ is the logistic CDF which represents the cumulative probability

in this context while x_{ij} represents the vector of covariates for the fixed effects and β represents the

coefficients of these covariates. As with the equation for the binary logistic mixed-effects model,

z_{ij} represents the random effects. This model is a random intercept model, therefore this term

equals 1. The random effects are also represented by the term u_j which is M realizations from a

multivariate normal distribution with a mean of 0 and variance matrix Σ. M is simply the number

of clusters or individuals in the model.

The model can also be represented in terms of the ordinal variable as having a continuous

underlying latent structure, η, divided into K observed cut points (StataCorp 2017a). This can be

represented as follows:

Equation 2:

$$y_{ij} = x_{ij}\beta + z_{ij}\, u_j + \varepsilon_{ij}$$

In this equation, y_{ij} are the observed responses from the underlying latent variable, while

$x_{ij}\beta$ are a vector of covariates, and ε_{ij} are errors that follow a logistic distribution with a mean of 0

and a variance of $\pi^2/3$. Following this, the value of $y_{ij} = 1$ if the predicted value is less than or

equal to κ_1, or the first cut point. The value is two if $\kappa_1 < y_{ij} \leq \kappa_2$ and generalizing to K values,

the value is K if $\kappa_{k-1} < y_{ij}$.

The models that were run are known as proportional odds models and constitute subject-

specific models since they incorporated a random effect allowing for individual intercepts (Rabe-

Hesketh and Skrondal 2012). With these models, there is an important assumption of

proportional odds. This means that the coefficients and thus the odds ratios are consistent

throughout the different levels of the ordinal variable (Brant 1990). This allows for the computation of a single coefficient rather than computing a separate coefficient for each level as is done in multinomial logistic regression. Using the ordinal nature of the variable allowed the current research to take advantage of this information, rather than discarding it by using a series of binary logistic regressions or multinomial regression.

This proportional odds assumption, however, is often violated when models have continuous variables, large sample sizes, and when there are a large number of explanatory variables (Allison 1999; Allison 2009; Brant 1990; Clogg and Shihadeh 1994). This is usually ascertained with a Brant test, although that can only be conducted on an ordinal logit model without random effects. An examination of the data by dichotomizing the dependent variable and running multiple binary logit models was conducted to ascertain whether there were any violations of the proportional odds assumption and, if so, whether they affect the substantive results of the model. It was expected that the models would violate this assumption, but unless there is a case of large disparities in coefficients between levels or the coefficients switch signs, an ordinal regression model is completely plausible.

Research question three was addressed by examining the binary logit or ordinal logit model, depending on outcome variable, and examining the coefficients for evidence of mediation when blocks of social bonding and strain variables were added to the models. If the coefficient was mediated, a significant association between residential mobility and the outcome variable would be attenuated. This was tested for all five outcome variables. While no tests for formal mediation were performed, the examination of coefficients was adequate to ascertain if there was any preliminary evidence of mediation in the model. In order to accomplish this, lagged

variables were not used in the model to maintain the temporal ordering necessary to establish a mediating effect (Hayes 2018).

Research question four was addressed by using models similar to the models used to assess research question two. A fifth model, representing a full model, was added with interaction terms. These interaction terms represented a moderating effect. This helps to establish the theoretical connection between residential mobility and neighborhood connectedness and inevitability of violence. This allowed the researcher to examine the direct impact of residential mobility, as well as examine the interaction of residential movement and feelings of safety and connection to the neighbor when an individual respondent moved. A moderation effect would indicate that effects of residential mobility on the outcome variable differed by level of connection to the respondent's neighborhood or their view on the necessity of violence in their neighborhood. It was important to investigate this relationship in order to establish how residential movement not only directly affected the probability of being involved in delinquent activity, but to also examine the impact of residential mobility on crime taking into account the effect of mobility on the related constructs of neighborhood connectedness and feelings of security within the neighborhood. This can examine the possible effect of how the presence of multiple risk factors such as mobility and beliefs can affect the likelihood of engaging in delinquent acts. These interactions were probed for substantive meaning by examining the simple slope and calculating any difference between groups regarding the magnitude of the effects in the interaction models (Jose 2013).

CHAPTER IV

RESULTS

The current study seeks to expand literature on residential mobility and juvenile

delinquency by analyzing a longitudinal sample drawn from impoverished areas over a 14 year

time span. While the previous literature has been mixed regarding the effects of residential

mobility and various forms of delinquency, few, if any studies examined truly disadvantaged

populations. This study examined that impact, as well as the impact of social bonding and strain

variables on juvenile delinquency and whether they had the hypothesized effect. This study

contributes by examining the effects of residential mobility in this population, identifies future

avenues of research concerning mobility in these populations, and recommends policies and

priorities for future research based on the extant findings.

This chapter describes the sample used in the study and displays the analyses used to

answer primary research questions. Hypotheses one, two and three were explored in the first

series of models, while hypotheses 4 and 5 were explored in the second set of models including

interactions terms. Models were run that analyzed the direct connection between residential

mobility and various forms of delinquency, controlling for theoretically relevant covariates.

Additionally, mediating and moderating effects were examined using a hierarchical regression

procedure.

DESCRIPTION OF THE SAMPLE

The current study captured data from 1998 to 2011 for juveniles, ages 13 to 18, who had

taken the survey at least three times. This led to a full sample of 3,837 individuals and 15,588

person-years. There was an average of four waves completed per individual with a range of

three to six waves per person. Certain demographic variables normally used in an analysis of this type were excluded. Race was not included in any models since 93.24% identified as African-American and 4.39% identified as Mixed or Creole by person-wave. The proportion of individuals identifying as Caucasian was 0.64%. This made comparing Black and White individuals impossible with any precision. Socioeconomic status was also not used as a predictor due to the nature of the sampling frame and the selection of neighborhoods based on poverty level. The sample was relatively homogenous based on conventional standards although each population has its own ways of stratifying itself (Sampson 2009). This was evident from the researcher's qualitative experience but does not have a place in the quantitative analysis. The descriptive data on the sample includes the imputed data, excluding the primary dependent variables which are displayed without imputed values. These outcomes related to delinquency were part of the imputation model and were imputed, but the imputed values were not used in analyses where these variables were in fact the outcome variable (Allison 2000).

DESCRIPTIVE STATISTICS

The following descriptive statistics show the characteristics of the full sample. This includes all 15,588 person-waves for the independent variables, and all valid cases for the dependent variables. In the analyses, only complete cases were used which resulted in the loss of a small number of cases for each series of models. The number of cases lost depended on the amount of missing data on the dependent variable. The dependent variable characteristics are displayed in Table 2. The dependent variables all show concentrations at the lower levels of delinquency. For example, in 71% of the person-years, there is no drug use. However, approximately 16.15% of person-waves indicate an arrest.

This is a problematic behavior if that proportion of juveniles are involved in not only an official police contact, but an arrest in any given year. Overall, the sample shows relatively low levels of serious delinquency with roughly 10% of person-years indicating heavy drug use and 8.85% indicating two or more fights in the last 30 days. These numbers are less than what one might expect with a sample of at-risk individuals in the primary age for offending.

Table 2: Summary Statistics for Dependent Variables

Dependent Variables	Frequency	Percent	Cumulative Percent	Cumulative Frequency
Arrest				
No in last year	12741	81.74	83.50	2518
Yes in last year	2518	16.15	100.00	15259
Fighting				
None in last 90 days	8763	56.87	56.87	8763
Yes in last 90 days	2353	15.27	72.14	11116
Once in last 30 days	2928	19.00	91.15	14044
Two or more in last 30 days	1364	8.85	100.00	15408
Weapons Carrying				
None in last 90 days	9709	63.52	63.52	9709
Yes in last 90 days	770	5.04	68.55	10479
Yes in last 30 days	1149	7.52	76.07	11628
Once in last 7 days	1858	12.15	88.22	13486
Two or more in last 7 days	1800	11.78	100.00	15286
Drug Use				
None in last 90 days	10867	71.00	71.00	10867
Yes in last 90 days	880	5.75	76.75	11747
Yes in last 30 days	855	5.59	82.34	12602
Once in last 7 days	1175	7.68	90.02	13777
Two or more in last 7 days	1528	9.98	100.00	15305
Gang Affiliation				
No real involvement	11290	73.17	73.17	11290
Hang with current members	2560	16.59	89.76	13850
Current member of a gang	1580	10.24	100.00	15430

Although the overall statistics regarding delinquency indicate that the majority of individuals are not involved in serious delinquency in any given year, there are still enough that are involved that it warrants investigation as to what predicts this. Just over 10% of the sample indicated being involved in a gang in a given year and roughly 10% indicate heavy drug use. This implies they reported getting high at least twice a week. While investigations of the data indicated that the primary drugs of choice were marijuana and alcohol, this still constitutes a problem. Just under 12% of the individuals reported regularly carrying a knife or gun in a given year. There is clearly value in examining whether residential mobility affects the probability that someone will engage in protective behaviors such as weapons carrying or retreatist behaviors such as chronic drug use.

Table 3 shows the summary statistics for the input, or independent variables. Age is centered at 13 years of age, which is the lowest age in the sample. The sample is split almost evenly between males and females with 49% of the person-years consisting of male responses. Residential mobility, the primary variable of concern, shows a mean of 3.59. This indicates that on average, the respondent has lived in the same neighborhood for over three years. The respondents, overall, report higher levels of positive peer support ($m = 5.28$) than they do negative peer support ($m = 2.35$). These scales have the same basic questions but differ in how friends respond to certain beliefs or activities. Maternal closeness is very high in this particular sample. A majority of the respondents (59.1%) scored a six on this scale.

The social bonding statistics show, on average, the respondent scores in the middle or high end of most scales. Adult expectations are very high for most individuals. This indicates that they expect to have a successful job, get married and have a successful and loving relationship, and other things that individuals might like to have as adults. Other variables show

values in the middle of the range for the 3,837 individuals and 15,588 person-years. Many of the

strain variables have means lower than the middle of the scale range.

Table 3: Summary Statistics for Independent Variables

Variables	Mean	*SD*	Range	Person-Years	Clusters
Residential Mobility	3.59	1.79	0-5	15588	3837
Control Variables					
Age (centered)	2.37	1.60	0-5	15588	3837
Sex	0.49	0.50	0-1	15588	3837
Social Bonding					
Neighborhood	6.92	2.47	0-11	15588	3837
Family Knowledge	9.16	2.73	0-17	15588	3837
Family Rules	2.66	1.83	0-5	15588	3837
Violent Beliefs	3.58	2.25	0-8	15588	3837
Adult Expectations	3.36	0.96	0-4	15588	3837
Positive Support	5.28	4.15	0-12	15588	3837
Maternal Closeness	5.22	1.24	0-6	15588	3837
Strain					
Self-Worth	6.47	2.00	0-9	15588	3837
Traumatic Stress	6.01	3.05	0-14	15588	3837
Hopelessness	1.30	1.73	0-6	15588	3837
Callousness	3.28	1.59	0-8	15588	3837
Anger	4.60	2.59	0-10	15588	3837
Family Arrest	0.24	0.43	0-1	15588	3837
Worry	5.76	3.81	0-18	15588	3837
Negative Support	2.35	3.08	0-12	15588	3837

A large number of respondents report that family members in the household have been

arrested in the past year (24%). This is a troubling statistic that indicates many of the juveniles

live in households where criminal activity is occurring, although with the current data there is no

way to know who is getting arrested, whether it be a parent, brother or sister, or other relative.

There appear to be low levels of worry and low levels of peer support of negative behaviors. Average self-worth is relatively high, which should act as a protective factor regarding delinquent behaviors.

The data indicates, that overall, levels of hopelessness are relatively low despite the conditions of the neighborhoods where the data was gathered. This is congruent with high adult expectations exhibited by the respondents. There are other problems with variables such as exposure to traumatic stress. While the mean is not on the high end of the scale, the mean along with the standard deviation, place a reasonable proportion of the juveniles within the range of exhibiting some possible signs of PTSD. It should be noted, however, that the instrument used in the survey is not a clinical tool and was not administered as such. As a sample, respondents seem to have hope for the future, low levels of hopelessness and worry, but moderate levels of traumatic stress.

ANALYSIS OF ARREST

The analysis of the arrest data used five models to test hypotheses 1, 3a, and 4a. These hypotheses represent the effect of residential mobility on likelihood of arrest in a given year, as well as whether strain or social bonding variables mediate any relationship between residential mobility and arrest. The five models consisted of model 1, which included only residential mobility as an input variable, and model 2 which included the control variables of age centered on 13, age squared, as well as gender at level 2. The third model added social bond variables while the fourth model added just the strain variables to the model containing residential mobility and the controls. Model 5 was the full model containing residential mobility, controls, strain, and social bond variables.

The model for analyzing arrest utilized a subsample of the full sample. This subsample was selected by dropping individuals who had provided a response on the dependent variable for less than three waves. Some respondents provided responses for the dependent variable for three or move waves, but did not provide a response for all waves otherwise completed. This resulted in a final subsample of 3,744 individuals who completed 15,079 person-waves of data. This represents a loss of 93 individuals and 509 person-years. This can also be expressed as a loss of 2.4% of the number of individuals contained in the full sample and 3.3% of the completed waves in the full sample. The subsample did not differ substantively from the full sample on any of the variables used in the models.

The model used to examine each combination of variables was a random effects, or mixed effects logit model. Random intercepts were introduced to control for clustering as well as allow for individual variation around the intercept to occur which helps account for any unmeasured differences between individuals (Allison 2009; Snijders and Bosker 2012). There is a single variable at level 2 which accounts for the gender of the individual. All other covariates are time-varying in nature. Since these models test mediation, lagged variables were not used. The primary variable of interest, residential mobility, was measured as years lived in the same neighborhood. A simple two-level random intercept logit model can be expressed in the following equations:

Equation 3:

$$\Pr(y_{ij} = 1 | x_{ij}, u_j) = H(x_{ij}\beta + z_{ij}u_j)$$

In this equation, for *M* clusters, *j* represents 1, ….. *M* clusters with cluster *j* containing $I = 1, …, n_j$ observations. This model contains between three and six observations per cluster. The component x_{ij} represents a row vector of covariates for the fixed effects with beta coefficients similar to standard logistic regression models. For this random-intercept model, z_{ij} is simply the scalar 1. Random effects are represented by u_j with *M* values from a multivariate normal distribution with a mean of 0 and variance v^2. $H(\cdot)$ represents the logistic cumulative distribution function (CDF), and represents $H(v) = \exp(v) / [1+\exp(v)]$ when the linear predictor indicates the probability of success, or a value of 1 (StataCorp 2017a). This can be simplified to the following equation by defining $\pi_{ij} = \Pr(\text{arrest} = 1)$.

Equation 4:

$\text{logit}(\pi_{ij}) = \beta x_{ij} + u_j$ for $j = 1, … , M$ individuals with $I = 1, … , n_j$ observations in cluster *j* where x_{ij} represents the row vector of covariates.

The initial model, containing only residential mobility as a predictor, showed no significant relationship between residential mobility and likelihood of arrest within a given year ($z = .01, p - .989$). The overall model was not significant ($\chi^2_{(1)} = 0.00, p = .989$). The McKelvey and Zavoina Pseudo-R^2 for the model was .254. Given that residential mobility was not a significant predictor, this statistic represents the variance accounted for by the random effects. The model, along with additional models with arrest as the dependent variable, is displayed in table 4.

The second model contained control variables including age, a squared term for age, and sex. This model was significant ($\chi^2_{(4)} = 253.73, p < .001$). Residential mobility, however, is not

significant. This provides additional support for failing to reject the null hypothesis for hypothesis 1. The control variables themselves are significant. Age, which is centered on 13, had a positive relationship with the odds of arrest in a given year (OR = 1.65, $p < .001$). This is a strong relationship indicating that for every unit increase in age, the odds of arrest within a given year increased 65%. This is an effect in the expected direction. The squared term for age was also significant (OR = .93, $p < .001$). The negative coefficient and odds ratio below one indicated that as age increases, the positive effect of age decreases. In other words, the effect of age was accelerating at a decreasing rate as the participant ages. This is not unexpected since the age crime curve generally begins to climb steeply at age 15 and the slope generally declines but stays positive through 18 where it peaks (Farrington 1986).

Gender was a strong predictor (OR = .36, $p < .001$). The odds of a female being arrested were 64% less than a male. Again, this is an expected effect that holds through other models explored in the current study. Finally, the model statistics indicate, like other models, that random intercepts were appropriate and led to a better model fit than a fixed effects logit model. An Likelihood-ratio (LR) test indicated that the addition of random intercepts significantly improved model fit ($\chi^2_{(1)} = 797.87$, $p < .001$). This, like other model tests in the current study, simply tested the hypothesis that the intra-class correlation was zero and was significant for this model as well all other models in the current study.

Table 4: Mixed-Effects Logit Model for Arrest with Coefficients and Standard Errors (Parentheses)

	Model 1	Model 2	Model 3	Model 4	Model 5
Residential Mobility	0.0002 (.017)	.0004 (.017)	.001 (.017)	.023 (.016)	.012 (.017)
Control Variables					
Age (centered)		.501*** (.058)	.450*** (.059)	.509*** (.059)	.478*** (.060)
Age Squared		-.077*** (.011)	-.068*** (.011)	-.072*** (.011)	-.068*** (.011)
Sex		-1.020*** (.078)	-.688*** (.076)	-.888*** (.074)	.702*** (.075)
Social Bonding					
Neighborhood			.061*** (.013)		.078*** (.013)
Family Knowledge			-.070*** (.011)		-.040*** (.114)
Family Rules			-.078*** (.017)		-.063*** (.018)
Violent Beliefs			.138*** (.013)		.074*** (.014)
Adult Expectations			-.182*** (.029)		-.090** (.031)
Positive Support			-.025*** (.007)		-.027*** (.008)
Maternal Closeness			-.034 (.023)		.004 (.023)
Strain					
Self-Worth				-.170*** (.015)	-.152*** (.016)
Traumatic Stress				.100 (.010)	.011 (.010)
Hopelessness				.061*** (.017)	.044* (.018)
Callousness				.080*** (.019)	.046* (.019)
Anger				.073*** (.012)	.056*** (.012)
Family Arrest				1.085*** (.061)	1.029*** (.061)
Worry				-.033*** (.009)	-.022* (.009)
Negative Support				-.004 (.010)	.005 (.011)
Wald χ2	0.00 (1)	253.73(4)***	566.10(11)***	862.40(12)***	957.07(19)***
Rho (ICC)	.425***	.411***	.364***	.338***	.325***
M&Z Psuedo-R²	.254	.290	.306	.334	.344

* p < .05, ** p < .01, *** p < .001.

Social Bonding Model

The third mode that was run regarding arrest resulted in a significant model ($\chi^2_{(11)} =$ 566.10, $p < .001$). Residential mobility was not significant in this model, which results in a failure to reject the null hypothesis for 3a. There was simply no relationship to mediate. Control variables were significant, although noticeable changes in odds ratios for specific variables included sex, where, for females, the odds of arrest were 50% lower rather than 64% lower compared to males. Most social bond variables were significant with the exception of maternal warmth. There were unexpected findings, including the relationship between neighborhood connectedness and likelihood of arrest. The stronger the connection to the neighborhood the more likely an individual was to be arrested in a given year (OR = 1.06, $p < .001$). Family knowledge, measured as how much a parent knows about the activities of the respondent, had an inverse relationship with likelihood of arrest as expected (OR = .93, $p < .001$). This indicated that for every unit increase in family knowledge, the odds of arrest in a given year was lowered by 7%. The establishment of family rules also had an inverse relationship with arrest (OR = .92, $p < .001$). Every unit increase in this measure led to a decrease of 8% regarding the odds of arrest.

Violent expectations, or the beliefs in the inevitability of violence, was strongly associated with increased odds of arrest (OR = 1.14, $p < .001$). For every unit increase in this variable, the odds of arrest rose by 14%. This is important, as this measure is associated with the "Code of the Street" as delineated by Anderson (2000). Adult expectations was inversely associated with odds of arrest (OR = .83, $p < .001$) as was positive peer support (OR = .97, $p < .001$). These were both in the expected direction. Overall, the presence of social bonds tended to lower the odds of arrest whereas lack of these bonds, was associated with higher odds of arrest

within a given year. The McKelvey and Zavoina Pseudo-R^2 for the model was .306, which was a very small increase from the model containing the control variables.

Strain Model

The fourth model included control variables and strain variables without social bond variables. This model was significant ($\chi^2_{(12)} = 862.40$, $p < .001$). Interesting initial effects included indications that strain variables did not attenuate the effect of age on the odds of arrest while social bond variables did attenuate it to some degree. The effect of sex was also not attenuated to the extent with the strain variables than it was with the social bonding model. As with previous models dealing with arrest, residential mobility was not significant. This led to the failure to reject to null hypothesis for hypothesis 4a. There is no relationship to mediate. Most of the strain variables were significant predictors of the odds of arrest with the exception of traumatic stress and negative peer pressure.

Self-worth was a strong predictor with an inverse relationship with arrest (OR = .84, $p <$ .001). For every unit increase on the self-worth scale, the odds of arrest within a given year was reduced by 16%. Overall anger, measured as internalized and externalized anger, was positively related to arrest (OR = 1.07, $p < .001$) while callousness was also positively related to negative outcomes (OR = 1.08, $p < .001$). A particularly strong predictor among the strain variables was the presence of an arrest of someone in the household within a given year (OR = 2.96, $p < .001$). This indicates that if someone in the household was arrested, the odds of arrest for the respondent increased 196%. Strain measured as hopelessness had a positive relationship with the dependent variable (OR = 1.06, $p < .001$). This is a difficult variable to interpret as there is no way to distinguish whether an arrest might cause hopelessness, or whether hopelessness leads

to a higher propensity to be arrested in a given year. Overall, strain variables were strong

predictors of the odds of arrest.

Comparing non-nested models can be difficult and often goodness of fit measures are

used (Rabe-Hesketh and Skrondal 2012). Comparisons of the social bonding model and strain

model indicate that the strain model was a slightly better fit. The social bonding model had an

AIC of 12028.41 and a BIC of 12127.49 with 13 degrees of freedom. The strain model had an

AIC of 11677.69 and a BIC of 11.784.39 with 14 degrees of freedom. This, along with the log-

likelihood values, indicates that the strain model does fit slightly better than the social bonding

model, but this should be interpreted with caution as the difference is not large and there is ample

support that both theoretical sets of variables have a significant effect on likelihood of arrest.

Overall, the model Pseudo-R^2 was .334, which represented a small increase from the model

containing the control variables.

Full Model

Both strain and social bonding variables have a significant effect on the odds of arrest

within a given year. With this established, a full model was run with control, social bond, and

strain variables. The model was significant ($\chi^2_{(19)} = 957.07, p < .001$). In the full model,

residential mobility is not significant, which led to a failure to reject the null hypothesis for

hypothesis 1. There is simply no support that residential mobility is empirically associated with

increased odds of arrest in a given year in any of the model specifications. The full model

indicates that age was a significant predictor (OR $= 1.61, p < .001$) and the squared age term still

indicated declining effect as the respondent ages. The odds ratio for sex indicated that the odds

of arrest are 50% lower for females compared to males when controlling for various sources of strain and social bonds.

