The effects of gang membership and transitions in a gang on within-individual changes in offending.

Leon Sergio Garduno

University of Louisville

Follow this and additional works at: https://ir.library.louisville.edu/etd

Part of the Criminology Commons

Recommended Citation

This Doctoral Dissertation is brought to you for free and open access by ThinkIR: The University of Louisville's Institutional Repository. It has been accepted for inclusion in Electronic Theses and Dissertations by an authorized administrator of ThinkIR: The University of Louisville's Institutional Repository. This title appears here courtesy of the author, who has retained all other copyrights. For more information, please contact thinkir@louisville.edu.
THE EFFECTS OF GANG MEMBERSHIP AND TRANSITIONS IN A GANG ON WITHIN-INDIVIDUAL CHANGES IN OFFENDING

By

Leon Sergio Garduno
B.A., Universidad de las Americas, Puebla, 2001
M.A., Universidad de las Americas, Puebla, 2004
M.A., Florida State University, 2014

A Dissertation
Submitted to the Faculty of the College of Arts and Sciences of the University of Louisville in Partial Fulfillment of the Requirements for the Degree of

Doctor of Philosophy in Criminal Justice

Department of Criminal Justice
University of Louisville
Louisville, Kentucky

August 2022
THE EFFECTS OF GANG MEMBERSHIP AND TRANSITIONS IN A GANG ON WITHIN-INDIVIDUAL CHANGES IN OFFENDING

By

L. Sergio Garduno

A Dissertation Approved on

July 27, 2022

by the following Dissertation Committee:

Dissertation Chair, Deborah G. Keeling, Ph.D.

Dissertation Co-Chair, Kristin Swartz, Ph.D.

Viviana Andreescu, Ph.D.

John C. Navarro, Ph.D.
DEDICATION

This dissertation is dedicated to my wife, Marline Guerrero, for her constant support in and out of graduate school. I would not have been able to achieve this degree without her patience and support. I also dedicate this dissertation to my three beautiful children, Allan, Arianne and Amelie, who give me joy (and stress) every day. Allan, I am sorry I did not have enough time to play with you during this time. Let’s go play now my big little guy. Thank you for your patience. I love you guys so, so much.
ACKNOLEDGEMENTS

I am very thankful to my dissertation chairs, Dr. Deborah G. Keeling and Dr. Kristin A. Swartz for guiding my dissertation through difficult times. It is because of their professionalism and unwavering commitment to their students that I was able to finish this dissertation. I thank Dr. Viviana Andreescu and Dr. John Navarro for their time and thoughtful comments on my research. Their comments helped me write a better dissertation. I am also grateful to Dr. Alex O. Widdowson for providing the coding needed to run the statistical analyses and for his patience and support on early versions of my dissertation. I also thank all of my professors from the Department of Criminal Justice at the University of Louisville and from the College of Criminology and Criminal Justice at Florida State University for sharing their knowledge with me. I want to particularly thank Dr. Viviana Andreescu, Dr. Thomas G. Blomberg, and Dr. William D. Bales for their constant support, especially during challenging times. I am also grateful for my friends from graduate school for sharing good and bad memories with me. I do not mention them out of fear of forgetting some names, but you know who you are. I also thank Dr. Gustavo Fondevila, Dr. Barbara S. Taylor, Dr. Roman López Villicaña, Dr. José Luis García Aguilar, Dr. David Dávila, Dr. Marco Almazán, Dr. Albert H. LeMay, Diego Uriburu, Candace Kattar, and Dr. Daniel Arretche for inspiring me to pursue a graduate education and for supporting me in this process. Last, I thank my parents Dr. Leon Garduno and Ofelia Villa for their support and for teaching us the value of hard work, and my siblings, Eryka and Eduardo for cheering for me.
ABSTRACT

THE EFFECTS OF GANG MEMBERSHIP AND LIFE-COURSE TRANSITIONS IN A GANG ON WITHIN-INDIVIDUAL CHANGES IN OFFENDING

Leon Sergio Garduno

July 27, 2022

Researchers have established that joining a gang exposes individuals to factors and environments that promote and increase antisocial and illegal behaviors, which decrease after leaving the gang (Decker & Van Winkle, 1994; Melde & Esbensen, 2014; Thornberry, Krohn et al., 1993). Scholars, by analyzing qualitative data, bivariate statistics, and by comparing gang members with non-gang members, have found that as individuals join and leave a gang they experience changes in the frequency with which they carry firearms, sell drugs, and engage in property crimes (Bjerregaard & Lizotte, 1995; Hagedorn, 1994; Thornberry et al., 1993). Researchers also have established that within-individuals’ earnings from general delinquency vary as they enter, continue, and leave the gang (Augustyn et al., 2019). The existing literature, however, has not quantitively measured within-individuals’ variations in earnings derived from specific forms of crime, or changes in the frequency with which they sell drugs or carry firearms as they transition through stages in the gang. This study addresses these gaps in the literature by analyzing, from a life-course perspective and utilizing mixed-effects models, seven waves of the National Longitudinal Survey of Youth – 1997 (NLSY97) to explore
whether within-individuals’ likelihood of generating income from property crimes, theft, and selling drugs, and the amount of income generated from these crimes vary as they enter, continue, and leave the gang. Additionally, this dissertation analyzes whether within-individuals’ likelihood of selling drugs and of carrying a handgun, and the frequency with which they engage in these behaviors vary as individuals transition through stages in the gang, that is, through their “life course” of gang membership. Results from this dissertation showed that gang membership was associated with higher within-individuals’ probabilities of generating income, and higher income generated from drug sales, theft, property crimes, and a combination of these activities. Gang membership was also associated with higher within-individuals’ likelihood and frequency of selling drugs and carrying a handgun. Additionally, results showed that within-individuals’ probabilities of generating income from most of the crimes analyzed increased as youth entered and continued in a gang. Joining and continuation in a gang was also associated with higher amounts of income generated from crime, selling drugs and carrying a handgun.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABSTRACT .......................................................... V</td>
</tr>
<tr>
<td>LIST OF TABLES ..................................................... x</td>
</tr>
<tr>
<td>CHAPTER 1. INTRODUCTION ............................................. 1</td>
</tr>
<tr>
<td>Current Study ....................................................... 9</td>
</tr>
<tr>
<td>Study Contributions ............................................... 10</td>
</tr>
<tr>
<td>Dissertation Outline ............................................... 13</td>
</tr>
<tr>
<td>CHAPTER II. EMPIRICAL BACKGROUND AND THEORETICAL FRAMEWORK ................................................. 14</td>
</tr>
<tr>
<td>Theoretical Framework – The Life Course Perspective ............................................. 14</td>
</tr>
<tr>
<td>The Life Course Perspective ......................................... 15</td>
</tr>
<tr>
<td>Life-Course Perspective in Criminology ................................... 20</td>
</tr>
<tr>
<td>Gang Membership as a Turning Point over the Life-Course ......................... 24</td>
</tr>
<tr>
<td>Defining Gangs and Gang Membership ................................... 25</td>
</tr>
<tr>
<td>Defining Gang Members .............................................. 29</td>
</tr>
<tr>
<td>Gang Membership Onset ............................................... 30</td>
</tr>
<tr>
<td>Gang Membership Onset as a Turning Point over the Life-Course .................... 31</td>
</tr>
<tr>
<td>The Effect of Gang Membership Onset on Behaviors ......................... 37</td>
</tr>
</tbody>
</table>

vii
Continuation in a Gang .......................................................... 40

Continuation in a Gang as a Pathway over the Life-Course ............... 41

The Effect of Continuation in a Gang on Behaviors .......................... 44

Leaving the Gang ..................................................................... 46

Leaving the Gang as a Turning Point over the Life-Course ............... 47

The Effect of Leaving the Gang on Behaviors ............................... 51

Gang Membership, Illegal Earnings, Drug Sales, and Firearms Carrying .......................... 53

Gang Membership and Illegal Earnings ........................................ 53

Gang Membership and Drug Sales ............................................. 57

Gang Membership and Firearms Carrying .................................... 61

Confounding Factors .................................................................. 65

Conclusions and Limitations of Prior Research ............................... 69

Conclusions of Prior Research ................................................... 69

Limitations of Prior Research ................................................... 69

Research Questions .................................................................... 71

CHAPTER III. METHODS ............................................................ 74

Data ........................................................................ 74

Analytical Sample ..................................................................... 75

Measures ........................................................................... 77

Dependent Variables ................................................................. 77

Main Independent Variables ..................................................... 82

Control Variables ................................................................... 84
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time Varying Control Variables</td>
<td>84</td>
</tr>
<tr>
<td>Time Stable Control Variables</td>
<td>86</td>
</tr>
<tr>
<td>Analytical Strategy</td>
<td>87</td>
</tr>
<tr>
<td>CHAPTER IV. RESULTS</td>
<td>92</td>
</tr>
<tr>
<td>Descriptive Statistics</td>
<td>92</td>
</tr>
<tr>
<td>Multivariate Analysis</td>
<td>94</td>
</tr>
<tr>
<td>Research question no. 1</td>
<td>94</td>
</tr>
<tr>
<td>Research question no. 2</td>
<td>99</td>
</tr>
<tr>
<td>Research question no. 3</td>
<td>101</td>
</tr>
<tr>
<td>Research question no. 4</td>
<td>104</td>
</tr>
<tr>
<td>Research question no. 5</td>
<td>107</td>
</tr>
<tr>
<td>Research question no. 6</td>
<td>109</td>
</tr>
<tr>
<td>Research question no. 7</td>
<td>111</td>
</tr>
<tr>
<td>Research question no. 8</td>
<td>112</td>
</tr>
<tr>
<td>Research question no. 9</td>
<td>114</td>
</tr>
<tr>
<td>Research question no. 10</td>
<td>116</td>
</tr>
<tr>
<td>Research question no. 11</td>
<td>118</td>
</tr>
<tr>
<td>Research question no. 12</td>
<td>119</td>
</tr>
<tr>
<td>CHAPTER V. CONCLUSIONS AND DISCUSSION</td>
<td>123</td>
</tr>
<tr>
<td>REFERENCES</td>
<td>136</td>
</tr>
<tr>
<td>CURRICULUM VIATE</td>
<td>165</td>
</tr>
</tbody>
</table>
# LIST OF TABLES

<table>
<thead>
<tr>
<th>TABLE</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Number of Respondents by Number of Waves Completed</td>
<td>76</td>
</tr>
<tr>
<td>2. Descriptive Statistics of Study Variable</td>
<td>93</td>
</tr>
<tr>
<td>3. Logistic mixed-effects models predicting within-individuals' likelihood of generating income from any illegal activity, drug sales, property crimes, or stealing things from gang membership</td>
<td>95</td>
</tr>
<tr>
<td>4. Linear mixed-effects models predicting within-individuals' amount of income generated from any illegal activity, drug sales, property crimes, or stealing things from gang membership</td>
<td>100</td>
</tr>
<tr>
<td>5. Logistic mixed-effects models predicting within-individuals' likelihood of generating income from any illegal activity, drug sales, property crimes, or stealing things across gang membership transitions</td>
<td>102</td>
</tr>
<tr>
<td>6. Linear mixed-effects models predicting within-individuals' amount of income generated from any illegal activity, drug sales, property crimes, or stealing things across gang membership transitions</td>
<td>105</td>
</tr>
<tr>
<td>7. Logistic mixed-effects model predicting within-individuals' likelihood of selling drugs from gang membership</td>
<td>107</td>
</tr>
<tr>
<td>8. Negative binomial mixed-effects model predicting frequency of selling drugs from gang membership</td>
<td>109</td>
</tr>
<tr>
<td>9. Logistic mixed-effects model predicting within-individuals' likelihood of selling drugs across gang membership transitions</td>
<td>111</td>
</tr>
<tr>
<td>10. Negative binomial mixed-effects model predicting within-individuals' frequency of selling drugs across gang membership transitions</td>
<td>113</td>
</tr>
<tr>
<td>11. Logistic mixed-effects model predicting within-individuals' likelihood of carrying a handgun from gang membership</td>
<td>115</td>
</tr>
<tr>
<td>12. Negative binomial mixed-effects model predicting frequency of carrying a handgun from gang membership</td>
<td>117</td>
</tr>
</tbody>
</table>
13. Logistic mixed-effects model predicting within-individuals' likelihood of carrying a handgun across gang membership transitions ..............................................118

14. Negative binomial mixed-effects model predicting within-individuals' frequency of carrying a handgun across gang membership transitions ..........................120
CHAPTER I
INTRODUCTION

Gangs are considered dangerous, expanding, and evolving criminal organizations that pose a threat to communities in the United States and abroad (Federal Bureau of Investigation [FBI], 2011; Miller, 1975). Gangs are responsible for almost half to ninety percent of violent crimes in many U.S. jurisdictions (National Gang Intelligence Center [NGIC], 2015) and for engaging in numerous violent and nonviolent crimes including murder, rape, human trafficking, financial crimes, and prostitution (NGIC, 2015; Venkatesh, 2008a). It is estimated that in 2012 there were 30,700 gangs (Egley et al., 2014) and approximately 1,059,000 juvenile gang members in the United States in 2010 (Pyrooz & Sweeten, 2015).

Gang members engage in a variety of deviant and criminal activities. These activities include: drug and alcohol consumption (Hagedorn, 1994), violent crimes (Curry, 2000), vandalism (Craig et al., 2002; Fox et al., 2010), illegally carrying firearms (Lizotte, Krohn, et al., 2000; Sheley et al., 1995), and murder (Papachristos, 2009a; Stretesky & Pogrebin, 2007). Gang members also engage in some crimes to generate income. This includes robbery (Bernasco & Block, 2009; Wang, 2002), illegal firearm sales (Knox et al., 1995) and drug sales (Esbensen & Huizinga, 1993; Hagedorn, 2002). In addition to identifying the diversity of gang involvement in crime, researchers have found that both involvement in crime (Lizotte et al., 2000; Thornberry et al., 1993) and
illegal income from crimes varies over an individual’s time in the gang (Augustyn et al., 2019).

It has been established that gang members generate income from some of the crimes they commit (Hagedorn, 1994; Levitt & Venkatesh, 2000; Wang, 2002), and that their level of involvement in those crimes and the amount of income generated from general delinquency vary over time (Augustyn et al., 2019). It also has been established that gang members sell drugs (Thornberry et al., 1993; Venkatesh, 2008a) and carry handguns (Blumstein, 1995; Lizotte et al., 1996), and the frequency with which they do varies over time (Bjerregaard & Lizotte, 1995; Gatti et al., 2005; Tigri et al., 2016). Little research, however, has been devoted to analyzing changes in within-individuals’ likelihood of generating income from specific forms of crime, or in the amount of income they generate as individuals enter a gang, continue in a gang, and leave the gang. Little research has also been devoted to analyzing within-individual’s changes in their likelihood of selling drugs and carrying a handgun as individuals transition through stages in a gang.

The purpose of this dissertation is twofold: first, to address this gap in the literature by using the life-course criminological perspective to explore whether within individuals’ probabilities of generating income from property crimes, drug sales and theft, and the amount of income generated from each of these crimes vary over the course of their gang involvement – entering, continuing, and exiting a gang; and second, to explore whether within individuals’ probabilities of selling drugs and of carrying a handgun, and the frequency in which they commit these activities vary as individuals transition through stages in a gang. While prior research has addressed gang members’
crime involvement in the aggregate and with a specific crime, the crimes included in the current analysis have never been assessed with respect to within-individual changes over the life course of gang involvement in a way that would provide for assessment of the relative involvement of multiple crimes, the relative contributions of specific crimes to income generated and changes in these factors over the individual’s life course.

As previously stated, this dissertation utilizes the life-course perspective in criminology as a framework to analyze within-individuals’ variations in offending as individuals transition through stages in a gang. The life-course is a perspective in which the whole stretch of human life, from birth to death, is important in the explanation of criminal behavior. This perspective examines within-individual changes in criminogenic factors and experiences throughout the life-course that facilitate, or promote, the onset, continuation, and desistance from crime. This perspective conceptualizes the life-course as an intersection among trajectories, transitions, and turning points (Elder, 1998; Farrington, 2003; Sampson & Laub, 2005).

Elder (1998) defined trajectories over the life-course as modes of behavioral continuity that are marked by transitions, and transitions can modify trajectories for the distinct meaning they give to them (e.g. joining the military or having children). Elder (1985, 1998) also stated that turning points are important events in the life-course of individuals that redirect paths and create a discontinuity between the past and the future. Turning points are important because they modify individuals’ identity, social roles, social networks, environments, attitudes, and behaviors, and could potentially re-direct their life in or out of crime (Laub & Sampson, 1993; Sampson & Laub, 2005).
The life-course perspective in criminology is particularly useful for analyzing gang membership and its related activities because joining a gang is a dynamic personal process (Pyrooz, Sweeten, & Piquero, 2013) influenced by a series of individual, social, and environmental factors occurring overtime (Caspi et al., 1987; Decker et al., 1996; Howell & Egley, 2005). In addition, gang membership tends to last for a number of years (Pyrooz, 2014a; Krohn & Thornberry, 2008), and during this time individuals continue to be influenced by factors that promote their continuation (Melde et al., 2012; Thornberry, Krohn, et al., 2003) or desistance from the gang and its related crimes (Densley & Pyrooz, 2019; Giordano et al., 2003; Pyrooz et al., 2013).

From a criminological life-course perspective, gang membership onset, or the process of joining a gang, may serve as a turning point during the life-course as individuals experience a series of transformations conducive to a trajectory of crime and deviance (Graber & Brooks-Gunn, 1996; Krohn & Thornberry, 2008; Melde & Esbensen, 2011, 2014). The turning point of joining a gang is followed by a trajectory inside a gang that ends with another potential turning point when individuals leave the gang. This turning point often involves the former gang member re-experiencing changes in their identity, values, routines, associates, and behaviors geared towards a pro-social lifestyle away from crime (Ebaugh & Ebaugh, 1988; Decker, Pyrooz, & Moule Jr., 2014; Hagan, 1993; Vigil, 1988a).

Researchers have examined gang members’ behavioral outcomes from a life-course criminology perspective (Pyrooz, 2014a; Pyrooz et al., 2014) and have concluded that gang membership, in addition to having a strong association with crime, has detrimental effects on many life events (Bendixen et al., 2006; Morash, 1983;
Thornberry, 1998). Broadly speaking, they have found that gang membership is associated with decreased probabilities of finishing high school (Pyrooz, 2014b), increased probabilities for victimizing others and for experiencing general and violent victimization (DeLisi et al., 2009; Taylor et al., 2007) including sexual assault (Gover et al., 2009) and being shot at (Sickmund et al., 1997). Gang members also are more likely to experience incarceration, poor health (Gilman et al., 2014), drug use (Dukes et al., 1997; Katz et al., 2005), teenage parenthood (Krohn et al., 2011), poor parenting (Augustyn et al., 2014), receiving welfare, illegal income (Gilman et al., 2014) and for having economic difficulties and family problems during adulthood (Krohn et al., 2011).

Within this line of research, a number of scholars also have analyzed gang members’ variations in illegal earnings (Augustyn et al., 2019) and patterns of offending overtime for specific crimes, including drug sales (Hagedorn, 1994), property crimes (Thornberry et al., 1993), and carrying firearms (Lizotte et al., 2000). In one of those studies, Augustyn and colleagues (2019) found that the amount of income gang members generated from criminal activities increased as they entered a gang and stayed in a gang, but then decreased after leaving the gang. Similarly, Hagedorn (1994) observed that as individuals transition out of their gang they sold drugs less frequently, and Bjerregaard and Lizotte (1995) found a similar pattern with handgun carrying. In a different study, Thornberry et al. (1993) found that gang members increased their consumption and sale of drugs overtime, but reduced their levels of general delinquency, and crimes against individuals and property. Understanding these behaviors is important because gang members generate income from several crimes to support their livelihood, gang expenses (Decker & Van Winkle, 1994; Venkatesh, 2008a), and to purchase firearms to protect
themselves (Naranjo, 2015) as their risk for encountering violent and potential deadly situations is prevalent (Adams & Pizarro, 2014; Cooper & Smith, 2012).

Research has established that joining or belonging to a gang is criminogenic—that is, being in a gang places individuals at a higher risk of being involved in crime (Adams & Pizarro, 2014; Curry & Decker, 1998; Thornberry et al., 1997). While it is well-established that gang membership is consistently associated with an increase in criminal behavior, the body of research examining how these behaviors increase, decrease, or desist through the various stages of gang membership is less established. However, a few studies have analyzed the effect of stages of gang membership on the increase and decrease of criminal or deviant behavior. For example, research has demonstrated that individuals’ deviant and delinquent behaviors significantly increase after joining a gang (Bjerregaard & Lizotte, 1995; Melde & Esbensen, 2011) and then decrease after leaving the gang (Melde & Esbensen, 2014). Further, some research has looked at more specific types of behaviors, and it appears that serious and violent delinquency (Krohn & Thornberry, 2008), drug use (Gilman et al., 2014), child maltreatment perpetration (Augustyn et al., 2014), and carrying firearms (Bjerregaard & Lizotte, 1995) increase after joining a gang. In contrast, leaving the gang is associated with a reduction in several crimes, including burglary, arson, shoplifting, drug sales, assault, shooting at someone else (Sweeten, Piquero, & Steinberg, 2013), and carrying firearms (Bjerregaard & Lizotte, 1995). Leaving the gang also is associated with reduced levels of violent victimization, exposure to unstructured activities and to antisocial peers (Sweeten, Piquero, & Steinberg, 2013).
Such is the criminogenic effect of gangs on individuals’ behaviors that Egley et al. (2007) stated: “there is something unique about gang membership itself that increases youths’ participation in serious and violent crime” (p. 224). Scholars have stated that individuals’ offending increases after joining a gang because gangs expose them to a series of conditions that foster criminogenic values and attitudes that promote crime-prone personalities and behaviors in them (Augustyn et al., 2019; Densley & Pyrooz, 2019; Thornberry et al., 1993; Weerman et al., 2015). As individuals stay in a gang, they maintain their high levels of offending because of the continual exposure to factors and environments promoting their antisocial behaviors (Esbensen et al., 2009; Pyrooz et al., 2016). Some of these factors include reduced legitimate job opportunities and prosocial peers (Granovetter, 1977, 1983), association with delinquent peers, commitment to their delinquent peers, drug and alcohol consumption, low guilt and neutralizations associated with their crimes (Esbensen et al., 2009), and reinforcement for their behaviors (Caspi et al., 1987).

On the other hand, individuals’ offending tends to decrease after leaving the gang because they now have more opportunities to be exposed to environments that foster and promote prosocial values, associates, and personalities, and that reduces their association with antisocial peers (Bracken et al., 2009; Rose & Clear, 2003). In sum, gang membership increases individuals’ criminal behaviors.

Gang members are exposed to unique opportunities to engage in illegal activities, including income generating crimes. Although selling drugs might be gang members’ most popular illegal source of income (Nguyen & Loughran, 2017), it is not their only one (Orlando, 1997; Venkatesh, 2008a, 2008b). Gang members also generate income
through check forgery, credit card theft, kidnapping (Huff, 1998), selling stolen property (Valdez, 2007) and many other activities (Venkatesh, 2008b). According to the FBI (2015), in approximately 60% of U.S. jurisdictions street gangs are moderately to highly involved in burglary, in 20% check fraud, counterfeiting, and credit card fraud, in 80% street level drug sales, in 20% extortion, in 40% fencing stolen goods, and in 60% of jurisdictions robbery.

Further, for gang members, carrying firearms is strongly associated with selling drugs and other criminal behaviors (Lizotte et al., 1994). Due to the criminal and dangerous nature of their activities, gang members often carry firearms to protect themselves, their drugs, and their money from potential attacks from other criminals (Blumstein, 1995; Zeoli et al., 2012). Researchers have established that a significantly higher number of gang members have ever carried a handgun compared to non-gang members (Lizotte et al., 1996), and studies reveal that at least 50% of gang members have access to firearms (Hagedorn, 1998; Lizotte et al., 1994), which are gang members’ most common instrument to commit murder (Cooper & Smith, 2012). Research also shows that gang members carry firearms inconsistently overtime (Lizotte et al., 2000; Tigri et al., 2016).

This body of research contributes to the existing knowledge regarding the association between gang membership and individuals’ criminal activities overtime, however, limitations remain. With some exceptions (Augustyn et al., 2019), the relation between transitions in a gang and changes in individual behaviors overtime, if any, is unknown. While researchers have found an association between joining a gang and increased levels of drug sales, crimes against property (Gatti et al., 2005), and carrying
firearms (Bjerregaard & Lizotte, 1995), only Augustyn et al. (2019) have established that joining a gang affects the amount of income individuals generate from criminal activities. Research also has found an association between staying in a gang and increased levels of drug sales and offenses against persons and property (Gatti et al, 2005). Relatedly, leaving the gang has been associated with decreased levels of crimes against property (Gatti et al., 2005), drug sales (Hagedorn, 1994), and carrying firearms (Bjerregaard & Lizotte, 1995).

It is unknown, however, if within-individuals’ likelihood of generating income from specific forms of crime, and the amount of income generated from these specific crimes vary as they enter a gang, continue in the gang, and leave the gang. So, for example, if theft, selling drugs, other property crimes all generate income, does the relative likelihood of generating income from these crimes change over the life course? Does the relative amount of income generated by a specific crime change over the life course?

CURRENT STUDY

The purpose of this dissertation is twofold: first, to advance scholarship on gangs and on the life-course perspective in criminology by analyzing—through a life-course framework—variations on within-individuals’ probabilities of generating income from three types of crime (drug sales, property crimes, theft) and the amounts of income generated from these distinct crimes as they joining a gang, stay in a gang, and leave the gang; and second, to separately analyze variations on within-individuals’ probabilities and frequency of selling drugs and of carrying a handgun as they joining a gang, stay in a gang, and leave the gang.
Results from this dissertation contribute to the knowledge regarding the relation that each stage in a gang has with criminal behaviors in general, and specifically on individuals’ likelihood of generating income from specific crimes, on the amount of income they generate from these crimes, and on the likelihood that individuals have to sell drugs and carry a handgun as they transition through stages in a gang.

To this end, this dissertation uses publicly available data from the National Longitudinal Survey of Youth 1997 (NLSY97). The NLSY97 consists of a national sample of 8,984 males and females born between the years 1980 and 1984 and living in the United States during the initial survey in 1997 (U.S. Bureau of Labor Statistics, NLSY97 Data Overview). Respondents were interviewed annually after 1997 until 2003, and were between 12 and 18 years old during the first wave of data collected, and between 18 and 24 years old in 2003.

STUDY CONTRIBUTIONS

This dissertation contributes in several ways to the existing literature on gangs and the life-course perspective in criminology. First, this dissertation sheds light on the criminogenic influence that gang membership has on individuals’ behaviors as it explores whether just entering a gang influences criminal behaviors, or whether the criminogenic effect that gang membership has on behaviors is influenced by the different stages an individual goes through while in a gang (i.e., entering, continuation, and leaving the gang).