Interesting changes in odds ratios between models included a slight attenuation of the effect that beliefs regarding the inevitability of violence had on likelihood of arrest. The odds ratio declined from 1.14 in the bonding model to 1.07 in the full model, which indicated the strain variables were accounting for the some of the variance attributed to this variable in the social bonding model. The odds ratio for adult expectations also increased from .83 to .91, which indicated that strain variables reduce the effect of this variable on arrest when added to the model. For the strain variables, the addition of the social bond variables to the model reduced the effect of hopelessness and callousness. The odds ratio for callousness dropped from 1.08 to 1.04. This indicated that with the inclusion of all theoretically relevant variables, the effect of callousness dropped from an 8% increase per unit to a 4% increase per unit regarding the odds of arrest in a given year.

Likelihood-ratio tests indicate that the full model fits better than the social bond model ($\chi^2_{(8)} = 477.09$, $p < .001$). A similar test indicated that the full model fits significantly better than the model containing just strain and control variables ($\chi^2_{(7)} = 124.37$, $p < .001$). There is evidence there was a larger improvement by adding the strain variables to the model, but overall the full model fits significantly better than a model containing only one set of theoretical variables. The Pseudo-R^2 values also slightly favor a strain model compared to the model with social bonding variables, although these values should be interpreted with caution (Hox, Moerbeek and van de Schoot 2018; Sapra 2014).

Overall, there is no evidence to support hypotheses 1, 3a, or 4a. Residential mobility was not associated with odds of arrest in any of these models. The occurrence of an arrest of a

member of the household had a large effect on the likelihood of arrest for the respondent, as did age and sex. Both sets of theoretical variables resulted in significant models with substantively important predictors. A surprising result in models 3 and 5 was that neighborhood connectedness had a positive relationship with arrest. This was unexpected since the significant relationship is in the opposite direction of what was predicted. Maternal warmth, which was hypothesized to be a significant protective factor, was not significant and neither was traumatic stress, which was predicted to be a risk factor. It was also evident in the model that positive peer pressure or support is a protective factor while negative peer pressure or antisocial attitudes held by peers was not a significant risk factor.

Arrest is the most concrete measure of the different delinquency outcomes in the current study and residential mobility simply had no effect. This is contrary to other studies (Gasper, DeLuca and Estacion 2010; Katz, Kling and Liebman 2001; Porter and Vogel 2014; Sciandra et al. 2013). Most other studies either find a negative association between residential mobility and arrest or have to implement multiple controls to mediate the effect of residential mobility on arrest or other delinquent acts. With this particular population, there appears to be no zero-order connection between residential mobility and arrest. This could indicate that it is a weak predictor for arrest in this particular population, but not in others. This reinforces the importance of the current study.

FIGHTING BEHAVIOR

Fighting behavior, as an outcome of interest, was analyzed using five models similar to the analysis for arrest. The first model included residential mobility, followed by a model with control variable. Then models with social bond, strain, and all variables were run to examine

hypotheses 2a, 3b, and 4b. These hypotheses examine the overall effect of residential mobility on fighting severity within a given year as well as mediating effects of social bond and strain variables on this relationship. While arrest was a dichotomous variable, severity of fighting is an ordinal variable and was analyzed using a mixed-effects ordinal logit model which allowed for random intercepts for each respondent (Hox, Moerbeek and van de Schoot 2018; Rabe-Hesketh and Skrondal 2012).

The analysis for fighting behavior involved a subsample of the full sample. This sample consisted of individuals who had completed the fighting severity scale for at least three time points during the survey period. Those who might have completed the MYS three times or more but failed to complete the scale at least that many times are excluded completely. Waves where an individual that, having answered the scale at least three times failed to answer it in a given wave had that specific wave excluded. This resulted in a subsample of 3,795 individuals and 15,324 person-waves. The average number of waves completed by an individual was four out of a possible six waves. The loss of information due to sample selection was 1.7% for person-waves and 1.1% for individual clusters (respondents).

To test the proportional odds assumption, an ordinal logit model without mixed effects was conducted to perform a Brant test to generate *p* values for each variable concerning the assumption of proportional odds (Brant 1990; Rabe-Hesketh and Skrondal 2012). This represents a population-averaged model somewhat similar to the mixed effects model. A full model was used for the test. Since the model had a large sample size, multiple continuous variables, a large number of explanatory variables, and more than three categories in the dependent variable, a cutoff value of .01 was used to determine in a preliminary manner whether

variables might violate the proportional odds assumption. The results of the model are displayed in Table 5.

The Brant test indicated that the variables of neighborhood, family rules, violent beliefs, traumatic stress, and hopelessness might violate the proportional odds assumption. Examination of the odds ratios, however, indicated that the variables were not problematic. The odds ratios for neighborhood connectedness ranged from 1.05 to 1.08, which provides evidence that there might very well be a common odds ratio for the different level. The same was true for violent beliefs, which ranged from 1.15 to 1.14 and traumatic stress and hopelessness which had a range of .03 and .04 between the highest and lowest odds ratios. Family rules had the largest range, which was from .94 to .87. While this is larger than the other ranges, the average of the odds ratios is close to the odds ratio for the full model (.915 vs. .930). This indicated that a partial proportional odds (PPO) model was not necessary for an analysis of fighting behavior.

Table 5: Proportional Odds Test for Fighting Behavior Displaying Odds Ratios

	Model 1 Lower Tier (1)	Model 2 Middle Tier (2)	Model 3 Upper Tier (3)	p value
Residential Mobility	.974	.979	.978	.664
Control Variables				
Age (centered)	.890	.972	.875	.038
Age Squared	.994	.987	1.001	.273
Sex	.605	.658	.708	.201
Social Bonding				
Neighborhood	1.049	1.051	1.083	.078
Family Knowledge	.958	.970	.955	.209
Family Rules	.941	.934	.869	.000
Violent Beliefs	1.147	1.115	1.138	.008
Adult Expectations	.858	.820	.831	.023
Positive Support	.985	.986	.982	.902
Maternal Closeness	1.018	1.011	1.032	.514
Strain				
Self-Worth	.911	.906	.929	.288
Traumatic Stress	1.054	1.041	1.068	.007
Hopelessness	1.035	1.071	1.072	.007
Callousness	1.062	1.067	1.052	.700
Anger	1.098	1.096	1.092	.947
Family Arrest	1.563	1.466	1.447	.189
Worry	1.021	1.016	1.020	.652
Negative Support	1.019	1.018	.989	.016

The initial model for fighting behavior contained only the variable for residential mobility. This model was significant ($\chi^2_{(1)} = 24.57$, $p < .001$). The variable for residential mobility was significant in the model without covariates (OR = .946, $p < .,001$). This is contrary to the model analyzing arrest, where residential mobility did not have a significant effect even in the initial model. The initial McKelvey and Zavoina Pseudo-R^2 was .205. This is

somewhat lower than the previous models for arrest. The random effects account for less variance in this model.

The interpretation of the odds ratio for the ordinal logit model can be less than straightforward. Residential mobility was coded "0" for those who have lived in the same neighborhood less than a year up to "5" for those who had been in a neighborhood five years or more, which led to a negative coefficient indicating an increase in the logit of the outcome variable. The results of the analysis are displayed in Table 6. In the simple model without covariates, there is a clear relationship between residential mobility and fighting behavior in the expected direction. In the simplest model in this set, there was support for hypothesis 2a.

The second model added control variables, including terms for age and age squared, as well as sex at level two. The overall model was significant ($\chi^2_{(4)} = 430.02$, $p < .001$) Age, centered at 13, was significant (OR = .912, $p = .013$) while the squared term for age was not significant. Sex appeared to be a strong indicator of fighting behavior (OR = .459, $p < .001$). Females are much less likely to fight, with the odds of falling into the most severe classification of fighting being 54% lower than males as compared to the three other classifications, and have the same reduced odds regarding classification into the two most severe categories compared to the two less severe categories. Overall, their odds were much lower compared to males for engaging in fighting on a weekly basis. Residential mobility remained significant (OR = .959, $p < .001$), which indicated that, even with control variables, the number of years spent in a neighborhood decreased the severity of fighting behavior. The addition of control variables increased the Pseudo-R^2 statistic to .229, which represents a modest increase.

Table 6: Mixed-Effects Ordinal Logit Model for Fighting Behavior with Coefficients and Standard Errors (Parentheses)

	Model 1	Model 2	Model 3	Model 4	Model 5
Residential Mobility	-.055*** (.011)	-.049*** (.012)	-.031** (.012)	-.016 (.011)	-.021 (.012)
Control Variables					
Age (centered)		-.096* (.037)	-.134*** (.037)	-.052 (.037)	-.087* (.038)
Age Squared		-.014 (.007)	-.006 (.007)	-.012 (.007)	-.008 (.007)
Sex		-.778*** (.528)	-.466*** (.051)	-.632*** (.049)	-.451*** (.050)
Social Bonding					
Neighborhood			.032*** (.008)		.050*** (.009)
Family Knowledge			-.594*** (.008)		-.040*** (.008)
Family Rules			-.068*** (.012)		-.721*** (.012)
Violent Beliefs			.195*** (.009)		.128*** (.010)
Adult Expectations			-.247*** (.020)		-.158*** (.021)
Positive Support			.010* (.005)		-.015** (.005)
Maternal Closeness			-.001 (.017)		.019 (.017)
Strain					
Self-Worth				-.116*** (.011)	-.090*** (.011)
Traumatic Stress				.048*** (.007)	.051*** (.007)
Hopelessness				.085*** (.013)	.051*** (.013)
Callousness				.104*** (.013)	.059*** (.013)
Anger				.115*** (.008)	.091*** (.008)
Family Arrest				.448*** (.043)	.385*** (.043)
Worry				.008 (.006)	.017** (.006)
Negative Support				.017* (.007)	.013 (.007)
Wald χ2	24.57*** (1)	430.02*** (4)	1254.88*** (11)	1487.64*** (12)	1855.91*** (19)
Rho (ICC)	.309***	.294***	.241***	.223***	.208***
M&Z Pseudo-R²	.205	.229	.269	.275	.300

* p < .05, ** p < .01, *** p < .001.

Social Bonding Model

Model 3 added social bonding variables to the variables contained in model 2. The model was significant ($\chi^2_{(11)}$ = 1254.88, *p* < .001). Age remained significant with a slightly decreased odds ratio, indicating a larger inverse effect, compared to model 2 (OR = .874, *p* <.001). Age was associated with lower odds of classification into more severe categories of fighting behavior. Sex still has a large effect, but this decreased with the addition of the social bonding variables. Residential mobility remained significant (OR = .969, *p* = .008). This indicated there was some possible mediating influence regarding the social bonding variables, but a very small one. It did not fully mediate the relationship and only led to an effective 1% increase in the odds of ending up in the highest classification of fighting behavior compared to the effect size of residential mobility in the previous model with control variables. Therefore, there is marginal support for hypothesis 3b. Longer tenure in a neighborhood lowered an individual's propensity to engage in more frequent fighting behavior.

While still significant, the effect size for residential mobility is not high. Each unit increase in the measure of residential mobility is associated with a 3% decrease in the odds of being classified in the most severe category of fighting behavior compared to classification in the lower three. Even with a small effect size, substantial tenure in a neighborhood would theoretically lead to a substantial decrease in the odds of engaging in weekly fighting behavior given the effect of cumulative logits. This variable still does not have the effect size of age or expectations of violence, but does have a substantive impact on this particular set of behaviors.

Neighborhood connectedness had an unexpected relationship with fighting behavior in that higher levels of this connectedness were associated with significantly increased odds of engaging in fighting behaviors (OR = 1.03, *p* < .001). For each increase in level of

neighborhood connectedness, an individual's odds of ending up in the most severe classification for fighting behaviors increased 3% compared to classification in any of the three lower groups. The neighborhood connectedness scale has a 12 point range, and the results of the analysis indicated there would be substantive differences between those with very low neighborhood connectedness and those with relatively high levels of this variable. Furthermore, the effect was in an unexpected direction in this model and the previous set of models examining odds of arrest.

The other social bond variables were significant in the model with the exception of maternal warmth. This was similar to the results produced by the analysis of arrest. Family knowledge and the existence of family rules both had significant impacts in the expected direction while expectations of violence had a particularly strong effect (OR = 1.21, $p < .001$). This was in the expected direction and indicated that for every unit increase in expectations or inevitability of violence, the odds of ending up in the most severe classification of fighting behavior increase 21% compared with classification in the lower three categories. Adult expectations had a relatively strong effect (OR = .78, $p < .001$) in the expected direction, and while positive peer expectations was significant, the effect was relatively low. The model fit statistic, or Psuedo-R^2 in this model was .269 which is a slight increase over the model containing just control variables.

Strain Model

Model 3 consisted of the addition of strain variables with the control variables and residential mobility. This model was significant ($\chi^2_{(12)} = 1487.64$, $p < .001$). In this model, residential mobility is not significant, which provided evidence of a mediating effect of strain variables on the effect of residential mobility. This provides support for hypothesis 3b and

implied that the effects of residential mobility were mediated by strain. The strain variables also mediated the effect of age, which was significant in previous models. Gender was still significant and had a larger effect size than in the previous social bonding model (OR = .53, $p < .001$). It is similar to the effect size present in the second model with just controls and residential mobility.

The strain variables themselves are mostly significant with the exception of worry, which was a significant predictor regarding the odds of arrest. Self-worth had a strong effect similar to the effect that was present in the previous model dealing with arrest (OR = .891, $p < .001$). Traumatic stress, which was not significant when analyzing arrest, is significant when looking at fighting behavior (OR = 1.049, $p < .001$). Callousness had an effect in the expected direction, and for every unit increase in score on this scale, odds of ending up in the highest classification of fighting behavior increased 10% compared to classification in lower categories. Internalized and externalized anger had a significant effect with an odds ratio of 1.12. This indicated that a single unit of increase on this scale, which ranged from 0 to 10, was associated with a 12% increase of classification in the highest category compared to the three lower categories, or classification in the two higher categories compared to the two lower ones. Arrest of a member of the household had a strong effect similar to the effect it had on odds of arrest in the previous set of models (OR = 1.56, $p < .001$).

Comparing the social bonding and strain models on model fit indices produced results which slightly favor the strain model. The social bonding model has an AIC of 32293.76 with 15 degrees of freedom and a BIC of 32408.32. The strain model has an AIC of 32080.48 with 16 degrees of freedom and a BIC of 32202.68. Likelihood-ratio tests are most likely invalid in a comparison since these tests are not designed for use with models utilizing robust standard

errors. Overall, both models are significant and provide unique insights into how these variables affect the odds of engaging in fighting behavior. Comparison of the McKelvey and Zavoina Pseudo-R^2 values showed that the strain model explained slightly more of the extant variance, although there is only a very slight difference between the two models.

Full Model

The final model included strain, social bonding variables, and control variables. It was significant ($\chi^2_{(19)} = 1855.91$, $p < .001$). Age became significant in the opposite direction than was expected (OR = .916, $p = .020$). This was not the case with the strain model, which indicated a possible suppression effect associated with strain variables. As age increases, the odds of classification in the most severe category decrease by 8.4% per unit of increase in age. Sex retained statistical significance but the effect size decreased to a level similar to the effect seen in the social bonding model. Residential mobility is not significant in the full model, although with a *p* value of .067 it approached statistical significance. This indicated that the null hypothesis for hypothesis 2a should not be rejected. Residential mobility is not associated with fighting behavior. It is mediated by strain variables and is not significant in model 3 or the full model.

Social bonding variables that were significant in the previous models were significant in the full model. In the full model, expectations of violence has a decreased effect size compared to the social bonding model (OR = 1.14, $p < .001$). Strain variables account for some of the variance attributed to that construct in the previous model. Neighborhood connectedness remained significant in the full model in the unexpected direction (OR = 1.05, $p < .001$). Existence of family rules and level of family knowledge remained significant predictors of level

of fighting behavior and adult expectations has a relatively strong effect size in the full model

(OR = .85, $p < .001$).

The strain variables followed a similar pattern compared to the social bonding variables

although there was slightly more change. Variables that were significant in previous models

remained significant in the full model with the exception of worry negative peer support. Worry

was not significant in the strain model but was significant in the full model (OR = 1.017, $p =$

005). The effect size was relatively small. Negative peer support followed an opposite pattern.

It was significant in the strain model but not in the full model. Social bonding variables account

for some of the variance that was attributed to the variable in the strain model. The effect size

for an arrest of a member of the household was attenuated in the full model compared to the

strain model. The odds ratio decreased by .09 but was still a significant and strong predictor.

Overall, the analysis of fighting behavior showed many similarities to the model for

arrest regarding the variables that were predictive. The main difference of interest was that

residential mobility was a significant predictor in some of the model specifications but was

mediated by the strain variables. This mediation effect was present in the full model as well.

Age appeared to be subject to suppression effects from strain variables as it dropped to non-

significance when these variables were added but was significant in the full model. It had an

effect in the opposite direction compared to its effect in the models examining the odds of arrest.

The same effect was present with worry as an indicator. It was not significant in the strain model

but was a significant predictor in the full model.

Neighborhood connectedness continued to have an effect in an unexpected direction.

There is adequate support to fail to reject the null hypothesis of 2a, and there is evidence to reject

the null hypothesis for 4a regarding mediation and the set of strain variables. Social bonding

variables do not mediate the relationship between residential mobility and fighting behavior, which leads to a failure to reject the null hypothesis for hypothesis 3a. Overall, the McKelvey and Zavoina Pseudo-R^2 was slightly higher for the full model at .300. This was a slight increase from the strain and social bonding models. While the overall increase in the Pseudo-R^2 is not particularly large when comparing the initial model with residential mobility as a predictor to the full model, it should be noted that the intra-class correlation decreased with successive models. This has the effect of lowering the amount of variance explained by clustering, thus lowering the proportion of the Pseudo-R^2 value that can be attributed to the random effects.

WEAPONS CARRYING

Weapons carrying is a concern in many locations, with juveniles displaying this behavior for several reasons. These include defensive behaviors as well as for purposes of aggressive delinquency. While firearms are the chief source of homicides involving weapons, the carrying of edged weapons is also problematic, as both increase not only the likelihood of committing violence but the likelihood of victimization as well (Lizotte et al. 2000; Spano and Bolland 2013). This study examined weapons carrying as carrying either a firearm or a knife. The dependent variable examined is similar to the previous variable regarding fighting behavior in that it is ordinal, measuring the frequency and temporal proximity of the behavior. A mixed-effects ordinal model was used to examine the effect on various sets of variables and, like the previous models, allowed for random intercepts. These models examine hypotheses 2b, 3c, and 4c.

The model for weapons carrying used a subsample of the full model. This subsample consisted of 3,748 individuals who had taken the survey and responded to the questions

regarding weapons carrying at least three times. This resulted in a total of 15,124 person-years

within the 3,754 clusters. This represented a loss of 464 person-years, or 3.0% of the total

sample, and 79 individuals, equaling 2.1% of the total individual "clusters" in the sample. Some

loss was from individuals who took the survey three times but failed to answer the questions of

interest each time and from others that took it more than three times and answered the questions

on at least three waves, but might have failed to complete the questions on additional waves.

The mean number of waves answered by each individual was four with a maximum of six.

The proportional-odds assumption is applicable to the models analyzing weapons

carrying and, like the models examining fighting behavior, has high sample sizes, continuous

variables and a large number of explanatory variables. With this particular variable, there are

five categories. All of these factors make reliance on formal tests problematic (Allison 1999;

Allison 2009; Hox, Moerbeek and van de Schoot 2018). A series of binary regressions was run,

dividing the dependent variables into appropriate levels representing a lower tier, middle tier,

upper tier, and high tier. There is no need for a 5th category representing the lowest category

since that would include all cases. Odds ratios that were close to one another would represent

equality of effects between categories. The results are displayed in table 7.

Several of the variables presented problems when analyzed with a Brant test (Brant

1990). Given the large sample size, continuous variables, and a five-category dependent

variable, as well as the sensitivity of the Brant test, a p-value of .01 was used to select variables

for further examination. Residential mobility significantly departed from the proportional odds

assumption ($p = .001$). The substantive differences in odds ratios, however, were somewhat

small with the departure primarily occurring in the upper tier. The difference between the lowest

and highest odds ratio was .056, which represented a 5.6% increase in the odds over the different

levels of the outcome variable. The average of the odds ratios for the proportional odds test was

1.026, which was very close to the odds ratio estimated in the model. It was reasonable to

assume that there was one underlying odds ratio for the different levels of the variable in the

model and that the departures from the proportional odds assumption, for this variable, did not

present a problem in this particular set of analyses.

Table 7: Proportional Odds Test for Weapons Carrying Displaying Odds Ratios

	Model 1 Lower Tier (1)	Model 2 Middle Tier (2)	Model 3 Upper Tier (3)	Model 4 High Tier (4)	p value
Residential Mobility	1.011	1.014	1.013	1.070	.001
Control Variables					
Age (centered)	1.265	1.246	1.178	1.221	.418
Age Squared	.976	.980	.993	.995	.197
Sex	.715	.728	.731	.776	.871
Social Bonding					
Neighborhood	1.027	1.028	1.022	1.024	.706
Family Knowledge	.927	.935	.934	.939	.263
Family Rules	.890	.885	.891	.893	.537
Violent Beliefs	1.251	1.231	1.206	1.206	.007
Adult Expectations	.820	.781	.763	.828	.000
Positive Support	.994	.994	.991	.992	.683
Maternal Closeness	.932	.943	.980	.991	.037
Strain					
Self-Worth	.908	.919	.933	.936	.065
Traumatic Stress	1.044	1.046	1.042	1.066	.057
Hopelessness	1.005	1.047	1.073	1.010	.000
Callousness	1.073	1.061	1.067	1.037	.498
Anger	1.086	1.086	1.079	1.059	.226
Family Arrest	1.951	1.863	1.758	1.835	.110
Worry	1.016	1.013	1.018	1.012	.273
Negative Support	1.053	1.054	1.044	.986	.000

Other variables show possible departures from the tested assumption, including violent beliefs, which declines with the higher tiers, and adult expectations, which is consistent at the first and last tier tested. Adult expectations has a difference between the largest and smallest ratios of .065, while violent beliefs has an absolute difference of .045. Neither of these switch signs and are not primary variables of interest, so they do not warrant switching to a PPO model. Hopelessness has some variation in odds ratios throughout the different categories. The absolute difference is .065, and the overall odds ratio captured by the final model approximated an average of the odds ratios displayed. Again, this was not a primary variable of interest.

Negative support did actually switch signs from a maximum of 1.054 to a minimum of .986. This is an interesting finding in itself. The effect for negative support seems to decline for those in the highest category of weapons carrying. This could possibly mean that other factors have a heavier influence on those who choose to carry weapons on a daily basis. None of these findings warrant a PPO model and will do an adequate job of representing the effect of the variables with a single estimated parameter compared to estimating a separate parameter for each level of the dependent variable.