Second, and related to the previous point, this dissertation contributes to the body of literature associated with the life-course perspective in criminology as it illustrates the criminogenic influence that each specific stage in the gang has on within-individuals’
criminal behaviors during their trajectory in a gang. It also assesses whether the turning points that joining a gang (Krohn & Thornberry, 2008; Melde & Esbensen, 2014) and leaving the gang represent (Melde & Esbensen, 2011) affect within-individuals’ probabilities of generating income from specific crimes, the amount of income they generate from them, and/or the likelihood and frequency of selling drugs and of carrying a handgun overtime. This dissertation also examines whether the trajectory of staying in a gang promotes changes in the previously mentioned behaviors. Additionally, the relationship between carrying a handgun and life course changes in gang membership will be examined.

Third, this dissertation builds upon previous research that has analyzed variations in illegal income throughout stages in a gang (Augustyn et al., 2019) by analyzing within-individuals’ likelihood of generating income from specific crimes, and the amount of income they generate from each crime as they transition through stages in a gang. Learning more about this subject is important because gangs generate income from several types of crimes to support their livelihood and their gang expenses (Decker & Van Winkle, 1994; Naranjo, 2015; Venkatesh, 2008a, 2008b). Identifying the likelihood that gang members have to generate income from specific crimes, and the amount of income they generate from them will increase the understanding of the preferences or opportunities gang members have to generate income from those crimes. In addition, analyzing variations in the probabilities of generating income from specific crimes, and in the amount of income gang members generate from those crimes across stages in a gang provides insights regarding the association that each stage in a gang has with
specific forms of offending, and the responsibilities or privileges individuals might have in a gang according to their status.

Fourth, this dissertation builds upon previous studies that have analyzed gang members’ variations in drug sales (Gatti et al., 2005) and carrying firearms overtime (Bjerregaard & Lizotte, 1995) as it analyzes the relation that entering a gang, staying in a gang, and leaving the gang have with within-individuals’ likelihood and frequency of selling drugs and of carrying a handgun. These results will contribute to the knowledge regarding the responsibilities or benefits that gang members receive as they transition through the gang. Moreover, variations in levels of offending may be an indicator of individuals’ levels of commitment and involvement with the gang. As firearms are used in many gang-related crimes, including murder (Papachristos, 2009a), results from this dissertation also will help elucidate when gang members are more likely to carry a handgun to commit a crime, or at what stage in the gang they fear more for their safety, and therefore feel the need to carry firearms.

Fifth, this dissertation—borrowing from the literature on criminology, psychology and related academic disciplines, provides a series of theoretical arguments that explain why within-individuals’ behaviors may vary as they enter, continue, and leave a gang. While gangs related literature has provided important insights regarding the mechanisms that promote changes in behaviors as individuals transition thorough stages in a gang (Krohn et al., 2011; Melde & Esbensen, 2011, 2014), the theoretical arguments presented in this dissertation that promote such changes fill gaps in the existing literature. These new theoretical arguments provide an opportunity for the empirical expansion on the literature on gangs, and on gang membership as a turning point over the life course.
DISSERTATION OUTLINE

This dissertation consists of five chapters. Chapter 1 provides an overview and introduction to the current dissertation. Chapter II discusses the theoretical foundation for this dissertation—the life-course perspective followed by a literature review of gang membership and relevant outcomes. The chapter outlines the main arguments of the life-course perspective in criminology and its association with gang membership. Further, it provides theoretical arguments explaining why gang members’ levels of offending may vary as individuals transition through various forms of gang membership. This chapter also includes an overview of prior empirical research that has analyzed the association between gang membership, sources of illegal income, drugs, and firearms. This chapter also presents the research questions that are examined in this dissertation. Chapter III describes the sample used for the analyses of this dissertation and presents in detail the measures and statistical methods used to answer the research questions presented. Chapter IV presents the results from the statistical analyses performed in this dissertation. Specifically, it presents the descriptive statistics of the sample and of the variables examined, and a series of multivariate mixed-effects models used to answer the research questions posed. Last, Chapter V presents a series of conclusions derived from the results of this dissertation and a discussion of their importance for both theory and practice. This chapter ends with a discussion of the limitations associated with the sample and methods of the study.
CHAPTER II
EMPIRICAL BACKGROUND AND THEORETICAL FRAMEWORK

This chapter has two goals. First, this chapter provides an overview of the life-course perspective and how it is beneficial in attempts to explain the processes that individuals go through as they enter, continue, and leave the gang and to explain why such stages over the life course may affect their levels of offending. Second, it reviews the empirical literature studying gangs, gang membership and the association between gang membership, income generating crimes, and firearms carrying.

THEORETICAL FRAMEWORK - THE LIFE-COURSE PERSPECTIVE

This dissertation utilizes the life-course perspective to analyze within-individual changes in offending throughout different stages in a gang. The first part of this section presents the origins and main tenets of the life-course perspective followed by a discussion of the life-course perspective as applied in criminology. This section is followed by a brief discussion of definitions of a gang and gang membership. This section is followed by life-course explanations of why individuals join a gang, continue in a gang, and leave the gang as well as, why their levels of offending may vary in each one of those stages, and why each one of these stages represent a stage over the life-course. Lastly, the final part of this section discusses, from a life-course perspective, the effect that entering a gang, staying in a gang, and leaving the gang has on individuals’ behaviors.
THE LIFE-COURSE PERSPECTIVE

The first calls for the study of longitudinal life histories began over a century ago (Thomas & Znaniecki, 1919) and gave rise to the life course perspective as an academic field of study. It is important to mention that the life course’s conceptual framework is rooted in the sociological tradition of analysis of the Chicago School. This sociological tradition analyzes individuals, groups, and social organizations in specific social situations while considering historical contexts and social changes (Elder et al., 2003). Within this line of thought, Mills (1959) argued that in order to understand individuals’ life and behaviors overtime, researchers needed to take into account the changing social, historical, cultural, political, and economic context in which they lived and that restrained their decisions.

Life-course theory grew out of the early work of Elder (1974), *Children of the Great Depression: Social Change and Life Experiences*. Subsequently, Elder’s work in refining the theory has produced a growing and well-grounded perspective on human behavior. “The life course has emerged over the past 30 years as a major research paradigm. Distinctive themes include the relation between human lives and a changing society, the timing of lives, linked of independent lies and Human agency” (Elder, 1994, p. 1). Elder (1994) credits the concept of life-course theory as originating with Mill’s (1959) publication *The Sociological Imagination* which referenced the “study of biography, of history and of the problems of their intersection within social structure” (Mills, 1959, p. 149).

A series of co-occurring events that happened in the 1950s and 1960s reignited the interest and facilitated the study of life history events. One of those events was the
changing age structure of society. The aging of the U.S. and other populations generated interest in the study of elders and in how their late life events were connected to their early life events (Elder et al., 2003).

Another related factor that reignited and facilitated the study of life history events was the maturation of individuals who had taken part in studies during their childhood. Psychologist like Macfarlane (1938) and Terman and Oden (1959) who had collected data to analyze developmental patterns of children continued to collect data from members of their original samples well into their adulthood. These longitudinal studies contained data from individuals’ childhood and more recent data regarding their education, work, marriage, and parenthood (Jones et al., 1971; Terman & Oden, 1959). Studies with these individuals had unique information as these people had lived through historic events (e.g. World Wars, Vietnam, the Civil Rights Movement), and their data allowed researchers to analyze how these events had influenced their lives (Elder et al., 2003). Each cohort of individuals has valuable and unique information as is marked by the unique characteristics of their generation (Ryder, 1985).

Relatedly, the systematic collection of longitudinal data in the 1960s (e.g. National Longitudinal Survey of Older and Young Men, and the National Longitudinal Survey of Mature and Young Women) (Moen et al., 1992; Pavalko & Smith, 1999; U.S. Bureau of Labor Statistics, National Longitudinal Surveys) gave researchers the opportunity to study the life history of individuals and their trajectories of behavioral stability and changes across stages in their life beyond the developmental processes of childhood (Elder, 1994; Elder et al., 2003).
Elder (1985) defined the life-course as the “pathways through the age differentiated life span,” where age is manifested in expectations and options that shape life stages and transitions. Elder (1975) considered that age graded transitions were embedded in social institutions that were subjected to historical changes. Similarly, Caspi et al. (1990) defined the life-course as a “sequence of culturally defined age-graded roles and social transitions that are enacted over time” (p. 15).

Trajectories and transitions are characteristics of the life-course perspective. Trajectories are long-term pathways of development over the life-course that cover numerous interconnected life domains, which could potentially influence each other (Elder, 1998). One’s experience with school, work, criminal justice involvement, military service, marriage, and parenthood are examples of trajectories. Trajectories are marked by transitions or changes. Transitions are short-term events—some of which are age graded—that are imbedded in trajectories. Finishing school, gaining employment, going to prison, enlisting in the military, getting married, and having children are transitions or events that can change life trajectories (Sampson & Laub, 2005). According to Elder (1985, as cited in Laub & Sampson, 1993), the natural intersection of trajectories and transitions can generate turning points, or meaningful changes in the life-course of individuals. The way individuals adapt to turning points will influence their future pathways.

Turning points generate discontinuities in identity, social roles, social networks, environments, attitudes, and behaviors, and could potentially re-direct individuals’ lives in or out of crime (Graber & Brooks-Gunn, 1996; Laub & Sampson, 1993; Rutter, 1996; Sampson & Laub, 2005). Institutional or structural turning points have the potential to
significantly alter paths in the life-course because they involve new situations that “knife off” the past from the present, and provide both supervision and monitoring, as well as new opportunities for social support and growth. They also provide change and structure in routine activities, as well as opportunities for identity transformations (Sampson & Laub, 2005).

The lack of research and theoretical models analyzing how and why early life events affected later life events and how those events were influenced by environmental factors keep researchers from understanding “how people lived their lives from childhood to old age, […] and how their life pathways influenced the course of development and aging” (Elder et al., 2003, p. 4). Today the life course perspective has transcended disciplinary boundaries and is used in sociology, social psychology, medicine, education, and criminology.

Perhaps the two academic disciplines that have led the theoretical and methodological development of the life course perspective are sociology and psychology. Sociologists, since the 1960s, have used the life course perspective to study lives and families and their theoretical works have contributed, among other themes, to the development of family theoretical frameworks. Developmental psychologists also have used the life course perspective to expand their work beyond the traditional constrains of age (e.g. childhood or adulthood) (Goulet & Baltes, 2013; Baltes & Schaie, 1973). The work of both sociologists and psychologists also has contributed to the development of methods used to study life history events. Specifically, their work has contributed to the development of time allocation studies, cohort analysis, and methods to collect, retrieve,
and analyze longitudinal data to links events and transitions in the life course (Elder et al., 2003).

It is also important to mention that the subjects analyzed from a life course perspective have changed overtime. According to Hogan (2018), early life course studies analyzed themes associated with traditional gender roles. For example, studies related to professional careers, employment, and status attainment were mainly conducted with male samples, and studies analyzing fertility and family cycles only included female samples. More recent life course studies have diversified their samples and the subjects analyzed. For example, within the field of psychology researchers have explored the effect of traits, goals, social transitions, age-graded roles, changing environments, and life-stories on the development and formation of individuals’ personalities (Caspi, 1987; McAdams & Olson, 2010). Psychologists also have analyzed how individuals’ race/ethnicity, socio economic status (SES), and gender affect their psychological well-being overtime (McLeod & Owens, 2004), and how people’s temperament and personalities affect their prospects of marriage, marriage stability, employment, parenthood, and careers (Caspi et al., 1987, 1988).

Researchers in the field of sociology also have used the life course perspective to examine ways in which changes in individuals’ lives impact several of their life domains. For example, scholars have analyzed whether current patterns of life satisfaction, health, vitality, family engagement, occupational attainment, and civic involvement has an effect on aging styles (Crosnoe & Elder Jr, 2002), and whether education, marital status, employment, income and health explain an increase in depressive symptoms among elders (Clarke et al., 2011). Relatedly, researchers also have examined the effect of work
and parental responsibilities as predictors of marital satisfaction overtime (Orbuch et al., 1996). Sociologists also have analyzed whether individuals’ variations on social and economic statuses overtime affect their’ rates of morbidity and mortality (Pearlin et al., 2005), and whether entering the military at an older age increase the odds of adverse health events later in life (Elder et al., 1994).

Scholars also have used the life course perspective to examine health outcomes. For example, some researchers have used this perspective to analyze how the psychosocial, behavioral, and biological processes occurring overtime influence the risk of chronic diseases later in life (Kuh et al., 2003). Similarly, other researchers have used the life course perspective to examine how childhood health disparities across socioeconomic and racial/ethnic groups affect health risk factors and the emergence of chronic diseases during adulthood (Braveman & Barclay, 2009).

**LIFE-COURSE PERSPECTIVE IN CRIMINOLOGY**

The study and use of the life course perspective as a series of changing and influential events with effects on individuals’ development and aging has been used by several academic disciplines (Bengtson & Allen, 2009; Benson, 2012; Johnson et al., 2011; Lageson & Uggen, 2013; Lu & Halfon, 2003; Sampson & Laub, 2017; Wadsworth et al., 2003). Farrington (2003) argued that developmental and life course criminology evolved from the criminal career paradigm (Blumstein, Cohen, & Farrington, 1988) by seeking to understand how offending and antisocial behavior developed, the effects of life events on the course of development, and the effect of risk factors at different ages. In contrast, the criminal career paradigm was limited to analyzing individuals’ criminal
onset, and their number, order, frequency, and seriousness of crimes committed in a period of time, as well as the factors that influenced the commission of those crimes.

Farrington (2003) also argued that the criminal career paradigm is one of four paradigms composing the developmental and life course criminology perspective. The risk factor prevention paradigm—which seeks to identify risk and protective factors that influence illegal behaviors (Farrington, 2000)—is a second component of the developmental and life course perspective. The other two components of such perspective are developmental criminology and life course criminology.

The life course perspective in criminology (Sampson & Laub, 1993, 2005), similar to developmental criminology perspectives (Catalano & Hawkins, 1996; Farrington, 2003; Moffit, 1993; Thornberry & Krohn, 2001), is interested in the documentation and explanation of within-individual changes in offending overtime. Although these two approaches explain the development of deviant and criminal behaviors overtime, the risk factors that affect individuals at different ages, and the effect that life events have on individuals’ development, they have distinct characteristics.

Developmental criminology is mostly interested in the development of offending and risk factors that influence that offending. Life course criminology, in contrast, is interested in the effects of life transitions and events on individuals’ offending and on developmental and risk factors. (Farrington, 2003). Blokland and Nieuwbeerta (2010) stated that “[l]ife course criminology […] concentrates on within-individual developments in crime over time and recognizes that the causal factors influencing development may shift as the individual progresses along his or her behavioral pathway” (p. 53). In addition to the four “pillars”—as denominated by Blokland and Nieuwbeerta,
— that compose the developmental and life course criminology, Blokland and Nieuwbeerta (2010) argue that there is a fifth pillar in this perspective: life history narratives. Such narratives provide personal accounts from criminal themselves about the processes that explain illegal behaviors overtime, and that developmental and life course theories claim to explain.

A number of theoretical perspectives have been used to explain individuals’ criminal involvement overtime and have contributed to the development of life course criminology (Blokland & Nieuwbeerta, 2010). For example, Sampson and Laub’s (1993, 2003) age graded theory of informal social control argues that crime results because of the absence of appropriate informal social controls (e.g., school, family, employment, marriage) that vary across a person’s life span. In a different perspective, Gottfredson and Hirsh (1990, 1995) stated that individuals’ low level of self-control is the sole cause of their criminal behaviors. In addition, since individuals’ low self-control also is responsible for driving people into criminogenic environments, low self-control is the only cause that can influence offending overtime.

In a different set of perspectives, Moffit (1993) suggested that some juveniles who present adult biological physical characteristics engage in delinquent acts to claim their self-believed “adult” autonomy that is socially granted during adulthood. However, as these individuals age and become legally and socially recognized adults and adopt adult roles, their offending cease as they no longer have a need to claim a mature status by offending. Moffit (1993) also claimed that some individuals who experienced deficient socialization processes during childhood and have neuropsychological deficits will be life course persistent offenders. The combination of these theories suggest that
individuals’ criminal behaviors overtime are influenced by early life events and a combination of both stable and varying individual, social, and environmental factors overtime (Blokland & Nieuwbeerta, 2010).

The life course perspective in criminology shares the same origins as the life course perspective in sociology and psychology. Similar to the development of the life course perspective in these disciplines, a series of studies generated interest in identifying and understanding the factors and dynamics occurring over a person’s life that affected their offending overtime. Perhaps the first study that promoted the development of the life course perspective in criminology was “The Jack-Roller” (Shaw, 1930). This study described the life of a young boy until adulthood, and the many criminogenic and prosocial dynamics and environments he was exposed to during this period. This study also showed how some of those factors served as turning points that lead to trajectories of conforming and criminal behaviors overtime.

The work of Sheldon and Eleanor Glueck (1934a; 1934b; 1937; 1940), in the creation of panel studies, pioneered the longitudinal analysis of the causes of crime and of the factors and interventions that decrease criminal offending overtime. The Gluecks’ (1950) Unraveling Juvenile Delinquency panel study involving 500 delinquent and 500 non-delinquent youth was highly influential in the development of the life course perspective in criminology and instrumental in the formation of the age graded theory of informal social control (Sampson & Laub, 1993). Another panel study that generated interest in the factors that influenced the continuation in criminal behaviors overtime found that 6% of a sample of approximately 10,000 juveniles was responsible for over 50% of crimes committed during the observation period (Wolfgang et al., 1972).
The areas of interest within life course criminology have expanded over time. More recent life course criminology studies have explored the association between emotions and crime (Giordano et al., 2007), the reciprocal association between employment and crime (Lageson & Uggen, 2013), and the importance of job stability and marital attachment as factors to reduce offending overtime (Sampson & Laub, 1990). Relatedly, a series of studies conducted with the Dunedin Multidisciplinary Health and Development Study revealed information about the association between neurocognitive problems, inadequate parenting, social ties, temperament problems and delinquency overtime (Moffitt & Caspi, 2001; Wright et al., 2001).

Criminology scholars also have used the life course perspective to analyze specific issues related to gang involvement. For example, they have analyzed the association between the formation of social capital with the onset, continuation and desistance from gangs (Moule et al., 2013), the pattern of gang membership in the life course (Pyrooz, 2014a), and the effect that transitions in a gang have on individuals’ legal and illegal earnings (Augustyn et al., 2019).

GANG MEMBERSHIP AS A TURNING POINT OVER THE LIFE-COURSE

Many scholars have used the life-course perspective as a framework to analyze gang membership and to explain why joining and leaving a gang serve as turning points over the life-course (Decker et al., 2013; Densley & Pyrooz, 2019; Dong & Krohn, 2016; Melde & Esbensen, 2011, 2014; Moule et al., 2013; Pyrooz, 2014a; Pyrooz et al., 2014). As individuals enter and leave the gang, they experience unique changes in identity, behaviors, routines, activities, and social networks (Augustyn et al., 2019; Densley, 2015;
Sweeten, Piquero, & Steinberg, 2013). The transitions that individuals go through as they enter and exit the gang can have a profound impact on their lives and can lead to paths in and out of crime over their life-course (Krohn et al., 2011; Thornberry, 1987).

Defining Gangs and Gang Membership

Before proceeding, it is important to note that there is a contrast between the life-course perspective and most of the definitions of gangs (Klein, 1971, p. 13, as cited in Bjerregaard, 2002; Miller, 1975) and gang members (Densley, 2014). The life-course perspective conceptualizes the life-course as a series of continuous events intersecting through trajectories, transitions, and turning points (Elder, 1998; Sampson & Laub, 2005). Gang membership, from this perspective, is also characterized by a unique and dynamic personal process filled with experiences occurring overtime as individuals join a gang, continue in a gang, and leave the gang (Augustyn et al., 2019; Decker & Lauritsen, 2002; Ebaugh & Ebaugh, 1988; Decker, Pyrooz, & Moule Jr., 2014; Sweeten, Pyrooz, & Piquero, 2013). Gang membership is not a simple dichotomous category where an individual is or is not a gang member. Similarly, scholars have established that gangs are highly dynamic organizations that experience changes overtime (Leverso & Matsueda, 2019; Venkatesh, 1997; 2008a). The dynamism found in both gangs and gang membership—which include periods of stability and change over time—are characteristics of the life-course perspective. These elements, however, were not properly captured in most of the definitions of gangs and gang membership.

Scholars, legislatures, and social organizations have defined gangs differently across time and space (California Penal Code, 1988; U.S. Department of Justice, About...
Violent Gangs; National Gang Center, What is a gang?; Puffer, 1912). Such definitions have been influenced by historical and geographic contexts (Thrasher, 1955), the media (Morash, 1983), politics (Fernández-Planells et al., 2020), and empirical observations (Miller, 1975). Scholars argue that the media coverage of gangs, which often portrays them as highly criminal organizations, has influenced both the public and policymakers about the extent of gangs’ criminal behaviors, and in turn, the response they have towards them (Hagedorn & Macon, 1988; Miller, 1975).

Scholars have provided numerous elements, concepts and ways of defining gangs over the years (Ball & Curry, 1995; Barak et al., 2020; Decker & Van Winkle, 1994; Densley & Stevens, 2015; Esbensen & Huizinga, 1993; Esbensen et al., 2001; Howell, 1998; Klein, 1991; Sharp et al., 2006; Wolf, 2012). The first scholars defining gangs in the United States considered them as groups of friends who get together to socialize and who also engage in deviant or criminal activities (Puffer, 1912; Thrasher, 1955). Crime, however, was neither a goal nor a necessary condition for the gang to exist.

For example, Puffer (1912) stated that the gang:

while it lasts, is for the boy one of the three primary social groups. These three are, the family, the neighborhood, and the playgroup; but for the normal boy the playgroup is the gang. All three are instinctive human groupings, formed like a pack and flock and hive, in response to deep-seated but unconscious need. (p. 7)

Similarly, Thrasher (1955) considered that juvenile gangs were groups of friends who met together regularly in a place to socialize and to engage in other activities, some of which were deviant. This group of friends had a leader, some members were closer to the group than others, and had roles and responsibilities. In addition, the size of the gang was
relatively small because of its members’ necessity to have face-to-face relations with each other. Thrasher (1955) also stated that conflict surged in gangs as their members have different personalities, compete with each other, and struggle for recognition within the gang. He also argued that individuals in gangs obtained recognition and respect by fighting others and for their involvement in the criminal justice system. Years later, Thrasher (1963) presented a formal definition of gang:

The gang is an interstitial group originally formed spontaneously, and then integrated through conflict. It is characterized by the following types of behavior: meeting face to face, milling, movement through space as a unit, conflict, and planning. The result of this collective behavior is the development of tradition, unreflective internal structure, esprit de corps, solidarity, morale, group awareness, and attachment to a local territory. (p. 46)

A more recent, and one of the most famous definitions of gangs was provided by Klein (1971, p. 13, as cited in Bjerregaard, 2002):

A juvenile gang is any detonable adolescent group of youngsters who (a) are generally perceived as a distinct aggregation by others in their neighborhood; (b) recognize themselves as a detonable group (almost invariably with a group name); and (c) have been involved in a sufficient number of delinquent incidents to call forth a consistent negative response from neighborhood residents, and/or law enforcement agencies.

Another well-known definition of gang was provided by Miller (1975), who defined a gang as “a group of recurrently associating individuals with identifiable leadership and internal organization, identifying with or claiming control over territory in the
community, and engaging either individually or collectively in violent or other forms of illegal behavior” (p. 9).

Moore (1988) also provided a definition of a gang where, similar to the early definitions of gangs, she considered important the role of friendships in these organizations. She stated that gangs:

are a friendship group of adolescents who share common interests, with a more or less clearly defined territory, in which most of the members live. They are committed to defending one another, the territory, and the gang name in the status-setting fights that occur in school and on the street.

More recently, scholars have recognized that gang members also use technology and the media to communicate with each other, and to advertise themselves, their behaviors, and their gang online (McCuddy & Esbensen, 2020; Pyrooz, Decker, & Moule Jr., 2013).

Aware of this situation, and considering that gangs are dynamic social groups, Fernández-Planells et al. (2020) built upon Thrasher’s (1963) definition of gang to provide a new definition of gang:

A (transnational) gang is an interstitial group originally formed spontaneously and later integrated through conflict. It is characterized by the following type of behaviour: face-to-face (and online) encounters, fights (and fun), movement through space as if it were a unit (and searches for intimate spaces), conflicts (and alliances) with similar groups and planning. The result of this collective behaviour is the development of a tradition, a non-reflexive internal structure (and the establishment of rules to regulate exchanges with other gangs and
institutions), esprit-de-corps, moral solidarity, group consciousness and an identity linked to territory (in their homeland, in their new land or in cyberspace. (p. 53, Bolds in original)

This dissertation uses Miller’s (1975) definition of gang as it is the one that most closely resembles the concept of gang provided to respondents of the NLSY97 to assess their gang membership status. This definition has widely been used in the literature on gangs (Ball & Curry, 1995; Brake, 2013; Chesney-Lind & Pasko, 2012; Esbensen et al., 2001; Fagan, 1989; Klein & Maxson, 2010). The NLSY97 defined a gang “as a group that hangs out together, wears gang colors or clothes, has set clear boundaries of its territory or turf, and protects its members and turf against other rival gangs through fighting or threats” (National Longitudinal Surveys. Household and Neighborhood Environment, n.d.). And, while this definition, by its very nature, influences the course of this dissertation research, the intent of the dissertation is to assess factors such as life course transitions that reflect the dynamic nature of gangs as organizations. This dynamic nature is based on the odds of and frequency of engaging in different criminal behaviors as members enter, continue and leave gangs over time.

Defining Gang Members

Similar to the problem of defining gangs, scholars and law enforcement organizations have different methods to identifying gang members and the extent to which they engage in illegal activities. Law enforcement agencies consider gang members those who accept their membership with a gang, among other criteria, which includes wearing certain “gang” colors, having gang tattoos, associating with known gang
members, attending a gang function, and statements from family members (Katz & Webb, 2004). Scholars tend to consider gang members those who self-report their affiliation with a gang (Esbensen & Huizinga, 1993; Thornberry et al., 1993).

From a scholarly perspective, researchers identify gang members based on self-reports (Bjerregaard, 2002). However, capturing the meaning, or meanings, that being a gang member has is not an easy task because such membership is characterized by different experiences, relationships, levels of involvement, duration, identification, transitions, and statuses in a gang (Klein 1971 as cited in Bjerregaard, 2002; Klein & Maxson, 2006, as cited in Pyrooz et al., 2014; Pyrooz et al., 2013). This study considers a gang member “an individual who identified himself or herself as being a member of a gang (such as through verbal statements, tattoos, or correspondence) [...]” (Densley, 2014).

Gang Membership Onset

Gang membership onset is the process of joining a gang (Feavel & Pyrooz, 2014). Gang membership, as many other behaviors during the life-course, has an onset, a period of continuation, and a period of desistance (Pyrooz, 2014a; Decker, Pyrooz, & Moule Jr, 2014). Although the exact percentage of youth who join gangs is unknown, research estimates that between 2-8% of juveniles have joined gangs in the United States at some point (Esbensen et al., 2013; Pyrooz, 2014a; Pyrooz & Sweeten, 2015). Research also indicates there is variation on youth’s age of gang membership onset. Most youth who join gangs do it between ages 12 and 15 years (Decker et al., 1996; Esbensen &
Huizinga, 1993; Pyrooz & Sweeten, 2015). However, some youth join gangs even before turning 11 years old, and some others join gangs as adults in their 20s (Pyrooz, 2014a).