Initial Model and Control Variables

The initial model, including just residential mobility as a covariate, was not significant ($\chi^2_{(1)} = .45, p = .504$). Residential mobility was not significant, indicating that by itself it does not influence weapons carrying in a basic bivariate model with mixed-effects. This was in contrast to fighting behavior where the primary variable of interest did have an effect in the bivariate model. The effects in the model with weapons carrying as an outcome variable is more consistent with the effect that residential mobility had on the odds of arrest. It is important,

however, to continue to analyze the models to ascertain the effect of residential mobility in a full model.

The addition of control variables in model two resulted in a significant model ($\chi^2_{(4)} = 218.49$, $p < .001$). Age was significant (OR $= 1.24$, $p < .001$). This indicated that for every unit increase in age, the odds of ending up in the highest classification of habitual weapons carrying increased by 24% as compared to classification in the lower four groupings. The odds of ending up in the two highest classifications, which indicate at least weekly weapons carrying, were 24% higher than falling into the lower three categories which represent less frequent to no weapons carrying. It is clear that age plays a role in weapons carrying. The squared age term is also significant and negative (OR $= -.97$, $p = .001$). This indicated that age had a positive relationship that decreased in size as age increased. Sex was significant and in the expected direction (OR $= .44$, $p < .001$). The odds of females falling into the highest classification of habitual weapons carrying were 56% lower than males compared to classification into the lower four categories of weapons carrying. The odds of falling into the two categories that constitute weekly weapons carrying compared to the lower categories were also 56% lower for females than males. This is consistent with previous models where females were less likely to engage in delinquent or dangerous behaviors. The initial model generated a McKelvey and Zavoina Pseudo-R^2 of .286, while the control model displayed a very slight increase to .296. These models are presented in table 8.

Social Bonding Model

In model 3, social bonding variables were added which resulted in a significant model ($\chi^2_{(11)} = 1528.71$, $p < .001$). Age remained significant but was attenuated slightly, while sex,

Table 8: Mixed-Effects Ordinal Logit Model for Weapons Carrying with Coefficients and Standard Errors (Parentheses)

	Model 1	Model 2	Model 3	Model 4	Model 5
Residential Mobility	-.009 (.013)	-.008 (.013)	.016 (.013)	.024 (.013)	.028* (.013)
Control Variables					
Age (centered)		.212*** (.042)	.160*** (.042)	.260*** (.042)	.208*** (.042)
Age Squared		-.026*** (.008)	-.017* (.008)	-.024** (.008)	-.017* (.008)
Sex		-.814*** (.062)	-.376*** (.057)	-.581*** (.057)	-.326*** (.056)
Social Bonding					
Neighborhood			.003 (.009)		.021* (.009)
Family Knowledge			-.090*** (.008)		-.069*** (.009)
Family Rules			-.113*** (.014)		-.116*** (.014)
Violent Beliefs			.266*** (.010)		.202*** (.011)
Adult Expectations			-.275*** (.022)		-.189*** (.023)
Positive Support			.004 (.005)		-.007 (.006)
Maternal Closeness			-.068*** (.018)		-.044* (.018)
Strain					
Self-Worth				-.128*** (.012)	-.080*** (.012)
Traumatic Stress				.035*** (.007)	.043*** (.007)
Hopelessness				.078*** (.014)	.025 (.014)
Callousness				.132*** (.014)	.063*** (.015)
Anger				.111*** (.009)	.076*** (.009)
Family Arrest				.679*** (.047)	.569*** (.047)
Worry				.002 (.006)	.015* (.006)
Negative Support				.052*** (.007)	.038*** (.008)
Wald χ2	0.45 (1)	218.49(4)***	1528.71(11)***	1458.61(12)***	2103.35(19)***
Rho (ICC)	.397***	.380***	.294***	.303***	.268***
M&K Pseudo-R²	.286	0.296	.354	.344	.380

* p < .05, ** p < .01, *** p < .001.

although significant, had a decline in effect size (OR = .69, $p < .001$). Taking into account social

bonding variables, the difference between males and females is not as great. Residential

mobility, as with previous models examining weapons carrying, was not significant. Other

social bonding variables were significant and acted as predictors of weapons carrying behavior.

Family knowledge was a significant protective factor regarding weapons carrying

(OR = .91, $p < .001$). The establishment of family rules also was a significant protective factor

(OR = .89, $p < .001$). These family variables were important in lowering the odds that an

individual would engage in weapons carrying activity. Maternal closeness was also significant

(OR = .93, $p < .001$). The model implied that familial variables were universally important at

limiting weapons carrying behavior. Clear expectations, monitoring, and a close relationship

with the caregiver were all protective factors.

Violent attitudes or the expectation of violence was a strong predictor of weapons

carrying behavior (OR = 1.30, $p < .001$). For every unit increase in this variable, an individual's

odds of falling into the highest category, indicating habitual weapons carrying, increased 30%

compared to classification in the lower four categories. Their odds were also 30% lower per unit

increase regarding falling into the two highest categories indicating at least weekly weapons

carrying. This would be consistent with individuals carrying weapons for protection from

anticipated violence or carrying them since violent expectations might lead an individual to

believe weapons are required for solving interpersonal disputes within the neighborhood. Adult

expectations also had a heavy influence on weapons carrying behavior (OR = .76, $p < .001$).

This scale has a relatively limited range, but indicates that a future orientation helped prevent

individuals from engaging in behaviors that might keep them from achieving goals as an adult.

Oddly enough, positive peer influence had no significant effect on weapons carrying, and neither

did neighborhood connectedness. In previous models, neighborhood connectedness has acted as a risk factor. Overall, the addition of social bonding variables did not mediate the relationship between residential mobility and weapons carrying. There was no relationship to mediate, thus there is no support for hypothesis 3c. The model displayed a McKelvey and Zavoina Pseudo-R^2 of .354, which represented a small increase over the control model.

Strain Model

Model four incorporated strain variables and was significant ($\chi^2_{(12)} = 1458.61$, $p < .001$). Age was a significant predictor (OR 1.30, $p < .001$). This indicated that older individuals had higher odds of carrying weapons. For every unit increase, the odds increased 30% that they carry weapons on a regular basis compared to falling into the lower four categories. The strain variables did not attenuate the relationship between age and weapons carrying as much as the social bonding variables. The variable for squared age was significant and indicates some declining importance of age as an individual got older. Sex remained significant, with females having lower odds of carrying weapons (OR = .56, $p < .001$). Residential mobility was not significant in the model, although it approached significance (OR = 1.02, $p = .053$). Regardless of the significance, the effect size is small.

Other strain variables had large impacts on the likelihood of regularly carrying weapons. Self-worth had a significant effect (OR = .88, $p < .001$). As self-worth increased, individuals were significantly less likely to carry weapons on a regular basis. For every unit increase, an individual's odds of ending up in the highest classification declined by 22%. Previous traumatic experience was significant in the expected direction although the effect size was not particularly large (OR = 1.04, $p < .001$). Hopelessness was significant and in the expected direction

(OR = 1.08, $p < .001$). The experience of traumatic stress and the development of hopelessness led to higher odds of regular weapons carrying. This indicated that external experiences, such as trauma and internal characteristics, such as hopelessness, both acted as risk factors.

Anger predicted higher odds of weapons carrying (OR = 1.12, $p < .001$). Callousness also acted as a risk factor and predicted higher levels of weapons carrying (OR = 1.14, $p < .001$). These, combined with the internal characteristic of hopelessness, demonstrated these are important constructs to address. Worry, however, was not a significant predictor which was surprising. External factors that predicted higher levels of weapons carrying included the arrest of a family member in a given year (OR = 1.97, $p < .001$). This risk factor indicated that individuals who had a household member arrested were 97% more likely to carry weapons on a regular basis compared to falling into the lower groups and also 97% more likely to carry a weapon at least weekly compared to falling into the lower three categories which indicated carrying a weapon occasionally or not at all. This familial variable was a very strong predictor. Negative peer support also played a role, although the effect size was not as large as some of the other variables (OR = 1.05, $p < .001$).

Overall the strain variables act as strong risk factors with self-worth acting as a strong protective factor. Still, there is no support for hypothesis 4c as there was no relationship with residential mobility to mediate. The strain variables actually increased the effect of residential mobility relative to the bivariate, control, and social bonding models. This is an interesting finding and might indicate a suppression effect where the strain variables were accounting for some of the variance that was suppressing the effect of residential mobility. It is significant in the full model, which lends additional support to that explanation.

The strain and social bonding models both have strong predictor variables and overall explanatory power. A comparison of the models indicated that the social bonding variable had an AIC of 31220.16 and a BIC of 31342.14, both with 16 degrees of freedom. The strain model had an AIC of 31449.09 and a BIC of 31578.7 with 17 degrees of freedom. Overall, the social bonding model seems to fit better than the strain model, although the comparison of the non-nested models should be interpreted with caution. Overall, both models provided valuable information. A comparison of Pseudo-R^2 values would slightly favor the social bonding model, although both show improvement over the initial and control model.

Full Model

The full model examining weapons carrying behavior was relatively consistent with previous models with the exception of residential mobility, which was significant in the full model (OR = 1.03, p = .028). This significant finding is unexpected considering the variable was not significant in any previous model. This represented a suppression effect (Hayes 2018; MacKinnon, Krull and Lockwood 2000). The effect size is relatively small, and is in an unexpected direction. For each unit increase in tenure in a given neighborhood, the odds of an individual falling into the highest classification of weapons carrying was 3% higher compared to the 4 lower classifications. This implies that the longer someone lives in the same neighborhood, the higher the odds that they carried weapons more frequently. The results of this model indicated an effect, but it did not support hypothesis 2b, which posited that there would be an inverse relationship between residential mobility and weapons carrying severity.

In the full model, age remained a significant predictor for weapons carrying (OR = 1.23, p < .001). Older individuals had higher odds of engaging in more frequent weapons

carrying. Sex remained significant, although the effect was attenuated from earlier models (OR = .72, $p < .001$). When both social bond and strain variables were added to the model, the difference between males and females regarding the odds of carrying weapons shrank. Males, however, still had significantly higher odds of engaging in this particular behavior.

Most social bonding variables remained significant in the full model. Neighborhood connectedness was significant (OR = 1.02, $p = .029$) except in the social bonding model. The effect size is small and, as with previous models regarding arrest and fighting, in an unexpected direction. Family knowledge and family rules both acted as protective factors in the final models with odds ratios of .93 and .89 respectively. The other social bonding variable measuring familial attachment, maternal closeness, was also significant (OR = .96, $p = .016$). Taken together, the family conditions were significant protective factors against high levels of weapons carrying. Expectations of violence acted as a strong risk factor (OR = 1.22, $p < .001$). For every unit increase in this variable, the odds of an individual ending up in the highest classification was 22% higher. This category constituted habitual weapons carrying. This perception of the inevitability and acceptability of violence might lead to defensive weapons carrying. This is similar to some of the constructs discussed in Anderson's Code of the Street (2000). Adult expectations, however, act as a protective factor (OR = .83, $p < .001$) in that individuals with higher expectations of achievement as adults had lower odds regarding weapons carrying.

Strain variables also acted as good predictors of weapons carrying with few surprises in this model. Self-worth acted as a protective factor (OR = .92, $p < .001$) and callousness was a risk factor (OR = 1.07, $p < .001$). In the full model, worry was a significant predictor (OR = 1.01, $p = .021$) although it was not in the strain model. The addition of the social bonding variables led to the variable becoming significant in the model, although the effect size is small.

Anger had a larger effect size (OR = 1.08, $p < .001$) and was a significant risk. Arrest of a family member in a given year was the risk factor with a large effect (OR = 1.77, $p < .001$) and is consistent with other models and theory. The full model attenuates the effect size somewhat compared to the strain model, but it still serves as a strong predictor. Finally, negative peer influence had a small effect and acted as a risk factor (OR = 1.04, $p < .001$). Overall, both internal strain factors such as callousness, traumatic stress, worry, and anger were significant risk factors while the internal characteristic of self-worth was protective. External factors such as arrest of a family member and negative peer influences acted as risk factors.

Overall, residential mobility only served as a predictive variable in the full model. Its effect size was small and in an unexpected direction. The analysis of the proportional odds assumption showed that residential mobility had a higher impact on those who were in the highest classification for weapons carrying, which implied that residential mobility seemed to have a larger impact on those engaged in regular weapons carrying. Age was one of the strongest predictors, which was not unexpected. This is contrary to fighting behavior, where age actually lowered the likelihood of engaging in regular fighting. Beliefs in the inevitability of violence seemed to lend support to the possibility that at least some weapons carrying was defensive in nature, while many of the strain variables, such as anger and callousness, were also associated with a higher likelihood of regular weapons carrying. The family could be considered a very important factor in weapons carrying since family knowledge and family rules, as bond variables, and the arrest of a household member as a strain variable all had reasonable effect sizes. The social bonding and strain variables together reduced the effect size of sex, which was lower than it was for prior models involving arrest and fighting. The full model, as expected, had a higher McKelvey and Zavoina Pseudo-R^2 value of .380.

DRUG USING BEHAVIOR

Drug use can have large impacts on the trajectory of youth regarding job opportunities, criminality, health, and other domains of life (Inciardi, Horowitz and Pottieger 1993; Sampson and Laub 1993; White, Pandina and LaGrange 1987). There are multiple pathways into drug use and drug use tends to be higher in disadvantaged areas such as the area examined in this study (Howell, Bolland and Lian 2012; Sullivan, Kung and Farrell 2004). The majority, 64.49%, of the individuals in the sample report never using drugs. The most common drug used in the full sample is alcohol, followed by marijuana. The use of harder drugs such as crack is rare with less than 5% reporting any lifetime use of the drug. Statistics for methamphetamine use are similar with slightly more than 5% reporting any lifetime use. Drug use, however, is still a problem and can lead to a variety of negative outcomes for juveniles. This warrants analyzing drug use as a deviant behavior in the sample of juveniles. Strain would indicate that drug use can be indicative of maladaptive behaviors such as retreatism as an adaptation to strain (Merton 1938).

The model for the analysis of drug use was a mixed-effects ordinal logit model with a dependent variable measuring drug use split into five categories. Random intercepts were added to the model to account for clustering as in the other models. The analysis used a subsample of the full sample that included only individuals who had completed the questions regarding whether they got drunk or high. The dependent variable does not distinguish between what drug was used, but rather if the individual got drunk or high, and how often they engage in that particular behavior. The subsample consisted of 15,130 person-years, and 3,748 individuals (clusters). This represented a loss of 3% of the person-years in the sample and a loss of information from 2.2% of individuals in the full sample. The analysis of drug use followed the

same pattern as previous models, with five models to analyze residential mobility, control

variables, strain and social bonding variables in separate models, and finally a full model.

The proportional odds assumption was analyzed. The results are displayed in table 9.

Table 9: Proportional Odds Test for Drug Use Displaying Odds Ratios

	Model 1 Lower Tier (1)	Model 2 Middle Tier (2)	Model 3 Upper Tier (3)	Model 4 High Tier (4)	p value
Residential Mobility	1.002	.989	.998	1.032	.016
Control Variables					
Age (centered)	1.617	1.548	1.527	1.840	.051
Age Squared	.972	.979	.982	.956	.092
Sex	.703	.645	.605	.592	.001
Social Bonding					
Neighborhood	1.056	1.049	1.047	1.073	.126
Family Knowledge	.923	.919	.917	.912	.805
Family Rules	.851	.851	.860	.819	.027
Violent Beliefs	1.237	1.220	1.217	1.246	.205
Adult Expectations	.913	.877	.865	.921	.002
Positive Support	.989	.978	.973	.960	.000
Maternal Closeness	.924	.962	.965	.969	.051
Strain					
Self-Worth	.899	.894	.922	.923	.017
Traumatic Stress	1.039	1.037	1.032	1.033	.962
Hopelessness	.924	.945	.955	.931	.001
Callousness	1.092	1.098	1.082	1.093	.757
Anger	1.067	1.073	1.064	1.050	.227
Family Arrest	1.541	1.486	1.508	1.574	.852
Worry	1.005	1.010	1.017	.983	.000
Negative Support	1.041	1.042	1.034	.989	.000

Binary mixed-effects regressions were run for the lower tier, middle tier, upper tier, and

highest tier with the coding displayed in the table. The proportional odds assumption was

problematic in that the model contained multiple continuous variables, had a large sample size with many clusters, and had a dependent variable with five categories. This often leads to a violation of the assumption even where there is no substantive difference in the logits for each level (Allison 1999; Brant 1990). The alpha level for examination of possible violations was set at .01, giving consideration to the sample size.

Sex varies across levels of the dependent variable ($p = .001$). The odds ratios range from .703 to .592 at the highest level and decline as the categories increase. This difference of .111 between the highest and lowest values is somewhat problematic, but sex is a control variable. Caution was used in the interpretation of the coefficients for this variable. Adult expectations also represented a departure for the PO assumption ($p = .002$). This variable displayed slightly lower odds ratios in the middle estimations, but does not represent a substantive problem since the estimated odds ratios for the binary regressions are relatively close. Positive peer support also displayed possible departures from the PO assumption. The difference in odds ratios across the levels of the dependent variable were small in magnitude which indicated that this variable should not be a problem in a proportional odds model.

Strain variables displayed departures from the assumption of proportional odds, although none were particularly severe. Hopelessness had odds ratios in the range of .924 to .955, but the differences were relatively small in magnitude. An average of these was congruent with the odds ratio from the final model (.931), which led to the assumption that there is indeed a single coefficient representing the variable across different levels. Worry displayed relatively consistent odds ratios but actually switched signs in the highest tier. In the full model, this variable is not a concern. The odds ratios closely bracket one and are not significant in the final

model. Negative peer support also had relatively consistent odds ratios until the highest category of drug use was analyzed.

This is a strange finding, but overall the odds ratio in the final model is close to the average of the odds ratios in the PO assumption analysis, which indicated that it was not unduly influenced by the final category. While this variable is important, the effect size is not large thus it should not have a large impact on the overall interpretation of the model. While there are some violations in the proportional odds assumptions, none of them are severe enough to warrant a partial proportional odds model and lose the ordering that is important for each variable. A single coefficient for each predictor is a reasonable practical assumption in this model that will not unduly influence the overall substantive interpretation of the results.

Initial Model and Control Model

The initial model, containing just residential mobility as a predictor was not significant ($\chi^2_{(1)} = .03$, $p = .853$). Residential mobility, in a bivariate regression, was not significant. This is similar to the effect found for arrest and weapons carrying. This does not lend any support to hypothesis 2c, although evidence from further models will be used for a final evaluation. The results are displayed in table 10. The second model added control variables to the model and was significant ($\chi^2_{(4)} = 499.01$, $p < .001$). These control variables were significant, with age having a pronounced effect on the odds of drug use (OR $= 1.67$, $p < .001$). For every year increase in age, the odds of an individual falling into the highest category of drug use, which represented getting high or drunk once a week or more, increased by 67%. Overall, the initial model displayed a Pseudo-R^2 value of .310, while the control variable model increased to .375.

Table 10: Mixed Effects Ordinal Logit Model for Drug Use with Coefficients and Standard Errors (Parentheses)

	Model 1		Model 2		Model 3		Model 4		Model 5	
Residential Mobility	-.003	(.014)	-.018	(.014)	-.007	(.014)	.007	(.014)	.002	(.014)
Control Variables										
Age (centered)			.511***	(.050)	.453***	(.050)	.539***	(.051)	.486***	(.051)
Age Squared			-.040***	(.009)	-.028**	(.009)	-.036***	(.009)	-.281**	(.009)
Sex			-.870***	(.071)	-.418***	(.068)	-.717***	(.068)	-.411***	(.067)
Social Bonding										
Neighborhood					.044***	(.011)			.050***	(.011)
Family Knowledge					-.100***	(.010)			-.084***	(.010)
Family Rules					-.167***	(.015)			-.162***	(.153)
Violent Beliefs					.256***	(.012)			.209***	(.012)
Adult Expectations					-.135***	(.026)			-.095***	(.027)
Positive Support					-.008	(.006)			-.017**	(.006)
Maternal Closeness					-.077***	(.020)			-.058**	(.020)
Strain										
Self-Worth							.142***	(.013)	-.093***	(.014)
Traumatic Stress							.029**	(.009)	.036***	(.009)
Hopelessness							-.029	(.016)	-.072***	(.016)
Callousness							.158***	(.016)	.088***	(.016)
Anger							.101***	(.010)	.062***	(.010)
Family Arrest							.507***	(.053)	.395***	(.054)
Worry							-.016*	(.007)	.002	(.008)
Negative Support							.038***	(.008)	.030**	(.009)
Wald χ2	.03(1)		499.01(4)***		1417.09(11)***		1168.10(12)***		1674.40(19)***	
Rho (ICC)	.432***		.440***		.384***		.392***		.369***	
M&K Pseudo R²	.310		.375		.431		.405		.446	

* p < .05, ** p < .01, *** p < .001.

It also represented a 67% increase in the odds of falling into the top two categories as opposed to the lower three tiers. The top two tiers represent at least weekly drug use. This was not an unexpected finding as older juveniles are more likely to abuse drugs (Howell, Bolland and Lian 2012). The squared term for age was significant, which implied that the effect for age tapers off towards the upper end of the age range to some extent. Sex also had a large impact (OR = .42, $p < .001$). The odds of females participating in more than weekly drug use were 58% lower than their male counterparts. This represented a large disparity between females and males, and as with the other models, males were more likely to engage in deviant behaviors. Residential mobility was not significant in the second model.

Social Bonding Model

The third model added social bond variables to the model, which resulted in a significant model ($\chi^2_{(11)} = 1417.09$, $p < .001$). These variables, overall, served as strong predictors of drug use. The coefficients for the control variables were attenuated to a certain extent as the model was more fully specified. The effect size for age declined from a 67% increase in odds per increase in unit to a 57% increase in odds per increase in unit of age. The effect size for sex was also attenuated from a 58% increase in the odds of males falling into the highest category to a 34% increase in this same result compared to their female counterparts. Residential mobility, similar to the previous models, remained non-significant, which did not support hypothesis 3d. There was no relationship to mediate.

Neighborhood connectedness was significant (OR = 1.04, $p < .001$) and in an unexpected direction. This was true in previous models, as neighborhood connectedness seems to be a risk factor rather than a protective factor for multiple delinquent behaviors. This includes drug use,

and while the effect size was relatively small, it is a consistent finding between different outcomes. Family knowledge served as a strong protective factor (OR = .90, $p < .001$). For each unit increase in level of family knowledge the odds of an individual falling into the highest category of drug use compared to the lower four categories declined by 10%. The existence of family rules also served as a strong protective factor (OR = .85, $p < .001$). For every unit increase in the existence of family rules, the odds of habitual drug use, the highest category, declined 15% compared to the odds of falling into one of the four lower tiers. These familial variables were significant in reducing the risk of high levels of drug usage. Maternal warmth, another familial variable, was significantly associated with a lower likelihood of serious drug use (OR = .93, $p < .001$).