Although a large number of studies have examined different factors that lead youth to join gangs—including the risk factor (Decker et al., 1996; Esbensen et al., 2009; 2010; Farrington & Welsh, 2007; Garduno & Brancali, 2017; Hill et al., 1999; Walker-Barnes & Mason, 2001), interactional (Thornberry, Krohn et al., 2003), and developmental (Howell & Egley, 2005) perspectives—far less research has analyzed the effect that gang membership onset has on individuals’ future behavior, specifically their criminal and delinquent behavior (Augustyn et al., 2019; Bjerregaard & Lizotte, 1995; Gatti et al., 2005; Melde & Esbensen, 2011, 2014). The few studies that have tend to take a life-course approach, suggesting that gang onset can serve as a potential turning point.

Gang Membership Onset as a Turning Point over the Life-Course

Melde and Esbensen (2011) were among the first scholars to claim that joining a gang could serve as a turning point over youths’ life-course because of their potential to redirect their lives into a path of crime. These authors, drawing from the life-course literature (Sampson & Laub, 2005; Elder, 1975; Thornberry, Krohn et al., 2003), stated that youths’ offending is likely to vary after joining a gang because of changes in a series of mechanisms involving their social bonds, levels of monitoring and supervision, routine activities, and identities. Melde and Esbensen (2014) also claimed that changes in mechanisms associated with youths’ peers, their commitment to them and to their school, feelings of guilt, and neutralizations helped explain why gang membership onset increases antisocial behaviors.
As youth join a gang and spend time associating with deviant gang members their identity is influenced and transformed by them in several ways (Little, 2020; Stautz & Cooper, 2014). Such identity transformations are important because they are characteristics of turning points that increase individuals’ offending after joining a gang (Sampson & Laub, 2005). According to Vigil (1988b), gang members have different identities and there is conflict among them. Such identities include: “the ideal (what I would like to be); feared (what I would not like to be); claimed (what I would like others to think I am), and real (what I am)” (p. 151).

As individuals joining a gang they are exposed to expectations of what is feared and idealized in the gang, and to models of behaviors through reputable gang members. Exposure to these expectations and behavioral models may increase individuals’ deviant and delinquent behaviors as they transition from their real self to their ideal self and to their claimed self in order to imitate venerated gang members and earn a good reputation in the gang (Lauger, 2020).

Individuals’ identities are also likely to change after joining a gang because they will consider their gang as a source of community and identity, which in turn will influence their emotions, behaviors, and the way they respond to and interact with their peers and others (Smith et al., 1999). Relatedly, new gang members’ identity will change because of their new roles with their gang, which are to serve the gang’s interest (Thrasher, 1955). According to Melde and Esbensen (2011), the roles youth have with a gang, and identifying with the gang can make new gang members consider themselves impatient and violent.
Another mechanism that explains youths’ increase in offending after joining a gang is related to their weakening of social bonds with society. Sampson and Laub (1993) claimed that “the probability of deviance increases when an individual’s bond to society is weak or broken” (p. 65). Youths’ ties with society are likely to be severed because the time they spend with fellow gang members will limit their opportunities to attach themselves to prosocial individuals and for getting involved in prosocial activities (e.g. family, works, school) (Hirschi, 1974). The limited opportunities youth will have to establish strong social bonds with prosocial individuals and institutions will help explain their increase in offending after joining a gang (Sampson & Laub, 1993).

Investing in new relationships, social interactions, and developing social bonds also are part of the turning point process that influences criminal behaviors and helps explain changes in offending after gang membership onset (Sampson & Laub, 2003). As youth join a gang, they spend time interacting with their gang peers and establishing social bonds with them. These interactions help new gang members be accepted and loved by their peers and obtain attachment security (Rom & Mikulincer, 2003), which increases their support towards their fellow gang members (Mikulincer, 2019). The identification and attachment new gang members feel for their peers and their gang will also push them to engage in socially desirable (Randall & Fernandes, 1991) and expected behaviors compatible with the gang and its culture (Hennigan & Spanovic, 2012).

Another bonding mechanism—not previously discussed in the literature (Melde & Esbensen, 2011, 2014)—that would increase youths’ offending after joining a gang is related to the attachment youth would develop to their gang peers. The idea that
attachment to gang members will increase delinquency might seem to oppose Hirschi’s (1974) argument that attachment is conductive to conformity, not to crime. Hirschi, however, also explained how attachment among those who share deviant cultures would affect individuals’ behaviors. According to Hirschi (1974), attachment to others—even if they are delinquent or gang members—should decrease delinquency because “[t]he essence of internalization of norms, conscience, or superego thus lies in the attachment of the individual to others” (p. 18). Thus, “to lack attachment to others is to be free from moral restraints” (p. 18), which would be conductive to crime. Although Hirschi (1974) claimed that “no good evidence has been produced to show that attachment to peers is actually conducive to delinquency” (p. 84), he further stated that:

Unless delinquent behavior is valued among adolescents, there is no reason to believe that attachments to other adolescents should produce results different from those obtaining from attachments to conventional adults. Predictions about the effects of peer attachments thus hinge on the assumed conventionality or non-conventionality of peers. If the peer "culture" requires delinquent behavior, then presumably attachment would foster conformity— that is, delinquency. (p. 84)

Hirschi’s (1974) work helped explain how attachment to people from different cultures influence individuals’ conformity to those cultures.

Another factor explaining how interactions with gang members would lead new gang members to increase their illegal behaviors is related to the need they have to prove to fellow gang members their worth and commitment to the gang. Those demonstrations of commitment include initiation rites (Best & Hutchinson, 1996; Descormiers & Corrado, 2016) and engaging in violence, such as gun fights, where gang members kill
rival gang members and face the risk of getting shot at for their gang and their peers (Stretesky & Pogrebin, 2007). New gang members who want to make a name for themselves inside and outside of their gang may also take the initiative to increase their involvement in antisocial and violent behaviors (i.e. fights, carrying a handgun, shooting at rival gang members) to let others know that these individuals are to be feared. The level of strain youth new to the gang may experience to be accepted by their gang peers and make a name for themselves may also influence their disposition to engage in behaviors that are desirable within the gang (Agnew & White, 1992).

Learning and accepting deviant values and behaviors is also part of the interaction and socialization process involved in the turning point that gang membership onset represents and that increase youths’ offending. As youth enter a gang and associate with gang members, they learn and develop positive definitions towards the gang (Winfree Jr, Bäckström, & Mays, 1994; Winfree Jr, Mays, & Vigil-Bäckström, 1994). Newly gang involved youth also learn to commit crimes by imitating criminal behaviors modeled by other gang members (Bandura & Walters, 1977) and because they receive positive reinforcement for engaging in those behaviors (Akers, 1998; Winfree Jr, Bäckström, & Mays, 1994). These youth also learn the motives, rationalizations, and attitudes to commit crime, and develop positive definitions about crime, antisocial values and behaviors because they are exposed to an environment where these features are desirable and positively reinforced (Akers, 1998; Burgess & Akers, 1966; McCarthy & Hagan, 1995; Stodolska et al., 2019; Sutherland, 1939). This environment also helps youth form their new criminogenic identity that distances them from pro-social values and institutions (Augustyn et al., 2019; Densley & Pyrooz, 2019; Weerman et al., 2015).
Relatedly, because youth new to the gang spend time with deviant peers where they are exposed to antisocial values and behaviors, they spend less time with family members, school, and prosocial peers who display prosocial values and behaviors (Melde & Esbensen, 2014). The higher ratio of exposure to antisocial over prosocial values and behaviors also helps explain why youths’ set of values and behaviors become antisocial after joining a gang (Sutherland, 1939). It is important to mention that the acceptance and internalizations of these values and behaviors comes natural to these youth as they see the gang as their world and their status in other groups is irrelevant to them. In addition, as youth join gangs their commitment is to their delinquent peers and the gang and no longer to social institutions like school (Melde & Esbensen, 2014; Thrasher, 1955).

Changes in levels of supervision are another characteristic of turning points that help explain variations in offending after gang membership onset. Changes in supervision may affect youths’ offending because they influence the behaviors youth engage in and who they associate with (Sampson & Laub, 2005). As youth spend more time with gang members after joining the gang, the level of supervision exerted on them by family and other prosocial institutions is reduced. The lack of supervision youth experience, added to the time spent with delinquent gang members, will increase youths’ deviant behaviors as there is no authority figure discouraging them from doing so (Haynie & Osgood, 2005, Warr, 1993, 1998). To the contrary, new gang members gain access to unstructurred activities where alcohol, drugs, sex, and opportunities to engage in crime are available (Cepeda & Valdez, 2003; Stodolska et al., 2019; King et al., 2013) and become part of their new routine (McCarthy & Hagan, 1995).
Changes on levels of supervision could be manifested in the absence of capable guardians that would prevent youth from engaging in antisocial behaviors (Boeringer et al., 1991; Payne & Salotti, 2007). The absence of capable guardians combined with youths’ disposition and opportunities to engage in delinquent behaviors (King et al., 2013) would also help explain why youths’ levels of delinquency increase after gang membership onset (Cohen & Felson, 1979).

In sum, the social, personal, behavioral and emotional changes youth go through after joining a gang constitute a turning point in their life that disengages them from prosocial environments, increase their delinquency, and sets them on a trajectory of crime (Laub & Sampson, 1993; Melde & Esbensen, 2011, 2014; Thornberry, Krohn et al., 2003).

The Effect of Gang Membership Onset on Behaviors

Only a few studies have analyzed change in behavior as individuals enter a gang (Augustyn et al., 2019; Bjerregaard & Lizotte, 1995; Gatti et al. 2005; Melde & Esbensen, 2011, 2014). The limited studies that have specifically analyzed the effect of gang membership onset on individuals’ behaviors have found that entering a gang increases several forms of criminal offending, including property crimes, drugs sales, substance use (Gatti et al. 2005), and gun ownership (Bjerregaard & Lizotte, 1995). In line with the mechanisms underlying the gang onset-offending association, joining a gang is also associated with increased levels of unstructured socializing and association with delinquent peers, and decreased parental monitoring, school commitment, and feelings of guilt (Melde & Esbensen, 2014). Moreover, researchers also have found that gang
membership onset has direct and indirect effects on behaviors (Augustyn et al., 2019; Melde & Esbensen, 2014).

In a study analyzing delinquent behaviors across different stages in a gang, Bjerregaard and Lizotte (1995) examined longitudinal data from the Rochester Youth Development Study and found that the percentage of current gang members who engaged in drug sales and several forms of delinquency (i.e. gun, serious, general, and street delinquency) was significantly higher than among future gang members, suggesting that joining a gang increase levels of offending. These authors also found that the percentage of youth who had a gun for protection and who carried a gun was higher among current gang members than among future gang members. These relations, however, were not significant. Similar conclusions were drawn by Gatti et al. (2005) after analyzing three waves of data from a sample of Canadian youth. These researchers found that youths’ drug use, drug sales, property and person offenses increased from the first wave of observations when they were not in a gang (age 14), to the second (age 15) or third (age 16) wave of observation after joining a gang.

In a study analyzing the direct and indirect effects that gang membership onset had on levels of income, Augustyn and colleagues (2019) found that as individuals joined a gang their legal earnings decreased and their illegal earnings increased. According to these authors, joining a gang had no direct effects on changes in legal or illegal income. However, entering a gang had indirect effects on both decreasing legal income through incarceration, and increasing illegal earnings through delinquent peers and drug use. Said differently, changes in income did not occur just because youth joined a gang. Instead,
changes in mechanisms associated with their incarceration, associates, and drug consumption explained variations in legal and illegal income after joining a gang.

Melde and Esbensen (2011) also examined the direct and indirect effects that gang membership onset had on delinquency by analyzing three waves of data from a school-based program. They concluded that gang membership onset had a direct effect of 42% increasing delinquency, and an indirect effect of 40% through decreasing feelings of guilt, and increasing techniques of neutralization, unstructured socializing, delinquent peers, and anger identity. Melde and Esbensen (2011) also concluded that the effect of gang membership onset on delinquency did not last long. Similar to the findings from Augustyn et al. (2019), this study also found that mechanisms associated with youths’ morals, identity, levels of supervision, and associates contributed to higher levels of delinquency.

Expanding upon their previous (2011) work, Melde and Esbensen (2014) analyzed longitudinal data from the Gang Resistance Education and Training (G.R.E.A.T.). Similar to their previous results, these authors found that as individuals joined a gang their social peers, school commitment, feelings of guilt, and parental monitoring were reduced compared to periods where they were not in a gang. Joining a gang also increased violent neutralizations, negative peer commitment, unstructured socializing, peer delinquency, and anger identity. Moreover, gang membership onset also explained an increase in delinquency after controlling for these time-varying factors associated with turning points.
Continuation in a Gang

Continuation in a gang can be understood as the process of persisting in a gang over a period of time (Pyrooz, Sweeten, & Piquero, 2013). Research indicates that there is variation in the length of time gang members stay in a gang. Although most youth who join gangs stay in them between one (Hill et al., 2001) and two years (Pyrooz, 2014a; Krohn & Thornberry, 2008), some youth stay in them for as little as one day (Melde et al., 2012) while others stay for five years or more (Pyrooz, Sweeten, & Piquero, 2013).

Before proceeding, it is important to mention that the literature on gangs lacks a framework defining the time that must pass or the conditions that must be met to differentiate between “new gang members” from those who “stayed” or “continued” in a gang. Some scholars have used six months as the period to separate these categories (Augustyn et al., 2019; Esbensen et al., 2012; Pyrooz et al., 2013).

Although some studies have examined factors and perspectives that lead youth to continue in gangs (Hill et al., 2001; Melde et al., 2012; Pyrooz et al., 2013; Thornberry, Lizotte et al., 2003), far less scholarship has analyzed the effect that continuation in a gang has on individuals’ behaviors (Augustyn et al., 2019; Krohn et al., 2011; Melde & Esbensen, 2014). The studies that have analyzed continuation in a gang have done it within a life-course perspective approach, suggesting that continuation in a gang is a pathway that starts during gang onset and finishes when individuals leave the gang (Pyrooz & Decker, 2011).
Continuation in a Gang as a Pathway over the Life-Course

Pyrooz and Decker (2011) were among the first scholars to declare that gang membership is a pathway that initiates when individuals join a gang and that ends when they leave it. A study conducted by Krohn et al. (2011) concluded that variations in a series of mechanisms that occur during individuals’ path in a gang during adolescence affect their current and future behaviors. These authors, drawing from previous literature (Curry et al., 1998; Hagan, 1997; Hagedorn & Macon, 1998; Vigil, 1988b), stated that such mechanisms are related to gang members’ embeddedness and commitment to the gang, interaction with other gang members, loyalty to them, their human and social capital, and social controls. Melde and Esbensen (2014) also suggested that individuals’ behaviors during their time in a gang may vary by their cumulative and interactional continuity (Caspi et al., 1989).

One of the mechanisms explaining variation in offending as individuals continue in a gang is related to their level of embeddedness in the gang. Pyrooz et al. (2013) applied the concept of criminal embeddedness (Hagan, 1993) to gang membership and stated that embeddedness in a gang “reflects varying degrees of involvement, identification, and status among gang members—the adhesion of the gang member to the gang” (p. 243). Based on this perspective, when individuals are highly embedded in gangs they would have higher levels of offending because they spend more time interacting with delinquent gang members, taking part in gang-related activities, and promoting the gang’s mission and values (Granovetter, 1977, 1983; Hagan, 1993). However, because individuals’ level of embeddedness in a gang vary overtime, variations
in their level of embeddedness would help explain variations in their levels of offending during their path in the gang (Pyrooz et al., 2013).

Changes in the nature and frequency of the interactions that gang members have with their peers may also affect their levels of offending during their path in a gang (Melde & Esbensen, 2014; Randall & Fernandes, 1991; Rom & Mikulincer, 2003). Since it is being argued that gang members’ interactions with gang and non-gang peers affect their behaviors and the attachment they have for them (Hennigan & Spanovic, 2012; Hirschi, 1974; Randall & Fernandes, 1991; Sutherland, 1939), it would be expected that changes in those interactions that occur as individuals continue in a gang would also affect their levels of offending. Changes that occur overtime within a gang (e.g. its members, values, the physical and social environment in which the gang operates) (Sánchez-Jankowski, 2003; Spergel, 1990; Venkatesh, 2008a), and changes in the lives of gang members (e.g. personal life, family, job responsibilities) (Bubolz & Lee, 2021; Pyrooz, McGloin, & Decker, 2017) are likely to affect the time and nature of the interactions gang members have with their peers, and hence of their offending.

Relatedly, it has been established that commitment to a gang and loyalty to fellow gang members can increase gang members’ offending (Descormiers & Corrado, 2016; Stretesky & Pogrebin, 2007). Variations in that commitment is another mechanism that would help explain changes in gang members’ offending as they continue in the gang (Descormiers & Corrado, 2016). Gang members’ commitment to their gang may be influenced by changes in the same mechanisms that would affect their interactions with gang and non-gang peers: changes in their gang (Sánchez-Jankowski, 2003) and in their personal lives (Bubolz & Lee, 2021; Pyrooz, McGloin, & Decker, 2017).
Variations in gang members’ cumulative and interactional continuity is another mechanism that could explain changes in their offending during their path in the gang. According to Caspi et al. (1989), cumulative continuity “arises when an individual’s interactional style with others channels him or her into environments that themselves reinforce that style, thereby sustaining the behavior pattern across the life course through the progressive accumulation of its own consequences” (p. 375). Cumulative continuity could also “arise because dependent persons may recruit and attach themselves to others who will continue to provide the nurturance and support they seek (p. 395).” Relatedly, interactional continuity “arises when an individual's style evokes reciprocal, sustaining responses from others in ongoing social interaction, thereby reinstating the behavior pattern across the individual's life course whenever the relevant interactive situation is replicated (p. 375).” Based on Caspi et al.’s (1989) framework, variations in gang members’ behaviors that channel them into crime, and in their attachment to those who provide them with the reinforcement, nurturance, and support they seek would also help explain variations in their offending as they continue in a gang.

Variations in gang members’ human, social, and criminal capital over their path in a gang is another mechanism that would help explain changes in their offending. The concept ‘human capital’ refers to the health, education, skills, family characteristics, and personality traits that individuals possess and that help them generate economic capital (Becker, 2009). As opportunities to acquire human (Becker, 1994; Ployhart et al., 2011), social (Dominguez & Watkins, 2003; Parcel & Menaghan, 1993), and criminal capital (Bayer, 2003; Bayer et al., 2009; McCarthy & Hagan, 1995; Loughran et al., 2013) vary overtime, it is possible to suggest that changes in the opportunities to acquire and use
those forms of capital will have an impact on gang members’ levels of criminal behaviors during their path in a gang.

Changes in gang members’ social controls caused by changes in their personal lives during their path in the gang is another mechanism that may also affect their level of offending (Hirschi, 1974). Getting married, having a legitimate job, and having children are social control mechanisms (e.g. increased supervision, routine activities, prosocial ties) that can change as gang members continue in a gang and that have the potential to affect their levels of offending (Bersani et al., 2009; Forrest, 2014; Pyrooz, McGloin, & Decker, 2017; Sampson & Laub, 1993; Uggen & Kruttschnitt; 1998; Uggen & Massoglia, 2003).

To summarize, the social, personal, emotional, and environmental changes youth may go through during their path in the gang have the capacity to affect their levels of offending as they continue in the gang (Melde & Esbensen, 2014; Krohn et al., 2011; Loughran et al., 2013; Pyrooz, McGloin, & Decker, 2017; Sánchez-Jankowski, 2003).

The Effect of Continuation in a Gang on Behaviors

Only a few studies have analyzed variations in behavior as individuals continue in a gang (Augustyn et al., 2019; Gatti et al., 2005; Krohn et al., 2011). The limited studies that have analyzed the effect of continuation in a gang on individuals’ behaviors have found that some behaviors remain stable overtime while others increase (Augustyn et al., 2019; Gatti et al., 2005; Melde & Esbensen, 2014).

In a study that examined longitudinal data from the Rochester Youth Development Study (RYDS), Krohn et al. (2011) analyzed the mechanisms that occurred
during gang members’ continuation in a gang and that affected their offending and likelihood of arrest during adulthood. These authors found that as youth stay in a gang they experienced precocious transitions associated with leaving their family home, cohabitation, teen parenthood and school dropout. Changes in these personal-life mechanisms generated economic (i.e., unemployment and decrease income) and family problems (i.e. losing temper, arguments, physical fights), which in turn affected their level of crime and likelihood of arrest during adulthood.

In a similar study, Cepeda et al. (2016) also found that early cohabitation and high school dropout increased heroin consumption as youth continued in a gang. However, age, early nest leaving, and becoming a teen parent decreased their heroin consumption.

On a different study that analyzed the mechanisms associated with variations in earnings, Augustyn et al. (2019) found that continuation in a gang had no direct or indirect effects on legal earnings. Staying in a gang, however, had an effect on the type of individuals these youth associated with and in their behaviors. Continuation in a gang had indirect effects increasing illegal earnings through association with delinquent peers.

In a longitudinal study analyzing gang members’ offending, Gatti and colleagues (2005) found that individuals who reported being in a gang across the three waves examined had stable levels of property offenses and of person offenses (i.e. carrying a weapon, using a weapon against a person, threatening to assault, or assaulting someone). Their levels of drug use, however, increased overtime. Melde and Esbensen (2014) also examined six waves of data from the Gang Resistance Education and Training (G.R.E.A.T) program and found that continuation in a gang had different effects on behaviors. Staying in a gang increased youths’ delinquency and ties with prosocial peers.
Nevertheless, continuation in a gang had no effect on violent neutralizations, levels of parental monitoring, unstructured socializing, peer delinquency, or anger identity.

Leaving the Gang

Leaving the gang can be understood as a process of desistance—or being de-embedded from the gang (Carson & Vecchio, 2015)—that involves deidentifying with the gang, reducing ties with gang associates, and reducing or eliminating criminal opportunities derived from those ties (Pyrooz & Decker, 2011). A common belief suggests that gang membership is for life or that the only way to leave the gang is by being “beaten out” or by committing murder (Carson et al., 2013; Sweeten, Pyrooz, & Piquero, 2013). Researchers, however, have found that most youth leave the gang in the first two years after joining (Pyrooz, 2014a; Krohn & Thornberry, 2008), and without committing murder or experiencing violent victimization (Carson et al., 2013).

Research also indicates that “push factors” are more influential in gang members’ decision to leave the gang than the “pull factors” they experience (Pyrooz & Decker, 2011, Roman et al., 2017). Push factors can be conceived as negative experiences associated with life in the gang that make its members want to leave the gang. In contrast, ‘pull factors’ are positive aspects outside of gangs that encourage individuals to leave the gang (Carson, 2013). Examples of push factors are personal and vicarious victimization (Decker & Lauritsen, 2002), and getting tired of the lifestyle (O’Neal et al., 2016). Examples of pull factors are having a legitimate job, family responsibilities, and prosocial peers (O’Neal et al., 2016; Pyrooz & Decker, 2011). In addition, most youth leave the
gang without facing any hostilities from members of their former gang (Pyrooz & Decker, 2011).

Leaving the Gang as a Turning Point over the Life-Course

Although numerous studies have examined different perspectives and factors that lead youth to leave their gangs—including the “push and pull factors” (Carson et al., 2013; O’Neal et al., 2016), the life-course (Hagan, 1993; Decker & Lauritsen, 2002), the role-exit (Decker, Pyrooz, & Moule Jr., 2014), and the “de-embeddedness” (Pyrooz et al., 2013) perspectives—less research has examined the effect that leaving the gang has on future delinquent and criminal behaviors (Augustyn et al., 2019; Gatti et al., 2005). The few studies that have addressed this issue tend to take a life-course approach, suggesting that leaving the gang can serve as a potential turning point.

Melde and Esbensen (2011) were among the first scholars to claim that leaving a gang could serve as a turning point over youths’ life-course because of their potential to redirect their long term trajectories. According to these scholars, the mechanisms that affect individuals’ criminal behaviors as they enter a gang are the same mechanisms that affect their illegal behaviors as they leave the gang. Such mechanisms involve changes in individuals’ social bonds, levels of monitoring and supervision, routine activities, and identities. Sweeten, Pyrooz, & Piquero, (2013) also argue that changes in individuals’ attitudes, level of gang embeddedness, human agency, as well as social learning and cognitive processes help them reduce their criminal behaviors as they leave the gang.

Identity transformations are part of the turning point that leaving the gang represents and that have the potential to decrease individuals’ offending (Melde &
Esbensen, 2011; Sampson & Laub, 2005; Sweeten, Pyrooz, & Piquero, 2013). As youth leave their gang and spend time associating with non-gang members, their identity would be influenced and transformed by their new group of associates (Little, 2020; Stautz & Cooper, 2014). Such identity transformations (Vigil, 1988b) would be influenced by youths’ new role in prosocial environments and by their desire to fit in and behave in ways that are expected in those environments, which in turn would decrease their level of offending (Melde & Esbensen, 2011; Smith et al., 1999).

Another mechanism related to the turning point that leaving the gang represents and that helps explain youths’ reduction in offending after leaving the gang is related to the strengthening of their social bonds with society (e.g. family, work, school). As youth leave the gang and get involved in more prosocial environments their ties with society are likely to increase (Hirschi, 1974), and hence their offending is likely to decrease (Sampson & Laub, 1993). Research has shown that having a significant other (Decker, Pyrooz, & Moule Jr., 2014; Pyrooz & Decker, 2011; Vigil, 1988b) and having children (Moloney et al., 2009; Navarro, 2021; Pyrooz, McGloin, & Decker, 2017) help gang members leave the gang and cease their offending because of the influence and importance these individuals have for them.

Relatedly, the social bonds that individuals develop with non-gang peers as they leave the gang also have the capacity to influence their criminal behaviors (Sampson & Laub, 2003). Social interactions with prosocial groups would help former gang members feel accepted as part of a group (Rom & Mikulincer, 2003) and motivate them to engage in socially desirable (Randall & Fernandes, 1991) and expected behaviors compatible with the culture of those groups (Hennigan & Spanovic, 2012).
Leaving the gang may also serve as a turning point that helps youth reduce their levels of offending when they associate with prosocial individuals and learn prosocial values and behaviors from them. Former gang members can learn conforming behaviors by imitating them when modeled by their associates (Bandura & Walters, 1977), and by receiving positive reinforcement for engaging in them (Akers, 1998; Winfree Jr, Bäckström, & Mays, 1994). These youth also would learn positive definitions, motives, rationalizations, and attitudes about prosocial behaviors by being exposed to environments where these features are desirable and positively reinforced (Akers, 1998; Burgess & Akers, 1966; McCarthy & Hagan, 1995; Stodolska et al., 2019; Sutherland, 1939). Such environments would also help youth shape their new prosocial identity (Vigil, 1988b) and help them engage in prosocial behaviors compatible with the values of their new group of associates (Randall & Fernandes, 1991).

Additionally, as youth leave the gang and increase their time associating with prosocial peers (Melde & Esbensen, 2014), their exposure to prosocial values and behaviors would also increase. In contrast, the time these youth spend with antisocial individuals and their antisocial values and behaviors would decrease. The higher ratio of exposure to prosocial over antisocial values and behaviors also would help explain why youths’ set of values and behaviors become prosocial after leaving the gang (Sutherland, 1939).