Other social bonding variables had a significant effect. Adult expectations, as with previous models analyzing other delinquent behaviors, was a significant protective factor (OR = .87, $p < .001$). A single unit increase in these expectations resulted in 13% lower odds of falling into the most serious category of drug use compared to the other four. Violent expectations or beliefs, however, was a significant risk factor (OR = 1.29, $p < .001$) and one of the strongest predictors of any of the social bonding variables. As with previous models, expectations and normalization of violent behavior predicted delinquent behavior. In this case it predicted higher levels of drug use. For every unit increase in violent attitudes, the odds of falling in the highest category of drug use increased by 29% compared to membership in one of the other tiers. The odds of ending up in either of the categories indicating weekly drug use increased by 29% compared to the other three lower tiers. Positive peer pressure, measured as friends believing prosocial behaviors were cool, was not significant. The model as a whole resulted in a McKelvey and Zavoina Pseudo-R^2 of .431, which showed some improvement over model 2.

Strain Model

The fourth model added strain variables to the control variables and residential mobility, and resulted in a significant model ($\chi^2_{(12}$ = 1168.10, p < .001). The strain variables did not attenuate the control variables as much as the social bonding variables. Age was significant (OR = 1.71, p < .001). This represented a strong risk factor. As individuals aged, they became much more likely to become heavily involved in drugs. Sex was also significant (OR = .49, p < .001). This was also not attenuated as much with the strain variables compared to the model with the social bonding variables. The odds of females falling into the upper classifications were 51% less than their male counterparts. They had 51% lower odds of falling into the highest category compared to the lower four tiers, and also 51% lower odds of falling into the upper two categories compared to the lower three categories. Residential mobility was not significant in the strain model which further lends support to failing to reject the null hypothesis for 2c.

Other strain variables acted as risk factors. Trauma had a significant but relatively small effect (OR = 1.03, p = .001), while callousness had a much larger effect size and also acted as a risk factor (OR = 1.17, p < .001). Anger was also a relatively strong predictor and risk factor (OR = 1.11, p < .001). The largest single risk factor was arrest of a household member in the last year (OR = 1.66, p < .001). This meant that individuals who had a household member arrested in the last year had increased odds of 66% regarding falling into the highest risk category for drug use compared to lower categories. They had the same elevated odds, 66%, of falling into the top two categories, representing at least weekly drug use, compared to the lower three categories. Negative peer support also had a small effect but could be considered a risk factor (OR = 1.04, p < .001). This was expected, especially with peer pressure as an indicator of juvenile drug initiation (Howell, Bolland and Lian 2012; Sariaslan et al. 2013). Worry, like

negative peer influence, had a small but significant effect (OR = .98, p = .035). This was in an unexpected direction, however. Hopelessness, which one would think would be associated with drug use, was not significant in this model. Overall, the model does not lend support to hypothesis 4d. This results in a failure to reject the null hypothesis.

The strain and social bonding models were compared using BIC and AIC statistics. The social bonding model had a BIC of 26805.53 and an AIC of 26683.54 with 16 degrees of freedom. The strain model had a BIC of 27258.8 and an AIC of 27129.19 with 17 degrees of freedom. The social bonding model appears to fit the data slightly better than the strain model. Both models, however, are significant and contain strong predictors related to the dependent variable. There is support for both theoretical constructs as predictors of juvenile drug use with this particular population. The strain model had a lower Pseudo-R^2 value at .405, compared to .431 for the social bonding model which was congruent with the other fit statistics. The social bonding model appears to be a slightly better fit for this particular outcome variable.

Full Model

The full model for frequency of drug use involved both social bonding and strain variables and resulted in a significant model ($\chi^2_{(12)}$ = 1674.40, p < .001). Age was significant and was somewhat attenuated compared to the control only model (OR = 1.62, p < .01). It still remained a very strong predictor of higher levels of drug use per unit increase. Sex was also significant and was attenuated from the control only model similar to the results of the social bonding model (OR = .66, p < .001). Residential mobility, as in previous models involving this dependent variable, was not significant. This resulted in the failure to reject the null hypothesis for hypothesis 2c. Overall, residential mobility had no effect on severity of drug use.

Neighborhood connectedness had a significant impact of the odds of classification into a higher category representing more severe drug use (OR = 1.05, $p < .001$). While not the strongest predictor, it had an effect in an unexpected direction. Neighborhood connectedness consistently predicted delinquent behavior in this unexpected direction. Family knowledge and family rules remained significant in the full model. Family knowledge was a protective factor (OR = .92, $p < .001$). This is consistent with the previous social bonding model. Family rules has a slightly larger effect size (OR = .85, $p < .001$). Maternal closeness, a final family variable in the social bonding context, was significant and acted as a protective factor (OR = .94, $p = .004$). These, taken together, show that family environment is important in preventing drug use. Adult expectations was significant in the final model (OR = .91, $p < .001$). In addition, positive peer influence was significant in the final model (OR = .98, $p = .009$). This was not consistent with the previous social bonding model where it was not significant. The effect size is small, but it acted as a protective factor.

Strain variables remained significant in the final model. Self-worth was a strong protective factor (OR = .91, $p < .001$) while traumatic stress was significant but in the expected direction (OR = 1.04, $p < .001$). This is consistent with the previous strain model. Hopelessness was significant in the final model (OR = .93, $p < .001$) but not the previous strain model. It is possible there is some kind of suppression effect where the addition of both social bonding variables and strain variables resulted in the unmasking of the variance accounted for by this particular variable. The effect size is moderate and it did act as a risk factor. The effect detected in the final model is more consistent with theory that would predict that an individual with high levels of hopelessness might be more likely to drift towards drug use (Merton 1968). Callousness remained significant in the final model (OR = 1.09, $p < .001$) as did internalized and

externalized anger (OR = 1.06, $p < .001$). Callousness had a slightly larger effect size, but both served as significant risk factors for higher levels of drug use.

One of the strongest predictors amongst the strain variables was arrest of a household member (OR = 1.48, $p < .001$). This was somewhat attenuated from an odds ratio of 1.65 in the strain model, indicating that social bonding variables account for some of the variance attributed to this variable in the strain model. With a more fully specified model, it still remains a very strong predictor of higher levels of drug use. Finally, negative peer pressure was significant in the final model and acted as a risk factor (OR = 1.03, $p = .001$). The effect size is small. It was not surprising that this was a significant predictor, but the small size of the effect was not anticipated. Family and internal values play a much larger role in the odds of a juvenile engaging in heavier drug use than peer influence, either positive or negative. Worry, which had a small effect size in the strain model, is not significant in the full model, which is an unexpected finding. The full model displayed a McKelvey and Zavoina Pseudo-R^2 value of .446, which was only a slight improvement over the social bonding model.

In summary, the predictors for drug use are congruent with previous models examining other delinquent behaviors. Familial variables such as family rules and family knowledge, along with maternal closeness, have a protective effect. Internal attitudes such as the anticipation or expectation of violence along with anger and callousness constitute risk factors. Self-worth was a protective factor as expected (McGee and Williams 2000). Self-worth and feelings of self-esteem were linked with a lower likelihood of heavier drug use as was adult expectations. Some of the strongest predictors of heavier drug use were demographic. Age and sex play a large role in the risk of heavy drug use. Despite this increased risk, it is important to note that the majority of respondents reported no drug use. There were also relatively few who reported moderate drug

use. There are some that use drugs weekly, and more that use no drugs at all. Contrary to

popular belief, the majority of juveniles in disadvantaged areas do not abuse drugs (Pollack and

Reuter 2006).

GANG MEMBERSHIP AND ASSOCIATION

Gang membership is the last delinquent activity investigated in this research. The

formation of gangs can lead to problematic behaviors such as weapons carrying, violence, and

arrest, and thus, by itself, can serve as a risk factor for other behaviors investigated in this

research (O'Brien et al. 2013; Spano, Freilich and Bolland 2008; Spano, Rivera and Bolland

2011). The definition of gang can vary from context to context, but in the researcher's

experience, most of the gang involvement in the research areas consisted of involvement in

relatively small neighborhood gangs and not necessarily large national gangs. This does not

imply that the smaller gangs are less violent in these areas. Roughly 10% of respondents

reported being members of a gang in any given year. Gang membership can be linked to

violence committed as part of gang activities as well as increased levels of violence outside the

activities of the gang (Rosenfeld, Bray and Egley 1999).

In order to ascertain the effect of the predictors on the likelihood of gang membership in

the current research, a binary logit model with mixed effects was used. Random intercepts were

entered into the model in all five analyses. Gang membership was collapsed into a binary

variable which indicated whether an individual reported that they were currently part of a gang

or not part of a gang. Five models were run in the same manner the other independent variables

were investigated, with models containing residential mobility run first followed by a model with

control variables, social bonding variables, strain variables, and finally, a full model containing

both strain and social bonding variables. These models test hypotheses 2d, 3e, and 4e regarding

overall effect of residential mobility and the mediating effects of social bonding and strain

variables respectively. A subsample was used in this model. The subsample consisted of all

individuals who completed the survey three or more times, and answered the questions regarding

gang involvement three or more times. This subsample consisted of 3,797 individuals (clusters)

and 15,353 person-years. This represented a loss of 235 person-years and 36 individuals from

the full sample. These numbers constituted a loss of 1.5% of person-years and 1% of

individuals.

Initial Model and Control Variables

The initial model with gang membership as the dependent variable was significant

$(\chi^2_{(1)} = 11.46, p < .001)$. Residential mobility was significant $(OR = .94, p = .001)$ in the

expected direction when taking into account the coding of residential mobility. Higher values

indicated longer residential tenure in a neighborhood. For every unit increase in residential

mobility, the odds of being a member of a gang decreased by 6%. This indicates, in a model

with no control variables or other covariates, residential mobility is associated with gang

membership, which leads tentative support to hypothesis 2d. The results of the analysis are

displayed in Table 11.

Table 11: Mixed-Effects Logit Model for Gang Membership with Coefficients and Standard Errors (Parentheses)

	Model 1	Model 2	Model 3	Model 4	Model 5
Residential Mobility	-.065*** (.019)	-.056** (.018)	-.026 (.019)	-.009 (.019)	-.008 (.019)
Control Variables					
Age (centered)		.018 (.067)	-.077 (.070)	.077 (.069)	-.007 (.070)
Age Squared		-.003 (.013)	.012 (.013)	-.003 (.013)	.007 (.014)
Sex		-1.588*** (.091	-1.12*** (.090)	-1.32*** (.091)	-1.04*** (.091)
Social Bonding					
Neighborhood			-.003 (.016)		.031 (.016)
Family Knowledge			-.092*** (.013)		-.067*** (.013)
Family Rules			-.098*** (.021)		-.121*** (.021)
Violent Beliefs			.276*** (.017)		.204*** (.017)
Adult Expectations			-.472*** (.033)		-.361*** (.034)
Positive Support			.004 (.009)		-.023* (.010)
Maternal Closeness			-.058* (.027)		-.033 (.028)
Strain					
Self-Worth				-.173*** (.018)	-.117*** (.019)
Traumatic Stress				.009 (.012)	.020 (.012)
Hopelessness				.121*** (.020)	.045* (.021)
Callousness				.136*** (.024)	.063** (.024)
Anger				.109*** (.014)	.073*** (.014)
Family Arrest				.525*** (.073)	.393*** (.075)
Worry				.042*** (.010)	.060*** (.010)
Negative Support				.064*** (.011)	.055*** (.287)
Wald χ2	11.46(1)***	334.47(4)***	987.55(11)***	929.50(12)***	1116.67(19)***
Rho (ICC)	.441***	.381***	.322***	.324***	.304***
M&Z Pseudo-R²	.233	.289	.390	.379	.438

* p < .05, ** p < .01, *** p < .001.

The second model, which included the control variables, was also significant ($\chi^2_{(4)}$ = 334.47, $p < .001$). Residential mobility remained significant (OR = .95, $p < .003$). This indicated that for every unit increase in residential mobility, the odds of belonging to a gang decreased by 5%. Age, surprisingly, was not a significant predictor of gang membership. This was contrary to models analyzing arrest, fighting, weapons carrying, and drug use. This was an unexpected finding, as it was expected that age would be positively associated with gang membership. This finding indicates that gang membership does not vary with age in this particular sample. Sex, however, was a significant predictor (OR = .20, $p < .001$). This can be interpreted as the odds of a female being in a gang are 80% lower than males. This effect was expected and indicates that being a female is a protective factor in this model. The initial model with only residential mobility in the model displayed a McKelvey and Zavoina Pseudo-R^2 of .233 while model 2 generated a Pseudo-R^2 of .289. These statistics were slightly lower than other models in the current research.

Social Bonding Model

The third model added social bonding variables to the model, which included residential mobility and the control variables. Residential mobility was not significant in this model, which indicated that social bonding mediated the relationship between residential mobility and gang membership. This provides support for hypothesis 3e. This represents a significant mediating effect since residential mobility had a reasonable effect size until the introduction of the social bonding variables. This indicated that the effect of residential mobility on gang membership operate through the social bonding variables (Hayes 2018; Jose 2013).

Sex remained significant (OR $= .26$, $p < .001$). This implies that, when adding social bonding variables to the model, the odds of a female being in a gang are 74% less than that of males. While neighborhood connectedness was not significant, as it had been for other forms of delinquency, familial variables were significant. Family knowledge acted as a protective factor (OR $= .91$, $p < .001$). For every unit increase in amount of family knowledge, the odds of being in a gang decreased 9%. The establishment of family rules was also significant (OR $= .91$, $p < .001$). As with family knowledge, every increase in this variable lowered the odds of being in a gang by 9%. Maternal closeness, the last of the familial variables in the social bonding set was also a protective factor (OR $= .94$, $p = .035$). Overall, connectedness with family and family monitoring were strong protective factors regarding gang membership.

Violent beliefs, or the expectation of violence, was a significant risk factor for gang membership (OR $= 1.32$, $p < .001$). A single unit increase in this variable increased the odds of gang membership by 32%. This was expected, as a juvenile might join a gang for protection if they expect violence and believe that the neighborhood is a violent place where one has to fight (Anderson 2000; Parker and Reckdenwald 2008; Spano, Freilich and Bolland 2008). Adult expectations served as a protective factor in this model (OR $= .62$, $p < .001$). A unit increase in adult expectations reduced the odds of gang membership by 38%. This is congruent with theory in that those with expectations in life such as obtaining a good job, finding a good marriage partner, and being successful overall were associated with decreased delinquent behaviors (Hill et al. 1999). Positive peer influence was not significant.

The social bonding model showed that familial ties, violent expectations, adult expectations, and sex were significant predictors of gang membership in this sample. Most social bonding variables were protective factors, although neighborhood connectedness, which

has displayed tendencies to become a risk factor, is not significant in the model examining this particular delinquent behavior. Overall, the fit was somewhat better with a Pseudo R^2 of .390 compared to previous models in the series.

Strain Model

The fourth model run involved adding the strain variables to residential mobility and the control variables. The model was significant ($\chi^2_{(12)} = 929.50$, $p < .001$). Residential mobility was not significant in this model. The addition of the strain variables appeared to mediate the relationship between residential mobility and gang membership. This provides support for hypothesis 4e. Age was not significant in the strain model, but sex was significant ($OR = .27$, $p < .001$). If the individual was female, her odds of being in a gang were 74% less than that of male counterparts. Overall, residential mobility and the control variables followed similar patterns to what was found in the social bonding model.

A variety of strain variables were significant in the model. Internal characteristics such as self-worth had an inverse relationship with the odds ratio of being in a gang ($OR = .84$, $p < .001$). For every unit increase in self-worth, the odds of gang membership declined by 16%. Hopelessness, another internal construct, has a positive relationship with the dependent variable ($OR = 1.13$, $p < .001$). Every unit increase in hopelessness increased the odds of joining a gang by 13%. Callousness had a similar effect ($OR = 1.15$, $p < .001$) in that it increased the odds of joining a gang. Worry was also significantly and positively related to gang membership ($OR = 1.04$, $p < .001$). These primarily internal characteristics, as a cluster, impacted the odds of an individual joining a gang.

External characteristics were also significant in the strain model. The arrest of a household member increased the odds of an individual being a member of a gang by 69% (OR = 1.69, $p < .001$). Internalized and externalized anger was shown to be a risk factor (OR = 1.11, $p < .001$). This represented both internalized anger, as well as external manifestations of anger. Traumatic stress, however, caused by an external event, was not significant. Negative peer influence served as a risk factor (OR = 1.06, $p < .000$). For every unit increase in peers approving and encouraging a variety of delinquent behaviors, the odds of gang membership increased 6%. Overall, many of the variables measuring strain had a significant relationship in the expected direction regarding membership in a gang.

The social bonding and strain variables were compared using AIC and BIC statistics in an effort to see which model fit the best. The social bonding model had an AIC of 8334.677 and a BIC of 8433.985 with 13 degrees of freedom. The strain model had an AIC of 8458.98 and a BIC of 8565.927 with 14 degrees of freedom. This would indicate that the social bonding model would be the preferred model between the two, although a model with both theoretical sets of variables has a significantly lower AIC and BIC, which were 8076.314 and 8236.734 respectively. The Pseudo-R^2 value of the strain model was .379 compared to .390 for the social bonding model which would confirm that there is slightly better fit with the social bonding model, although both models show an improvement over models without these variables.

Full Model

The full model investigating gang membership included the addition of both theoretical sets of variables to residential mobility and the control variables. The model was significant ($\chi^2_{(19)} = 1116.67$, $p < .001$). The ICC for the model was .304. Residential mobility, as expected

after examination of previous models, was not significant. This led the to a failure to reject the null hypothesis for hypothesis 2d. Residential mobility was not significantly related to gang membership. It is mediated by both the social bonding variables and strain variables as separate sets and when both are entered into the model. Age is not significant as it had been in models investigating other delinquent behaviors. Sex remained significant in the full model (OR = .35, $p < .001$). The odds of a female being in a gang were 65% less than a male counterpart. This is somewhat attenuated compared to the control only model, where the odds ratio was .20.

The social bonding variables behaved similarly to results from the social bonding model with a few exceptions. Neighborhood connectedness, which was a risk factor in previous models examining other delinquent behaviors was not significant in the full model, although it approached significant in an unexpected direction (OR = 1.03, $p = .061$). Familial variables were significant. Family knowledge (OR = .93, $p < .001$) decreased the odds of gang membership by 7% per unit increase, while the establishment of family rules (OR = .89, $p < .001$) decreased the odds by 11% per unit increase. Maternal warmth and closeness, which was significant in the social bonding model, was not significant in the full model. While maternal closeness was not significant, positive peer influence was significant in the final model (OR = .98, $p < .020$). This variable was not significant in the social bonding model and has a relatively small effect size in the full model.

Strain variables also behaved similarly to the results from the previous strain model. Self-worth served as a significant protective factor (OR = .89, $p < .001$). For every unit increase in this variable, the odds of gang membership declined by 11%. Hopelessness served as a risk factor (OR = 1.05, $p = .037$) although significance was reduced from the .001 level. Callousness,

as expected, was a risk factor (OR = 1.06, $p < .009$) although the effect size was somewhat attenuated. In the strain model, callousness was associated with a 15% increase in the odds of gang membership per unit increase, while in the full model it was associated with a 6% increase. Anger, in internal and external form, served as a risk factor (OR = 1.08, $p < .001$), as did the arrest of a household member in a given year (OR = 1.48, $p < .001$). This was somewhat attenuated as well. Arrest of a household member was associated with a 69% increase in the odds of gang membership in the strain model compared to a 48% increase in the full model. Worry, as expected, served as a risk factor (OR = 1.06, $p < .001$). Negative peer influence was associated with higher odds of gang membership in a given year (OR = 1.06, $p < .001$). Overall, several of the strain variables were somewhat attenuated regarding effect size in the full model, which was to be expected. Many of them were still significant and in the expected direction.

The full model indicated that residential mobility, once appropriate theoretical variables were added, was not associated with gang membership. This indicated a tentative mediating effect for both social bonding variables and strain variables which supports hypotheses 3e and 4e. Both social bonding variables and strain variables, as separate sets, were associated with gang membership as well as having a mediating effect on residential mobility. The full model showed that both sets of theoretical variables are important in explaining the association between internal and external conditions and the odds of gang membership in a given year with a Pseudo-R^2 of .438, much of which consists of the explanatory power of the fixed effects.

Conclusion

Overall, residential mobility had an inconsistent effect on delinquent behavior. It was not associated with the odds of arrest in a given year, but was significantly associated with fighting

behavior. The association with fighting behavior was mediated by strain variables, but not social bonding variables. Theoretically this makes sense, as a theoretical link can be made between residential mobility, strain, and fighting (Anderson 2000; Hagan, MacMillan and Wheaton 1996). As the respondent moved to a new area, they might have to fight to gain respect in a new neighborhood. Elevated levels of severity regarding fighting behavior seemed to be a more common outcome for those who had been in a neighborhood less than a year or around a year. Residential mobility was also significant regarding weapons carrying behavior in the full model. Although the effect size was small, those who had moved more recently had greater odds of engaging in frequent weapons carrying. This could be explained by a desire for protection, although there is no way to gauge this using the current research.

Residential mobility was not significantly associated with drug use. Given the areas where the research was conducted, in the researcher's opinion and experience this would not be due to lack of availability of drugs or lack of individuals with which to use drugs or alcohol. It appears that residential mobility simply does not increase the odds of drug use. This was an unexpected finding. Finally, residential mobility did affect the odds of membership in a gang, although this relationship was mediated by both social bonding variables and strain variables, entered into the model as separate groups. This could be explained by a desire to integrate into the neighborhood, gain friends for protective purposes, and satisfy a desire to belong (Parker and Reckdenwald 2008; Rosenbaum et al. 1992; Spano, Freilich and Bolland 2008). These are simply theoretical explanations that might explain the relationship between residential mobility and the dependent variable.

Other interesting findings include the effects of the social bonding variables and strain variables. Age was not a significant predictor of gang membership, which is a surprising

finding. Neighborhood connectedness, normally considered a protective factor, served as a risk factor in many of the models (O'Brien et al. 2013; Pettit and McLanahan 2003). The theoretical underpinnings of this connection were not investigated by the current research, so it is difficult to draw any firm conclusions from that particular finding. Familial variables such as the establishment of rules and family monitoring, as well as maternal closeness, tended to have a protective factor, as did other social bonding variables such as adult expectations. The expectations of violence, as expected, served as a risk factor. Overall, the social bonding variables provide tentative support to this particular theory, although the current research was not designed to formally test this theory (Hirschi 1969).

The strain variables provided consistent and strong predictors regarding delinquency. The event of a member of the household being arrested in a given year was a significant risk factor in all models, as was callousness and anger. Self-worth was a consistent protective factor. Negative peer support, however, was not a consistent predictor. While it was significant regarding the odds of higher levels of weapons carrying, drug use, and gang membership, it was not significant regarding the odds of arrest and fighting behavior. Positive peer support was significant regarding the odds of arrest, high levels of fighting behavior, drug use, and gang membership, but not weapons carrying. Overall the effect sizes for both positive and negative peer support were not high, indicating that other factors play a larger role than peer influence. This is contradictory to previous research (Hagan, MacMillan and Wheaton 1996; Haynie, South and Bose 2006).

INTERACTION MODELS

Interactions in regression models are generally added to further understand the relationships between variables within the model and to thus facilitate a better understanding of the processes that might be underlying relationships in the model (Agresti and Kateri 2011; Meyers, Gamst and Guarino 2016). Two interaction terms were explored in the current research dealing with residential mobility and neighborhood connectedness and residential mobility and expectations or acceptability of violence. These interaction terms were designed to further understand the effects of residential mobility on these social bonding variables based on theoretical ideas linking residential mobility with changes in these variables. These effects were hypothesized to go beyond a simple positive or negative relationship.

The relationships were hypothesized to be different in that there might be a moderating effect between these variables where those who had recently moved would have not only an attenuated connection with their neighborhood, but that this would be fundamentally different than the effect of residential mobility on those who had not moved. In effect, lack of neighborhood connections for someone who had just moved would simply compound other problems faced by the individual, such as adapting to a new environment and negotiating a different set of social norms and social actors in the new environment (Chung and Steinberg 2006; Witherspoon et al. 2009).

A similar effect was hypothesized with expectations of violence. The disorienting effect of moving to a new neighborhood can raise anxiety and other negative states that contribute to taking a defensive attitude designed to ensure survival (Boggess and Hipp 2010; Haynie and South 2005; Sharkey and Sampson 2010). Proximal residential mobility might condition this expectation of violence, creating a moderating effect that exists only when individuals have

recently relocated. Expectations for violence and the attitudes towards the acceptability of this violence can be exacerbated by a recent relocation (Cotton and Schwartz-Barcott 2016; Drummond, Bolland and Waverly 2011). In this sense, Anderson's work (2000) lays a foundation for this need for this reactive behavior when functioning in disadvantaged neighborhoods. The establishment of status and finding one's place in the social structure become increasingly important when an individual is surrounded by unfamiliar territory and does not have an established reputation (Anderson 2000; Drummond, Bolland and Waverly 2011).

The interaction models are similar to the previous models in the current research. Each model is a mixed-effects logit model with either a binary or ordinal outcome. The models are random-intercept models which allow for the intercepts to vary over the different individuals (Hox, Moerbeek and van de Schoot 2018; Rabe-Hesketh and Skrondal 2012). These analyses also used the same subsamples that were previously examined. This series of models testing the interaction terms have some other differences to previous models in the current research. They test an interaction between residential mobility and neighborhood connectedness and an interaction term between residential mobility and violent expectations and they also examine residential mobility coded as a binary variable with values of "0" for having resided in a neighborhood for less than a year, and "1" for those who have resided in the same neighborhood around a year or more.

This alternative specification of residential mobility captures the effects of a proximal move rather than treating residential mobility as a discrete continuous variable. In effect, it captured the effects of a recent relocation rather than analyzing residential mobility on a continuum. It should be noted that as with previous models in the current research, lower values of residential mobility indicated less residential tenure. This was not expected to change the

results regarding the effect of residential mobility on the dependent variables since the proportional odds assumption was reasonably met for the previous models concerning residential mobility. Other differences in model specification included neighborhood connectedness and violent expectations being centered at their grand mean within the respective subsamples for each analysis.

For each of the interaction analyses, a series of models was run with an initial model that included residential mobility operationalized as a dichotomous variable, control variables, and both social bonding and residential mobility variables. Neighborhood connectedness was grand mean centered, as was the expectations of violence variable. For each set of models, the subsample was used for grand mean centering rather than the full model. These variables were grand mean centered for easier interpretation in the interactions (Aiken, West and Reno 1991; Snijders and Bosker 2012). After the initial model, a model with an interaction term for residential mobility and neighborhood connectedness was run followed by a model with just an interaction term for residential mobility and violent expectations added to the initial model. The final model includes both interaction terms. These models are designed to test hypotheses 5 and 6.

Arrest with Interactions

The first model with interactions included arrest as a dependent variable. The subsample for the analysis consisted of 15,079 person-years and 3,744 clusters, or individuals in this case. The initial model is very similar to the final model previously run as part of the current research with coefficients that were identical out to three decimal places. This model was significant ($\chi^2_{(19)} = 930.37, p < .001$). The Wald χ^2 statistic is slightly lower, but overall the intra-class

correlation and coefficients and thus odds ratios are similar. The dichotomous measurement of residential stability was not significant while the coefficients for neighborhood connectedness was (OR = 1.08, $p < .001$). Violent expectations was also significant (OR = 1.08, $p < .001$). Table 12 displays the results of the analysis.

Table 12: Mixed-Effects Logit Model for Arrest with Interactions, Coefficients and Standard Errors (Parentheses)

	Model 1		Model 2		Model 3		Model 4	
Residential Mobility	.040	(.096)	.022	(.099)	.010	(.095)	-.008	(.098)
Control Variables								
Age (centered)	.478***	(.060)	.478***	(.060)	.479***	(.060)	.479***	(.060)
Age Squared	-.068***	(.012)	-.068***	(.012)	-.068***	(.012)	-.068***	(.012)
Sex	-.701***	(.075)	-.701***	(.075)	-.700***	(.075)	-.700***	(.075)
Social Bonding								
Neighborhood (gmc)	.078***	(.013)	.109**	(.040)	.079***	(.013)	.110**	(.039)
Family Knowledge	-.040**	(.012)	-.040**	(.012)	-.040**	(.012)	-.040**	(.012)
Family Rules	-.063***	(.018)	-.063***	(.018)	-.063***	(.018)	-.063**	(.018)
Violent Beliefs (gmc)	.073***	(.014)	.073***	(.014)	.029	(.037)	.028	(.037)
Adult Expectations	-.090**	(.031)	-.090**	(.031)	-.090**	(.031)	-.090**	(.031)
Positive Support	-.027***	(.008)	-.027**	(.008)	-.027**	(.008)	-.026**	(.008)
Maternal Closeness	.004	(.024)	.004	(.024)	.004	(.024)	.004	(.024)
Strain								
Self-Worth	-.151***	(.016)	-.151***	(.016)	-.151***	(.016)	-.151***	(.016)
Traumatic Stress	.011	(.010)	.011	(.010)	.011	(.010)	.011	(.010)
Hopelessness	.044*	(.018)	.044*	(.018)	.044*	(.018)	.044*	(.018)
Callousness	.046*	(.020)	.046*	(.020)	.046*	(.020)	.046*	(.020)
Anger	.056***	(.012)	.056***	(.012)	.055***	(.012)	.056***	(.012)
Family Arrest	1.03***	(.063)	1.03***	(.063)	1.03***	(.063)	1.03***	(.063)
Worry	-.022*	(.009)	-.022*	(.009)	-.022*	(.009)	-.022*	(.009)
Negative Support	.005	(.011)	.004	(.011)	.005	(.011)	.005	(.011)
Interaction								
RM by NH			-.034	(.041)			-.035	(.041)
RM by VB					.050	(.038)	.051	(.038)
Wald χ2	930.37(19)***		931.08(20)***		931.06(20)***		931.79(21)***	
Rho (ICC)	.325***		.325***		.325***		.325***	
M&Z Pseudo R²	.343		.344		.344		.344	

* p < .05, ** p < .01, *** p < .001.

Model two, which included the interaction term between residential mobility and

neighborhood connectedness was significant ($\chi^2_{(20)} = 931.08$, $p < .001$). The interaction term,

however, was not significant, indicating there is no multiplicative effect between residential

mobility and neighborhood connectedness in this model. This led to a failure to reject the null

hypothesis for hypothesis 5a. Interpreting main effects in a logistic model with interaction terms

is not advisable, and would add nothing to the current research (Aiken, West and Reno 1991).

The interaction term did not add anything to the model, and the McKelvey & Zavoina Psuedo-R^2

is virtually unchanged from the initial model.

Model 3 added an interaction term for residential mobility and expectations of violence.

The overall model was significant ($\chi^2_{(20)} = 931.06$, $p < .001$). The interaction term was not

significant. This led to a failure to reject the null hypothesis for hypothesis 6a. There is no

significant interaction between the two variables. The results of this model imply the there is no

differential effect of recent residential mobility on expectations of violence concerning the odds

of getting arrested in a given year. The non-significance of the interaction term led to a model

with very few changes in coefficients for other variables in the model and did not explain any

additional variance over the initial model, as the Pseudo-R^2 is virtually the same, and only

increases due to rounding. While both interactions have the expected sign, neither approaches

significance in this set of models.

Model 4 included both interaction terms. Overall, this model was significant

($\chi^2_{(21)} = 931.79$, $p < .001$). Neither of the interaction terms were significant in this model,

providing further support confirming the results in models 2 and 3. There is simply no

interaction present between either neighborhood connectedness or violent expectations and

residential mobility in this series of models. The interaction terms did not add any explanatory

power to the model or affect most of the coefficients in the model. In summary, the initial model would be the preferred model since it is more parsimonious.

Fighting Behavior with Interactions

The second series of models included interactions with fighting behavior as the outcome variable. The subsample for this series of analyses included 15,324 person-years and 3,795 individuals or clusters. A series of mixed-effects ordinal logit models were run to examine the effects of the interaction terms. Similar to the first series of models examining interactions, the initial model is similar to the full model previously examined regarding fighting behavior. It was significant ($\chi^2_{(19)} = 1826.34$, $p < .001$). While the Wald χ^2 is slightly smaller, other model statistics such as the intra-class correlation, McKelvey & Zavoina Pseudo-R^2, and variable coefficients are the same. The dichotomous measure of residential mobility was not significant. Neighborhood connectedness was significant (OR = 1.05, $p < .001$) as was violent expectations (OR = 1.14, $p < .001$). The results of the initial model and models with interactions are displayed in Table 13.

Model two included an interaction term between residential mobility and neighborhood connectedness. Overall, the model was significant ($\chi^2_{(20)} = 1826.60$, $p < .001$). The interaction term was not significant. This led a failure to reject the null hypothesis for hypothesis 5b. There is no significant interaction between residential mobility and neighborhood connectedness in this model. The Pseudo-R^2 statistic remained unchanged, indicating the addition of the interaction term did nothing to explain further variance in the model. There is simply no interaction between the two variables in question, which leads to the conclusion that there is no moderating effect of residential mobility on neighborhood connectedness regarding the odds of engaging in

fighting behavior. This is similar to the results of the interaction model examining the odds of

arrest.

Table 13: Mixed-Effects Logit Model for Fighting with Interactions, Coefficients and Standard Errors (Parentheses)

	Model 1		Model 2		Model 3		Model 4	
Residential Mobility	.001	(.065)	.002	(.068)	-.010	(.066)	-.013	(.068)
Control Variables								
Age (centered)	.087*	(.038)	.087*	(.038)	.087*	(.038)	.087*	(.038)
Age Squared	-.008	(.007)	-.008	(.007)	-.008	(.007)	-.008	(.007)
Sex	-.454***	(.050)	-.454***	(.050)	-.454***	(.050)	-.454***	(.050)
Social Bonding								
Neighborhood (gmc)	.048***	(.008)	.052*	(.026)	.049***	(.008)	.053*	(.025)
Family Knowledge	-.040***	(.008)	-.040***	(.008)	-.041***	(.008)	-.041***	(.008)
Family Rules	-.072***	(.012)	-.072***	(.012)	-.072***	(.012)	-.071***	(.012)
Violent Beliefs (gmc)	.128***	(.010)	.128***	(.010)	.107***	(.026)	.106***	(.026)
Adult Expectations	-.160***	(.021)	-.160***	(.021)	-.160***	(.021)	-.160***	(.021)
Positive Support	-.015**	(.005)	-.015**	(.005)	-.015**	(.005)	-.015**	(.005)
Maternal Closeness	.019	(.017)	.019	(.017)	.019	(.017)	.019	(.017)
Strain								
Self-Worth	-.090***	(.011)	-.090***	(.011)	-.090***	(.011)	-.090***	(.011)
Traumatic Stress	.051***	(.007)	.051***	(.007)	.051***	(.007)	.051***	(.007)
Hopelessness	.051***	(.013)	.051***	(.013)	.051***	(.013)	.051***	(.013)
Callousness	.059***	(.013)	.059***	(.013)	.059***	(.013)	.059***	(.013)
Anger	.091***	(.008)	.092***	(.008)	.091***	(.008)	.091***	(.008)
Family Arrest	.386***	(.043)	.386***	(.043)	.386***	(.043)	.386***	(.043)
Worry	.017**	(.006)	.017**	(.006)	.017**	(.006)	.017**	(.006)
Negative Support	.013	(.007)	.013	(.007)	.013	(.007)	.013	(.007)
Interaction								
RM by NH			-.005	(.026)			-.005	(.026)
RM by VB					.024	(.027)	.024	(.027)
Wald χ2	1826.34(19)***		1826.60(20)***		1826.20(20)***		1826.47(21)***	
Rho (ICC)	.209***		.209***		.209***		.209***	
M&Z Pseudo R²	.298		.298		.298		.298	

* p < .05, ** p < .01, *** p < .001.

Model three was significant overall ($\chi^2_{(20)}$ = 1826.20, $p < .001$). The interaction term between residential mobility and violent expectations was not significant. This led to a failure to reject the null hypothesis for hypothesis 6b. There was no significant interaction between the two variables. The coefficients of the variables in the model were stable and there was no real increase in the Psuedo-R^2. This indicated that the addition of the interaction term did nothing to improve the model. There appears to be no moderating effect between residential mobility and violent expectations concerning the severity of fighting behavior. The lack of a multiplicative effect between the two variables is surprising, since one would expect that recent displacement would lead to an attitude that violence might be necessary to establish one's presence and place in the social structure of the neighborhood, leading to more fighting behavior. This does not appear to be the case.

Model 4 included both interaction terms and the overall model was significant ($\chi^2_{(21)}$ = 1826.47, $p < .001$). Neither interaction term was significant, which provided further evidence that there is no significant interaction between any of the variables tested. The coefficients for the variables in the model were stable and there was no increase in variance explained. Overall, the model for fighting behavior was similar to the model for odds of arrest. There were no moderating effects for the variables tested in the model, leading to the rejection of the null hypothesis for hypotheses 5b and 6b.

Weapons Carrying with Interactions

The third series of models run with interactions had weapons carrying behavior as an outcome. A series of mixed-effects ordinal regression model with random intercepts was run. The subsample for the analysis consisted of 15,124 person-years, and 3,754 clusters or

individuals. The models examined the interaction between residential mobility and neighborhood connectedness and violent expectations, respectively. The initial model was significant ($\chi^2_{(19)} = 2102.37$, $p < .001$). The results of the model were similar to the previous model run with weapons carrying as a dependent variable. Residential mobility was not significant while neighborhood connectedness was (OR = 1.02, $p = .017$). Violent expectations was also significant in the initial model (OR = 1.22, $p < .001$). The results of the initial model and models with interactions are displayed in Table 14.

Model two included an interaction term between residential mobility and neighborhood connectedness. The overall model was significant ($\chi^2_{(20)} = 2102.46$, $p < .001$). The interaction term, however, was not significant. This led to a failure to reject the null hypothesis for hypothesis 5c. This result was similar to the previous models examining interaction terms for residential mobility and neighborhood connectedness. Compared to the initial model, the McKelvey & Zavoina Pseudo-R^2 remained virtually the same, as did most coefficients for variables not involved in the interaction. Overall the interaction term had very little impact on the model.

Model three included an interaction term for residential mobility and violent expectations. The overall model was significant ($\chi^2_{(20)} = 2102.46$, $p < .001$). The interaction term was not significant, but approached significance ($b = .050$, $p = .078$). While it is advisable to interpret coefficients that approach significance in some circumstances, the large sample size combined with minimal added explained variance in the model indicate that it would be unwise to attempt to interpret this interaction as having any substantive meaning, thus interpretation of the interaction would border on chasing results that mean nothing from a substantive standpoint.

The addition of the interaction term did little to improve model fit or increase explained variance. This leads to a failure to reject the null hypothesis for hypothesis 6c.

Table 14: Mixed-Effects Logit Model for Weapons with Interactions, Coefficients and Standard Errors (Parentheses)

	Model 1	Model 2	Model 3	Model 4
Residential Mobility	.060 (.066)	.043 (.068)	.030 (.067)	.011 (.069)
Control Variables				
Age (centered)	.208*** (.042)	.208*** (.042)	.208*** (.042)	.209*** (.042)
Age Squared	-.017* (.008)	-.017* (.008)	-.017* (.008)	-.017* (.008)
Sex	-.322*** (.056)	-.323*** (.056)	-.322*** (.056)	-.323*** (.056)
Social Bonding				
Neighborhood (gmc)	.022* (.009)	.047 (.026)	.023* (.009)	.048 (.026)
Family Knowledge	-.069*** (.009)	-.069*** (.009)	-.069*** (.009)	-.069*** (.009)
Family Rules	-.117*** (.014)	-.117*** (.014)	-.117*** (.014)	-.117*** (.014)
Violent Beliefs (gmc)	.202*** (.011)	.202*** (.011)	.157*** (.027)	.157*** (.027)
Adult Expectations	-.188*** (.023)	-.188*** (.023)	-.188*** (.023)	-.188*** (.023)
Positive Support	-.007 (.006)	-.007 (.006)	-.007 (.006)	-.007 (.006)
Maternal Closeness	-.044* (.018)	-.044* (.018)	-.044* (.018)	-.044* (.018)
Strain				
Self-Worth	-.079*** (.012)	-.079*** (.012)	-.079*** (.012)	-.079*** (.012)
Traumatic Stress	.043*** (.007)	.043*** (.007)	.043*** (.007)	.043*** (.007)
Hopelessness	.025 (.014)	.025 (.014)	.025 (.014)	.025 (.014)
Callousness	.063*** (.015)	.063*** (.015)	.063*** (.015)	.063*** (.015)
Anger	.075*** (.009)	.075*** (.009)	.075*** (.009)	.075*** (.009)
Family Arrest	.568*** (.047)	.568*** (.047)	.568*** (.047)	.568*** (.047)
Worry	.014* (.006)	.014* (.006)	.014* (.006)	.014* (.006)
Negative Support	.037*** (.008)	.037*** (.008)	.037*** (.008)	.037*** (.008)
Interaction				
RM by NH		-.028 (.027)		-.028 (.027)
RM by VB			.050 (.028)	.051 (.028)
Wald χ2	2102.37(19)***	2102.46(20)***	2105.39(20)***	2105.37(21)***
Rho (ICC)	.267***	.268***	.268***	.268***
M&Z Pseudo R²	.378	.378	.379	.379

* p < .05, ** p < .01, *** p < .001.

Model four included both interaction terms and was significant overall ($\chi^2_{(21)} = 2105.37$, $p < .001$). The interaction terms were not significant, although, as with model three, the interaction term for residential mobility and violent expectations approached significance. The model statistics were relatively stable, with the Pseudo-R^2 remaining stable, as were the coefficients for variables not involved in the interactions. There was no moderating or multiplicative effect between residential mobility and either of the variables with which it interacted. This was consistent with previous models examining interaction terms in the current research. This final model further confirms that the null hypotheses for hypotheses 5c and 6c should not be rejected.

Drug Use Behavior

The fourth series of models investigating interactions constituted four models run with drug use behavior as the outcome variables. As with the other models, a series of mixed-effects ordinal logit models were run with random intercepts. The model utilized a subsample of the full sample. This subsample consisted of 15,130 person-years, and 3,748 clusters or individuals. Violent beliefs and neighborhood connectedness were centered on their respective grand means. The initial model included residential mobility, control variables, and all covariates. The overall model was significant ($\chi^2_{(19)} = 1672.37$, $p < .001$). Residential mobility was not significant. Neighborhood connectedness was significant (OR = 1.05, $p < .001$). Violent beliefs was also significant (OR = 1.23, $p < .001$). The model was similar to the full model run previously in the current research. The McKelvey & Zavoina Pseudo-R^2 for the initial model was .446, which did not vary much throughout the series of models. The results of the models are displayed in Table 15.

The second model included an interaction term between residential mobility and neighborhood connectedness. The overall model was significant ($\chi^2_{(20)} = 1672.38$, $p < .001$) The interaction term was not significant, which led to a failure to reject the null hypothesis for hypothesis 5d. There was no significant interaction between the two variables. This was similar to previous models regarding arrest, fighting behavior, and weapons carrying behavior. Overall, there was very little change in the model with the inclusion of the interaction term and coefficients of other predictor variables remained stable.

Table 15: Mixed-Effects Logit Model for Drugs with Interactions, Coefficients and Standard Errors (Parentheses)

	Model 1		Model 2		Model 3		Model 4	
Residential Mobility	-.045	(.080)	-.045	(.084)	-.096	(.081)	-.096	(.084)
Control Variables								
Age (centered)	.486***	(.051)	.486***	(.051)	.487***	(.051)	.487***	(.051)
Age Squared	-.028**	(.009)	-.028**	(.009)	-.028**	(.009)	-.028**	(.009)
Sex	-.410***	(.067)	-.410***	(.067)	-.409***	(.067)	-.409***	(.067)
Social Bonding								
Neighborhood (gmc)	.051***	(.011)	.051	(.030)	.051***	(.011)	.052	(.029)
Family Knowledge	-.083***	(.010)	-.083***	(.010)	-.083***	(.010)	-.083***	(.010)
Family Rules	-.162***	(.015)	-.162***	(.015)	-.162***	(.015)	-.162***	(.015)
Violent Beliefs (gmc)	.209***	(.012)	.209***	(.012)	.137***	(.032)	.137***	(.032)
Adult Expectations	-.095**	(.027)	-.095**	(.027)	-.096**	(.027)	-.096**	(.027)
Positive Support	-.017**	(.006)	-.017**	(.006)	-.017**	(.006)	-.017**	(.006)
Maternal Closeness	-.057**	(.020)	-.057**	(.020)	-.058**	(.020)	-.058**	(.020)
Strain								
Self-Worth	-.093***	(.014)	-.093***	(.014)	-.093***	(.014)	-.093***	(.014)
Traumatic Stress	.036***	(.009)	.036***	(.009)	.036***	(.009)	.036***	(.009)
Hopelessness	-.072***	(.016)	-.072***	(.016)	-.072***	(.016)	-.072***	(.016)
Callousness	.088***	(.016)	.088***	(.016)	.088***	(.016)	.088***	(.016)
Anger	.062***	(.010)	.062***	(.010)	.061***	(.010)	.061***	(.010)
Family Arrest	.395***	(.054)	.395***	(.054)	.394***	(.054)	.394***	(.054)
Worry	.002	(.008)	.002	(.008)	.003	(.008)	.003	(.008)
Negative Support	.030**	(.009)	.030**	(.009)	.030**	(.009)	.030**	(.009)
Interaction								
RM by NH			-.001	(.032)			-.008	(.031)
RM by VB					.081*	(.033)	.081*	(.033)
Wald χ2	1672.37(19)***		1672.38(20)***		1688.63(20)***		1688.85(21)***	
Rho (ICC)	.369***		.369***		.369***		.369***	
M&Z Pseudo R²	.446		.446		.447		.447	

* p < .05, ** p < .01, *** p < .001.