Variations in levels of supervision is another characteristic of turning points that would help explain variations in offending after individuals leave the gang (Sampson & Laub, 2005). When youth leave the gang and spend more time with prosocial peers and family members they would experience higher levels of supervision. Higher levels of
supervision and structured routines of prosocial activities would also help explain why youth reduce their level of offending after leaving the gang (Flanagan et al., 2019; Hughes & Short, 2014).

Another important factor associated with the desistance process from crime is age (Stolzenberg & D'Alessio, 2008). Although age is not a personal, emotional, or social mechanism that promotes desistance from crime, it is biological factor that influence mechanism associated with the turning point of leaving the gang and desistance from crime. Age is related to individuals’ natural process of maturation and involves changes in their psychology, roles, and identity; which influence their work orientation, responsibilities, and self-identity. This process of maturation assists individuals, among other things, to desist from crime (McCuish et al., 2020). Research has established that younger individuals are more likely to associate with deviant peers and to engage in crime (Stolzenberg & D'Alessio, 2008) whereas as older individuals are more likely to associate with more prosocial individuals and acquire adult roles and responsibilities (e.g. work and marriage) that keep them away from crime (Giordano et al., 2003; Pyrooz & Decker, 2011; Sampson & Laub, 2005; Warr, 1998). Since age influence the type of activities individuals engage in and the people they associate with, it also helps individuals to “grow out of crime” (Rutherford, 1986).

While age and changes in all of the mechanisms presented above are related to the turning point process of leaving the gang and can help youth desist from crime, youth also require the right attitude and exert human agency to reduce their offending after leaving the gang (Sampson & Laub, 2005). As Pyrooz et al., (2014) stated, desistance among gang members is about “severing ties with gang associates and thus eliminating
(or reducing) criminal opportunities.” Exerting human agency and having the attitude needed to desist is important because even if former gang members are exposed to prosocial individuals and environments—where they can develop social bonds, that can help them shape their identity, learn and accept prosocial attitudes and behaviors, and that offer prosocial activities and supervision—their level of offending is unlikely to diminish if they continue to have positive attitudes about crime and continue to be engaged with the gang and its associates (Pyrooz et al., 2014; Sweeten, Pyrooz, & Piquero, 2013).

Individuals who leave the gang and seek to decrease their offending would have to define who they want to become and make an active effort to disassociate with the gang, its members, and crime. Such effort would require an ongoing cognitive process of self-evaluation and behavioral changes to achieve consistency between their desired self-identity and their behaviors (Bandura, 1989; Giordano et al., 2002; Paternoster & Bushway, 2009).

The Effect of Leaving the Gang on Behaviors

Studies that have analyzed the association between leaving the gang and behaviors have found that leaving the gang is associated with changes in personal and social mechanisms associated with turning points (Sweeten, Pyrooz, & Piquero, 2013; Melde & Esbensen, 2014). Some of these studies also indicate that leaving the gang is associated with changes in criminal behaviors (Augustyn et al., 2019; Gatti et al., 2005).

For example, Sweeten, Pyrooz, & Piquero (2013) examined whether leaving the gang was associated with changes in personal and social mechanisms associated with the turning point of leaving the gang. They found that as individuals left the gang and de-
embed themselves from it their association with both friends and antisocial peers decreased; the same as their level of victimization, unstructured activities, and offending. Their temperance, however, increased after leaving the gang.

Similar results were found by Melde and Esbensen (2014) after analyzing data from the G.R.E.A.T. program. These authors found that leaving the gang was associated with a decrease in unstructured socializing, negative peer commitment, violent neutralizations, and delinquency. In contrast, Augustyn and colleagues (2019) found no mediating mechanism between leaving the gang and reductions in illegal earnings.

In a study analyzing changes in weapons possession as individuals left the gang, Bjerregaard and Lizotte (1995) concluded that former gang members own fewer weapons for protection, engage less in gun related, serious and street delinquency, and carry firearms less often than current gang members. These scholars also found that although former gang sold drugs, they did it less frequently than current gang members. Similar results were found by Hagedorn (1994), who found that former gang members reduced their involvement in drug sales after leaving the gang.

Gatti et al. (2005) found different results after analyzing changes in behaviors across gang transitions in a sample of Canadian youth. These scholars found that individuals who left the gang reported a reduction in their personal and property offenses and an increase in their drug sales.

Similar to the turning point that gang membership onset represents, the social, personal, behavioral and emotional changes youth go through after leaving the gang constitute a turning point in their life. This turning point, however, has the potential to disengage youth from antisocial environments, help them decrease their delinquency, and
set them on a trajectory away from crime (Laub & Sampson, 1993; Melde & Esbensen, 2014; Sweeten, Pyrooz, & Piquero, 2013; Thornberry, Krohn et al., 2003).

GANG MEMBERSHIP, ILLEGAL EARNINGS, DRUG SALES, AND FIREARMS CARRYING

Both qualitative (Cummings & Monti, 1993; Jankowski, 1991; Papachristos, 2009b; Sullivan, 1989) and quantitative (Augustyn et al., 2019; Thornberry et al., 1993) research studies have analyzed sources of illegal income among gang members. Although some studies describe the many illegal activities of gang members to generate income (Venkatesh, 2008a, 2008b), most of them focus on drug sales (Hagedorn, 1994; Papachristos, 2009b). Studies also have analyzed the role that firearms have within gang membership (Naranjo, 2015), and the frequency with which they carry them (Lizotte et al., 2000). The following section presents a summary of the empirical literature that has analyzed the association between gang membership, drug sales, other illegal earnings, and carrying firearms.

Gang Membership and Illegal Earnings

Gang members earn money through a combination of both legal and illegal opportunities in what is known as “cafeteria-style” earning (Klein, 1984). Having legal and illegal sources of income is common among gang members; and their ability to generate income from these opportunities is related to the social capital they have in both prosocial and delinquent environments.
Social capital is a concept that refers to the social relations that individuals have with others and give them access to the economic and social resources of their social network (Coleman, 1988; Portes, 1998). In contrast, criminal capital is a concept that refers to opportunities for acquiring criminal skills and knowledge through social connections—such as deviant mentors, co-offenders, and peers (Loughran et al., 2013; McCarthy & Hagan, 1995, 2001; Morselli et al., 2006)—that can be conductive to criminal activities, including the acquisition of illegal earnings (Decker & Van Winkle, 1996). Gang members develop criminal capital by associating with criminal individuals (Loughran et al., 2013) in the same manner prosocial individuals develop social capital that can lead to economic resources by associating with prosocial peers (Dominguez & Watkins, 2003; Portes, 1998; Robison et al., 2002).

Gang members deeply embedded in the gangs have limited opportunities to associate with prosocial individuals and establish the social capital needed to succeed in the formal economy because they spend more time with the gang and their deviant peers (Hagan, 1993; Pyrooz, Sweeten, & Piquero, 2013). Gangs, however, provide unique opportunities for acquiring criminal capital as they offer a network of deviant associates and opportunities to learn and engage in deviant activities. Gang members engage in numerous forms of criminal activities to generate income (Decker & Van Winkle, 1994; Venkatesh, 2008a, 2008b).

Morselli and Tremblay (2004) classified gang members’ income generating activities as predatory or market offenses. Predatory offenses are characterized by the involuntary transfer of property (e.g. theft, robbery or burglary) (Naylor, 2003). These offenses tend to generate lower earnings than market offenses such as drug sales, and
their economic success is determined by target selection, frequency of occurrence, and detection avoidance (Cohen & Felson, 1979). On the other hand, market offenses are those in which there is an agreement among producers, sellers, and consumers regarding the sell and purchase of a product and its price. Market offenses are regulated by the supply and demand of a product in the market (e.g. selling drugs or stolen merchandise).

Drugs sales is perhaps the most well-known gang members’ source of income (Nguyen & Loughran, 2017; Orlando, 1997; Van Gemert & Weerman, 2015), however, it is not the only one (Venkatesh, 2008a, 2008b; Orlando, 1997). Gangs members engage in a wide variety of other illegal activities to earn money, including auto theft, shoplifting, check forgery, credit card theft, burglary, kidnapping, robbery (Huff, 1998), the illegal sale of shotguns, handguns, and ammunition cartridges (Knox et al., 1995), selling stolen property (Valdez, 2007), theft (Cloward & Ohlin, 2013; Vigil & Yun, 1990), trafficking drugs, arms and people, smuggling migrants across countries, and committing murder for hire (Fishel & Grizzard, 2005).

Gangs also have been known to rent space in public places and to charge “protection fees” of informal neighborhood vendors—who sell food, cloths, or firearms—in order to keep competitors away, for providing safety to prostitutes, and for assaulting individuals who abuse prostitutes (Venkatesh, 2008a). Gangs also generate illegal income by extorting formal businesses, gypsy cab drivers (Cloward & Ohlin, 2013; Vigil & Yun, 1990; Venkatesh, 2008a), prostitutes and their pimps (O’Leary & Howard, 2001; Venkatesh, 2008a), and from gambling activities (Sánchez-Jankowski, 2003).
In a study analyzing the number of gang members who engaged in numerous forms of income generating crimes, Sheley et al. (1995) found that one percent of gang members only engaged in robbery, two percent only engaged in burglary, six percent only sold drugs, and eight percent only carried a firearm. In addition, eight percent of the surveyed gang members reported carrying a gun and engaging in burglary or robbery, 23 percent reported carrying a firearm and selling drugs, and two percent reported carrying a firearm, selling drugs, and engaging in robbery and burglary. In addition, while some scholars have found that individuals engage in income generating crimes more often when they are in a gang (Hagedorn, 1994), other scholars have found that higher levels of offending do not always occur when individuals are in a gang (Thornberry et al., 1993).

Some research has suggested that gang involvement in income producing crimes varies according to the length of their gang membership. According to Huff (1998), gang members first get involved in property crimes, and after a period of about two years they transition to drug sales and violent crimes. In a more recent study using data from the Pathways to Desistance Study, Augustyn et al. (2019) analyzed seven years of within-individual variations in legal and illegal earnings while accounting for different statuses in a gang. Specifically, these authors analyzed if legal and illegal earnings varied as individuals entered a gang, stayed in a gang, and left the gang. Their analyses revealed that entering a gang had indirect effects on both legal and illegal earnings. Entering a gang reduced legal earnings through incarceration but increased illegal earnings through delinquent peers and drug dependence. Staying in a gang had no effects on legal earnings but increased illegal earnings through delinquent peers. Last, leaving the gang had no effect on legal earnings but a negative direct effect on illegal earnings. These authors
concluded that while gang membership increase illegal earnings, such earnings are for a short time and “does not pay in terms of overall earnings” (Augustyn et al., 2019).

It is important to mention that although gang members consume and sell drugs, and engage in income generating crimes (e.g. robbery, burglary, and theft) more often than non-gang members (Hill et al., 2001), non-gang affiliated individuals also commit a wide variety of crimes to generate income (Agnew et al., 2008; Dhami, 2008; Miller, 1998). Some of those crimes committed by non-gang affiliated individuals include drug sales, prostitution, property crimes (Maher et al., 2002), burglary, mugging, shoplifting, forgery, robbery (Viscusi, 1986), fraud, selling stolen property, and theft (Williams & Sickles, 2002). For example, Nguyen and Loughran (2017) analyzed data from the Pathways to Desistance Study and from the National Supported Work Demonstration Project to examine the amount of earnings that youths generate from engaging in several criminal activities, including burglary, auto theft, and selling stolen property and drugs. These authors found variation in the levels of earnings reported between datasets. Participants from the Pathways to Desistance Study reported weekly earnings of $1,470, and participants from the National Supported Work Project reported weekly earnings of $914. Drug selling was the most commonly income generating crime reported on both datasets.

Gang Membership and Drug Sales

Drugs sales might be gang members’ most common income generating crime, and researchers tend to focus on this activity when analyzing gang members’ illegal sources of income (Hagedorn, 1994; Levitt & Venkatesh, 2000; Thornberry et al., 1993;
Venkatesh, 2008a, 2008b). It is important to state that the association between gangs and drug sales is not fortuitous. According to Hochschild (1989), the economic restructuring of American inner-cities shifted the job landscape from large manufacturing employers to jobs in the suburbs (and overseas) in the service industry in the 1970’s and 1980’s. These changes in employment severely reduced the availability of legitimate jobs and income opportunities among minority youth living in these areas.

Drugs markets, fueled by the scarcity of legitimate job opportunities, became an attractive economic alternative for inner-city youth as the markets provided them with a lucrative source of income with great economic potential (Hales et al., 2006; Sassen-Koob, 1989, as cited in Fagan & Chin, 1990). Because of the numbers of members that gangs have, their organization, and connections to drug suppliers, they rapidly became deeply involved in the commercialization of several narcotics, including crack cocaine, powder cocaine, marijuana, PCP, LSD/mushrooms, heroin, and crystal meth (Block & Block, 1993; Huff, 1998).

A number of studies have analyzed individuals’ levels of drug sales and related income according to their status in a gang. These studies tend to find that there is variation in the amount of sales and income gang members generate from selling drugs (Hagedorn, 1994; Levitt & Venkatesh, 2000).

In a study that analyzed several waves of data collected from the Rochester Youth Development Study (RYDS), Thornberry et al. (1993) examined whether gang members sold drugs and engaged in property offenses more frequently than non-gang members. They also examined changes in offending across different statuses in the gang. Not surprisingly, this study found that gang members sold drugs and engaged in property
crimes more frequently than non-gang members. However, individuals’ highest frequency of involvement in drug sales and property crimes did not always occur when they were in the gang. Gatti et al. (2005) also found among a sample of Montreal youths that gang members sold drugs and engaged more frequently in property offenses than non-gang members across the three years observed. In addition, stable gang members had higher levels of property offenses than transient gang members, and youths’ frequency of selling drugs and of crimes against property increased as they entered a gang. Leaving the gang, however, decreased youths’ levels of property crimes but not of drug sales.

In a related qualitative study, Hagedorn (1994) analyzed the drug related economy using a sample of 236 active and former gang members from Milwaukee, Wisconsin and developed a typology of gang members based on their values and conventional behaviors. This author found that 72% of his respondents had sold cocaine on and off in the last five years. Gang members had an average monthly income of $2,400 from drug sales, but there was great variation in the drug-related income reported. About a third of the sample earned an income similar to working at a minimum wage. In contrast, three individuals from the sample reported earning more than $10,000 for selling drugs in any given month. Approximately 30% of the sample reported working in the legal economy, and 75% of those who reported being currently employed in the legal economy had also sold cocaine in the past 5 years.

Hagedorn’s (1994) typology of gang members included four categories: legits, homeboys, dope fiends, and the new jacks. The legits composed approximately five percent of the sample and were former gang members who had walked out of the gang.
life. They were enrolled in school or working formal jobs, and had never sold cocaine, or at least not in the past five years. The homeboys were unskilled and uneducated African American or Latino adults who wanted to transition to a conventional lifestyle, but their poor employment and salary prospects made it difficult to transition. These individuals were still associating with their gang members, had a stable emotional partner, nearly 60% had held legitimate jobs, and about 50% of them had sold drugs during at least 12 months of the past three years. Over one third of homeboys had served time in jail, and although they considered selling drugs wrong and immoral, they did it because of the money it provided. Dope fiends are gang members who drink alcohol excessively, and who sell and consume cocaine. Although their level of cocaine consumption varied, over 80% of individuals in this category used it at least several times per week. Similar to the homeboys, dope fiends also want legal employment, but their substance consumption habits affect their prospects for it. Last, the new jacks, who were approximately 25% of the informants, sold cocaine as a career and wanted to emulate the life of drug dealers portrayed in the media. Drug selling was their only source of income and lacked intentions of finding legal employment.

In another qualitative study on gangs and drug sales, Levitt and Venkatesh (2000) analyzed several years of drug related financial information from a gang that Venkatesh (2008ab) had studied for years. These authors found that gang members, according to their different ranks in the gang—which included street-level drug sellers, officers, and a gang leader—earned from $140 to $10,900 per month from drug revenues. This gang, considering all of its illegal sources of income, generated $18,500 to $68,400 per month. Although these amounts of money may seem substantial, the drug-derived earnings from
most gang members in Venkatesh’s (2008b) study compared to minimum wages in the formal economy (Levitt & Venkatesh, 2000; Venkatesh & Levitt, 2000).

Fagan (1991, as cited by Hagedorn, 1994) also found variation in the amount of earnings that drug dealing generated among gang members. He found that drug dealing earnings ranged from about $1,000 to nearly $5,000 per month in two Manhattan neighborhoods. Similarly, Papachristos (2009b) found that a gang member in Chicago working a few hours a day selling crack-cocaine can earn $50 daily. This author also stated that the image of life in a gang that is portrayed and glamorized in the popular media as filled with cars and cash is a lie, as many gang members struggle economically and with unemployment.

Although selling drugs seems relatively common among gang members (Hagedorn, 1994, Papachristos, 2009b), research suggests that crime is not the optimal avenue for acquiring wealth (Augustyn et al., 2019), as the income it generates—at least among lower rank gang members—is not substantially higher than the minimum-wage they could earn thorough legal employment (Levitt & Venkatesh, 2000; MacCoun & Reuter, 1992; Papachristos, 2009b; Venkatesh, 2008b).

Gang Membership and Firearms Carrying

Because of gang members’ illegal behaviors (e.g., drug sales, prostitution, auto theft), their possibility of having violent encounters with rival gang members and other individuals is constant (Venkatesh, 2008a). Concerns for self-protection are common among gang members as they use violence to solve drug and territory related disputes.
Gangs acquire and use firearms as a defense mechanism to secure their territory against other drug-selling gangs, to keep customers from buying drugs from other gangs by intimidating them (Naranjo, 2015), and to commit other crimes such as armed robbery (Cepeda et al., 2016; Hureau & Braga, 2018; Wright & Decker, 1997). In a related study, Ratcliffe and Taniguchi (2008) found that violent and property crimes are more likely to occur on street corners used for selling drugs inside a gang’s area, and especially around street corners disputed by two gangs for selling drugs.

Estimates indicate that between 50% (Hagedorn, 1998; Lizotte et al., 1994) and 70% of gang members have access to firearms, which are intended for self-protection (Taylor, 1990, as cited in Bjerregaard & Lizotte, 1995). Research also indicates that shooting a firearm during a gang fight predicts longer duration in a gang (Cepeda et al., 2016).

Studies have analyzed the dangerous situations that gang members face. According to Hagedorn (1998), over 30% of gang members have been shot at on drug related dealings, and 61% of gang members stated that the last three people they have seen get killed were killed for drug related transactions. A more recent study by Cepeda et al., (2016) found that 19% of gang members had been shot at while selling drugs, and 88% of gang members have shot a gun in a gang fight. Thus, the risks that gang members’ encounter might influence their preference for lethal powerful weapons (Huff, 1998).
Venkatesh (2008a) also helps illustrate the potential deadly situations encountered by gang members. In his qualitative work, this author described a scene in which a group of gang members he had been following for years were socializing in front of an apartment building alongside children who were playing sports. Suddenly, the occupants of a car that drove by them started shooting at them. A local gang member was shot in the leg during the drive-by shooting and taken to the hospital. The gang members who were attacked pulled out their firearms to defend themselves in case there was another drive-by shooting against them. Ralphs et al. (2009) also indicated that drive-by shootings against rival gangs, and even against people who are not affiliated with gangs are common in areas controlled by gangs.

Firearms are commonly used in gang-related homicides (Adams & Pizarro, 2014; Block & Block, 1993). According to Block & Block (1993), firearms were used in almost all street-gang homicides in Chicago over a 25-year period from 1965 to 1990. Data from Los Angeles police and sheriff’s departments revealed that firearms were used in 91% of all gang-related homicides in that city between 1983 to 1985, compared to 64% of non-gang related homicides (Klein et al., 1991). More recent studies corroborated previous findings, as they found gang homicides are more likely to be carried out with a firearm (91%) than non-gang homicides (58%) (Adams & Pizarro, 2014). Such is the case that 92% of gang-related homicides committed in 2008 nationwide were committed with a firearm (Cooper & Smith, 2012).

Carrying a handgun is relatively common among gang members. As gang members are exposed to situations that can turn violent at any given time (Venkatesh, 2008a), and because of the criminal nature of their activities, they cannot ask the police
for protection. Instead, gang members carry firearms to protect themselves against robberies and attacks from other gang members and drug dealers (Adams & Pizarro, 2014; Blumstein, 1995; Blumstein & Cork, 1996; Zeoli et al., 2012).

It is estimated that a significant number of gang members (between 23.5% and 37.6%) have ever carried a handgun compared to non-gang members (between 2.6% and 7.5%) (Lizotte et al., 1996). According to Goldstein et al. (1987), carrying a firearm while conducting illegal activities also increases the fear of getting caught by the police, which increases gang members’ perceived need of protection. Carrying handguns among gang members is also correlated to involvement in other violent crimes and negative life outcomes (Bjerregaard & Lizotte, 1995; Lizotte et al., 1994; Thornberry, Krohn et al., 2003; Tigri et al., 2016).

In a quantitative study analyzing gang membership and firearms carrying, Bjerregaard and Lizotte (1995) analyzed data from the Rochester Youth Development Study and found that a higher percentage of gang members than non-gang members carried a firearm across three waves of data examined. The percentage of gang members who carried a firearm increased from the time individuals were not in a gang to the time they joined the gang, and then declined after leaving the gang. In addition, a lower percentage of former gang members reported carrying a firearm than individuals who had not joined the gang but would in the future compared to those who never joined a gang. Moreover, joining a gang increased a juvenile’s likelihood of acquiring a gun by 27% (Bjerregaard & Lizotte, 1995).

In a more recent study, Tigri et al., (2016) analyzed data from the National Longitudinal Survey of Youth 1997, and found that gang members were significantly
more likely to carry a firearm than non-gang members in the first three of the four waves of data analyzed. Similar results were found by Lizotte et al. (2000) after analyzing eight waves of data from the Rochester Youth Development Project. These authors found that gang members were significantly more likely to carry a hidden firearm than non-gang members inconsistently across the waves of data analyzed. Additionally, those who reported higher levels of drug sales also were more likely to carry a hidden firearm in one of the eight waves of data analyzed.

CONFOUNDING FACTORS

In addition to the factors reviewed above that can influence the outcomes examined in this dissertation as individuals transition through stages in a gang, research indicates that there are many other variables that can influence such outcomes during this period (Bjerregaard & Smith, 1993; O’Brien et al., 2013; Rosenfeld et al., 1999). Some of those variables include the amount of income individuals generate in the legitimate economy (Hagedorn, 1994), whether they have children or not (Pyrooz, McGloin, & Decker, 2017), and whether they have family or friends in a gang (Winfree, Bäckström & Mays, 1994). The following paragraphs will review a series of variables that could affect individuals’ levels of involvement on the dependent variables examined in this dissertation.

The effect of age on deviant and illegal behaviors is commonly analyzed in the criminology and in life-course literature (Farrington, 1986; Gottfredson, 2017; Gove, 2018; Sampson & Laub, 2017). Studies analyzing the effect of age on criminal behaviors have found that crime tends to peak during adolescence and declines thereafter (Loeber et
Research analyzing samples of gang members also have found that age influence youths' level of offending overtime (Melde & Esbensen, 2013; Smith & Bradshaw, 2005).

As previously stated, some gang members generate income through both legal and illegal means (Augustyn et al., 2019; Hagedorn, 1994; Klein, 1984). Having a legal source of income is important for gang members as that money may help them reduce their need to generate income from criminal activities to cover their livelihood expenses (Hagedorn, 1994; Knox et al., 1995). School enrollment is another factor that may affect individuals’ levels of offending on the variables examined in this dissertation as they transition through stages in a gang. Being enrolled in school reflects individuals’ commitment to conventional values (Thornberry, 1987), and the education they acquire while in school increase their odds of having access to legitimate economic opportunities and to develop social capital (Coleman, 1988; Mincer, 1974). Additionally, not being in school is associated with the commission of violent behaviors and of stealing things (Jarjoura, 1993).

Having children and getting married may also influence individuals’ levels of offending across stages in a gang (O’Neal et al., 2016; Pyrooz, McGloin, & Decker, 2017). These variables may help gang members develop prosocial ties and change their activities and routines into prosocial ones (Bersani et al., 2009; Uggen & Massoglia, 2003). Marriage may also expose individuals to higher levels of supervision and prosocial environments.

Another factor that could influence individuals’ levels of offending over their time in a gang is related to the level of urbanicity where gang members live. Urban gangs
display more signs of aggression than rural gangs (Evans et al., 1999), are considered a feature of low-class areas (Bannister & Fraser, 2008; Hagedorn & Macon, 1988), and are more likely to experience poverty and violence (Tolan et al., 2003). In addition, racial minority urban gang members are also more likely to experience racial segregation (Adamson, 2000), which could lead to strain and crime (Agnew & White, 1992).

The number of arrests an individual experience, before, during, or after their involvement with the gang can also influence their involvement on the variables examined in this dissertation because such arrests may deter them from engaging in further crime, and might limit the amount of crime they commit because of incapacitation (Braga, 2017; Kent et al., 2000; Levitt, 1998; Piquero & Blumstein, 2007; Thornberry et al., 2018). Using marijuana may also affect the dependent variables examined as this activity has been associated with increased odds of carrying a gun on school property (Durant et al., 1999), and has been linked to property and drug related crimes (Green et al., 2010), fights (Pearson et al., 2017) and other forms of delinquency among gang members (Bjerregaard, 2010; Bjerregaard & Smith, 1993; Thornberry, Krohn et al., 2003).

Whether gang members attack other individuals or get into fights with them could also influence involvement in the outcome variables examined. Fights with rival gangs can influence individuals’ decision to carry a handgun for protection, the frequency with which they engage in income generating crimes on specific geographic areas, and the income generated from those activities (Adams & Pizarro, 2014; Cepeda et al., 2016; Fagan, 1989; Howell, 1999; Levitt & Venkatesh, 2000; Ousey & Lee, 2002, 2004).
Having peers or family members in gangs may also increase youths’ levels of offending as they transition through stages in a gang. Research conducted by Winfree Jr., Bäckström, and Mays (1994) and by Winfree Jr., Mays, and Bäckström (1994) found that associating with peer gang members influenced youths’ group context crimes (e.g., taking part in fights involving more than two people, and shooting at someone). Both of these studies found that associating with gang members had no effect on self-reported theft.

Individual’s gender may also influence the outcome variables analyzed in this dissertation. Research indicates that males gang members earn more money from criminal activities than female gang members (Augustyn et al., 2019). Male gang members also sell drugs, engage in property and personal crimes (Esbensen & Winfree, 1998), and in violence more often than female gang members (Esbensen, 2010). Other crimes committed more often by male than female gang members include carrying hidden weapons, attacking someone with a weapon, armed robbery, fights, and shooting someone (Esbensen et al., 1999).

Gang members’ race/ethnicity is also important when analyzing their criminal behaviors because some studies have found that gang members from certain races/ethnicities engage in certain crimes more often than gang members from other races/ethnicities (Esbensen & Winfree, 1998; Lyon et al., 1992). For example, Lyon and colleagues (1992) found that white gang members, compared to Hispanics, had higher levels of general and home delinquency. Similarly, Esbensen & Winfree (1998) found that white gang members had the highest rate of property crimes, drug sales, and drug use, whereas African-Americans had the highest rate of crimes against a person, and the
lowest rate of drug use. In contrast, Hispanics had the lowest rate of property crimes, and Asians had the lowest rate of crimes against a person and of drug sales. Other studies, however, have found no differences between gang members’ criminal activities by race/ethnicity (Esbensen, 2010; Winfree, Mays, & Vigil-Bäckström, 1994).

CONCLUSIONS AND LIMITATIONS OF PRIOR RESEARCH

Conclusions of Prior Research

The review of the literature that has analyzed the association between gang membership, income generating crimes, drug sales, and firearms offers two broad conclusions. First, this literature indicates that gang members engage in numerous income generating crimes (Venkatesh, 2008b), there is variation in the frequency with which they engage in these crimes (Sheley et al., 1995), and in the income they generate from them (Augustyn et al., 2019; Hagedorn, 1994). Second, gang members carry firearms more often than non-gang members (Sheley et al., 1995), and there is variation in their frequency of carrying them (Lizotte et al., 2000).

Limitations of Prior Research

The empirical literature that has analyzed the association between gang membership, income generating crimes, drug sales, and firearms offers important insights about gang membership and its relationship with specific crimes. Nevertheless, it is not without limitations. The following paragraphs will describe four major limitations identified in the empirical literature reviewed for this dissertation that limit the strength of the conclusions from this body of work.
First, some of the studies that have analyzed gang members’ involvement in distinct forms of income generating crimes have been conducted with relatively small samples drawn from a small geographic area (Hagedorn, 1994; Levitt & Venkatesh, 2000). With some exceptions (Augustyn et al., 2019), the question of whether large samples of gang members from different parts of the country engage in distinct forms of income generating crimes, and whether they derive income from them has received practically no attention.

Second, no research has analyzed individual variations in the likelihood of generating income from specific types of crime, and the amount of income they generate from those crimes as individuals go through different statuses in a gang. Scholars have provided estimates of the amount of money gang members generate from selling drugs (Levitt & Venkatesh, 2000; Hagedorn, 1994) or for engaging in a group of illegal activities (Augustyn et al., 2019), but have not explored gang members’ likelihood of generating income derived from property crimes or from stealing things.

Last, some prior studies have been conducted analyzing percentages and means. For example, Bjerregaard and Lizotte (1995) compared, in three waves of data, the percentage of individuals who carried a gun according to their status in a gang. They observed that carrying a gun was more common among gang members than among future or former gang members. Similarly, Thornberry et al. (1993) analyzed differences of means, and Gatti et al. (2005) used multivariate analysis of variance to examine changes in levels of delinquency across observation periods. Conclusions drawn from studies analyzing data with percentages and means are not very informative as they do not state the direction or size of the effect that the independent variables have on the dependent
variables. Moreover, the association between two variables oftentimes changes when analyzed in multivariate statistical models due to the nature of this form of analysis which provides greater ability to address the influence of multiple variables simultaneously.

More methodologically sound studies have examined the odds of carrying a firearm across waves of data while controlling for confounders (Lizotte et al., 2000; Tigri et al., 2016). These studies, however, omitted significant potentially confounding variables (e.g. employment status, levels of parental supervision, future expectations, victimization, arrests, level of education, violent behaviors) that could mediate the association between gang membership and the outcome variables examined.

This dissertation addresses some of these gaps in the literature while overcoming some of its limitations by analyzing—using multivariate statistical methods—data from a national and relatively large sample of individuals regarding the amount of income they generate from three forms of crime, as well as their likelihood and frequency of selling drugs and carrying a handgun as they transition through stages in a gang.

RESEARCH QUESTIONS

The 12 research questions that this dissertation seeks to answer are:

1) Do individuals’ probabilities of generating income from selling drugs, for engaging in property crimes, for theft, or for engaging in any of those activities combined vary after becoming gang members? This research question is explored using logistic mixed effects models (equation number 1 listed below).

2) Do individuals generate different amounts of income from the crimes mentioned in question number 1 after becoming gang members? This research
question is explored using linear mixed effects models (equation number 3 listed below).

3) Do individuals’ probabilities of generating income from the crimes mentioned in question number 1 vary after they enter a gang, continue in the gang, and leave the gang, that is, over the life-course of gang membership? This research question is explored using logistic mixed effects models (equation number 2 listed below).

4) Do individuals generate different amounts of income from each of the crimes mentioned in question number 1 as they transition through different statuses in a gang, that is, over the life-course of gang membership? This research question is explored using linear mixed effects models (equation number 4 listed below).

5) Do individuals’ probabilities of selling drugs vary after they become gang members? This research question is explored using logistic mixed effects models (equation number 1 listed below).

6) Do individuals’ frequency of selling drugs vary after they become gang members? This research question is explored using negative binomial mixed effects models (equation number 5 listed below).

7) Do individuals’ probabilities of selling drugs vary after they enter a gang, when they continue in a gang, or after they exit the gang, that is, transition through life-course changes in gang membership? This research question is explored using logistic mixed effects models (equation number 2 listed below).

8) Do individuals’ frequency of selling drugs vary after they enter a gang, continue in a gang, or exit the gang? This research question is explored using negative binomial mixed effects models (equation number 6 listed below).
9) Do individuals’ probabilities of carrying a handgun vary after joining a gang?  
This research question is explored using logistic mixed effects models (equation number 1 listed below).

10) Do individuals’ frequency of carrying a handgun vary after joining a gang?  
This research question is explored using negative binomial mixed effects models (equation number 5 listed below).

11) Do individuals’ probabilities to carry a handgun vary after they enter a gang, when they continue in a gang, or after they exit the gang, that is, over the life-course of gang membership? This research question is explored using logistic mixed effects models (equation number 2 listed below).

12) Do individuals’ frequency of carrying a handgun vary after they join a gang, continue in a gang, or exit the gang, that is, over the life-course of gang membership? This research question is explored using negative binomial mixed effects models (equation number 6 listed below).
CHAPTER III
METHODS

DATA

Data analyzed in this dissertation is publicly available and comes from the National Longitudinal Survey of Youth 1997 (NLSY97). The NLSY97 is a panel study of a national sample of 8,984 non-institutionalized civilian men and women living in the United States at the time of the initial interview in 1997\(^1\). Youth in the sample were born between 1980 and 1984 and were between 12 and 16 years old as of December 31, 1996. (U.S. Bureau of Labor Statistics [USBLS]. NLSY97 Data Overview).

The NLSY97, which is sponsored by the U.S. Bureau of Labor Statistics (USBLS. Information for NLSY97 and NLSY97 Respondents), gathers information about respondents’ labor market experiences, education, household, family, dating and marriage, income, health, attitudes and expectations, and about their involvement in crime and substance use (USBLS. NLSY97 Data Overview). Interviews for the study were conducted annually from 1997 to 2011, and biennially starting in 2013. The NLSY97 had a total of 18 waves of data available at the time this dissertation was conducted.

\(^1\) Respondents’ interviews are conducted using a computer-assisted personal interview instrument (CAPI), which is administered by an interviewer with a laptop computer. Respondents self-administer sensitive portions of the interview using an audio computer-assisted self-interviewing (ACASI) system that allows them to enter their answers into the computer instead of sharing them with the interviewer. Interviews may also have been conducted by phone due respondents’ location or because of their unwillingness to be interviewed in person (National Longitudinal Surveys, Interview Methods).
The NLSY97 sample incorporates two samples gathered independently from one another. The first of consists of a cross-sectional sample of 6,748 youth in the U.S., and the second one is a supplemental oversample of 2,236 Black and Hispanic youth (National Longitudinal Surveys [NLS]. Sample Design & Screening Process). The NLSY97 includes a similar percentage of males (51.1%) and females. Most NLSY97 respondents are white (51.8%), and followed by Black (26.2%), Hispanics (21.1%) and respondents of other races (0.9%) (USBLS. NLSY97 Data Overview).

The NLSY97 was selected for the analyses of this dissertation for two reasons: first, this dataset provides information about respondents’ gang membership, participation in a number of income generating crimes, firearm carrying, substance use, among other variables of interest (e.g. legal income, marriage, parenthood, and education). Second, the panel nature of these data allows for the analysis of respondents’ information over several years making it possible to estimate the within-individual relationships between gang membership and a series of outcome variables as well as to apply the life course perspective.

ANALYTICAL SAMPLE

This analysis will use the full sample of NLSY97 for the dissertation analysis (n = 8,984). Only cases with a complete set of responses per wave on the variables of interest are included in the analyses. Cases with missing responses were deleted from the sample as well as those cases who stated being in a gang on wave 1. Cases who declared being in a gang on wave 1 were deleted from the sample because it would not have been possible
to measure within-individual changes on the outcome variables from the time they were not in a gang to the time they joined a gang.

This dissertation only analyzes data from waves 1 through 7 because imprisoned respondents were not asked to report their gang membership status on waves 8 and 9, which decreased the sample of respondents for this study. In addition, the NLSY97 eliminated gang membership questions for all respondents after wave 9. The first wave of data collection occurred in 1997, the second in 1998, the third in 1999, the fourth in 2000, the fifth in 2001, the sixth in 2002, and the seventh in 2003. NLSY97 respondents had a retention rate of 86.3% by wave 7 (year 2003) (NLS. Retention Rates in NLSY97). The final sample analyzed in this dissertation consist of 52,531 person-waves obtained from 8,482 individuals who completed between one and seven waves of data collection. Table 1 shows the number of respondents by number of waves completed.

<table>
<thead>
<tr>
<th>Number of waves completed</th>
<th>Number of respondents by waves completed</th>
<th>Person-waves</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>187</td>
<td>187</td>
</tr>
<tr>
<td>2</td>
<td>204</td>
<td>408</td>
</tr>
<tr>
<td>3</td>
<td>263</td>
<td>789</td>
</tr>
<tr>
<td>4</td>
<td>405</td>
<td>1,620</td>
</tr>
<tr>
<td>5</td>
<td>578</td>
<td>2,890</td>
</tr>
<tr>
<td>6</td>
<td>1,278</td>
<td>7,668</td>
</tr>
<tr>
<td>7</td>
<td>5,567</td>
<td>38,969</td>
</tr>
<tr>
<td>Total</td>
<td>8,482</td>
<td>52,531</td>
</tr>
</tbody>
</table>
MEASURES

This section presents the variables that are used in this dissertation.

DEPENDENT VARIABLES

This dissertation analyzes a total of 12 dependent variables. Four measures of income from criminal activities were assessed during the analysis. One was a generic measure, income from any illegal activity, the other three were measures of income from three specific crimes: drug sales, property crimes, and theft.

The variable income from any illegal activity is a dichotomous measure indicating whether the respondent received any income from any illegal activity. Respondents who received any income equal or greater than $1, as indicated by the variable amount of income from any illegal activity, were coded 1. Respondents who received no income from any illegal activity were coded 0.

The variable income from drug sales is a dichotomous measure indicating whether the respondent received any income from drug sales. Respondents who received any income equal or greater than $1, as indicated by the variable amount of income from drug sales, were coded 1. Respondents who received no income from drug sales were coded 0.

The variable income from property crimes is a dichotomous measure indicating whether the respondent received any income from property crimes—“such as fencing, receiving, possessing or selling stolen property” (National Longitudinal Surveys, Crime, Delinquency & Arrest). Respondents who received any income equal or greater than $1, as indicated by the variable amount of income from property crimes, were coded 1. Respondents who received no income from property crimes were coded 0.
The variable income from theft\(^2\) is a dichotomous measure indicating whether the respondent received any income from stealing things worth $50 or more. Respondents who received any income equal or greater than $1, as indicated by the variable theft, were coded 1. Respondents who received no income from theft were coded 0.

The variable amount of income from any illegal activity is a continuous measure in dollars resulted from adding the responses of the variables amount of income from drug sales, amount of income from property crimes, and amount of income for stealing something worth more than $50. With the goal of reducing skew, a one was added to the income reported on each of the variables used for this continuous measure and their natural logarithm was used in the analysis (Tabachnick & Fidell, 2001). This type of logarithmic transformation are used in linear regression models to transform the distribution of variables that are skewed into more normal distributions (Benoit, 2011).

The logged version of this dependent variable is used in the multivariate statistical models.

The variable amount of income from drug sales is a continuous measure, in dollars, of the total income for selling illegal drugs the year prior to the interview. Measures for this variable were obtained from the question: ‘In [the previous year], about how much cash income did you make from selling or helping to sell marijuana, cocaine, or other drugs?’ Cases who did not report a total income for selling drugs but reported—on separate questions—selling drugs and a frequency of doing it were assigned their

---

\(^2\) The variable “theft” was preceded in the NLSY97 by a question asking respondents the number of times they have “stolen something from a store, person or house, or something that did not belong to you worth 50 dollars or more including stealing a car…. ”
reported estimated income for selling drugs—also asked in a different question.\(^3\) The estimated income was coded for this dissertation 1=$49, 2=$75, 3=$250, 4=$750, 5=$2,500, and 6=$5,001. The values from the codes 2 through 5 are the mean of the minimum and maximum values provided by the NLSY97. The value for code 1 and code 6 serve as a conservative proxy for the original NLSY97 coding (Less than $50 and more than $5,000, respectively). These six categories of estimated income were determined by the NLSY97. Respondents who reported not selling drugs were coded $0 on illegal income. With the goal of reducing skew, a one was added to the income reported in this variable and its natural logarithm was used (Tabachnick & Fidell, 2001) in the multivariate statistical models.

The variable amount of income from property crimes is a continuous measure in dollars of the total income from engaging in property crimes the year prior to the interview. Measures for this variable were obtained from the question: ‘In [the previous year], what was your total cash income from other property crimes such as fencing, receiving, possessing or selling stolen property?’ Cases who did not report a total income for property crimes but reported—on separate questions—committing them and a frequency of doing it were assigned their reported estimated income for such crimes.\(^4\) The estimated income for this dissertation was coded 1=$49, 2=$75, 3=$250, 4=$750, 5=$2,500, and 6=$5,001. The values from the codes 2 through 5 are the mean of the

\(^3\) The variable asking estimated income for selling drugs asked respondents “would you say it was… [estimated income selling illegal drugs]. The response options provided by the NLSY97 for this variable were 1 (Less than $50), 2 ($50 or more but less than $100), 3 ($100 or more but less than $500), 4 ($500 or more but less than $1000), 5 ($1000 or more but less than $5000), and 6 ($5000 or more).

\(^4\) The variable asking estimated income from other property crimes asked respondents “would you say it was… [estimated income from other property crimes]. The response options provided by the NLSY97 for this variable were 1 (Less than $50), 2 ($50 or more but less than $100), 3 ($100 or more but less than $500), 4 ($500 or more but less than $1000), 5 ($1000 or more but less than $5000), and 6 ($5000 or more).
minimum and maximum values provided by the NLSY97. The value for code 1 and code 6 serve as a conservative proxy for the original NLSY97 coding (Less than $50 and more than $5,000, respectively). These six categories of estimated income were determined by the NLSY97. Respondents who reported not engaging in property crimes were coded $0 on illegal income. With the goal of reducing skew, a one was added to the income reported in this variable and its natural logarithm was used (Tabachnick & Fidell, 2001) in the multivariate statistical models.

The variable amount of income for theft is a continuous measure, in dollars, of the total income for stealing things worth more than $50. Measures for this variable were obtained from the question: ‘In [the previous year], what was the amount of cash you received for the items you stole or would have received if you had sold them?’ Respondents who did not report a total income for stealing things worth more than $50 but reported—on separate questions—committing them and a frequency of doing it were assigned their reported estimated income for such crimes. The estimated income for this dissertation was coded 1=$49, 2=$75, 3=$250, 4=$750, 5=$2,500, and 6=$5,001. The values from the codes 2 through 5 are the mean of the minimum and maximum values provided by the NLSY97. The value for code 1 and code 6 serve as a conservative proxy for the original NLSY97 coding (Less than $50 and more than $5,000, respectively). These six categories of estimated income were determined by the NLSY97. Respondents who reported not stealing things worth more than $50 were coded $0 on illegal income. With the goal of reducing skew, a one was added to the income reported in this variable.

---

5 The variable asking estimated income from theft asked respondents “would you say it was… [estimated amount received if R sold items >$50]. The response options provided by the NLSY97 for this variable were 1 (Less than $50), 2 ($50 or more but less than $100), 3 ($100 or more but less than $500), 4 ($500 or more but less than $1000), 5 ($1000 or more but less than $5000), and 6 ($5000 or more).
and its natural logarithm was used (Tabachnick & Fidell, 2001) in the multivariate statistical models.

The variable sold drugs is a dichotomous measure (Yes=1, No=0) of whether respondents have sold or helped sell drugs in the past 12 months or since the date of the last interview. The measure for this variable at wave one was obtained from the question: “How many times have you sold or helped to sell marijuana, hashish or other hard drugs in the last 12 months? As responses for this question are continuous, respondents who indicated selling drugs zero times were coded 0, and respondents who indicated selling drugs one or more times were coded one. In subsequent waves, measures for this variable were obtained from the question: ‘Have you ever sold /since the last interview on [Date] or helped sell marijuana (pot, grass), hashish (hash), or other hard drugs such as heroin, cocaine or LSD?’

The variable frequency sold drugs is a continuous measure of the number of times respondents sold or helped sell drugs in the past 12 months or since the date of the last interview. Measures for this variable were obtained from the question: ‘How many times have you sold or helped to sell marijuana, hashish or other hard drugs in the last 12 months/since the last interview on [date of last interview]?’

The variable carry handgun is a dichotomous measure (Yes=1, No=0) of whether respondents have carried a handgun in the 12 months prior to the first interview or since the date of the last interview (DLI). Measures for this variable were obtained from the question: ‘Have you carried a handgun in the past 12 months (asked in the first wave only), or since the last interview? When we say handgun, we mean any firearm other than a rifle or a shotgun’ (Asked on subsequent waves). Responses of the cases who on wave
one reported having carried a handgun in the past 12 months but reported never carrying a handgun on a previous question from the same wave were coded 0 (No).

The variable *frequency carry handgun* is a continuous measure of the number of times respondents have carried a handgun in the last 30 days. Measures for this variable were obtained from the question: ‘How many times have you carried a handgun in the last 30 days?’ Responses of the cases who on a previous question from the same wave reported never carrying a handgun were coded 0. This coding process was done on each wave of data analyzed.

**MAIN INDEPENDENT VARIABLES**

*Gang membership and statuses in the gang*

The main independent variables in this dissertation are gang membership and different statuses in a gang. The variable *gang membership* is a dichotomous measure of whether respondents have been in a gang in the 12 months prior to the first interview or since the last interview. This measure was created from items that asked respondents ‘Have you been a member of a gang in the past 12 months? (asked in the first wave only), or since the last interview date […]?’ (Asked on subsequent waves). Respondents who on each wave reported being a member of a gang were coded 1 (Yes), and those who reported not being a member of a gang on that wave were coded 0 (No). These questions allow me assess gang membership at each wave. Gang self-nomination is a common and reliable measure to assess individual gang membership (Curry, 2000; Decker, Pyrooz et al., 2014; Esbensen et al., 2001).
The NLSY97 defined gang as “a group that hangs out together, wears gang colors or clothes, has set clear boundaries of its territory or turf, and protects its members and turf against other rival gangs through fighting or threats” (National Longitudinal Surveys, Household and Neighborhood Environment). According to Bellair and McNulty (2009), although this definition does not reference core membership, it contains “essential elements in the definition of a street gang: current membership (i.e., in the past year), relative permanence (i.e., hangs out together), organization/stability (i.e., wearing gang colors or clothes), and a delinquent focus (i.e., protection of turf by fighting or threats).”

The variables created for analyzing the different statuses in a gang were: enter gang, continue in a gang, left the gang, and never in a gang. These mutually exclusive variables were created using the same question used to determine gang membership. The variable enter gang is a dichotomous measure (Yes=1, No=0) in which respondents who reported belonging to a gang at a given wave also reported not belonging to a gang the wave prior. The variable continue in a gang is a dichotomous measure (Yes=1, No=0) in which respondents who reported belonging to a gang at a given wave also reported belonging to a gang the wave prior. The variable left the gang is a dichotomous measure (Yes=1, No=0) in which respondents who reported not belonging to a gang at a given wave also reported belonging to a gang the wave prior. The variable never in a gang is a dichotomous measure (Yes=1, No=0) in which respondents reported in all waves not belonging to a gang. This variable is used as a reference category. This strategy has been used to assess stability and change in gang status across waves in prior research (Augustyn et al., 2019).6

---

6Thirty-seven respondents reported returning to a gang after having exited a gang.
CONTROL VARIABLES

The statistical analyses of this dissertation control for time-varying and time-stable control variables that could serve as confounders between the independent and the outcome variables examined.

Time varying control variables

Variables described in this section may change overtime and were measured on each wave of data collected. The variable *age* is a continuous variable that describes the age of the respondent at each wave. This measure was obtained from the statement: ‘Age as of the interview date.’

The variable *salary income* is a continuous measure in dollars of the total income received from wages and salaries the year prior to the interview. Measures for this variable were obtained from the question: ‘During [previous year], how much income did you receive from wages, salary, commissions, or tips from all works, before deductions from taxes or anything else?’ In addition, cases who did not report a total income from wages but on a separate question reported having received income from wages were assigned their reported estimated income for such activities, gathered from a separate question. The estimated income for this dissertation was coded 1=$2,500, 2=$7,500, 3=$17,500, 4=$37,500, 5=$75,000, 6=175,000, and 7=$250,001. The values from the codes 1 through 6 are the mean of the minimum and maximum values provided by the NLSY97. The value for code 7 serves as a conservative proxy for the original NLSY97

---

7 The variable asking estimated income from wages and salary in past year asked respondents “… tell me the letter of the category that is your best estimate of the amount you received last year in wages, salary, commissions and tips?” 1 (A $1 - $5,000), 2 (B $5,001 - $10,000), 3 (C $10,001 - $25,000), 4 (D $25,001 - $50,000), 5 (E $50,001 - $100,000), 6 (F $100,001 - $250,000), and 7 (G More than $250,000).
Respondents who reported not receiving income from wages the year prior to the interview were coded $0. With the goal of reducing skew, a one was added to the income reported in this variable and its natural logarithm was used (Augustyn et al., 2019; Tabachnick & Fidell, 2001) in the multivariate statistical models where the dependent variable also was logged.

The variable **school enrollment** is a dichotomous measure (Yes=1, No=0) indicating whether the respondent was enrolled in any school/college/university at the time of the survey. Measures for this variable were obtained from the statement: ‘Enrollment status as of the survey date.’

The variable **parenthood** is a dichotomous measure (Yes=1, No=0) indicating whether the respondent had one or more biological children residing in his/her household at the time of the survey. ‘Measures for this variable were obtained from the statement: Marital or cohabitation status as of the survey date.’

The variable **married** is a dichotomous measure (Yes=1, No=0) indicating whether the respondent was married (with spouse present or absent) at the time of the survey. ‘Measures for this variable were obtained from the statement: Marital or cohabitation status as of the survey date.’

The variable **urban** is a dichotomous measure (Yes=1, No=0) indicating whether the respondent was living in an urban setting (as opposed to rural or unknown setting) at the time of the survey. Measures for this variable were obtained from the statement: ‘Residence in an urban or a rural area as of the survey date.’

The variable **arrests** is a continuous measure of the number of times the respondent has been arrested ever (wave 1) or since the prior interview (waves 2-7). Measures for this variable were obtained from the questions: ‘In total, how many times
have you been arrested/since the last interview on [date of last interview]?’ Respondents who reported not having been arrested ever or since the time of the previous interview on a previous question were coded 0 on this variable.

The variable marijuana use is a dichotomous measure (Yes=1, No=0) indicating whether the respondent has consumed marijuana ever (wave 1), or since the prior interview (waves 2-7). This measure was obtained from the question ‘Have you ever used marijuana, for example: grass or pot, in your lifetime?/Since the date of last interview?'

The variable attacked others is a continuous measure of the number of times the respondent has attacked someone or has been in a situation where a serious fight or assault occurred. This measure was obtained from the question: ‘How many times have you attacked someone or have had a situation end up in a serious fight or assault of some kind in the last 12 months/since the last interview on [date of last interview]?’ Respondents who reported not having attacked anyone ever or since the previous interview on a previous question were coded 0 on this variable.

The variable family in gang is a dichotomous measure (Yes=1, No=0) of whether the respondent has relatives or friends in a gang. This measure was obtained from the question: ‘Do any of your brothers, sisters, cousins or friends belong to a gang?’

*Time stable control variables*

Variables described in this section may not change overtime and were measured only at the first wave of data collected. The variable gender is a dichotomous measure (Male=1, Female=0) that asked respondents about their gender.
Respondents’ race/ethnicity indicates the race or ethnicity respondents identified with. The mutually exclusive race and ethnicity dichotomous options (Yes=1, No=0) presented to respondents were White, Black, Other, and Hispanic, respectively. In the analyses. White serves as the reference category.

ANALYTICAL STRATEGY

Logistic and linear mixed-effects models will be used to analyze the within-individual effects of gang membership (and gang transitions) on the likelihood of generating income through criminal activities and on the amount of income individuals generate from such activities. Additionally, logistic and negative binomial mixed effects models will be used to examine the association between transitions through different statuses in a gang and the likelihood and frequency of selling drugs and of carrying a handgun.

Specifically, logistic regression will be used to predict the dichotomous variables analyzed in this dissertation (i.e., likelihood of generating income from specific forms of crime, likelihood of generating income from a combination of crimes, likelihood of selling drugs, and likelihood of carrying a handgun) (LaValley, 2008; Wright, 1995). Linear models will be used to explain the continuous variables analyzed (amount of income generated from specific forms of crime, and income generated from a combination of crimes) (Smithson & Merkle, 2013). Last, negative binomial will be used to analyze count variables presenting a positively skewed distribution (i.e., frequency of selling drugs and frequency of carrying a handgun). This method is selected to account
for the abnormal distributions of their standard errors (Clark & Perry, 1989; Oztig, & Askin, 2020; White & Bennetts, 1996).

Mixed effects models have been used to analyze crime related topics, including changes in crime seriousness (Liu et al., 2011), the effect of educational attainment on crime (Sabates, 2008), and the effect of neighborhood crime on mental health (Baranyi et al., 2021). Mixed effects models also have been used to examine gang members’ behaviors, including the effect that intervention programs have on between-individuals’ antisocial outcomes (Valdez et al., 2013), and the effect that incarceration has on between-individuals and within-individuals’ involvement in gangs (Pyrooz, Gartner, & Smith, 2017).

Mixed-effect models is a multilevel statistical method that allows to estimate within-individual changes overtime and between-individual differences of the dependent variable (Guo, 2002; Luke, 2019; Osgood, 2010; Th. Gries, 2015). This method nests each respondents’ measures into their corresponding subjects and compares each person’s offending with his or her own across time while accounting for the same between-individual changes. This type of modeling also guarantees that the estimates from the time-varying independent variables on the dependent variable are not influenced by individuals measured or unmeasured time-stable characteristics (Bersani & Doherty, 2013; Osgood, 2010; Widdowson & Siennick, 2021).