The third model included an interaction term between residential mobility and violent expectations. The overall model was significant ($\chi^2_{(20)} = 1688.63$, $p < .001$). The interaction term was significant ($b = .081$, $p = .015$). This led to the rejection of the null hypothesis for hypothesis 6d. There was a significant interaction between residential mobility and violent

expectations concerning the odds of drug use. This is contrary to findings for other delinquent behaviors previously investigated in the current research. The significant interaction term indicated that violent expectations had a differential effect between the group of respondents who had recently moved and those who did not recently move. This was an effect on the log-odds of moving into a higher classification involving more serious drug use.

Residential mobility was coded "0" for a recent move, and "1" for no recent neighborhood transition while violent expectations was grand mean centered. Given the coding scheme of residential mobility, the interaction can be interpreted as the magnitude of the effect of violent expectations was higher for those who have lived in their neighborhoods longer regarding the log-odds of heavy drug use. The logits in the model are assumed to be linear in relation to the predictors (Brambor, Clark and Golder 2006; Jose 2013). Interpreting the interaction in terms of log-odds or logits, the group who has lived in neighborhoods longer has an unequal and greater slope than those who have recently moved, holding other variables constant.

The simple slopes of the two groups are represented by coefficients in the model. The simple slope for those in the reference category of residential mobility, in this case those who have recently moved, is .137. The group who had lived in their neighborhoods around a year or more had a slope of .218. The difference between the two groups when violent expectations is at the mean, represented by 0 in this model, is displayed by the coefficient associated with residential mobility. This represents the difference in average logits between those who have recently moved and those who have not. The distance between the lines for the logits was .096, with those who had not recently moved having log-odds .096 lower than those who had moved when violent expectations held at its mean.

The substantive interpretation of the interaction indicates that the magnitude of the effect of violent expectations varies across levels of that variable concerning the two groups of those who have recently moved and those who have not. At lower levels of violent expectations, those who have recently moved experience effects of a greater magnitude compared to the other group. This changed throughout the range of the variable. As the variable nears the mean value for the subsample (3.57), there is a smaller difference in the magnitude of the effect between the two groups. At higher levels of violent expectations, those who have not recently moved experience effects of a greater magnitude. The lines for the simple slopes intersect slightly above the mean value of violent expectations. This indicated an ordinal interaction where the lines for the log-odds intersect within the value range of the variable.

For those with above average levels of violent expectations, the magnitude of the effect is greater if they have not recently moved. This is contrary to what was expected. There is a significant interaction, but is not the functional form that was hypothesized. Those who have resided in the same neighborhood for around a year or longer are at higher risk of engaging in more severe drug using behavior conditional on having above average levels of violent expectations. The magnitude of the impact of violent expectations is moderated in the group that has been in the same neighborhood for less than a year. Interactions are symmetrical in nature so no real causal statement is implied by this finding (Berry, Golder and Milton 2012). While those with higher levels of violent expectations face increased risk if they had not recently moved relative to those who have, those who had moved faced a greater magnitude of effect at values of violent expectations below a value only slightly above the mean for the sample.

The fourth model included both interaction terms between residential mobility and neighborhood connectedness and violent expectations respectively. The overall model was

significant ($\chi^2_{(21)}$ = 1688.85). The first interaction term between residential mobility and neighborhood connectedness was not significant. The second interaction term between residential mobility and violent expectations was significant ($b = .081$, $p = .015$). The coefficient and effect of the significant interaction term was similar to that described in model 3 of this set of models. Model 4 shows that the significant interaction term remains stable with the introduction of the non-significant interaction term, and the effect was the same. The McKelvey & Zavoina Pseudo-R^2 was slightly increased at .447 compared to .446 before. Overall the interaction terms do not add much explanatory power to the model, and thus even though the interaction term between residential mobility and violent expectations is significant, its effect on the model and effect size was negligible. Overall, the series of models led to a failure to reject the null hypothesis for hypothesis 5d, but a rejection of the null hypothesis for hypothesis 6d.

Gang Membership

The fifth and final series of models examined residential mobility and gang membership using a mixed-effects logit model with random intercepts. The outcome for these models was dichotomous. The series of models utilized a subsample of the full sample. This subsample included 15,353 person-years, and 3,797 clusters or persons. Violent expectations and neighborhood connectedness were grand mean centered using subsample values. Residential mobility was operationalized as a dichotomous variable in similar fashion to previous models. The models included residential mobility, all control variables and both strain and social bonding variables. The overall initial model was significant ($\chi^2_{(19)}$ = 1116.66, $p < .001$). Residential mobility was not significant in this model. Neighborhood connectedness was not significant in

the initial model, but violent beliefs was (OR = 1.23, $p < .001$). The McKelvey & Zavoina

Pseudo-R^2 for the model was .439. The results of the models are displayed in Table 16.

The second model included an interaction term between residential mobility and

neighborhood connectedness. The overall model was significant ($\chi^2_{(20)} = 1113.80$, $p < .001$).

The interaction term was not significant, which lends evidence to fail to reject the null hypothesis

for hypothesis 5e. In this model, the interaction term was not significant between residential

mobility and neighborhood connectedness. This is similar to previous models for arrest, fighting

behavior, weapons carrying, and drug use.

The third model included an interaction term between residential mobility and violent

beliefs. The overall model was significant ($\chi^2_{(20)} = 1120.43$, $p < .001$). While the overall model

was significant, the interaction term was not. This led to a failure to reject the null hypothesis for

hypothesis 6e. There was no interaction between the two variables examined in the model.

While the interaction term was significant in the models for drug use, it was not significant in

models for arrest, fighting behavior, or this series of models examining gang membership.

The fourth model included both interaction terms previously examined involving gang

membership. The overall model was significant ($\chi^2_{(21)} = 1117.30$, $p < .001$). The interaction

term for residential mobility and violent beliefs was not significant, but the interaction term for

residential mobility and neighborhood connectedness was significant in this model

($b = -.104$, $p = .05$). This is surprising considering the interaction was not significant in a model

without the second interaction term. While the interaction term was not significant in other

models, the significance in this particular model led to the rejection of the null hypothesis for

hypothesis 5e.

Table 16: Mixed-Effects Logit Model for Gangs with Interactions, Coefficients and Standard Errors (Parentheses)

	Model 1		Model 2		Model 3		Model 4	
Residential Mobility	.133	(.114)	.070	(.117)	.069	(.122)	-.000	(.125)
Control Variables								
Age (centered)	-.007	(.070)	-.005	(.070)	-.007	(.070)	-.044	(.070)
Age Squared	.007	(.014)	.007	(.014)	.008	(.013)	.007	(.013)
Sex	-1.046***	(.092)	-1.049***	(.092)	-1.044***	(.092)	-1.05***	(.092)
Social Bonding								
Neighborhood (gmc)	.030	(.017)	.120*	(.052)	.030	(.017)	.123*	(.051)
Family Knowledge	-.068***	(.013)	-.068***	(.013)	-.068***	(.013)	-.068***	(.013)
Family Rules	-.121***	(.021)	-.120***	(.021)	-.121***	(.021)	-.120***	(.021)
Violent Beliefs (gmc)	.204***	(.018)	.203***	(.018)	.151**	(.044)	.145**	(.044)
Adult Expectations	-.362***	(.034)	-.361***	(.034)	-.362***	(.034)	-.362***	(.034)
Positive Support	-.023*	(.010)	-.023*	(.010)	-.023*	(.010)	-.022*	(.010)
Maternal Closeness	-.034	(.028)	-.033	(.028)	-.034	(.028)	-.033	(.028)
Strain								
Self-Worth	-.118***	(.019)	-.118***	(.019)	-.118***	(.019)	-.118***	(.019)
Traumatic Stress	.020	(.012)	.020	(.012)	.020	(.012)	.020	(.012)
Hopelessness	.045*	(.021)	.044*	(.021)	.045*	(.021)	.044*	(.021)
Callousness	.064**	(.024)	.064**	(.024)	.063**	(.024)	.064**	(.024)
Anger	.074***	(.014)	.075***	(.014)	.073***	(.014)	.074***	(.014)
Family Arrest	.394***	(.075)	.396***	(.075)	.394***	(.075)	.396***	(.075)
Worry	.060***	(.010)	.060***	(.010)	.060***	(.010)	.060***	(.010)
Negative Support	.056***	(.013)	.055***	(.013)	.056***	(.013)	.055***	(.013)
Interaction								
RM by NH			-.101	(.054)			-.104*	(.053)
RM by VB					.061	(.047)	.066	(.047)
Wald χ2	1116.66(19)***		1113.80(20)***		1120.43(20)***		1117.30(21)***	
Rho (ICC)	.304***		.305***		.303***		.304***	
M&Z Pseudo R²	.439		.440		.439		.440	

* p < .05, ** p < .01, *** p < .001.

The effect of this interaction term should be interpreted with caution since it is surprising

that it was not significant in the model without the other interaction term and the difference

between the two groups is virtually zero at the mean value of neighborhood connectedness. The

logits, which are assumed to be linear in the model, predict movement from no gang membership

to gang membership since gang membership is a binary variable. Residential mobility was constructed with those who had recently moved constituting the reference group (coded 0) and neighborhood connectedness was centered at the grand mean for the sub-sample. This mean was 6.92.

The analysis of the simple slopes, obtained from the model coefficients, showed that the simple slope for those who had been in a neighborhood around a year or longer was lower at .019 than the simple slope for those who had recently moved, which was .123. The simple slope for those who had been in the same neighborhood around a year or more led to a relatively flat line. The difference between the two groups at the mean value for neighborhood connectedness, which is coded as 0 in this analysis, is virtually non-existent, which indicated that this is where the two lines intersected, again leading to an ordinal interaction where the lines of the predicted log-odds cross within the actual range of the examined variable. This interaction had a different form than the previous interaction discussed in the section examining the models related to drug use. In this interaction, it is clear that those who had not recently moved experienced a more consistent magnitude of effect regarding neighborhood connectedness and the log-odds of being a member of a gang. Those who had been in the neighborhood less than a year saw more variance in the magnitude of the effect of neighborhood connectedness throughout the range of the variable.

The substantive interpretation of the interaction can be described in terms of the changing magnitude of the effect of neighborhood connectedness on those who had resided in a neighborhood less than a year. At levels of neighborhood connectedness below the mean for the sub-sample, those who had recently changed neighborhoods showed lower predicted log-odds of joining a gang. At levels of neighborhood connectedness above the mean value (6.92), the

variable had an increased magnitude of effect on those who had recently resided in the neighborhood. Those who had lived in the same neighborhood for around a year or more displayed a consistent effect. Neighborhood connectedness has a larger magnitude of effect on those who have recently relocated. With low levels of neighborhood connectedness, these individuals displayed lower log-odds of joining gang relative to the other group. As neighborhood connectedness increased, the magnitude of the effect increased for the group displaying recent movement, and at levels higher than the mean of neighborhood connectedness this group was at higher risk of joining a gang.

This interaction makes logical sense, although it is not completely congruent with what was expected. Hypothetically, the magnitude of effect for neighborhood connectedness was expected to increase throughout the range of the variable for the group who had recently moved to a new neighborhood, but the indication that this increased magnitude does not take place until values above the mean are reached is not congruent. A disordinal interaction was expected where the lines representing the predicted linear log-odds of the groups would not cross within the 12-point range of neighborhood connectedness. As neighborhood connectedness increases, the magnitude of the effect increases only for those who have recently moved to a new neighborhood. This could be explained by the need for neighborhood connectedness to join a gang. This could be a function of opportunity (Cloward and Ohlin 1960). Beyond this, individuals who are new to a neighborhood could face increased pressure to join a gang for protection, thus explaining why the opportunities that are increased with neighborhood connectedness, combined with the need for protection and membership within a community, would lead to higher log-odds when neighborhood connectedness is above the mean for those who have recently moved.

Overall, the interaction term does not add a great deal of explanatory power to the model and has a small effect size. While the term is significant, the substantive impact on the model is small. The interaction term was associated with an increase in the McKelvey & Zavoina Pseudo-R^2 for the model, which only slightly increased from .439 to .440 with the inclusion of the interaction term. The interaction term, while interesting, did not have any substantive impact on the model compared to many of the other predictors present in the set of models examining the odds of gang membership.

CONCLUSION

The current research examined the effect of residential mobility on a variety of delinquent outcomes using a sample from impoverished areas. These outcomes ranged from arrest to drug use and gang membership. The results showed that residential mobility, overall, was not a particularly strong predictor of delinquency. This is contrary to previous research that found that residential mobility was a significant risk factor for various forms of delinquency (Hagan, MacMillan and Wheaton 1996; Haynie and South 2005; Huebner and Pleggenkuhle 2015) Other research found no association between residential mobility and delinquent outcomes, but used an extensive array of control variables to find no relationship (Gasper, DeLuca and Estacion 2010; Porter and Vogel 2014; Sharkey and Sampson 2010; Tittle and Paternoster 1988). The results of the current research showed no relationship in several of the models without incorporating control variables which indicated that overall, residential mobility was a weak predictor for this particular population.

Despite the primary input variable of interest not being significant in many of the models, variables theoretically associated with social bonding and strain did display consistent effects

throughout the analyses and did predict the odds of engaging in delinquent behaviors. In some models, these variables mediated the relationship between residential mobility and delinquency. These predictors, for the most part, were significant in the expected direction although there were exceptions such as neighborhood connectedness.

Arrest as an outcome was not associated with residential mobility, leading to the rejection of research hypothesis one. There was no evidence of a mediating effect with social bonding or strain variables since there was not a significant relationship to mediate. This led to the rejection of the research hypotheses for 3a and 4a. There was also no interaction effects in the models examining arrest. This led to the rejection of hypotheses 5a and 6a. In summary, there was simply no connection between residential mobility and odds of arrest in a given year.

Residential mobility was associated with the odds of engaging in severe fighting behavior in a given year, but was mediated by strain variables. This indicated that residential mobility did not have a significant direct effect on the odds of fighting. The effect of residential mobility, rather, was through strain. There was partial support for research hypothesis 2a and support for hypothesis 4a, but no support for hypothesis 3a or 5b and 6b. There was not interaction between residential mobility and either neighborhood connectedness or violent expectations.

Weapons carrying, and the severity of weapons behavior was not associated with residential mobility with the exception of the full model with both social bonding and strain variables. This lends partial support for hypothesis 2b as far as there is a connection, but no support for any mediating effects, which involve hypotheses 3c and 4c. There were no significant interaction effects in the model, which led to the rejection of research hypotheses 5c and 6c. Residential mobility had a relatively low effect size in the full model, but was significant. It was also significant in an unexpected direction which is why there is only

qualified support for hypothesis 2b. Those who have been in a neighborhood longer had slightly higher odds of habitual carrying of weapons.

The primary variable of interest was not associated with drug use. This led to the rejection of research hypotheses 2c, 3d, and 4d. There was, however, an interaction effect between residential mobility and violent beliefs. This supported research hypothesis 6d but not 5d. This interaction effect showed that the multiplicative effect of the interaction variable tempered the effect of violent beliefs for those who had not recently moved. It served as a correction of sorts, lowering the effect of violent beliefs on the odds of drug use for those who had not recently moved compared to those who had recently moved. Violent beliefs still acted as a risk factor, but this effect was greater for those who had recently moved to a new neighborhood.

Gang membership was positively associated with residential mobility, which provided partial support for research hypothesis 2d. There were also mediating effects for both social bonding variables and strain variables separately providing support for research hypotheses 3e and 4e. Residential mobility did not have a direct effect on the odds of gang membership, but rather had an indirect effect through social bonding and strain variables. In addition, there were interaction effects between residential mobility and neighborhood connectedness. This supported hypothesis 5e, but there was no support for research hypothesis 6e. The interaction effect only became significant in the full model with an interaction term between residential mobility and violent beliefs also in the model. This confounds the effect to some degree, but implied that neighborhood connectedness had a stronger positive relationship to gang membership for those who had not recently moved compared to those who had recently moved.

While this makes theoretical sense, the effect is small, as the overall combined effect of residential mobility and neighborhood connectedness did not increase to a great degree.

Theoretical Variables

The sets of theoretical variables acted as significant predictors of the odds of engaging in delinquent behavior throughout the models investigated in the current research. The social bonding variables were significant in the expected directions. The exception to this was neighborhood connectedness that acted as a risk factor rather than as a protective factor. This was true for several of the outcomes including arrest, fighting, weapons carrying, and drug use. While the effect size was relatively small, this is a surprising finding. Familial variables acted as stronger protective factors. These included family knowledge of what the youth did as well as the establishment of family rules. Maternal closeness was the exception and was only significant concerning the outcomes of drug use and weapons carrying. There are several possible reasons for this that are discussed in chapter 5.

Future orientation in the form of adult expectations was a consistent and strong protective factor in all models. This consistent predictor measured goals that the individual has as an adult such as obtaining a good job, being involved in a good, loving relationship with a significant other, and furthering their education. This is consistent with commitment as a social bonding construct (Hirschi 1969). While future orientation was a protective factor, violent beliefs was a strong and consistent risk factor. This represents belief. The belief that violent is inevitable leads to greater odds of engaging in delinquent behaviors. This is consistent with the Code of the Street, as described by Anderson (2000). Previous research has established that this is a problematic code for this particular population (Drummond, Bolland and Waverly 2011).

Positive peer support, representing attachment, was a significant but weak protective factor in all models with the exception of weapons carrying. This is contrasted with a strain variable, negative peer support. Negative peer support was a risk factor for weapons carrying, drug use, and gang membership. It was not, however, a particularly strong predictor compared to other strain and social bonding variables.

The strain variables were similar to the social bonding variables in that most were consistently significant and in the expected direction. There were mixed results as to which set of variables had more explanatory power. There was little substantive difference as to which theoretical set better explains delinquency throughout the spectrum of behaviors. It was apparent, however, that a properly specified model contained both sets. Both sets of variables consistently resulted in models with better explanatory power as measured with AIC, BIC, and the McKelvey and Zavoina Psuedo-R^2 statistic.

Self-worth, as a source of strain was a consistent risk factor. Low self-worth increased the odds of engaging in each of the examined delinquent behaviors and had a moderate effect size. Traumatic stress had a smaller effect size and was significant in all models except models examining the odds of arrest. Higher levels of hopelessness also predicted higher odds of engaging in higher levels of delinquent behavior and had a small effect size compared to other variables. Elevated levels of callousness and anger acted as strong risk factors for each delinquent behavior. While specific mechanisms that might cause these conditions were not examined in the current research, it was clear that these constructs were important and warrant attention in any policy development to reduce delinquency. Familial criminality, as measured by the arrest of a household member in a given year, served as a strong and consistent risk factor for involvement in higher levels of delinquency for each of the five behaviors examined.

Involvement of household members in crime to the extent that they are arrested would also need to be addressed in any policy development aimed at reducing crime. There are several theoretical pathways in which this could have led to the increased odds of arrest for the individual. These are examined in chapter 5.

Interactions between residential mobility and neighborhood connectedness and violent beliefs were not significant in most of the models in the current research. While there were some interaction effects that were significant, these had little substantive impact on the overall model and had weak effects. They also did not conform to the *a priori* hypotheses and had little theoretical explanation regarding the two interactions that were significant. While they can be explained logically in a *post hoc* fashion, interactions without strong theoretical backing should be interpreted with caution (Berry, Golder and Milton 2012). The squared term for age was consistently significant in all models except gang membership and fighting. The lack of significance in models with gang membership as an outcome is surprising. Age, as a main effect interpreted with the interaction was not significant in any of the gang membership models. The effect of age was also limited in models with fighting as an outcome, but this is not as surprising. Gender, as expected, had a strong effect in all models. Females had lower odds of engaging in all of the delinquent behaviors examined, as discussed in the previous sections examining each model. Strain and social bonding variables sometimes increased the odds ratio of gender, meaning that it brought males and females closer together regarding risk of engagement in delinquent behaviors, but never mediated gender. They simply reduced the gap.

In summary, the models that examined five delinquent behaviors showed relatively consistent results concerning predictors and the relative strength of these predictors. Residential mobility, as the input variable of concern in the current research, was not a particularly strong

predictor of delinquency and was not significant in the majority of the models examined. In

models where it was significant in an initial model without other covariates, it was mediated

when sets of theoretical variables were added to the model. Unlike prior research, there was no

need to control for movement to different schools. Models were also run that utilized

appropriate ordinal variables rather than dichotomizing outcomes and measured the effect of

residential mobility as well as two sets of theoretical variables on specific delinquent outcomes

rather than collapsing all behaviors into a single measure of delinquency. This specificity allows

for better examination of the effect of the variables in different contexts. Chapter 5 will explore

the theoretical meanings behind the results combining qualitative observations of the researcher

with the empirical results described in this chapter. Implications for future research will be

explored as well as the policy implications of the current research and how they might be applied

to specific at-risk populations.

CHAPTER V

DISCUSSION AND CONCLUSION

It is apparent that while residential mobility has some impact on delinquent behaviors,

this impact is not consistent across type of behaviors and is often mediated by other theoretical

factors such as strain or social bonding variables. This indicates that, in these cases, residential

mobility might not be a major causal factor impacting delinquent behavior, at least among these

high-risk adolescents. The results of this study do, however, provide support for some of the

research hypotheses but the evidence is mixed. This study still contributes to the theoretical

understanding of residential mobility and other sociologically relevant variables in extremely

disadvantaged populations as they relate to juvenile delinquency. Residential mobility did not

have the impact or effect size that was expected even given the mixed results of prior research on

this subject. This chapter discusses the summary of analytical findings of the current research,

theoretical explanations for these findings, policy implications of the results, as well as

limitations of the research and avenues of future research.

ANALYTICAL FINDINGS

The first two hypotheses tested the relationship between residential mobility (coded with

less time spent in a neighborhood at lower values) with five delinquent behaviors including arrest

within the last year, frequency of fighting behavior, drug use, weapons carrying, and whether the

individual was currently a member of a gang. Overall, these fundamental analyses provided

some support for the hypotheses, but this varied by type of behavior. Residential mobility was

not significantly related to arrest within the last year. While most of the other variables were

associated with this outcome, residential mobility was not. This did not lend support to

hypothesis 1. This, as an outcome variable, is the least nebulous and would theoretically be subject to less error regarding recall, variations in personal definitions, and other confounding factors (Hindelang, Hirschi and Weis 1979; Maxfield, Weiler and Widom 2000).

The second hypothesis tested the remaining outcome variables in a series of models ending with a full model containing specific sets of variables related to strain and social bonding constructs. In the series of models regarding fighting behavior, the effect of residential mobility was lowered by 1% when social bonding variables were added, as measured by comparing odds ratios. The effect of residential mobility was mediated by strain variables and was not significant in the full model. This indicated that, concerning fighting behavior, the effect of residential mobility is indirect through strain experienced by respondents. There is mixed support for hypothesis 2a. This is contrary to what was expected. Fighting behavior would be expected to increase as an individual moved to a new neighborhood considering that they might be inclined to fight in order to establish their place in the social order of the neighborhood (Anderson 2000; Boggess and Hipp 2010).