Mixed-effect models allow the determination of the effect that transitions through a gang have on the outcome variables examined at the individual level. The statistical analyses performed in this dissertation will be completed using the software Stata 15 (StataCorp17). The regression equations that will be used to estimate the effect that gang
membership onset and transitions through the gang have on the outcome variables are presented as follow (Widdowson, 2018).

Equation 1 is a logit model that estimates the likelihood of occurrence of the outcome variables (i.e. generating income from criminal activities, carrying a handgun, and selling drugs). In this equation, the subscript \(i\) represents each respondent, and \(j\) indicates respondent-wave. The main independent variable captures individuals’ gang membership status across waves.

\[
E1: P_{ji}/1-P_{ji} = \beta_{0i} + \beta_1 gangmembership_{ji} + \beta_2 age_{ji} + \beta_3 mean(gangmembership_{ji}) + \beta_4 mean(age_{ji}) + V_{ji} + \beta S_i + r_i
\]

The dependent variable in this equation, \(P_{ji}/1-P_{ji}\) indicates each individuals’ likelihood of occurrence of an event (i.e., generating income from criminal activities, carrying a handgun, and selling drugs) at each wave. The expression \(\beta_{0i}\) represents each individuals’ intercept. \(Gangmembership_{ji}\) indicates whether each individual was (or was not) a gang member at each wave. \(Age_{ji}\) represents respondents’ age at any given wave. The expressions \(mean(gangmembership_{ji})\) and \(mean(age_{ji})\) represent each individuals’ mean on their gang membership status and age, respectively, and reflect between-individual differences on the dependent variable (Bersani & Doherty, 2013; Osgood, 2010). The expression \(V_{ji}\) represents time-varying control variables (e.g., legal employment, marital status, etc.); \(S_i\) represents time-stable control variables (e.g., race/ethnicity); and \(r_i\) represents individual-specific time-invariant residuals. As suggested by Sweeten, Piquero, & Steinberg (2013), I included power polynomials for age (e.g., \(age_{ji}, age_{ji}^2\)), to obtain estimates of the age crime curve on the outcome variable. Grand mean centering was used in the creation of the age polynomials to reduce the possibility of
multicollinearity between the terms (Horney et al., 1995; Widdowson et al., 2021).

Equation number 1 is used to examine research questions number 1, 5, and 9 (listed above).

Equation 2 is similar to equation 1 but contains the variables $\beta_{1} \text{entgang}_{ji} + \beta_{2} \text{contgang}_{ji} + \beta_{3} \text{leftgang}_{ji}$ to capture within-individual changes in the likelihood of occurrence of the outcome variables (i.e. generating income from criminal activities, carrying a handgun, and selling drugs) across statuses in a gang (i.e. enter gang, continue in a gang, and left the gang). It also includes group means for enter gang, continue in a gang, and left the gang.

$$E2: P_{ji} / (1 - P_{ji}) = \beta_{0i} + \beta_{1} \text{entgang}_{ji} + \beta_{2} \text{contgang}_{ji} + \beta_{3} \text{leftgang}_{ji} + \beta_{4} \text{age}_{ji} + \beta_{5} \text{mean}(\text{entgang}_{ji}) + \beta_{6} \text{mean}(\text{contgang}_{ji}) + \beta_{7} \text{mean}(\text{leftgang}_{ji}) + \beta_{8} \text{mean} (\text{age}_{ji}) + \beta V_{ji} + \beta S_{i} + r_{i}$$

Equation number 2 is used to examine research questions number 3, 7 and 11 (listed above).

Equation 3 is a linear model that estimates the amount of income generated from illegal activities. To address the positive skewness in the dispersion of income, a value of one was added to each individual’s income reported and the natural log of such income calculated. This is a standard procedure in these types of analyses (Augustyn et al., 2019).

Similar to equation 1, the main independent variable captures gang membership across waves.

$$E3: Y_{j} = \beta_{0i} + \beta_{1} \text{gangmembership}_{ji} + \beta_{2} \text{age}_{ji} + \beta_{3} \text{mean}(\text{gangmembership}_{ji}) + \beta_{4} \text{mean}(\text{age}_{ji}) + \beta V_{ji} + \beta S_{i} + r_{i}$$

Equation number 3 is used to examine research question number 2 (listed above).
Equation 4 is similar to equation 3 but contains the variables $\beta_1\text{entergang}_{ji} + \beta_2\text{contgang}_{ji}$ + $\beta_3\text{leftgang}_{ji}$, and their respective means.

$$E4: \ln Y_{ji} = \beta_0i + \beta_1\text{entergang}_{ji} + \beta_2\text{contgang}_{ji} + \beta_3\text{age}_{ji} + \beta_3\text{mean(entgang}_{ji}) + \beta_4\text{mean(contgang}_{ji}) + \beta_5\text{mean(leftgang}_{ji}) + \beta_6\text{mean(age}_{ji}) + \beta V_{ji} + \beta S_i + r_i$$

Equation number 4 is used to examine research question number 4 (listed above).

Equation 5 is a negative binomial model that estimates the frequency of selling drugs and of carrying a handgun. Similar to equation 1, the main independent variable captures gang membership across waves.

$$E5: \ln Y_{jj} = \beta_0i + \beta_1\text{gangmembership}_{ji} + \beta_2\text{age}_{ji} + \beta_3\text{mean(gangmembership}_{ji}) + \beta_4\text{mean(age}_{ji}) + \beta V_{ji} + \beta S_i + r_i$$

Equation number 5 is used to examine research questions number 6 and 10 (listed above).

Equation 6 is similar to equation 5 but contains the variables $\beta_1\text{entergang}_{ji} + \beta_2\text{contgang}_{ji}$ + $\beta_3\text{leftgang}_{ji}$, and their respective means.

$$E6: \ln Y_{ji} = \beta_0i + \beta_1\text{entergang}_{ji} + \beta_2\text{contgang}_{ji} + \beta_3\text{leftgang}_{ji} + \beta_4\text{age}_{ji} + \beta_3\text{mean(entgang}_{ji}) + \beta_5\text{mean(contgang}_{ji}) + \beta_6\text{mean(leftgang}_{ji}) + \beta_7\text{mean(age}_{ji}) + \beta V_{ji} + \beta S_i + r_i$$

Equation number 8 is used to examine research questions number 8 and 12 (listed below).
CHAPTER IV
RESULTS

This chapter shows the results from the statistical analyses performed to answer the research questions presented in this dissertation. This chapter first presents the descriptive statistics of the sample as well as of the variables examined. Next, this chapter presents the results obtained from a series of multivariate mixed-effects models that examine the within-individual effects that gang membership and transitions through the gang have on the outcome variables examined.

DESCRIPTIVE STATISTICS

The descriptive statistics of the sample analyzed in this dissertation as well as the dependent variables, independent variables, and control variables are presented in Table 2. The means and the standard deviations presented in this table represent the average values of each variable across person-waves (Widdowson, 2018). Descriptive statistics indicate that 49% of the sample was composed of males and White individuals. African-American and Hispanic youth composed 25% and 20% of the sample, respectively. Youths’ mean age was slightly under 18 years. Most youth were enrolled in school (68%), and less than 10% of them had their children living with them or were married. In addition, 1% of youth in the sample reported being a gang member.
Descriptive statistics also indicate that 5% of the sample generated income from a combination of drug sales, property crimes, or theft. Of those who generated income, 3% of youth generated income from drug sales, 1% from property crimes, and 1% from stealing things. Table 2 also indicates that 5% of youth sold drugs and 4% carried a handgun during the observation period.

Table 2

Descriptive Statistics of Study Variables

<table>
<thead>
<tr>
<th>Dependent Variables</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min.</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Income from any illegal activity</td>
<td>0.05</td>
<td>0.21</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Income from drug sales</td>
<td>0.03</td>
<td>0.17</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Income from property crimes</td>
<td>0.01</td>
<td>0.12</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Income from theft &gt;$50</td>
<td>0.01</td>
<td>0.13</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Amount of income from any illegal activity</td>
<td>471.29</td>
<td>2242.14</td>
<td>0</td>
<td>2,999,997</td>
</tr>
<tr>
<td>Amount of income from drug sales</td>
<td>277.48</td>
<td>13188.62</td>
<td>0</td>
<td>999,999</td>
</tr>
<tr>
<td>Amount of income from property crimes</td>
<td>99.57</td>
<td>8793.31</td>
<td>0</td>
<td>999,999</td>
</tr>
<tr>
<td>Amount of income from theft &gt;$50</td>
<td>94.22</td>
<td>7087.43</td>
<td>0</td>
<td>999,999</td>
</tr>
<tr>
<td>Amount of income from any illegal activity-logged</td>
<td>0.27</td>
<td>1.28</td>
<td>0</td>
<td>14.91</td>
</tr>
<tr>
<td>Amount of income from drug sales-logged</td>
<td>0.17</td>
<td>1.04</td>
<td>0</td>
<td>13.81</td>
</tr>
<tr>
<td>Amount of income from property crimes-logged</td>
<td>0.07</td>
<td>0.64</td>
<td>0</td>
<td>13.81</td>
</tr>
<tr>
<td>Amount of income from theft &gt;$50-logged</td>
<td>0.09</td>
<td>0.75</td>
<td>0</td>
<td>13.81</td>
</tr>
<tr>
<td>Sold drugs</td>
<td>0.05</td>
<td>0.22</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Frequency sold drugs</td>
<td>1.17</td>
<td>8.74</td>
<td>0</td>
<td>99</td>
</tr>
<tr>
<td>Carry handgun</td>
<td>0.04</td>
<td>0.20</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Frequency carry handgun</td>
<td>0.21</td>
<td>2.08</td>
<td>0</td>
<td>30</td>
</tr>
<tr>
<td>Main Independent Variables</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gang membership</td>
<td>0.01</td>
<td>0.10</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Enter gang</td>
<td>0.00</td>
<td>0.08</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Continue in a gang</td>
<td>0.00</td>
<td>0.05</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Left the gang</td>
<td>0.00</td>
<td>0.07</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Never in a gang</td>
<td>0.95</td>
<td>0.20</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Time-Varying Controls</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>17.73</td>
<td>2.59</td>
<td>12</td>
<td>24</td>
</tr>
<tr>
<td>Salary income</td>
<td>3,456.79</td>
<td>6,514.95</td>
<td>0</td>
<td>175,000</td>
</tr>
<tr>
<td>School enrollment</td>
<td>0.68</td>
<td>0.46</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Parenthood</td>
<td>0.08</td>
<td>0.27</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Married</td>
<td>0.03</td>
<td>0.19</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Urban</td>
<td>0.73</td>
<td>0.43</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Arrests</td>
<td>0.10</td>
<td>0.68</td>
<td>0</td>
<td>60</td>
</tr>
</tbody>
</table>

93
<table>
<thead>
<tr>
<th>Variable</th>
<th>0.22</th>
<th>0.41</th>
<th>0</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marijuana use</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attacked others</td>
<td>0.30</td>
<td>2.73</td>
<td>0</td>
<td>99</td>
</tr>
<tr>
<td>Family in gang</td>
<td>0.10</td>
<td>0.30</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Time-Stable Controls</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>0.49</td>
<td>0.49</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>White</td>
<td>0.49</td>
<td>0.50</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Black</td>
<td>0.25</td>
<td>0.43</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Hispanic</td>
<td>0.20</td>
<td>0.40</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Other</td>
<td>0.03</td>
<td>0.18</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Sample size</td>
<td>8,482</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of respondent-waves</td>
<td></td>
<td>52,531</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Unit of analysis is person-wave.

**MULTIVARIATE ANALYSIS**

**Research Question no. 1.**

Table 3 presents four logistic mixed effects models where gang membership predicts the likelihood of generating income from three distinct forms of illicit activities and a combination of them, net of controls. These models assess the first research question presented in this dissertation: do individuals’ probabilities of generating income from selling drugs, for engaging in property crimes, for theft, or for engaging in any of those activities combined vary after becoming gang members?
### Table 3

Logistic mixed-effects models predicting within-individuals' likelihood of generating income from any illegal activity, drug sales, property crimes, or stealing things from gang membership

<table>
<thead>
<tr>
<th></th>
<th>Any illegal activity</th>
<th>Drug sales</th>
<th>Property crimes</th>
<th>Stealing things</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OR [95% CI]</td>
<td>OR [95% CI]</td>
<td>OR [95% CI]</td>
<td>OR [95% CI]</td>
</tr>
<tr>
<td>Gang membership</td>
<td>2.06*** 1.49 - 2.84</td>
<td>2.22***</td>
<td>1.53 - 3.22</td>
<td>1.73* 1.13 - 2.66</td>
</tr>
<tr>
<td>Age</td>
<td>0.82*** 0.78 - 0.85</td>
<td>0.95*</td>
<td>0.92 - 0.99</td>
<td>0.78*** 0.72 - 0.84</td>
</tr>
<tr>
<td>Age^2</td>
<td>0.98*** 0.97 - 0.99</td>
<td>-</td>
<td>-</td>
<td>0.99 0.98 - 1.01</td>
</tr>
<tr>
<td>Age^3</td>
<td>1.00** 1.00 - 1.00</td>
<td>-</td>
<td>-</td>
<td>1.00 0.99 - 1.00</td>
</tr>
<tr>
<td>Salary</td>
<td>0.99 0.99 - 1.00</td>
<td>0.99</td>
<td>0.99 - 1.00</td>
<td>0.99 0.99 - 1.00</td>
</tr>
<tr>
<td>School enrollment</td>
<td>0.73*** 0.64 - 0.84</td>
<td>0.66***</td>
<td>0.56 - 0.77</td>
<td>0.82 0.65 - 1.03</td>
</tr>
<tr>
<td>Parenthood</td>
<td>0.80 0.60 - 1.06</td>
<td>0.72</td>
<td>0.51 - 1.03</td>
<td>0.97 0.57 - 1.64</td>
</tr>
<tr>
<td>Married</td>
<td>0.65 0.40 - 1.06</td>
<td>0.54</td>
<td>0.29 - 1.01</td>
<td>0.99 0.44 - 2.22</td>
</tr>
<tr>
<td>Urban</td>
<td>1.09 0.95 - 1.24</td>
<td>1.04</td>
<td>0.88 - 1.23</td>
<td>0.97 0.78 - 1.20</td>
</tr>
<tr>
<td>Arrests</td>
<td>1.45*** 1.37 - 1.54</td>
<td>1.25***</td>
<td>1.18 - 1.31</td>
<td>1.24*** 1.18 - 1.31</td>
</tr>
<tr>
<td>Marijuana use</td>
<td>9.78*** 8.73 - 10.95</td>
<td>25.23***</td>
<td>21.26 - 29.94</td>
<td>5.17*** 4.31 - 6.19</td>
</tr>
<tr>
<td>Attacked others</td>
<td>1.07*** 1.06 - 1.09</td>
<td>1.05***</td>
<td>1.04 - 1.06</td>
<td>1.05*** 1.04 - 1.06</td>
</tr>
<tr>
<td>Family in gang</td>
<td>2.49*** 2.17 - 2.85</td>
<td>2.47***</td>
<td>2.09 - 2.93</td>
<td>3.06*** 2.49 - 3.76</td>
</tr>
<tr>
<td>Gender</td>
<td>2.80*** 2.45 - 3.19</td>
<td>2.50***</td>
<td>2.11 - 2.95</td>
<td>5.22*** 4.12 - 6.62</td>
</tr>
<tr>
<td>Hispanic</td>
<td>0.89 0.76 - 1.04</td>
<td>0.83</td>
<td>0.67 - 1.02</td>
<td>0.81 0.63 - 1.05</td>
</tr>
<tr>
<td>Black</td>
<td>0.64*** 0.55 - 0.75</td>
<td>0.59***</td>
<td>0.48 - 0.73</td>
<td>0.55*** 0.42 - 0.71</td>
</tr>
<tr>
<td>Race other</td>
<td>0.73 0.52 - 1.04</td>
<td>0.47**</td>
<td>0.28 - 0.77</td>
<td>0.90 0.53 - 1.53</td>
</tr>
<tr>
<td>Constant</td>
<td>0.00*** 0.00 - 0.00</td>
<td>0.00***</td>
<td>0.00 - 0.00</td>
<td>0.00*** 0.00 - 0.00</td>
</tr>
</tbody>
</table>

Chi-Squared 0.000 0.000 0.000 0.000

Abbreviations: OR = Odds Ratio; CI = Confidence Intervals.
These Odds Ratio are estimated after controlling for the means of the variables gang membership, age, and age polynomials.
Number of respondents = 8,482; Number of person waves = 52,531
*p ≤ .05. **p ≤ .01. ***p ≤ .001 (two-tailed)
Results from Table 3 indicate that during periods in which youth were in a gang their odds of generating income from any illegal activity were 2.06 higher compared to periods when they were not in a gang. This table also shows a similar trend when analyzing within-individuals’ likelihood of generating income from the other three forms of crime analyzed. Specifically, during periods in which youth were in a gang their odds of generating income from drug sales were 2.22 times higher compared to periods when they were not in a gang. Similarly, their odds of generating income from property crimes and theft were 1.73 and 1.84 higher, respectively, during periods in which they were in a gang relative to periods when they were not in a gang.

Table 3, however, also showed that gang membership was not the only variable explaining within-individuals’ variation in youths’ odds of generating income from drug sales, property crimes, theft, or a combination of these variables. This table also showed that within-individuals’ odds of generating income from drug sales, property crimes, or any combination of these crimes were significantly lower during periods when respondents were enrolled in school than in periods when they were not in school. This finding is not be surprising because when youth are enrolled in school they have less time to engage in income generating crimes and crimes in general, than when they are not in school (Jarjoura, 1993). Moreover, the prosocial environment that schools offer and the sense of attachment that youth develop towards their school are known to dissuade students from engaging in illicit activities (Gottfredson et al., 2002; Hawkins et al., 1999).

Results from Table 3 also show that within-individuals’ odds of generating income from any of the variables analyzed were similar during the periods when youth
had their children living with them and were married, to the periods when they did not have their children living with them or were not married. These findings differ from other studies suggesting that as individuals get married or have children their offending decreases because of changes in their routines, prosocial ties, and increased levels of supervision (Pyrooz, McGloin, & Decker, 2017; Uggen & Massoglia, 2003).

Surprisingly, arrests did not deter individuals from generating income from the types of crime analyzed (Braga, 2017; Levitt, 1998; Thornberry et al., 2018). Results from Table 3 showed that during periods where individuals reported a higher number of arrests they also had higher odds of generating income from all categories analyzed. Although within-individuals’ variation in legal income did not predict within-individuals’ variation in their odds of generating income from the crimes analyzed, it is possible to suggest that a higher number of arrests make these youth less likely to generate income in the formal economy, so they are pressured to generate income in the informal economy (Hales et al., 2006; Papachristos, 2009b).

Similarly, youths’ within-individuals’ odds of generating income from all variables analyzed were significantly higher during periods in which they reported higher levels of marijuana use, higher incidence of attacking others, and having a family member or friend in a gang relative to periods when they reported lower levels of marijuana use, lower incidence of attacking others, and no family or friends in a gang, respectively. These findings are not surprising as previous research indicates that marijuana use is associated with higher levels of property and drug related crimes (Green et al., 2010) and to other forms of delinquency that can generate income (Bjerregaard, 2010). Marijuana dependence also is known to increase individuals’ involvement in
income generating crimes to produce funds to buy this substance (Anglin & Speckart, 1988; Blumstein, 1995; Goldstein, 1985). Attacking others may also explain higher odds of generating income from these crimes as previous research indicates that fighting rival gang members influences youths’ ability to expand the areas where they engage in illegal activities, including income generating crimes (Cepeda et al., 2016; Howell, 1999; Ousey & Lee, Venkatesh, 2008a). However, since this dissertation did not capture data on whether or not those attacked were rival gang members, this is only speculation. In addition, previous research also has established that associating with gang members increases youths’ involvement in context crimes (e.g., taking part in fights and shooting at someone) (Winfree Jr., Bäckström, & Mays, 1994); Winfree Jr., Mays, & Bäckström, 1994) though not in self-reported theft.

Additionally, males had higher odds than females to generate income from all of the dependent variables analyzed. This finding is not surprising as males tend to engage in more forms of crime than females (Cernkovich & Giordano, 1979; DeLisi & Vaughn, 2016; Fergusson & Horwood, 2002), and male gang members also engage in more forms of crime than female gang members (Esbensen, 2010; Esbensen & Winfree, 1998). Since males engage in more crime than females, it is expected that their odds of generating income from crime would be higher.

African American youth had lower odds to generate income from a combination of illegal activities, drug sales, and from property crimes than White youth. These results align with findings from Esbensen and Winfree (1998) and Lyon et al. (1992), who found that White gang members were more likely to engage in some crimes than African
American or Hispanic gang members. These odds ratio from Table 3 were obtained after holding all other variables in the models constant.

**Research Question no. 2.**

Table 4 presents four linear mixed effects models where gang membership predicts the amount of income generated from three distinct forms of illicit activities and the total amount of income across all three sources, net of controls. Since the dependent variables were logged in these models, the regression coefficients from this table will be interpreted in terms of percent change to ease their interpretation (Benoit, 2011). These models assess the second research question in this dissertation: do individuals generate different amounts of income from the crimes identified in question number 1 after becoming gang members?
Table 4

*Linear mixed-effects models predicting within-individuals' amount of income generated from any illegal activity, drug sales, property crimes, or stealing things from gang membership*

<table>
<thead>
<tr>
<th></th>
<th>Any illegal activity</th>
<th>Drug sales</th>
<th>Property crimes</th>
<th>Stealing things</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coef.</td>
<td>s.e.</td>
<td>Coef.</td>
<td>s.e.</td>
</tr>
<tr>
<td>Gang membership</td>
<td>1.00***</td>
<td>0.05</td>
<td>0.84***</td>
<td>0.04</td>
</tr>
<tr>
<td>Age</td>
<td>-0.00***</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Salary</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>School enrollment</td>
<td>-0.06***</td>
<td>0.01</td>
<td>-0.07***</td>
<td>0.01</td>
</tr>
<tr>
<td>Parenthood</td>
<td>-0.01</td>
<td>0.02</td>
<td>-0.02</td>
<td>0.01</td>
</tr>
<tr>
<td>Married</td>
<td>-0.04</td>
<td>0.03</td>
<td>-0.04</td>
<td>0.02</td>
</tr>
<tr>
<td>Urban</td>
<td>0.01</td>
<td>0.01</td>
<td>0.00</td>
<td>0.01</td>
</tr>
<tr>
<td>Arrests</td>
<td>0.24***</td>
<td>0.00</td>
<td>0.14***</td>
<td>0.00</td>
</tr>
<tr>
<td>Marijuana use</td>
<td>0.63***</td>
<td>0.01</td>
<td>0.49***</td>
<td>0.01</td>
</tr>
<tr>
<td>Attacked others</td>
<td>0.07***</td>
<td>0.00</td>
<td>0.04***</td>
<td>0.00</td>
</tr>
<tr>
<td>Family in gang</td>
<td>0.26***</td>
<td>0.01</td>
<td>0.14***</td>
<td>0.01</td>
</tr>
<tr>
<td>Gender</td>
<td>0.17***</td>
<td>0.01</td>
<td>0.10***</td>
<td>0.01</td>
</tr>
<tr>
<td>Hispanic</td>
<td>-0.01</td>
<td>0.01</td>
<td>-0.02</td>
<td>0.01</td>
</tr>
<tr>
<td>Black</td>
<td>-0.06***</td>
<td>0.01</td>
<td>-0.04***</td>
<td>0.01</td>
</tr>
<tr>
<td>Race other</td>
<td>-0.05</td>
<td>0.03</td>
<td>-0.06*</td>
<td>0.03</td>
</tr>
<tr>
<td>Constant</td>
<td>0.00</td>
<td>0.02</td>
<td>0.01</td>
<td>0.01</td>
</tr>
</tbody>
</table>

| Chi-Squared | 0.000 | 0.000 | 0.000 | 0.000 |

Abbreviations: Coef. = Coefficient; s.e. = Standard Errors.
These coefficients are estimated after controlling for the means of the variables gang membership and age.
Number of respondents = 8,482; Number of person waves = 52,531
*p ≤ .05. **p ≤ .01. ***p ≤ .001 (two-tailed)*

Table 4 shows that during periods where youth were in a gang their within-individual income derived from a combination of any illegal activity was almost 172% higher ((= exp (1.00) ≈ 2.718282) than in periods when they were not in a gang.

Similarly, youths’ within-individuals’ income derived from drug sales, property crimes, and from stealing things was 131%, 49%, and 55% higher during periods when they were
in a gang compared to periods when they were not in a gang. These results were obtained after holding all other variables in the model constant.

Considering the control variables’ estimates from Table 3, it is not surprising that periods when youth had a higher number of arrests, higher marijuana use, more attacks on others, and family or friends in a gang were associated with higher income from all variables examined relative to periods where they had lower levels of these variables. This table also showed that males, compared to females, had a significantly larger income on all dependent variables. In addition, African American youth generated a significantly lower amount of income on all forms of crime analyzed, or a combination of them, than White youth. Results from this research resemble those by Augustyn et al. (2019), who also found that males generated more illegal earnings than females. These authors, in contrast, found that Hispanics, and not African Americans, generated less illegal income than Whites. Hagedorn (1994), in a qualitative study, also found that a higher percentage of Latinos generated more income from drug sales than African Americans.

**Research Question no. 3.**

Table 5 presents four logistic mixed effects models where different gang membership transitions predict the likelihood of generating income from three distinct forms of illicit activities and a combination of them, net of controls. These models assess the third research question in this dissertation: do individuals’ probabilities of generating income from the crimes included in this research vary after they enter a gang, continue in the gang, and leave the gang, that is, over the life-course of gang membership?
### Table 5

Logistic mixed-effects models predicting within-individuals’ likelihood of generating income from any illegal activity, drug sales, property crimes, or stealing things across gang membership transitions

<table>
<thead>
<tr>
<th></th>
<th>Any illegal activity</th>
<th>Drug sales</th>
<th>Property crimes</th>
<th>Stealing things</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OR [95% CI]</td>
<td>OR [95% CI]</td>
<td>OR [95% CI]</td>
<td>OR [95% CI]</td>
</tr>
<tr>
<td>Enter gang</td>
<td>2.08*** 1.44 - 3.00</td>
<td>2.24*** 1.46 - 3.42</td>
<td>1.59 0.97 - 2.58</td>
<td>1.72* 1.08 - 2.74</td>
</tr>
<tr>
<td>Continue in gang</td>
<td>2.09* 1.17 - 3.71</td>
<td>2.96*** 1.56 - 5.61</td>
<td>2.71** 1.32 - 5.56</td>
<td>1.74 0.85 - 3.58</td>
</tr>
<tr>
<td>Leave gang</td>
<td>1.07 0.68 - 1.69</td>
<td>1.34 0.79 - 2.28</td>
<td>1.55 0.82 - 2.94</td>
<td>1.12 0.59 - 2.12</td>
</tr>
<tr>
<td>Age</td>
<td>0.82*** 0.78 - 0.85</td>
<td>0.95* 0.92 - 0.99</td>
<td>0.78*** 0.72 - 0.84</td>
<td>0.74*** 0.69 - 0.80</td>
</tr>
<tr>
<td>Age^2</td>
<td>0.98*** 0.97 - 0.99</td>
<td>- -</td>
<td>0.99 0.98 - 1.01</td>
<td>0.98** 0.96 - 0.99</td>
</tr>
<tr>
<td>Age^3</td>
<td>1.00*** 1.00 - 1.00</td>
<td>- -</td>
<td>1.00 0.99 - 1.00</td>
<td>1.00 0.99 - 1.00</td>
</tr>
<tr>
<td>Salary</td>
<td>0.99 0.99 - 1.00</td>
<td>0.99 0.99 - 1.00</td>
<td>0.99 0.99 - 1.00</td>
<td>0.99 0.99 - 1.00</td>
</tr>
<tr>
<td>School enrollment</td>
<td>0.73*** 0.64 - 0.84</td>
<td>0.66*** 0.56 - 0.78</td>
<td>0.83 0.66 - 1.04</td>
<td>0.70*** 0.56 - 0.86</td>
</tr>
<tr>
<td>Parenthood</td>
<td>0.80 0.60 - 1.06</td>
<td>0.72 0.51 - 1.03</td>
<td>0.96 0.57 - 1.63</td>
<td>0.93 0.61 - 1.42</td>
</tr>
<tr>
<td>Married</td>
<td>0.65 0.40 - 1.05</td>
<td>0.54 0.28 - 1.01</td>
<td>0.99 0.44 - 2.22</td>
<td>0.70 0.32 - 1.54</td>
</tr>
<tr>
<td>Urban</td>
<td>1.09 0.95 - 1.24</td>
<td>1.04 0.88 - 1.23</td>
<td>0.97 0.79 - 1.20</td>
<td>1.09 0.89 - 1.33</td>
</tr>
<tr>
<td>Arrests</td>
<td>1.46*** 1.38 - 1.54</td>
<td>1.25*** 1.19 - 1.31</td>
<td>1.24*** 1.18 - 1.31</td>
<td>1.38*** 1.31 - 1.47</td>
</tr>
<tr>
<td>Marijuana use</td>
<td>9.75*** 8.70 - 10.92</td>
<td>25.21*** 21.24 - 29.92</td>
<td>5.16*** 4.31 - 6.19</td>
<td>5.22*** 4.42 - 6.16</td>
</tr>
<tr>
<td>Attacked others</td>
<td>1.07*** 1.06 - 1.09</td>
<td>1.05*** 1.04 - 1.06</td>
<td>1.05*** 1.04 - 1.06</td>
<td>1.04*** 1.03 - 1.05</td>
</tr>
<tr>
<td>Family in gang</td>
<td>2.47*** 2.16 - 2.83</td>
<td>2.46*** 2.08 - 2.92</td>
<td>3.03*** 2.47 - 3.73</td>
<td>2.49*** 2.06 - 3.01</td>
</tr>
<tr>
<td>Gender</td>
<td>2.79*** 2.45 - 3.18</td>
<td>2.49*** 2.11 - 2.94</td>
<td>5.19*** 4.10 - 6.58</td>
<td>1.95*** 1.63 - 2.35</td>
</tr>
<tr>
<td>Hispanic</td>
<td>0.89 0.76 - 1.04</td>
<td>0.83 0.67 - 1.02</td>
<td>0.82 0.63 - 1.06</td>
<td>0.96 0.77 - 1.21</td>
</tr>
<tr>
<td>Black</td>
<td>0.64*** 0.54 - 0.75</td>
<td>0.59*** 0.48 - 0.73</td>
<td>0.54*** 0.42 - 0.70</td>
<td>0.74** 0.59 - 0.92</td>
</tr>
<tr>
<td>Race other</td>
<td>0.73 0.51 - 1.03</td>
<td>0.46** 0.28 - 0.76</td>
<td>0.88 0.52 - 1.50</td>
<td>0.98 0.61 - 1.57</td>
</tr>
<tr>
<td>Constant</td>
<td>0.00*** 0.00 - 0.00</td>
<td>0.00*** 0.00 - 0.00</td>
<td>0.00*** 0.00 - 0.00</td>
<td>0.00*** 0.00 - 0.00</td>
</tr>
</tbody>
</table>

Chi-Squared: OR = Odds Ratio; CI = Confidence Intervals.

*Abbreviations: OR = Odds Ratio; CI = Confidence Intervals.

These Odds Ratio are estimated after controlling for the means of the variables gang membership, age, and age polynomials.

Number of respondents = 8,482; Number of person waves = 52,531

*p ≤ .05. **p ≤ .01. ***p ≤ .001 (two-tailed)
Results from table 5 indicate that youths’ within-individuals’ odds of generating income from any illegal activity were 2.08 times higher during periods when they entered a gang relative to periods when they were never in a gang. Similarly, youths’ within-individuals’ odds of generating income from any illegal activity were 2.09 times higher during periods when they continued in a gang than during periods when they were never in a gang, after holding all other variables in the model constant. Similar results were observed when analyzing drug sales. This table also shows that entering a gang had no significant effect on within-individuals’ odds of generating income from property crimes relative to periods when they were never in a gang. Similarly, continuation in a gang had no significant effect on youths’ within-individuals’ odds of generating income from theft relative to periods where they were never in a gang. Leaving the gang showed no differences in youths’ within-individuals’ odds of generating income from drug sales, property crimes, stealing things, or any combination of those crimes compared to periods where they were never in a gang. Since the control variables estimates from table 3 and table 5 are similar, their interpretation would also be similar. These results show that not all transitions through the gang have a significant effect on the outcome variables examined. Specifically, joining a gang increased within-individuals’ odds of generating income on most outcome variables examined (with the exception of property crimes).

Continuation in a gang also increased within-individuals’ odds of generating income from most of the dependent variables (with the exception of theft), and leaving the gang had no effect on within-individuals’ odds of generating income from any of the dependent variables analyzed. Unfortunately, prior studies have not examined changes in
within-individuals’ odds of generating income from criminal activities so the results observed in this table cannot be compared to other studies.

**Research Question no. 4.**

Table 6 presents four linear mixed models in which different gang membership transitions predict the amount of income generated from three distinct forms of illicit activities and the total amount of income across all three sources, net of controls. Since the dependent variables were logged in these models, the regression coefficients from this table will be interpreted in terms of percent change to ease their interpretation (Benoit, 2011). These models assess the fourth research question in this dissertation: do individuals generate different amounts of income from each of the crimes included in the analysis as they transition through different statuses in a gang, that is, over the life-course of gang membership?
Table 6

Linear mixed-effects models predicting within-individuals' amount of income generated from any illegal activity, drug sales, property crimes, or stealing things across gang membership transitions

<table>
<thead>
<tr>
<th></th>
<th>Any illegal activity</th>
<th>Drug sales</th>
<th>Property crimes</th>
<th>Stealing things</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coef.</td>
<td>s.e.</td>
<td>Coef.</td>
<td>s.e.</td>
</tr>
<tr>
<td>Enter gang</td>
<td>0.97***</td>
<td>0.06</td>
<td>0.81***</td>
<td>0.05</td>
</tr>
<tr>
<td>Continue in gang</td>
<td>1.20***</td>
<td>0.10</td>
<td>1.16***</td>
<td>0.09</td>
</tr>
<tr>
<td>Leave gang</td>
<td>0.10</td>
<td>0.07</td>
<td>0.17**</td>
<td>0.05</td>
</tr>
<tr>
<td>Age</td>
<td>-0.01***</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Salary</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>School enrollment</td>
<td>-0.06***</td>
<td>0.01</td>
<td>-0.07***</td>
<td>0.01</td>
</tr>
<tr>
<td>Parenthood</td>
<td>-0.01</td>
<td>0.02</td>
<td>-0.02</td>
<td>0.01</td>
</tr>
<tr>
<td>Married</td>
<td>-0.04</td>
<td>0.03</td>
<td>-0.04</td>
<td>0.02</td>
</tr>
<tr>
<td>Urban</td>
<td>0.01</td>
<td>0.01</td>
<td>0.00</td>
<td>0.01</td>
</tr>
<tr>
<td>Arrests</td>
<td>0.24***</td>
<td>0.00</td>
<td>0.14***</td>
<td>0.00</td>
</tr>
<tr>
<td>Marijuana use</td>
<td>0.63***</td>
<td>0.01</td>
<td>0.49***</td>
<td>0.01</td>
</tr>
<tr>
<td>Attacked others</td>
<td>0.07***</td>
<td>0.00</td>
<td>0.04***</td>
<td>0.00</td>
</tr>
<tr>
<td>Family in gang</td>
<td>0.26***</td>
<td>0.01</td>
<td>0.14***</td>
<td>0.01</td>
</tr>
<tr>
<td>Gender</td>
<td>0.17***</td>
<td>0.01</td>
<td>0.10***</td>
<td>0.01</td>
</tr>
<tr>
<td>Hispanic</td>
<td>-0.01</td>
<td>0.01</td>
<td>-0.02</td>
<td>0.01</td>
</tr>
<tr>
<td>Black</td>
<td>-0.06***</td>
<td>0.01</td>
<td>-0.04***</td>
<td>0.01</td>
</tr>
<tr>
<td>Race other</td>
<td>-0.06</td>
<td>0.03</td>
<td>-0.07*</td>
<td>0.03</td>
</tr>
<tr>
<td>Constant</td>
<td>0.00</td>
<td>0.02</td>
<td>0.01</td>
<td>0.01</td>
</tr>
</tbody>
</table>

Chi-Squared 0.000 0.000 0.000 0.000

Abbreviations: Coef. = Coefficient; s.e. = Standard Errors.
These coefficients are estimated after controlling for the means of the variables gang membership and age.
Number of respondents = 8,482; Number of person waves = 52,531
*p ≤ .05. **p ≤ .01. ***p ≤ .001 (two-tailed)

Results from table 6 indicate that youths’ within-individuals’ amount of income generated from a combination of illegal activities was significantly higher during periods in which they entered a gang and continued in a gang compared to periods when they were never in a gang. Specifically, youths’ within-individuals’ amount of income derived from a combination of illegal activities was 163% and 232% higher during periods in
which they entered a gang \((= \exp (0.97) \approx 2.637944)\) and continued in a gang \((= \exp (1.20) \approx 3.320117)\), respectively, compared to periods when they were never in a gang. Similar results were observed when analyzing the effect that entering and continuing in a gang had on the income generated from selling drugs, property crimes, and for stealing things.

Only the amount of income generated from drug sales during periods of leaving the gang resulted in a significant difference from the amount of income generated during periods when youth were never in a gang. Additionally, youths’ within-individuals’ amount of income derived from drug sales was 18 times higher during periods in which they left the gang compared to periods where they were never in a gang. Results from this table also showed that although youths’ within-individuals’ likelihoods of generating income from property crimes as they entered a gang, and from theft as they continued in the gang were not significantly different than periods when they were never in a gang (Table 5), the amount of income generated from these crimes as youth entered and continued in the gang, respectively, were significantly higher relative to periods where they were never in a gang.

Results also indicate that African American youth generated significantly lower amounts of income from all crimes analyzed, as well as a combination of them, than White youths. In addition, youth from other races generated almost 7 times less income from drug sales than White youth. Augustyn et al. (2019) also found that joining a gang and staying in the gang was associated with indirect within-individual increases in illegal earnings. In contrast, leaving the gang was associated with a direct within-individual decrease in illegal earnings.
Research Question no. 5.

Table 7 presents a logistic mixed effects model predicting the likelihood of selling drugs from gang involvement, net of controls. This model assesses the fifth research question in this dissertation: do individuals’ probabilities of selling drugs vary after they become gang members?

Table 7

*Logistic mixed-effects model predicting within-individuals' likelihood of selling drugs from gang membership*

<table>
<thead>
<tr>
<th></th>
<th>OR</th>
<th>[95% CI]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gang membership</td>
<td>1.99***</td>
<td>1.39 - 2.83</td>
</tr>
<tr>
<td>Age</td>
<td>0.89***</td>
<td>0.85 - 0.94</td>
</tr>
<tr>
<td>Age^2</td>
<td>0.96***</td>
<td>0.95 - 0.97</td>
</tr>
<tr>
<td>Age^3</td>
<td>1.00***</td>
<td>1.00 - 1.00</td>
</tr>
<tr>
<td>Salary</td>
<td>1.00</td>
<td>0.99 - 1.00</td>
</tr>
<tr>
<td>School enrollment</td>
<td>0.74***</td>
<td>0.65 - 0.85</td>
</tr>
<tr>
<td>Parenthood</td>
<td>0.71*</td>
<td>0.53 - 0.94</td>
</tr>
<tr>
<td>Married</td>
<td>0.57*</td>
<td>0.35 - 0.93</td>
</tr>
<tr>
<td>Urban</td>
<td>1.09</td>
<td>0.94 - 1.26</td>
</tr>
<tr>
<td>Arrests</td>
<td>1.27***</td>
<td>1.21 - 1.34</td>
</tr>
<tr>
<td>Marijuana use</td>
<td>22.92***</td>
<td>20.02 - 26.25</td>
</tr>
<tr>
<td>Attacked others</td>
<td>1.06***</td>
<td>1.04 - 1.07</td>
</tr>
<tr>
<td>Family in gang</td>
<td>2.59***</td>
<td>2.23 - 3.02</td>
</tr>
<tr>
<td>Gender</td>
<td>1.90***</td>
<td>1.65 - 2.19</td>
</tr>
<tr>
<td>Hispanic</td>
<td>0.71***</td>
<td>0.59 - 0.85</td>
</tr>
<tr>
<td>Black</td>
<td>0.47***</td>
<td>0.39 - 0.56</td>
</tr>
<tr>
<td>Race other</td>
<td>0.50***</td>
<td>0.33 - 0.75</td>
</tr>
<tr>
<td>Constant</td>
<td>0.00***</td>
<td>0.00 - 0.00</td>
</tr>
</tbody>
</table>

Chi-Squared                     0.000

Abbreviations: OR = Odds Ratio; CI = Confidence Intervals.

These Odds Ratio are estimated after controlling for the means of the variables gang membership, age, and age polynomials.

Number of respondents = 8,482; Number of person waves = 52,531

*p ≤ .05. ***p ≤ .001 (two-tailed)
Results from Table 7 indicate that youths’ within-individuals’ odds of selling drugs were 1.99 times higher during periods in which they were in a gang compared to periods when they were not in a gang, after holding all other variables in the model constant. This table also shows that males had 1.90 higher odds than females to sell drugs. Since the control variables estimates from table 3 and table 7 are similar, their interpretation also would be similar. An important difference between these control variables, however, is that during periods when individuals were married and had their children living with them, their within-individuals’ odds of selling drugs were significantly lower relative to periods when they were single and had no children living with them. Consistent with previous research, this model demonstrated that marriage and having children reduced within-individuals’ odds of engaging in delinquency (Bersani et al., 2009; O’Neal et al., 2016, Sampson & Laub, 1993). This finding indicates that although marriage and having children does not affect within-individuals’ odds of generating income from drug sales (Research Question no. 1, Table 3), or the amount of income generated from selling drugs (Research Question no. 2, Table 4), it does reduce within-individuals’ odds of selling drugs. In addition, Hispanic, African American, and youth from other races had lower odds to sell drugs than their White counterparts. These results mimic those obtained by Esbensen and Winfree (1998), who found that White gang members had the highest rate of drug sales compared to African American, Hispanic, or white gang members. Unfortunately, prior studies have not examined changes in within-individual’s likelihood of selling drugs derived from gang membership, so the results observed in this table cannot be compared to other studies.
Research Question no. 6.

Table 8 presents a negative binomial mixed effects model predicting the frequency of selling drugs from gang involvement, net of controls. Regression coefficients from this table are presented as incidence rate ratios to ease their interpretation. This model assesses the sixth research questions in this dissertation: do individuals’ frequencies of selling drugs vary after they become gang members?

Table 8

*Negative binomial mixed-effects model predicting frequency of selling drugs from gang membership*

<table>
<thead>
<tr>
<th></th>
<th>IRR</th>
<th>s.e.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gang membership</td>
<td>3.12***</td>
<td>0.97</td>
</tr>
<tr>
<td>Age</td>
<td>1.05*</td>
<td>0.02</td>
</tr>
<tr>
<td>Salary</td>
<td>1.00</td>
<td>0.00</td>
</tr>
<tr>
<td>School enrollment</td>
<td>0.50***</td>
<td>0.05</td>
</tr>
<tr>
<td>Parenthood</td>
<td>0.47**</td>
<td>0.11</td>
</tr>
<tr>
<td>Married</td>
<td>0.27***</td>
<td>0.10</td>
</tr>
<tr>
<td>Urban</td>
<td>1.27*</td>
<td>0.15</td>
</tr>
<tr>
<td>Arrests</td>
<td>1.98***</td>
<td>0.11</td>
</tr>
<tr>
<td>Marijuana use</td>
<td>242.96***</td>
<td>29.39</td>
</tr>
<tr>
<td>Attacked others</td>
<td>1.11***</td>
<td>0.01</td>
</tr>
<tr>
<td>Family in gang</td>
<td>4.34***</td>
<td>0.55</td>
</tr>
<tr>
<td>Gender</td>
<td>3.70***</td>
<td>0.45</td>
</tr>
<tr>
<td>Hispanic</td>
<td>0.64**</td>
<td>0.10</td>
</tr>
<tr>
<td>Black</td>
<td>0.29***</td>
<td>0.04</td>
</tr>
<tr>
<td>Race other</td>
<td>0.34**</td>
<td>0.12</td>
</tr>
<tr>
<td>Constant</td>
<td>0.00***</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Chi-Squared        0.000

Abbreviations: IRR = Incident Rate Ratios; s.e. = Standard Errors.
These coefficients are estimated after controlling for the means of the variables gang membership and age.
Number of respondents = 8,482; Number of person waves = 52,531
*p ≤ .05. **p ≤ .01. ***p ≤ .001 (two-tailed)
Results from Table 8 indicate that youths’ within-individuals’ frequency rate of selling drugs are 3.12 times higher during periods when they were in a gang than during periods when they were not in a gang, after controlling for all other variables in the model. Males also reported a 3.70 times higher frequency rate of selling drugs than females. In addition, Hispanic, African American, and youth from other races had a significant lower frequency rate of selling drugs than White youth. Results from this research related to those found by Thornberry et al. (1993) and by Gatti et al. (2005), as they also found that gang membership was associated with an increase in drug sales. Relatedly, Esbensen and Winfree (1998) also found that selling drugs was more common among male than among female gang members, and among White individuals than among African American, Hispanic, Asian or individuals of other race/ethnicity categories.

Unlike previous tables, Table 8 showed that during periods where youth were in urban settings their within-individuals’ frequencies of selling drugs were higher relative to periods when they were in rural (or unknown setting). Precisely why youth had a higher frequency rate of selling drugs while living in urban settings is not known. However, it is possible to argue that there is a higher demand for drugs in urban settings (Rigg & Monnat, 2015), or that their objective or perceived level of poverty was higher in urban settings compared to their (objective or perceived) level of poverty in rural settings, which would motivate youth to sell drugs more frequently to generate more income when living in an urban area (Tolan et al., 2003).
**Research Question no. 7.**

Table 9 presents a logistic mixed effect model where different gang membership transitions predict the likelihood of selling drugs, net of controls. This model assesses the seventh research questions in this dissertation: do individuals’ probabilities of selling drugs vary after they enter a gang, when they continue in a gang, or after they exit the gang, that is, transition through life-course changes in gang membership?

### Table 9

*Logistic mixed-effects model predicting within-individuals' likelihood of selling drugs across gang membership transitions*

<table>
<thead>
<tr>
<th></th>
<th>OR</th>
<th>[95% CI]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enter gang</td>
<td>2.01***</td>
<td>1.35 - 3.01</td>
</tr>
<tr>
<td>Continue in gang</td>
<td>2.16*</td>
<td>1.15 - 4.04</td>
</tr>
<tr>
<td>Leave gang</td>
<td>1.22</td>
<td>0.75 - 1.99</td>
</tr>
<tr>
<td>Age</td>
<td>0.89***</td>
<td>0.85 - 0.94</td>
</tr>
<tr>
<td>Age^2</td>
<td>0.96***</td>
<td>0.95 - 0.97</td>
</tr>
<tr>
<td>Age^3</td>
<td>1.00***</td>
<td>1.00 - 1.00</td>
</tr>
<tr>
<td>Salary</td>
<td>1.00</td>
<td>0.99 - 1.00</td>
</tr>
<tr>
<td>School enrollment</td>
<td>0.75***</td>
<td>0.65 - 0.85</td>
</tr>
<tr>
<td>Parenthood</td>
<td>0.71*</td>
<td>0.53 - 0.94</td>
</tr>
<tr>
<td>Married</td>
<td>0.57*</td>
<td>0.35 - 0.93</td>
</tr>
<tr>
<td>Urban</td>
<td>1.09</td>
<td>0.95 - 1.26</td>
</tr>
<tr>
<td>Arrests</td>
<td>1.28***</td>
<td>1.21 - 1.35</td>
</tr>
<tr>
<td>Marijuana use</td>
<td>22.88***</td>
<td>19.98 - 26.2</td>
</tr>
<tr>
<td>Attacked others</td>
<td>1.06***</td>
<td>1.04 - 1.07</td>
</tr>
<tr>
<td>Family in gang</td>
<td>2.58***</td>
<td>2.22 - 3.00</td>
</tr>
<tr>
<td>Gender</td>
<td>1.89***</td>
<td>1.65 - 2.18</td>
</tr>
<tr>
<td>Hispanic</td>
<td>0.71***</td>
<td>0.59 - 0.85</td>
</tr>
<tr>
<td>Black</td>
<td>0.47***</td>
<td>0.39 - 0.56</td>
</tr>
<tr>
<td>Race other</td>
<td>0.50***</td>
<td>0.33 - 0.75</td>
</tr>
<tr>
<td>Constant</td>
<td>0.00***</td>
<td>0.00 - 0.00</td>
</tr>
</tbody>
</table>

Chi-Squared 0.000

Abbreviations: OR = Odds Ratio; CI = Confidence Intervals.

These Odds Ratio are estimated after controlling for the means of the variables enter gang, continue in gang, leave the gang, age, and age polynomials.

Number of respondents = 8,482; Number of person waves = 52,531

*p ≤ .05. ***p ≤ .001 (two-tailed)
Results from Table 9 indicate that within-individuals’ odds of selling drugs were 2.01 times higher during periods when youth entered a gang than during periods when they were never in a gang. Similarly, youths’ within-individuals’ odds of selling drugs were 2.16 times higher during periods when they continued in a gang compared to periods when they were never in a gang. No significant differences in within-individuals’ odds of selling drugs were observed during periods when youth left the gang and were never in a gang. Table 9 also shows that males and White youth had higher odds to sell drugs than females and youth from any other race/ethnicity, respectively. Since the control variables estimates from table 9 were similar to those of table 7, their interpretation also would be similar. Unfortunately, prior studies have not examined changes in within-individuals’ odds of selling drugs across gang membership transitions, so the results observed in this table cannot be compared to other studies.

**Research Question no. 8.**

Table 10 presents a negative binomial mixed effects model where different gang membership transitions predict the frequency of selling drugs, net of controls. Regression coefficients from this table are presented as incidence rate ratios to ease their interpretation. This model assesses the eighth research questions in this dissertation: do individuals’ frequencies of selling drugs vary after they enter a gang, continue in a gang, or exit the gang?
### Table 10

**Negative binomial mixed-effects model predicting within-individuals' frequency of selling drugs across gang membership transitions**

<table>
<thead>
<tr>
<th></th>
<th>IRR</th>
<th>s.e.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enter gang</td>
<td>3.31***</td>
<td>1.18</td>
</tr>
<tr>
<td>Continue in gang</td>
<td>4.09*</td>
<td>2.32</td>
</tr>
<tr>
<td>Leave gang</td>
<td>2.02</td>
<td>0.81</td>
</tr>
<tr>
<td>Age</td>
<td>1.05</td>
<td>0.02</td>
</tr>
<tr>
<td>Salary</td>
<td>1.00</td>
<td>0.00</td>
</tr>
<tr>
<td>School enrollment</td>
<td>0.51***</td>
<td>0.05</td>
</tr>
<tr>
<td>Parenthood</td>
<td>0.47**</td>
<td>0.11</td>
</tr>
<tr>
<td>Married</td>
<td>0.26***</td>
<td>0.10</td>
</tr>
<tr>
<td>Urban</td>
<td>1.29*</td>
<td>0.15</td>
</tr>
<tr>
<td>Arrests</td>
<td>1.98***</td>
<td>0.11</td>
</tr>
<tr>
<td>Marijuana use</td>
<td>242.07***</td>
<td>29.28</td>
</tr>
<tr>
<td>Attacked others</td>
<td>1.11***</td>
<td>0.01</td>
</tr>
<tr>
<td>Family in gang</td>
<td>4.28***</td>
<td>0.55</td>
</tr>
<tr>
<td>Gender</td>
<td>3.68***</td>
<td>0.45</td>
</tr>
<tr>
<td>Hispanic</td>
<td>0.64**</td>
<td>0.10</td>
</tr>
<tr>
<td>Black</td>
<td>0.29***</td>
<td>0.04</td>
</tr>
<tr>
<td>Race other</td>
<td>0.34**</td>
<td>0.12</td>
</tr>
<tr>
<td>Constant</td>
<td>0.00***</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Chi-Squared: 0.000

Abbreviations: IRR = Incident Rate Ratios; s.e. = Standard Errors.

These coefficients are estimated after controlling for the means of the variables enter gang, continue in gang, leave the gang, and age.

Number of respondents = 8,482; Number of person waves = 52,531

*p ≤ .05. **p ≤ .01. ***p ≤ .001 (two-tailed)

Results from Table 10 indicate that youths’ within-individuals’ frequency rate of selling drugs was 3.31 and 4.09 times higher during periods when they entered a gang and continued in a gang, respectively, than during periods when they were never in a gang. These results are obtained after holding all other variables in the model constant.

Since the control variables estimates from Table 10 were similar to those of Table 8, their interpretation also would be similar. Results also indicate that males had a frequency rate of selling drugs 3.68 times higher than that of females, and that White youth also had a
significant higher frequency rate of selling drugs than youth of any other race/ethnicity.

Results from this research relate to the findings by Bjerregaard and Lizotte (1995), who found that the percentage of individuals who sold drugs was higher among current gang members, past gang members, and then future gang members. In similar studies, Thornberry et al. (1993) and Gatti et al. (2005) also found that individuals who were in a gang for at least two periods had an increase in drug sales overtime.