Residential mobility was associated with increased odds of carrying weapons on a regular basis. The results of the models, however, displayed possible suppression effects in that residential mobility was only significant in the final model with both social bond and strain variables present. In this model, there was support for residential mobility as a predictor of weapons carrying behavior. This was in contrast to drug using behavior, where there was no significant effect regarding residential mobility. This does not lend support to hypothesis 2c. This is unexpected as there were two theoretical explanations as to why frequency of drug use would covary with residential mobility. One could argue that those who have been in neighborhoods longer would be more familiar with where to readily obtain drugs. Those who

were newer to a neighborhood, conversely, could be more likely to use drugs due to strain, which was associated with drug use, or use drugs to fit in with a new group of peers (Howell, Bolland and Lian 2012). Neither of these theoretical explanations appear to be supported by the empirical evidence in the current study.

A final outcome analyzed was residential mobility and gang membership. This was tested as part of hypothesis 2d. There was an association between the odds of being a gang member in a given year and residential mobility in the expected direction. Residential mobility did not appear to have a significant direct effect on odds of gang membership. The association was mediated by both social bond and strain variables. This implied that the relationship is indirect through each of these sets of variables. This, overall, provided mixed support for hypothesis 2d.

Mediating Relationships

Hypotheses 3 and 4 tested mediating relationships between each of the five delinquent outcomes and social bond variables and strain variables respectively. These hypotheses tested the tentative relationship between residential mobility and whether specific theoretically related sets of variables accounted for any relationship between mobility and delinquency, which, in effect would make the finding of a relationship between residential mobility and delinquency more robust. Results for these hypotheses were mixed. Residential mobility was not associated with arrest, which precluded it from being mediated by any variables (Baron and Kenny 1986). The association between fighting behavior and theoretical variables did show evidence of mediation. While there was little mediation effect involving social bonding variables, strain variables mediated the relationship between residential mobility and fighting behavior.

Residential mobility served as a risk factor for increased violent behavior, but this relationship was reduced to non-significance with the introduction of theoretical variables related to strain. This implied that the effect was moving through the strain variables rather than residential mobility, and variance better explained by the construct of strain was attributed to residential mobility in models not including variables representing strain (Hayes 2009).

One other delinquent behavior displayed mediation in the associated models. Residential mobility served as a risk factor for increased odds of gang membership, but was mediated by both social bonding variables and strain variables. Both theoretical sets of variables separately mediated the relationship between residential mobility and gang membership, implying that moving to a new neighborhood by itself does not necessarily constitute a risk factor for membership in a gang. This appears to be a function of social bonding and strain, although in the model examined neither single set of predictors was greatly superior to the other regarding model fit. Models examining other outcomes, including drug use and weapons carrying did not provide evidence of any mediating effect with residential mobility not displaying a significant association with drug use and, while there was a significant relationship between residential mobility and weapons carrying, there was no mediation effect. Rather, there was a suppression effect from social bonding and strain variables. Overall, the models examining mediation provided partial support for hypothesis 3b and support for hypothesis 3e. There was no support for hypotheses 3a, 3c, or 3d. For strain variables, there was support for hypotheses 4b and 4e, but none for 4a, 4c, or 4d.

The mediating effects in the model, while not consistent from behavior to behavior, do provide insight into certain delinquent behaviors that were examined. In the current study, fighting behavior was influenced by strain rather than residential mobility. This was in

conjunction with no mediating effects by the social bonding variables. While this does not provide evidence that strain is particularly more important than social bonding when predicting the frequency of fighting behavior, it does provide evidence that the negative effects or additional risk that an individual faces after moving to a new neighborhood could be alleviated more effectively by addressing sources of strain rather than addressing social bonds. Residential mobility does not have an indirect effect through social bonding variables, but does have an indirect effect through the strain variables.

Residential mobility and the association with gang membership also displayed mediation effects. This is particularly important since gang membership is a problem in itself and is also related to other violent problematic behaviors (Melde and Esbensen 2013; Spano, Freilich and Bolland 2008; Spano and Bolland 2011). Both social bonding and strain variables mediated the effect of residential mobility on the odds of gang membership, implying that residential mobility had an indirect association with gang membership through these sets of variables but no direct effect (Jose 2013). Social bonding variables and strain also have direct effects on the odds of gang membership, but with residential mobility as the primary concern of the current research, the implications appear to be that by addressing social bonding and strain as sources of problematic behavior, the effect of residential mobility on underprivileged youth could be addressed.

RESIDENTIAL MOBILITY AND WEAK EFFECTS

Over the course of conducting the current research, the researcher spent a significant amount of time in the neighborhoods that were part of the MYS. This provided unique insights into relevant policy implementation, as well as possible explanations for the results of the

research. This experience provided a qualitative view of life in impoverished areas and served as the impetus for the development of the hypotheses tests in this dissertation. This experience also informs the following discussion.

Residential mobility, overall, was not significant in all of models examining different types of delinquency. It was mediated in most models where it was a significant predictor with the exception of weapons carrying, where it had a relatively weak effect in the final model but not prior models examining that specific outcome. This is incongruent with previous research that has found that either residential mobility was a strong predictor of delinquency or that it had to be controlled for with multiple groups of variables including school mobility (Gasper, DeLuca and Estacion 2010). It is generally understood in the prior research that residential mobility should have some impact on delinquent behavior, especially in bivariate models, which were run in the current research (Boggess and Hipp 2010; Byck et al. 2015; Clampet-Lundquist 2004; Cotton and Schwartz-Barcott 2016; Hagan, MacMillan and Wheaton 1996). The findings from the current research indicate that for this particular population, this just is not supported by the empirical evidence.

There are several plausible reasons why this might have occurred in the current research and why this does not occur in the majority of the prior research involving juveniles and residential mobility. The population sampled in the current research is different than populations addressed by much of the prior research. Studies involving truly disadvantaged populations are rarer than those involving representative populations. While there are some commonalities, there are many qualitative and quantitative differences between a representative sample of United States youth and the population investigated in the current research (Anderson 2000; Wilson 1987). Individuals in this sample were extremely disadvantaged, and this study does have the

advantage of providing a relatively homogenous population regarding race and socioeconomic status, which eliminates these as possible confounders. There are, however, difficult constructs to measure that may explain why residential mobility does not have the anticipated effect on the population.

There are also several theoretical perspectives that provide plausible reasons for the differences in prior research and the current study that are informed by empirical research and qualitative observations. These theoretical explanations include differential effects of strain and social bonds on individuals involved in the current study, the effects of moving from one area to an area that is geographically different but has a similar social and economic structure, and the quality of communal ties within the larger geographical area which might connect different neighborhoods. These all offer insight into why the particular population investigated in the current study responded differently to residential mobility than previous research would suggest.

Strain and Social Bonding

Past research has examined residential mobility in samples that are more representative of the general population of the United States or a heterogeneous mix of individuals regarding race and economic status (Gasper, DeLuca and Estacion 2010; Porter and Vogel 2014; Speare, Frey and Goldstein 1975). With the population of the current study, some of the assumptions might not apply. An assumption is that residential mobility is a risk factor and, overall, that is demonstrated in some of the current analyses. It is, however, a weak predictor. This might be due to the differential effect of strain on the individuals in the study. The sample for the current research comes from extremely impoverished areas and they tend to move to other extremely impoverished areas which, at a macro-level, display the same characteristics as the

neighborhoods from which they moved (Boggess and Hipp 2010; Sariaslan et al. 2013). Furthermore, these youth tend to be under increased strain throughout the course of their daily lives (Jaggers et al. 2014). This indicates that strain is a constant companion for these youth and thus is particularly salient for these individuals.

Life is not easy for many of the individuals included in the current study. They live in impoverished areas racked by violence much like the communities studied by Kotlowitz (1992) in his book, "There Are no Children Here". Kotlowitz chronicled the life of individuals in the projects of Chicago. These same conditions are present to a certain extent in the areas involved in the current research. Individuals face a daily struggle to deal with violence, poverty, food insecurity, and other threats that can dwarf residential mobility as a cause of strain (Kotlowitz 1992). For individuals who are not under high levels of strain on a regular basis, residential mobility might constitute a specific strain of high enough intensity to overcome coping mechanisms, thus leading to delinquent behavior (Agnew 2006). Individuals who are more hardened might not respond to the strain caused by residential mobility in a similar fashion. Strains that are chronic and high in magnitude abound in the impoverished areas which makes strain caused by residential mobility proportionally weaker.

Moving to a different neighborhood becomes just another strain added to the already high levels of strain but does not, by itself, push them across a threshold that would necessarily lead an individual to commit delinquent acts. This would be congruent with strain mediating the effects of residential mobility in several of the models. It might be significant by itself as a predictor, but when combined with other strains, the effect becomes non-significant because it is conditioned by the overall level of strain faced by an individual. Also supporting this theoretical explanation is the relatively low correlations between residential mobility and the strain

variables. While significant, they are still weak. Residential mobility simply becomes just another strain with a moderate contribution to the overall levels of existing strain.

Respondents do not report particularly high levels of strain on most of the variables. The means are towards the middle or lower end of the scale for many of the strain variables, which might indicate that, despite living in stressful conditions, the mental anchor point as to what constitutes high levels of strain is shifted from what other samples might report a high level of strain.

Many of the individuals in areas such as the target areas in the MYS struggle to find adequate supplies of food each day (Gundersen, Kreider and Pepper 2011; Keene and Geronimus 2011; Slopen et al. 2010). They are more likely to live in unstable households, whether they have recently moved or not, and face increased strain due to the constantly high levels of violence in impoverished areas (Boggess and Hipp 2010; Bratt 2002; Spano, Rivera and Bolland 2006). These high levels of strain simply lower the importance of residential mobility relative to populations that have been previously researched. It is just another problem piled on top of the chronic issues faced by those who live in extremely impoverished areas. Moving to another neighborhood may just not rattle the individuals involved in the current research as much as it might other populations. Strain variables were a consistent predictor of delinquency in all models that were part of the current research. Residential mobility is just not enough of an additional strain to elicit additional delinquent behavior.

Social bonding variables were also a consistent predictor in all models investigated in the current research. The empirical evidence supports the conclusion that social bonding is a viable paradigm to use when understanding causes of delinquency in this particular population (Church et al. 2012). Individuals who live in disadvantaged areas move more often than those who do not

(Dong et al. 2005; Jelleyman and Spencer 2008). Residential mobility is clearly associated with negative health outcomes and most likely contributes to delinquency in some fashion, but in a similar pattern to the strain variables. The youth investigated in the current research quite possibly respond to disruptions in social bonding differently than the general population. Residential mobility may not disrupt social bonds like it does with those who are not in impoverished areas (Roy, McCoy and Raver 2014; Stoneman et al. 1999). The amount of stress that residential mobility places on social bonds is not strong compared to the stresses placed on social bonds faced by residing in these communities. This is supported by the relatively weak correlations between residential mobility and social bonding variables in the current study. It just doesn't add enough stress to attenuate social bonds enough to have a large effect size regarding delinquency. Just as another added strain is not enough to push an individual past the threshold to commit more delinquent acts, the added threat to social bonds is not enough to attenuate them to the point where they do not control anti-social behavior.

Similarity of Geography, Social Structure, and Economic Structure

In essence, the residentially mobile participants in this research were moving from one bad area to another. The vast majority of them stayed within the target area (Bolland 2012; Bolland 2007). They did not move to substantially better areas such as the areas for the experimental group in the MTO study (Sanbonmatsu et al. 2011). They moved to areas that had a similar physical and cultural geography. The areas might not have the same physical layout, but social structures were similar, the types of physical structures were similar, and it likely took less to adjust to these areas than it would take, for example, to move to a different state. Many of the respondents were simply moving to another housing project. Others moved to subsidized

housing not owned by the government, but these changes had no impact on outcomes in the current research (analysis not shown). The fact that they are transitioning to another similar neighborhood could indicate that it poses a less stressful transition than would be expected in youth who move to different cities or states.

The neighborhoods in the current study share many similarities. They all had high levels of poverty, high levels of unemployment, and low levels of education (Bolland 2007). These are the truly disadvantaged areas that Wilson (1987) discussed regarding neighborhoods where there was concentrated disadvantage. When residents of these neighborhoods move in or out of a neighborhood, they are not changing environments. They are familiar with the social structure of the neighborhood and how any social codes work within these neighborhoods (Anderson 2000).

From a qualitative standpoint, the researcher observed that these residents had lived in similar neighborhoods most of their lives, therefore it might be expected that a simple move would not have a great effect on them. They know how to go about obtaining the necessities to function in life and in the social environment of the neighborhood. This could be an explanation of why there are low correlations between residential mobility and social bonding and strain variables in the current research. Individuals have to learn and adapt less from a move to a new neighborhood than would be expected from someone outside of this population. Those who move to drastically different neighborhoods would have to adapt to a new geographical area, new social norms, social structure, and new roles within that social structure. Those who move from one disadvantaged area to another only have to worry about establishing themselves in a social structure that they know how to navigate and is similar to the one they departed.

This is not to say that all of the neighborhoods are the same. There are unique attributes associated with each neighborhood that was part of the current research. There were, however,

more similarities than differences, and many times the individuals were able to import their

identity from a prior neighborhood and use membership in that neighborhood as a bonding factor

to join a group in a different neighborhood. An example of this was when members from a

specific neighborhood that had been closed were relocated to another housing project. They

maintained their group identity because there were enough of them who made this move during a

short time period. They were able to develop the critical mass necessary to form a sort of

neighborhood gang (Cloward and Ohlin 1960). This did, however, lead to observed violence

during the afternoons in the summer. There was tension between the two groups, but there is no

empirical evidence that this represented an initiation or increase in delinquency at the individual

level, as it could have just been a continuation of prior behavior by individuals who were violent

before moving.

Economic similarities were also common between neighborhoods. All had high levels of

unemployment with chronic lack of job opportunities (Bolland 2007). Often these

neighborhoods were isolated from other areas through artificial barriers such as brick walls and

large fences or were isolated geographically from other higher income neighborhoods. There

was also the stigma associated from living in the neighborhoods that did not change when they

moved (Arthurson 2013; McCormick, Joseph and Chaskin 2012). These factors contributed to

similar economic, social, and structural similarities between the neighborhoods that led to less

effort required for adaptation, thus less change in behavior.

Communal Ties between Neighborhoods

An additional factor that possibly decreased the shock of moving from one neighborhood

was that individuals did not necessarily lose their ties to a previous neighborhood (Clampet-

Lundquist 2010). The researcher observed that there were well established lines of

communication between neighborhoods and residents had little trouble moving between the

neighborhoods despite geographical distance. This allowed individuals to retain friendships and

support systems in multiple areas, whether it was through familial ties or friendship ties. They

were able to travel back and forth and the maintenance of these ties likely lessened the shock of

moving to a new area (South and Haynie 2004). Furthermore, most did not leave everything

behind when transitioning to a new neighborhood. It simply did not seem to affect bonds a great

deal and did not cause any particularly sharp increase in strain that was not already present.

Perhaps the best observed factor was the presence of extended family in multiple

neighborhoods. The juveniles were able to easily transit from one neighborhood to another and

have a location where they could stay and spend time with their friends. Many of the

respondents in the current research were contacted in more than one neighborhood in any given

year, even though they only took the survey once. When asked why they were in a different

neighborhood, or what they were up to, the response was often that they were staying with an

aunt or uncle for a short period. This behavior would allow them to ease into any residential

transition gradually, thus lessening the shock of residential mobility. They were also able to

maintain a wide network of friends which could be drawn upon if needed (Curley 2009).

Individuals, even after moving, would be able to draw on adult mentors, including other family

members after the individuals had moved, maintaining attachment.

Overall, many of the neighborhoods, in particular the larger housing projects, showed

signs of being socially interconnected. Individuals in different neighborhoods knew each other

and interacted with each other. Most respondents were familiar with not only neighboring areas

but areas that were somewhat remote geographically (Boggess and Hipp 2010; Hipp, Faris and

Boessen 2012). This was facilitated by having friends and family members in multiple target neighborhoods in the current research. This, along with the similar social, economic, and geographic similarities between neighborhoods likely lessened the impact of residential mobility for this particular population. This might explain why the results of this study do not correspond to previous studies regarding residential mobility. Residential mobility has less of an impact on this population due to the aforementioned reasons.

POLICY IMPLICATIONS

There are important policy implications regarding displacement of juveniles from impoverished areas that emerged from the current research as well as prior research in this area. Unfortunately, there is no panacea when it comes to policies that can improve the lives of the truly disadvantaged. Multiple efforts have been enacted over the years, including the Moving to Opportunity project as well as HOPE VI projects (Clampet-Lundquist 2004; Sciandra et al. 2013). Neither of these efforts proved to be universally successful. Residential mobility itself does not seem to have a great effect on the specific population for possible reasons discussed above, but the current research displays areas where improvements can be made regarding policies to reduce juvenile delinquency in disadvantaged population (Byck et al. 2015).

Residential mobility might be beneficial to residents if employed correctly, as the stress of moving does not seem to affect the odds of delinquency for the juveniles in the population of concern. Strain and social bonding should be addressed in any policy aimed at reducing juvenile delinquency in this population. Along with addressing these areas, care must be used when relocating large numbers of individuals from housing projects to other areas of a city (McCormick, Joseph and Chaskin 2012; Sanbonmatsu et al. 2011). It is most likely a good thing

to break up large housing projects in order to lower the concentration of poverty and provide opportunities that are lacking when poverty and disadvantage is too heavily concentrated in one area (Sampson and Laub 1994; Wilson 1987). At the same time, care needs to be taken to ensure that movement of individuals with low socioeconomic status does not simply create another poor area with concentrated disadvantage. Drastically changing the nature of an area can have adverse effects on not only those who move to a new area but residents who already live there (Bursik and Grasmick 1993).

Strategies Associated with Movement and Macro-Level Strategies

One approach to improving outcomes for the population in the current study would be to allow residential mobility into working class or middle income areas, with careful attention paid to the concentration of individuals moved to any specific location. One of the problems with the MTO experiment was that there was stigma and discrimination faced by those who moved to better areas (Arthurson 2013; Sanbonmatsu et al. 2011; Sciandra et al. 2013). This might be remedied by ensuring that enough members from the lower socioeconomic classes are placed in a certain area. This would allow individuals to maintain attachments with those who are similar to them while forming bonds with others who might be from a different socio-economic stratum (Haynie, South and Bose 2006). Care would have to be taken to ensure that the overall demographics at the neighborhood level would not change in a drastic fashion. This is a difficult balancing act with no clear answer as to whether there is a particular tipping point at which a neighborhood might become increasingly criminogenic. This strategy is similar to what was employed with many of the HOPE VI projects. One aspect that might be added is support once individuals are relocated to better areas. The provision of services such as job training and

placement and other targeted programs aimed at integrating individuals into the workforce might benefit juveniles indirectly by lowering the amount of strain faced by the family unit, thus lowering strain on the juvenile. Even programs as simple as increased access to food can be combined with movement to a better area to improve outcomes including educational achievement and social functioning, as well as lowering risk factors such as worry (Gundersen, Kreider and Pepper 2011). Worry, a predictor of delinquency, should decrease as financial stability increases and overall family security increases. Lack of access to jobs is one of the characteristics of disadvantaged neighborhoods, but simply moving to a better neighborhood with no support regarding access to the labor market would be relatively ineffective at affecting any positive change.

Neighborhood effects must be taken into account when employing macro-level residential movement strategies in order to prevent a concentration of juveniles that is high enough to establish and maintain a deviant subculture that could be imported from a highly impoverished area (Cloward and Ohlin 1960). Violent expectations was shown to be a strong predictor of delinquency in the current study, and by maintaining a neighborhood that does not support these attitudes would likely be effective at reducing delinquency (Anderson 2000). Less exposure to violence as a way of life should lower the likelihood of engaging in aggressive or protective acts such as fighting and weapons carrying (Beardslee et al. 2018; Drummond, Bolland and Waverly 2011). Along these lines, increasing collective efficacy through community programs can aid in lowering the amount of violence in the neighborhood and increasing informal control over juveniles (Sampson 2012). This would allow for indirect control from a familial standpoint to increase, thus increasing family knowledge regarding their

children and family monitoring. Both of these factors were significant protective factors in the

current study.

An additional policy implication of macro-level theory involves the environment itself.

By increasing informal control in a neighborhood, the appearance and structure of a

neighborhood could be improved. Careful attention paid to the physical structure of the

neighborhood and maintenance of housing units and infrastructure within a neighborhood has the

potential to lower crime within that neighborhood (Kelling and Wilson 1982). Enforcement of

community norms could then be accomplished largely through informal social control. This was

evident in observations by the researcher. Some housing projects were better maintained than

other housing projects. These might have not been in the target area, but had a reputation for

lower crime rates and provided a general increase in perceived quality of life according to the

residents interviewed by the researcher. There are several ways that the environment can be

manipulated to increase the appeal of a neighborhood, including the demolition of derelict

buildings. There was a push to do this in one of the target areas in particular, but the city was

unsuccessful at removing the structures. Fortunately, the ones the residents did not set on fire

collapsed on their own, which marginally improved the quality of the neighborhood. A more

structured approach would most likely be more effective compared to resident-initiated burning

of structures.

Strategies to Improve Individual Outcomes

Policies that lower strain and increase social bonding could be effective at the individual

level if employed in conjunction with moving. As stated previously, the promotion of collective

efficacy in neighborhoods would serve as a protective factor regarding the odds of juvenile

delinquency. Programs promoting self-worth and mentoring programs providing youth with a

clear path for the future could both lower risk factors, as higher adult expectations was associated

with lower odds of delinquency as was higher self-worth (Lockhart et al. 2017). Schools can

play a large part in mitigating many of the risk factors faced by individuals who come from

disadvantaged areas (Herbers, Reynolds and Chen 2013; Sharkey et al. 2011). The performance

and environment of a school is often a function of the students who attend the school. By

lowering the concentration of disadvantaged students in any given school, the educational

environment would improve and those who were impoverished would benefit from a more stable

high-performing school (Battistich et al. 1995; Payne and Welch 2013).

Mental health services, if made available in the neighborhoods, also constitute a policy

initiative that would lower the odds of an individual engaging in delinquent behavior.

Individuals who have grown up in these neighborhoods suffer trauma (Burton et al. 1994;

Dierkhising et al. 2013). This trauma manifests itself in low self-worth, traumatic stress,

callousness, and anger. These were all shown as risk factors in the current study. Mental health

services could address these issues, as one is basically dealing with a large group of traumatized

youth. This, however, is harder to implement than it might appear on the surface. For effective

mental health services to be provided, clinicians would need to be involved in the neighborhood

and would need to be accessible to residents. Stigma of receiving mental health treatment would

have to be overcome. Qualified clinicians are expensive in a time of decreasing public mental

health expenditures. In addition to these barriers, clinicians need to be carefully selected. The

target area of the MYS was a site where mental health providers were assigned to housing

projects and provided an office. This was relatively ineffective because clinicians were reluctant

to leave the office and engage the community. Without building trust with the juveniles, they

were not able to provide meaningful help for the individuals in the community. Fear of leaving their offices kept the clinicians from being effective. Selection of clinicians who are not afraid to leave their offices in disadvantaged areas would be critical for the successful implementation of a comprehensive mental health policy designed to help youth deal with anger, traumatic stress, low self-worth, hopelessness, and family problems.

The largest cluster of risk factors for increased odds of juvenile delinquency in the current study are internal characteristics such as self-worth, traumatic stress, hopelessness, callousness, anger, worry, and violent beliefs. These would best be addressed in a multi-systemic way with a combination of increased social support at school and at home, increased mental health treatment availability, and also an improvement in neighborhood conditions and the provision of opportunities (O'Brien et al. 2013; Parker and Reckdenwald 2008; Rosenbaum 1995; Roy, McCoy and Raver 2014). Policy initiatives aimed at addressing these internal characteristics, either through mental health approaches or environmental change, would be most effective at lowering the odds of delinquency for the population investigated in the current study.

LIMITATIONS

There are multiple limitations to the current research as there is with any research. Limitations in data collection, scope and implementation of the research design, and specific analyses all act as limitations. It is important to understand these limitations in terms of how it affects generalization to other populations and the implications and strength of the conclusions drawn from the study.

Data Collection

Data collection for the MYS involved primarily surveys and thus the research has all the limits of survey data. While there are a large number of participants, surveys did not allow for in-depth data collection that could inform theory and reasons for strain, quality of social bonds, and how residential mobility had affected individuals in these neighborhoods (Creswell 2007). Interviews could also more directly measure the constructs of interest. Surveys used scales not specifically designed for the constructs of interest, but do an adequate job of providing the information necessary for analysis. Often proxy measures are not as good as direct measures, but the MYS does lend itself to criminological study.

Methods of data collection also constituted limitations for the research. Surveys were often given in group settings, and while there were multiple administrators to make sure individuals filled out surveys properly and received individualized help if they needed it, given the population, there were still difficulties with some individuals. Missing data can be related to reading problems as well, although this is mitigated to some extent as data missing for this reason resembles data that is missing at random (Peugh and Enders 2004).

Missing data as a whole was a limitation of the study, although it is no more of a problem with the MYS than most longitudinal study. There were multiple individuals who missed waves of data collection for a variety of reasons. Often, quality of contact information needed to follow up with an individual and the workload required to find all of the individuals was just not available. All possible efforts were made to contact individuals from year to year while they maintained eligibility for the survey, but many were missed. Bolland (2012) suggests that the missing data can be considered MAR, and, overall, the coverage of the population of interest was high (Bolland 2012; Bolland 2007).

A final consideration involving data collection involves the trust that one must gain in order to effectively collect information from disadvantaged and hard to reach populations. There was normally a mix of races represented on the research teams through the various years and it did not take long for the neighborhoods to accept and even expect the MYS to occur every year (Bolland 2007). The researcher's experience with the survey showed that there was not a large problem with acceptance of the survey in the neighborhoods. Operating in the high-crime areas was relatively safe and the survey respondents and residents of the target areas were cooperative and accommodating. This is often a limitation in surveys of this kind, but the longitudinal nature of the MYS and the work conducted by researchers in the field minimized this limitation. Many of the research assistants were involved in neighborhood activities at the Boys and Girls clubs, and, through selective recruitment and training, the vast majority of the individuals were able to operate with no problems within the often unfamiliar territory of the housing projects and poor areas in Mobile and Prichard. They posed no great threat to the residents of these neighborhoods and were generally accepted without problems.

Research Design

The research design of the MYS acts as a limitation regarding what can be drawn from the data. In practice, both passive and active sampling were used as tools to draw a representative sample (Bolland 2012). There was, however, not a truly random sample drawn from the population which raises concerns regarding generalizability to the population being investigated. This changed throughout the administration of the survey, which relied less and less on active sampling as the years progressed. Anyone in the area who qualified for the survey was sampled, which could lead to bias. The existence of other datasets with which to verify the

representativeness of the MYS sample as well as the implications of missing data are good and there is no indication that missing data represents selection bias, it is a limitation that raises questions, justified or not, regarding the representativeness of the data (Bolland, Tomek and Bolland 2017).

Additional research design elements would have aided in drawing conclusions from the survey. The MYS only surveyed individuals from ages 10 to 18. This is a limitation in that it limits the amount of time that individuals were followed and limits the number of time points available for analysis. If the survey had followed individuals into young adulthood, other questions could have been addressed in the current research, such as employment and criminal outcomes rather than just juvenile outcomes and juvenile delinquency. This would have allowed for an expansion of the scope of the current research and allowed for life-course perspectives and techniques to be utilized with the data.

Statistical Analysis

With any statistical analysis, there are limitations. A small portion of the data was imputed using single imputation which is sometimes frowned upon by some statisticians (Enders 2010). This was appropriate for the current study, however, and reduced the number of problems associated with multiple imputation regarding multiple dataset, pooled estimates, and what would have been unnecessary and to a certain extent, limiting work regarding multiple datasets and mathematically intensive models. Single imputation was adjusted for with clustered standard errors, which is a perfectly legitimate solution to dealing with small amounts of missing data. Missing between wave data was not imputed, which acts as a limiting factor for the survey as well. This would have increased the overall sample of person-years and has been done in past

research (Gasper, DeLuca and Estacion 2010; Young and Johnson 2015). While there is nothing wrong with this approach, it was determined that it was not warranted in the current study.

The analysis of the data in the current study has several limitations. Ordinal variables can be more difficult to handle. With the combination of large sample size, continuous predictors and ordinal or binary outcome variables, the selection of techniques available diminishes compared to analyses containing continuous outcomes. The models in the current analysis did not respond well to the addition of random slopes to the models in that they simply failed to converge. This is not uncommon. Similar to decisions is data imputation, the researcher made a choice to treat the outcome variables as categorical rather than continuous because of their construction. Previous research has treated them as continuous (Moore 2015), or as dichotomized variables (Gasper, DeLuca and Estacion 2010; Spano, Rivera and Bolland 2006; Spano et al. 2012). This was true in past research for not just outcome variables but also many of the input variables. This data reduction method loses the ordering of the variables. Ordinal regression, while more complex, is underutilized in criminological research and hopefully researchers will adjust this in the future (Allison 2009).

FUTURE RESEARCH

Ideas for future research regarding residential mobility might focus on more direct data collection in terms of interviews, or a mixed-methods approach to better identify the causal mechanisms at work regarding juvenile delinquency (Catalano et al. 2002; Hill et al. 1999). While the current research contributes in terms of analyzing risk and protective factors regarding delinquency and produced findings that indicate the risk might move through social bonding

constructs and strain variables, more work needs to be done to examine the specific problems

that youth face when they move and how this can be addressed.

Future research also should address not only the individual consequences of residential

mobility but the neighborhood context of this mobility and how neighborhoods can be affected.

The MTO study does this to a certain extent, but focuses primarily on individual outcomes

(Sanbonmatsu et al. 2011; Sciandra et al. 2013). Other studies focus on outcomes at the

neighborhood level (Boggess and Hipp 2010; Hipp 2007; Hipp and Yates 2011; Hipp, Faris and

Boessen 2012). This is valuable research, but many cities are moving more and more residents

from housing projects into other types of neighborhoods and attempting to integrate these

individuals into existing neighborhoods with their own social and economic structures (Clampet-

Lundquist 2004; Popkin et al. 2004). This started with the HOPE VI projects and continues in

many areas, including the area where the current research was conducted. It is important to look

at changes in the neighborhoods as well as the outcomes for individuals and what balance might

be best for policy.

Other avenues for future research include further analysis of the differentiating factors for

different delinquent behaviors. There was some variation in the current research among the

predictors for various types of delinquent behaviors. Many current studies either focus on a

single behavior or just lump all behavior into a dichotomous variable measuring whether an

individual committed a delinquent act or not. It is important to investigate what delinquent acts

are being committed, whether there are different pathways to these delinquent acts, and what the

severity and frequency of these acts are. With the addition of statistical techniques such as

multi-level modeling and structural equation modeling to the general education of graduate

students, further research can use these techniques to better disentangle the effects of the predictors on behaviors.

In addition, measurement error, which is particularly problematic with hard to reach populations, can be addressed to better affect inferences from research. A final note for future research is that much of it is conducted in isolation, meaning the researcher is not actively involved in the collection of the data and does not usually associate with the area being researched or the participants in the area. The Chicago School pioneered mixed-methods research in criminology and a return to this general idea of drawing on qualitative research to inform quantitative research might better guide research in the future (Onwuegbuzie and Leech 2004). While it is not necessary to fully embed oneself in disadvantaged neighborhoods, it would assist research if the researchers had some idea what occurs on a daily basis within these neighborhoods.

FINAL THOUGHTS

Residential mobility did not have a large effect in the current study, but both sets of strain variables and social bonding variables acted as predictors of juvenile delinquency. Policy recommendations to address the plight of the underclass are hard to implement because they cost money, which society often seems unwilling (Beckett and Western 2001). The only way to improve these areas and the lives of the individuals in these areas is through a multi-systemic approach that addresses multiple needs and provides opportunities that allow not only juveniles, but adults to have a successful life and have access to some semblance of the chances of success as those who are not bound by the chains and stigma of concentrated disadvantage. Living in

these areas is not an easy existence. The areas are often racked with violence, drug use and instability which takes a mental and physical toll on the individuals within these areas.

In the course of conducting the current research, the researcher spent a great deal of time in these areas over a period of six years. The insights gained from this qualitative dimension were indispensable in the interpretation of the quantitative aspects of this study. The problems faced by individuals within the areas investigated as part of the MYS were not just represented by numbers. They represent the daily struggle that many face in these areas on concentrated poverty with little hope of escape. Despite these challenges many in these areas are resilient and adapt to the conditions in which they are forced to live by a variety of forces including social stratification, labor market conditions, education, and where they start off in life.

Residential mobility just represents another strain that fails to push individuals into juvenile delinquency. Other internal and external conditions have a larger effect although residential mobility plays a role in certain delinquent behaviors discussed throughout this document. It is important to remember, however, that the large majority of youth surveyed as part of the current research do not engage in high levels of juvenile delinquency. Most adapt to their situations in a conventional manner. This is true regarding the youth who were surveyed as well as the adults that were interviewed by the researcher. These individuals are able to maintain familial and community social bonds and to cope with strain in a pro-social manner rather than resort to retreatism or criminal innovation as a way to survive.

The current research adds to the body of research on a traditionally neglected population. Simply adding to the body of research on the truly disadvantaged is not enough. Research needs to inform policy when engaging in programs that affect socioeconomically disadvantaged groups. Governments have a responsibility to their citizens and governmental reform efforts

differ based on polity (Huber, Ragin and Stephens 1993). Over time perhaps more progress will be made in integrating the truly disadvantaged into society rather than separating them into housing projects and concentrated areas of poverty, cut off from many of the resources the general populace enjoys. This has been done in multiple cities including Omaha, Dayton, Tampa, and other cities that differ in composition and geography (Turner 1998). There is promise that residential mobility, rather than being a detriment, could again become an opportunity much as it was viewed in the 1950s. The current research shows that residential mobility by itself poses little risk of increased odds of delinquency. Juveniles appear to be relatively resilient to this change. Therefore there is little danger in attempting to disperse areas of concentrated poverty while paying close attention to where individuals on housing assistance are placed. All the while ensuring that communities remain healthy, connected, and serve as a catalyst for possible upward mobility rather than acting as an invisible prison from which residents cannot escape.

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APPENDIX A

DEPENDENT VARIABLES

Arrest Within the Last Year

"During the past year (12 months), were you arrested?"

(Answer Choices: 1. No, 2. Yes).

Fighting

"Have you ever been in a physical fight (a fight with hitting, kicking, or pushing)?"

(Answer Choices: 1. No, 2. Yes).

"In the past 3 months (90 days), were you in a physical fight?"

"In the past 30 days, were you in a physical fight?"

(Answer Choices: 1. No, 2. Yes just once, 3. Yes, more than once)

Weapons Carrying (carried a gun OR knife)

"Have you ever carried a gun?"

(Answer Choices: 1. No, 2. Yes)

"In the past three months (90 days) have you carried a gun?"

"In the past month (30 days) have you carried a gun?"

"In the past week (7 days) have you carried a gun?"

(Answer Choices: 1. No, 2. Yes just once, 3. Yes, more than once)

"Have you ever carried a knife or razor?"

(Answer Choices: 1. No, 2. Yes)

"In the past three months (90 days) have you carried a knife or razor?"

"In the past month (30 days) have you carried a knife or razor?"

"In the past week (7 days) have you carried a knife or razor?"

(Answer Choices: 1. No, 2. Yes just once, 3. Yes, more than once)

Drug Use

"Have you ever gotten drunk on alcohol or high on drugs?"

(Answer Choices: 1. No, 2. Yes)

"In the past year (12 months), did you get drunk on alcohol or high on drugs?"

"In the past month (30 days), did you get drunk on alcohol or high on drugs?"

"In the past week (7 days), did you get drunk on alcohol or high on drugs?"

(Answer Choices: 1. No, 2. Yes just once, 3. Yes, more than once)

Gang Involvement

"Have you ever been involved in a gang?"

"Are you currently involved in a gang?"

"Do you hang out with members of a gang?"

(Answer Choices: 1. No, 2. Yes)

APPENDIX B

SOCIAL BONDING VARIABLES

Neighborhood Connectedness

"I feel I am an important part of my neighborhood."

"If I moved away from my neighborhood, I would be sorry to leave."

"Very few of my neighbors know me."

"I have friends in my neighborhood who know they can depend on my."

"I do <u>not</u> like living in my neighborhood."

"There are people in my neighborhood who care about me."

"I have friends in my neighborhood I can depend on."

"If you <u>don't</u> look out for yourself in my neighborhood, no one else will."

"<u>No one</u> in my neighborhood takes any interest in what their neighbors are doing."

"It is hard to make good friends in my neighborhood."

"If I am upset about a personal problem, there are people in my neighborhood I can turn to."

(Answer Choices: 1. Agree, 2. Disagree)

Parental Monitoring Scale (Family Knowledge)

"Does your mother or father know who you hang out with?"

"Does your mother or father know exactly where you are most afternoons (after school) and

during the day on weekends and during the summer?"

(Answer Choices: 1. No, 2. Yes)

"How much does your mother or father <u>really</u> know about what you do most afternoons (after

school) and during the day on weekends and during the summer?"

"How much does your mother or father <u>really</u> know about how you spend your time?"

(Answer Choices: 1. They <u>don't</u> know, 2. They know a little, 3. They know a lot)

"How much does your mother or father <u>really</u> know about where you go at night?"

(Answer Choices: 1. I <u>don't</u> go out at night, 2. They <u>don't</u> know, 3. They know a little, 4. They know a lot)

"Does your mother or father <u>try</u> to find out how you spend your time?"

(Answer Choices: 1. They <u>don't</u> try, 2. They try a little, 3. They try a lot)

Existence of Family Rules

"Does your family have rules about when you do homework?"

"Does your family have rules about dating?"

"Does your family have rules about drinking?"

"Does your family have rules about using drugs?"

"Does your family have rules about fighting and hitting other people?"

(Answer Choices: 1. No, 2. Yes)

Inevitability of Violence (Violent Beliefs)

"It is not possible to avoid fights in my neighborhood."

"If you <u>don't</u> carry a knife or gun in my neighborhood, something bad might happen to you."

"Kids who are in a gang get respect from other kids in my neighborhood."

"When I get mad, I usually <u>don't</u> care who gets hurt."

"Carrying a weapon lets other kids know that they <u>shouldn't</u> mess with you."

"If someone starts a fight with me, I am going to finish it."

"Hitting someone really knocks some sense into them."

"When you are in an argument, you should stand your ground to get what you want."

(Answer Choices: 1. Agree, 2. Disagree)

Expectations about Adulthood

"When I am an adult, I expect to have a good job that I like and that will pay enough for me to live on."

"When I am an adult, I expect to have good friends I can talk to and do things with."

"When I am an adult, I expect to have a long and happy marriage."

"When I am an adult, I expect to spend time in jail or prison."

(Answer Choices: 1. Agree, 2. Disagree)

Positive Peer Support

"How many of your friends think it's cool if you don't drink alcohol?"

"How many of your friends think it's cool if you don't use drugs?

"How many of your friends think it's cool if you don't carry a weapon?"

"How many of your friends think it's cool if you don't want to fight when you are insulted, dissed, or called out?"

"How many of your friends think it's cool if you do well in school?"

"How many of your friends think it's cool if you don't have sex?"

(Answer Choices: 1. Most of them, 2. Some of them, 3. Almost none of them)

Warmth Towards Mother (Maternal Closeness)

"I can usually count on her to help me out if I have some kind of problem."

"She usually keeps pushing me to do my best in whatever I do."

"We do fun things together."

"She usually helps me if there is something I don't understand."

"When she wants me to do something, she usually explains the reasons why."

"She spends time just talking with me."

(Answer Choices: 1. I <u>don't</u> have anyone who is like a mother to me, 2. Agree, 3. Disagree)

APPENDIX C

STRAIN VARIABLES

Self-Worth

"I am usually unhappy with myself."
"I am happy with myself."

"I sometimes do things I know I shouldn't do."
"I hardly ever do things I know I shouldn't do."

"I usually don't like the way I behave."
"I usually like the way I behave."

"I like the kind of person I am."
"I don't like the kind of person I am."

"I usually get into trouble because of the things I do."
"I usually don't do things that get me into trouble."\
"I usually make good decisions."
"I usually don't make good decisions."

"I usually behave myself very well."
"I often find it hard to behave myself."

"I am not very happy with the way I do a lot of things."
"The way I do things is fine."

"I don't like the way I am leading my life."
"I like the way I am leading my life."

(Respondents select one response from each set).

Traumatic Stress

"I have bad dreams about the bad things that have happened to a family member or friend."

"I have trouble sleeping at night when bad things happen to a family member or friend."

"I think I would feel better if I could talk to someone about the bad things that happen to a family

member or friend."

"When bad things happen to a family member or friend, it feels like they are happening to me."

"I think about bad things that have happened to a family member or friend, even when I <u>don't</u> want to."

"After bad things happen to a family member or friend, I feel uncomfortable being with them because it reminds me of the bad things that happened."

"I worry that bad things might happen to a family member or friend."

(*Answer Choices: 1. Almost never, 2. Sometimes, 3. Very Often*)

Hopelessness

"All I see ahead of me are bad things, <u>not</u> good things."

"There's <u>no</u> use in really trying to get something I want because I probably won't get it."

"I might as well give up because I <u>can't</u> make things better for myself."

"I <u>don't</u> have good luck now and there's no reason to think I will when I get older."

"I <u>never</u> get what I want, so it's dumb to want anything."

"I <u>don't</u> expect to live a very long life."

(*Answer Choices: 1. Agree, 2. Disagree*)

Callousness/Lack of Caring

"I often blame others for my mistakes."

"I care about how well I do at school or work."

"I am able to lie easily and skillfully."

"I feel bad or guilty when I do something wrong."

"I sometimes act charming and nice to get things I want."

"I care about the feelings of others."

"I usually hide my feelings or emotions from others."

"I get angry when I am corrected or punished."

(Answer Choices: 1. Agree, 2. Disagree)

Anger

"When I get angry, I get into fights."

"When I get angry, I yell a lot."

"When I get angry, I get crazy or loco."

"When I get angry, I keep thinking about it for a long time."

"When I get angry, I figure out what to do about it by myself."

(Answer Choices: 1. Often true for me, 2. Sometimes true for me, 3. Almost never true for me)

Family Arrest

"During the past year (12 months), was anyone who lives in your apartment arrested?"

(Answer Choices: 1. No, 2. Yes)

Worry

"How much do you worry about getting good grades?"

(Answer Choices: 1. I am not in school, 2. Not at all, 3. Some, 4. Very much)

"How much do you worry about being pressured into doing something dangerous by your friends?"

"How much do you worry about not fitting in with other kids in the neighborhood or at school?"

"How much do you worry that your family has enough money to get by?"

"How much do you worry that you might not get a good job when you get older?"

"How much do you worry about getting along with people of other races?"

"How much do you worry about gangs in your neighborhood?"

"How much do you worry about whether you are 'straight' or 'gay'?"

"How much do you worry that you might get AIDS?"

(Answer Choices: 1. Not at all, 2. Some, 3. Very much)

Negative Peer Support

"How many of your friends think you are a punk if you <u>don't</u> drink alcohol?"

"How many of your friends think you are a punk if you <u>don't</u> use drugs?"

"How many of your friends think you are a punk if you <u>don't</u> carry a weapon?"

"How many of your friends think you are a punk if you <u>don't</u> want to fight when you are insulted, dissed, or called out?"

"How many of your friends think you are a punk if you do well in school?"

"How many of your friends think you are a punk if you <u>don't</u> have sex?"

(Answer Choices: 1. Most of them, 2. Some of them, 3. Almost none of them)

APPENDIX D

ADDITIONAL COVARIATES

Residential Mobility

"How long have you lived in your neighborhood?"

(Answer Choices: 1. Less than one year, 2. About one year, 3. About two years, 4. About three years, 5. About four years, 6. Five years or longer)

Age

"How old are you now?"

(Answer Choices: 1. 9, 2. 10, 3. 11, 4. 12, 5. 13, 6. 14, 7. 15, 8. 16, 9. 17, 10. 18, 11. 19)

Sex

"Are you male or female (a boy or a girl)?"

(Answer choices: 1. Male (boy), 2. Female (girl))

VITA

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EDUCATION
Ph.D., Criminology and Criminal Justice. Old Dominion University, August 2019
M.S., Criminal Justice. The University of Alabama, August 2010
B.S.W., Social Work. The University of Alabama, December 2005
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PROFESSIONAL EXPERIENCE

2015-*Current*   Criminal Justice Instructor and Adviser
                  University of South Alabama, Mobile AL

2013-2015   Adjunct Instructor of Criminal Justice
                  Bryant and Stratton College, Hampton VA

2005-2010   Research Assistant, Mobile Youth Survey
                  University of Alabama, Tuscaloosa, AL

TEACHING EXPERIENCE (SELECTED CLASSES)

Introduction to Criminology (CRJS 215S), Research Methods (CJ 310), Policing and Society (CJ 320), Judicial Process (CJ 330), Criminal Law (CJ 332), Policies and Procedures of Corrections (CJ 340), War and Peace (SOC 352U), Introduction to the Offender (CJ 360), Criminology of Armed Conflict (CJ390), Terrorism and Homeland Security (CRJU 423)

SELECTED PRESENTATIONS

Hollingsworth, M. (2018). "Counter-Insurgency Operations in Failed States: Terrorism and State Crime in Africa and the Middle East". Annual meeting of the American Society of Criminology, Atlanta, GA, November 2018.

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ACADEMIC INTERESTS

Low-intensity Conflict, Terrorism and Political Violence, Armed Conflict, Failed States, State Crime, Methodology and Statistics, Military and Police Weaponry and Tactics.