**Research Question no. 9.**

Table 11 presents a logistic mixed effects model predicting the likelihood of carrying a handgun from gang involvement, net of controls. This model assesses the ninth research question in this dissertation: do individuals’ probabilities of carrying a handgun vary after joining a gang?
Table 11

Logistic mixed-effects model predicting within-individuals' likelihood of carrying a handgun from gang membership

<table>
<thead>
<tr>
<th>OR</th>
<th>[95% CI]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gang membership</td>
<td>2.97*** 2.15 - 4.10</td>
</tr>
<tr>
<td>Age</td>
<td>0.91*** 0.88 - 0.93</td>
</tr>
<tr>
<td>Salary</td>
<td>1.00*** 1.00 - 1.00</td>
</tr>
<tr>
<td>School enrollment</td>
<td>0.65*** 0.57 - 0.75</td>
</tr>
<tr>
<td>Parenthood</td>
<td>0.82 0.62 - 1.07</td>
</tr>
<tr>
<td>Married</td>
<td>1.91*** 1.43 - 2.56</td>
</tr>
<tr>
<td>Urban</td>
<td>0.66*** 0.57 - 0.76</td>
</tr>
<tr>
<td>Arrests</td>
<td>1.21*** 1.15 - 1.28</td>
</tr>
<tr>
<td>Marijuana use</td>
<td>2.11*** 1.87 - 2.38</td>
</tr>
<tr>
<td>Attacked others</td>
<td>1.06*** 1.05 - 1.07</td>
</tr>
<tr>
<td>Family in gang</td>
<td>2.32*** 2.00 - 2.70</td>
</tr>
<tr>
<td>Gender</td>
<td>7.12*** 6.02 - 8.41</td>
</tr>
<tr>
<td>Hispanic</td>
<td>0.85 0.70 - 1.02</td>
</tr>
<tr>
<td>Black</td>
<td>0.76** 0.64 - 0.91</td>
</tr>
<tr>
<td>Race other</td>
<td>0.71 0.47 - 1.07</td>
</tr>
<tr>
<td>Constant</td>
<td>0.00*** 0.00 - 0.00</td>
</tr>
</tbody>
</table>

Chi-Squared 0.000

Abbreviations: OR = Odds Ratio; CI = Confidence Intervals.
These Odds Ratio are estimated after controlling for the means of the variables gang membership and age.
Number of respondents = 8,482; Number of person waves = 52,531
*p ≤ .05. **p ≤ .01. ***p ≤ .001 (two-tailed)

Results from Table 11 indicate that youths’ within-individuals’ odds of carrying a handgun were 2.97 times higher during periods in which they were in a gang compared to periods when they were not in a gang, after holding all other variables in the model constant. Interestingly, within-individuals’ odds of carrying a handgun were higher during periods when youth earned higher legal income relative to periods where they earned lower legal income. This table also showed that youths’ within-individuals’ odds of carrying a handgun were higher during periods when they were married and living in rural settings than during periods when they were single and living in urban areas, respectively. In addition, males had 7.12 higher odds to carry a handgun than females,
and African American youth had 0.76 lower odds to carry a handgun than their White counterparts. Unfortunately, prior studies have not examined changes in within-individual’s likelihood of carrying a handgun derived from gang membership, so the results observed in this table cannot be compared to other studies.

**Research Question no. 10.**

Table 12 presents a negative binomial mixed effects model predicting the frequency of carrying a handgun from gang involvement, net of controls. Regression coefficients from this table are presented as incidence rate ratios to ease their interpretation. This model assesses the tenth research questions in this dissertation: do individuals’ frequencies of carrying a handgun vary after joining a gang?
Table 12

Negative binomial mixed-effects model predicting frequency of carrying a handgun from gang membership

<table>
<thead>
<tr>
<th></th>
<th>IRR</th>
<th>s.e.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gang membership</td>
<td>5.80***</td>
<td>2.09</td>
</tr>
<tr>
<td>Age</td>
<td>0.97</td>
<td>0.03</td>
</tr>
<tr>
<td>Salary</td>
<td>1.00***</td>
<td>0.00</td>
</tr>
<tr>
<td>School enrollment</td>
<td>0.42***</td>
<td>0.05</td>
</tr>
<tr>
<td>Parenthood</td>
<td>0.64</td>
<td>0.17</td>
</tr>
<tr>
<td>Married</td>
<td>4.70***</td>
<td>1.39</td>
</tr>
<tr>
<td>Urban</td>
<td>0.42***</td>
<td>0.06</td>
</tr>
<tr>
<td>Arrests</td>
<td>1.44***</td>
<td>0.09</td>
</tr>
<tr>
<td>Marijuana use</td>
<td>2.80***</td>
<td>0.36</td>
</tr>
<tr>
<td>Attacked others</td>
<td>1.12***</td>
<td>0.01</td>
</tr>
<tr>
<td>Family in gang</td>
<td>3.08***</td>
<td>0.52</td>
</tr>
<tr>
<td>Gender</td>
<td>34.68***</td>
<td>6.50</td>
</tr>
<tr>
<td>Hispanic</td>
<td>0.75</td>
<td>0.14</td>
</tr>
<tr>
<td>Black</td>
<td>0.84</td>
<td>0.14</td>
</tr>
<tr>
<td>Race other</td>
<td>0.42</td>
<td>0.18</td>
</tr>
<tr>
<td>Constant</td>
<td>0.00***</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Chi-Squared: 0.000

Abbreviations: IRR = Incident Rate Ratios; s.e. = Standard Errors.
These coefficients are estimated after controlling for the means of the variables gang membership and age.
Number of respondents = 8,482; Number of person waves = 52,531
***p ≤ .001 (two-tailed)

Results from Table 12 indicate that youths’ within-individuals’ frequency rate of carrying a handgun were 5.80 times higher during periods when they were in a gang than during periods when they were not in a gang, after controlling for all other variables in the model. Since the control variables estimates from Table 12 were similar to those of Table 11, their interpretation also would be similar. Males also reported a 34.68 higher frequency rate of carrying a handgun than females. No significant differences were found for the frequency to carry a handgun by individuals’ race/ethnicity.Relatedly, Lizotte et al. (1996) also found that gang membership was correlated with carrying a handgun.
Research Question no. 11.

Table 13 presents a logistic mixed effect model where gang membership transitions predict the likelihood of carrying a handgun, net of controls. This model assesses the eleventh research question in this dissertation: do individuals’ probabilities of carrying a handgun vary after they enter a gang, when they continue in a gang, or after they exit the gang, that is, transition through life-course changes in gang membership?

Table 13

*Logistic mixed-effects model predicting within-individuals' likelihood of carrying a handgun across gang membership transitions*

<table>
<thead>
<tr>
<th></th>
<th>OR</th>
<th>[95% CI]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enter gang</td>
<td>3.22***</td>
<td>2.23 - 4.64</td>
</tr>
<tr>
<td>Continue in gang</td>
<td>2.45***</td>
<td>1.41 - 4.27</td>
</tr>
<tr>
<td>Leave gang</td>
<td>1.27</td>
<td>0.81 - 1.99</td>
</tr>
<tr>
<td>Age</td>
<td>0.91***</td>
<td>0.88 - 0.93</td>
</tr>
<tr>
<td>Salary</td>
<td>1.00***</td>
<td>1.00 - 1.00</td>
</tr>
<tr>
<td>School enrollment</td>
<td>0.65***</td>
<td>0.57 - 0.75</td>
</tr>
<tr>
<td>Parenthood</td>
<td>0.82</td>
<td>0.62 - 1.07</td>
</tr>
<tr>
<td>Married</td>
<td>1.90***</td>
<td>1.42 - 2.55</td>
</tr>
<tr>
<td>Urban</td>
<td>0.66***</td>
<td>0.58 - 0.76</td>
</tr>
<tr>
<td>Arrests</td>
<td>1.21***</td>
<td>1.15 - 1.28</td>
</tr>
<tr>
<td>Marijuana use</td>
<td>2.11***</td>
<td>1.87 - 2.38</td>
</tr>
<tr>
<td>Attacked others</td>
<td>1.06***</td>
<td>1.05 - 1.07</td>
</tr>
<tr>
<td>Family in gang</td>
<td>2.31***</td>
<td>1.98 - 2.68</td>
</tr>
<tr>
<td>Gender</td>
<td>7.11***</td>
<td>6.01 - 8.40</td>
</tr>
<tr>
<td>Hispanic</td>
<td>0.85</td>
<td>0.70 - 1.02</td>
</tr>
<tr>
<td>Black</td>
<td>0.76**</td>
<td>0.64 - 0.91</td>
</tr>
<tr>
<td>Race other</td>
<td>0.71</td>
<td>0.47 - 1.07</td>
</tr>
<tr>
<td>Constant</td>
<td>0.00***</td>
<td>0.00 - 0.00</td>
</tr>
</tbody>
</table>

Chi-Squared 0.000

Abbreviations: OR = Odds Ratio; CI = Confidence Intervals.
These Odds Ratio are estimated after controlling for the means of the variables enter gang, continue in gang, leave the gang, and age.
Number of respondents = 8,482; Number of person waves = 52,531
**p ≤ .01. ***p ≤ .001 (two-tailed)
Results from Table 13 indicate that youths’ within-individuals’ odds of carrying a handgun were 3.22 times greater during periods when they entered a gang than during periods when they were never in a gang. Similarly, youths’ within-individuals’ odds of carrying a handgun were 2.45 times greater during periods when they continued in a gang compared to periods when they were never in a gang. No significant differences in within-individuals’ odds of carrying a handgun were observed during periods when youth left the gang and were never in a gang. This table also shows that males and White youth had higher odds to carry a handgun than females and African American youth, respectively. Unfortunately, prior studies have not examined changes in within-individuals’ odds of carrying a handgun across gang membership transitions, so the results observed in this table cannot be compared to other studies.

**Research Question no. 12.**

Table 14 presents a negative binomial mixed effects model where different gang membership transitions predict the frequency of carrying a handgun, net of controls. Regression coefficients from this table are presented as incidence rate ratios to ease their interpretation. This model assesses the twelfth research question in this dissertation: do individuals’ frequencies of carrying a handgun vary after they join a gang, continue in a gang, or exit the gang, that is, over the life-course of gang membership?
Table 14

Negative binomial mixed-effects model predicting within-individuals' frequency of carrying a handgun across gang membership transitions

<table>
<thead>
<tr>
<th></th>
<th>IRR</th>
<th>s.e.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enter gang</td>
<td>5.28***</td>
<td>2.21</td>
</tr>
<tr>
<td>Continue in gang</td>
<td>6.61**</td>
<td>4.24</td>
</tr>
<tr>
<td>Leave gang</td>
<td>1.34</td>
<td>0.65</td>
</tr>
<tr>
<td>Age</td>
<td>0.97</td>
<td>0.03</td>
</tr>
<tr>
<td>Salary</td>
<td>1.00***</td>
<td>0.00</td>
</tr>
<tr>
<td>School enrollment</td>
<td>0.42***</td>
<td>0.05</td>
</tr>
<tr>
<td>Parenthood</td>
<td>0.64</td>
<td>0.17</td>
</tr>
<tr>
<td>Married</td>
<td>4.69***</td>
<td>1.39</td>
</tr>
<tr>
<td>Urban</td>
<td>0.42***</td>
<td>0.06</td>
</tr>
<tr>
<td>Arrests</td>
<td>1.45***</td>
<td>0.09</td>
</tr>
<tr>
<td>Marijuana use</td>
<td>2.82***</td>
<td>0.37</td>
</tr>
<tr>
<td>Attacked others</td>
<td>1.12***</td>
<td>0.01</td>
</tr>
<tr>
<td>Family in gang</td>
<td>3.10***</td>
<td>0.52</td>
</tr>
<tr>
<td>Gender</td>
<td>34.38***</td>
<td>6.46</td>
</tr>
<tr>
<td>Hispanic</td>
<td>0.75</td>
<td>0.14</td>
</tr>
<tr>
<td>Black</td>
<td>0.84</td>
<td>0.14</td>
</tr>
<tr>
<td>Race other</td>
<td>0.42*</td>
<td>0.18</td>
</tr>
<tr>
<td>Constant</td>
<td>0.00***</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Chi-Squared          0.000

Abbreviations: IRR = Incident Rate Ratios; s.e. = Standard Errors.
These coefficients are estimated after controlling for the means of the variables gang membership and age.
Number of respondents = 8,482; Number of person waves = 52,531
*p ≤ .05. **p ≤ .01. ***p ≤ .001 (two-tailed)

Results from Table 14 indicate that youths’ within-individuals’ frequency rate of carrying a handgun was 5.28 and 6.61 times higher during periods when they entered a gang and continued in a gang, respectively, than during periods when they were never in a gang. These results are obtained after holding all other variables in the model constant. There were no within-individuals’ significant differences in the frequency of carrying a handgun between the periods when youth left the gang and the periods when they were
never in a gang. Results also indicate that males had a frequency rate of carrying a handgun 34.38 times higher than that of females, and that White youth also had a significantly higher frequency rate of carrying a handgun than youth of “other” races. Similar results were found by Bjerregaard and Lizotte (1995) as they found that the percentage of individuals who carried a gun (i.e., pistol, revolver, rifle, shotgun) was higher among current gang members, future gang members, and then past gang members. In a related study, Lizotte et al. (1996) found that the frequency with which active gang members carried a handgun varied over time.

This dissertation showed that gang membership has significant effects on within-individuals’ behaviors. Results from this dissertation showed that gang membership was associated with higher within-individuals’ probabilities of generating income, and higher income generated from drug sales, theft, property crimes, and a combination of these activities. For example, gang membership increased 2.22 times within-individuals’ odds of generating income from drug sales, and 131 times the actual amount of income generated from that activity. Gang membership was also associated with higher within-individuals’ likelihood and frequency of selling drugs and carrying a handgun. For example, gang membership increased 1.99 times within-individuals’ odds of selling drugs, and 3.12 times the frequency which with they sold them.

Results from this dissertation also showed that transitions thorough the gang has within-individuals’ effects on the outcome variables analyzed. Specifically, this dissertation showed that within-individuals’ probabilities of generating income from most of the crimes analyzed increased as youth entered and continued in a gang. For example, joining a gang increased 1.72 times within-individuals’ odds of generating income from
theft, and continuation in a gang increased 2.09 within-individuals’ odds of generating income from any illegal activity. Joining and continuation in a gang was also associated with higher amounts of income generated from crime. Entering a gang increased 58% within-individuals’ income generated from theft (\(= \exp (0.46) \approx 1.584074\)), and continuation in a gang increased 218% within-individuals’ income from drug sales (\(= \exp (1.16) \approx 3.189933\)). Joining a gang and continuing in it also changed within-individuals odds and frequency of selling drugs and carrying a handgun. For example, joining a gang increased 2.01 times within-individuals’ odds of selling drugs, and continuation in a gang increased 6.61 time within-individuals’ frequency of carrying a handgun.
CHAPTER V
CONCLUSION AND DISCUSSION

This chapter begins by presenting some limitations with the current research. This chapter also demonstrates how the results obtained from this dissertation contribute to the literature on gangs and to the literature on the life course perspective in criminology. In addition, this chapter provides a discussion regarding the theoretical, research, and practical implications derived from this dissertation. It is important to note that although some of the subjects analyzed and results obtained in this dissertation are similar to those from previous studies, important differences exist between such findings, in the methods used to generate such findings, and more importantly, in the meaning of those findings. Additionally, replication is part of the scientific method and strengthens our understanding of findings generated by increasing the generalizability of research findings.

It is important to acknowledge that although this research contributes to the existing knowledge on gangs and the life-course perspective, it presents some limitations. Some of these limitations are related to the sample used for the dissertation. Although the NLSY97 consists of a national sample of youth in the U.S., it is not representative of youth who have been in a gang, who are currently in a gang, or of youth who are at risk for joining a gang (Lavrakas, 2008; Weisel, 1999). Consequently, the findings derived from this dissertation cannot be generalized to other populations. Relatedly, the findings from this dissertation do not represent the behavioral tendencies of gang members from
any particular gang, or from gangs from a particular geographic location. Additionally, data from the NLSY97 is self-reported. Self-reported data could potentially be a problem and result in inaccurate results if some respondents intentionally provided under or over-estimates of their own deviant and illegal activities because of social desirability (Harrison, 1995; Tan & Grace, 2008) or memory problems (Elliott & Ageton, 1980; Shillington et al., 2012). Relatedly, some respondents’ data could be imprecise regarding the time of actual and declared events. Said differently, some respondents, because of memory problems, might have stated that something occurred before their previous interview with NLSY97 interviewers, however, that event might have happened after such interview. While NLSY97 specifically asked respondents their involvement in activities “since their last interview,” it is possible that some respondents, on some waves of data collected, got confused regarding the actual time of events and reported their involvement in some behaviors (e.g., smoking marijuana, selling drugs), or the occurrence of an event (e.g., enrollment in school) in period that did not correspond to the period being asked about. Readers should be aware of these limitations when interpreting the results derived from this dissertation.

Despite these limitations, this research contributes to the current knowledge on gangs and on the life-course perspective by shedding light on the effect that entering a gang, continuing in a gang, and leaving the gang has on within-individuals’ likelihood of generating income from specific crimes, on the amount of income they generate from those crimes, and in the likelihood and frequency of selling drugs and of carrying a handgun. Specifically, results from this dissertation showed that there is variation, derived from gang membership and from transitions in a gang, on the outcome variables
examined in this dissertation. The analyses of the multivariate mixed-effects statistical models used to answer the research questions presented in this research showed that within-individuals’ likelihoods of generating income, and the amount of income generated from drug sales, property crimes, theft, and a combination of these crimes were higher during periods when youth were in the gang relative to periods when they were not in a gang. Results also showed that within-individuals’ likelihoods of generating income, and the amount of income generated from these outcome variables were higher during periods when youth joined a gang and continued in the gang relative to periods when they were never in a gang. In addition, the amount of income generated from drug sales was also higher during periods when youth left the gang relative to periods where they were never in a gang. Similar results were found when analyzing whether gang membership, and transitions in a gang increased youths’ within-individuals’ likelihoods and frequencies of selling drugs and of carrying a handgun, after controlling for important confounders.

These results further demonstrate the criminogenic effect that joining a gang has on behaviors (Adams & Pizarro, 2014; Thornberry et al., 1997) and contribute to the literature on gangs and to the literature on the life course perspective by showing how joining a gang served as a turning point that increased within-individuals’ likelihood of generating income from drug sales and theft, and the actual income generated from these crimes and property crimes. In addition, the turning point of joining a gang also increased within-individuals’ likelihood and frequency of selling drugs and of carrying a handgun. Results from this dissertation also contribute to the literature on gangs and to the literature on the life course perspective by demonstrating that continuation in a gang
served as a trajectory of crime—that began during gang membership onset—as within-individuals’ outcomes on the dependent variables examined were higher as they continued in the gang relative to periods were they had never been in a gang.

Additionally, these results demonstrated that leaving the gang served as another turning point over the life course as within-individuals’ likelihood of generating income from drug sales, property crimes, theft, a combination of these activities, and of selling drugs and carrying a handgun were similar to periods when they had not joined a gang. This dissertation also breaks down and illustrates the distinct effect that each stage in the gang has on individuals’ outcome variables examined and that originate with the turning point of joining a gang. It is important to mention that some of the within-individual changes on the outcome variables examined were not significant as youth transitioned through stages in a gang. For example, Table 5 showed that within-individuals’ likelihood of generating income from property crimes and from stealing things were not significant as youth entered or continued in a gang, respectively. Similarly, changes in within-individuals’ likelihood of generating income from any of the outcome variables examined in this table were not significant as youth left the gang. These results suggest that joining a gang and staying in it did not have a criminogenic effect on youths’ within-individuals’ likelihood of generating income from property crimes and theft relative to periods when they were not in a gang. Similarly, leaving the gang did not increase or reduce youths’ within individual’s probabilities of generating income from drug sales, property crimes, theft (and a combination of these activities) relative to periods where they were never in a gang. Table 6, in contrast, showed that youths’ within-individual
income from drug sales was higher in periods when they left the gang than in periods when they had not been in a gang.

Similar conclusions can be drawn from the tables analyzing within-individuals’ likelihood (Table 9) and frequency of selling drugs (Table 10), and within-individuals’ likelihood (Table 13) and frequency of carrying a handgun (Table 14) across transitions in a gang. These tables showed that changes in within-individuals’ likelihood and frequency of selling drugs and of carrying a handgun were significant as youth entered and continued in the gang, but not as they left the gang. These results suggest that youths’ likelihood and frequency of selling drugs and of carrying a handgun were comparable during periods when they left the gang to periods when they were never in a gang. These results help illustrate the criminogenic effect that joining a gang can have on some behaviors over the life course. These results, however, also showed that the effect that gangs have on some illegal behaviors is limited to periods of gang membership. This dissertation revealed that as individuals left the gang their within-individuals’ probabilities of generating income, and the actual income generated from property crimes, theft, and a combination of these activities decreased. As individuals left the gang their within-individuals’ likelihood and frequency of selling drugs and of carrying a handgun also decreased and went back to levels comparable to periods when they had not been in a gang. That is, leaving the gang help decrease individuals’ levels of offending. Since this dissertation showed that joining a gang increased within-individuals’ offending and leaving the gang decrease within-individuals’ offending, policy makers should allocate funds to the development, implementation and evaluation of gang prevention programs and of programs that help you transition out of gangs. Well developed and
implemented programs—such as the Gang Resistance and Education Training Program (G.R.E.A.T) and the Functional Family Therapy (Esbensen & Osgood, 1999; Gottfredson et al., 2018; Peterson & Esbensen, 2004; Thornberry et al., 2018)—can help youth stay away from gangs and reduce their level of offending.

This dissertation also contributes to the literature on gangs and the life course perspective by showing that gang membership and transition through a gang also affects within-individuals’ likelihood of generating income, and the income generated from drug sales, property crimes, theft, a combination of these crimes, and the likelihood and frequency of selling drugs and of carrying a handgun. While previous literature has shown that within-individuals’ legal and illegal income varied as youth became gang members, and as they entered a gang, continued in a gang, and left the gang (Augustyn et al., 2019), whether gang membership and transitions in a gang would also affect within-individuals changes in other sets of behaviors had not been addressed. This dissertation showed that gang membership and transitions through the gang also promoted within-individuals’ changes in the behaviors analyzed in this dissertation. Further research with other samples and outcome variables would be needed to expand our knowledge regarding the effect that joining a gang, continuation in a gang, and leaving the gang has on both social and antisocial behaviors.

While a number of scholars (Augustyn et al., 2019; Melde & Esbensen, 2011, 2014; Thornberry, Krohn et al., 2003; Winfree Jr, Bäckström, & Mays, 1994) and Chapter II in this dissertation provide theoretical arguments that explain within-individual changes in behaviors derived from gang membership and transitions through the gang, further empirical research is needed to test those arguments and determine the mediating
factors that influence within-individuals’ changes on the outcome variables examined in this dissertation as youth become gang members and as they transition thorough stages in a gang.

This dissertation also contributes to the existing literature on gangs and the life-course perspective by analyzing within-individuals’ changes in the amount of income generated from specific crimes derived from gang membership and from transitions through the gang. The current research found that gang membership was associated with a significant increase in within-individuals’ earnings from drug sales, property crimes, theft, and a combination of them. In addition, earnings from these crimes also were higher during periods when youth entered a gang and continued in a gang relative to periods when they were never in a gang. Only income from drug sales was significantly higher during periods when youth left the gang relative to periods when they were never in a gang. These results supports research conducted by Augustyn et al. (2019) who also found that within-individuals’ illegal income increased during periods of gang membership and during periods when youth entered and continued in a gang. These researchers also found that leaving the gang was associated with a significant decrease in within-individuals’ illegal income. Unfortunately, Augustyn and colleagues (2019) did not specify the sources of illegal income analyzed. An important difference between the study conducted by Augustyn et al. (2019) and the current research is that Augustyn et al. (2019) analyzed illegal income generated from a group of crimes, and this research examined income generated from drug sales, property crimes, theft, and a combination of them. This difference is important because the analyses from the current research sheds light on the influence that gang membership, and each stage in the gang has on within-
individuals’ changes in income from the specific forms of crime analyzed. The current research and Augustyn et al. (2019) found that within-individuals’ illegal income tended to decrease after leaving the gang. These authors argue that such decrease in income could be attributed to gang members removing themselves, or be removed by their former gang peers, from lucrative criminal activities. Interestingly, the current research showed that within-individuals’ income generated from drug sales was higher when youth left the gang relative to periods when they had not been in the gang. It is possible to argue that these individuals could have established connections in the drug business and kept them even after leaving the gang. These youth could continue to sell drugs—and generate income from them—from their home or from their place of legal employment even after leaving the gang (Papachristos, 2009b). This finding aligns with previous research that had established that some individuals continue to sell drugs even after leaving the gang as a way to generate income (Hagedorn, 1994). This finding also illustrates the long-term effect that the turning point of joining a gang can have on individuals’ behaviors of their life course, even after leaving the gang.

The current results also contribute to the literature analyzing sources of income among gang members (Cloward & Ohlin, 2013; Orlando, 1997; Ventakesth, 2008a; 2008b), gangs’ finances (Levitt & Venkatesh, 2000), and gang members’ income derived from drugs (Hagedorn, 1994; Papachristos, 2009b). While some scholars have explored how much money gang members generate from drug sales, no research, to date, had explored within-individuals’ changes in income from drug sales derived from gang membership and from transitions through the gang. Moreover, no research had explored within-individuals’ changes in income from property crimes and from theft as youth
became gang members, or as they entered a gang, continued in a gang, and left the gang. The current research addresses both of these gaps in the literature.

The current findings on income help illustrate the amount of income derived from specific forms of crime that individuals can generate throughout their time in the gang, and why gang members may prefer to engage in certain income generating crimes over others. This information may also shed light on the possibilities and responsibilities that youth may have of generating income for the gang as they join a gang, continue in a gang, and leave the gang. These results may also be useful for practitioners working with high at-risk youth and gang members as it might help them gain a better understanding of the amount of income derived from drug sales, property crimes, and theft (and a combination of them) that youth can generate while in a gang. Practitioners—using this information—could develop strategies to counteract the temptation of illegal income earnings associated with gang membership (Melde et al., 2012; Papachristos, 2009b), and design strategies to assist gang members find legal sources of income, especially if illegal income is what keeps individuals in the gang (Krohn et al., 2011).

The current research also contributes to the existing literature related to gang membership and transitions through the gang and their effect on youths’ drug sales and firearms carrying. Specifically, previous longitudinal research conducted by Bjerregaard and Lizotte (1995) had analyzed—by comparing percentages of individuals across stages in a gang—whether such stages were associated with individuals’ frequency of engaging in drug sales, carrying a gun, and other forms of delinquency. These scholars found that the percentage of current gang members who engaged in drug sales, carried a gun, and engaged in other forms of delinquency was higher than the percentage of future gang
members and the percentage of former gang members. Similarly, Gatti et al.’s (2005) longitudinal research using multivariate analysis of variance revealed that youths’ drug sales, property and person offenses (e.g., carrying a weapon) increased from the time youth where not in a gang to the time they joined a gang. In addition, as youth stayed in a gang they reported stable levels of property and person offenses and an increase in drug sales. However, as youth left the gang they reduce their personal and property offenses but increase their drug sales.

Relatedly, the current research found that within-individuals’ frequencies of selling drugs and of carrying a handgun where higher during periods when youth became gang members, and during periods when youth entered a gang and continued in a gang, relative to periods when they left the gang and were never in a gang. And, while the current findings are similar to results found by Bjerregaard and Lizotte (1995) and by Gatti, et al. (2005), they are not the same. These two previous studies produced estimates of variations in offending obtained from groups of individuals across stages in a gang. The current research, in contrast, used multivariate mixed-effects models and estimated within-individual differences in the likelihood and frequency of offending as youth entered and transition through stages in a gang after controlling for important confounders. This difference is important because the current research compares the estimates of a person’s likelihood and frequency of selling drugs and of carrying a handgun as he or she becomes a gang member and transitions through stages in a gang, with his or her own estimates when he or she was not a gang member.

On a different, but related subject, Huff (1989) had suggested that gang members first get involved in property crimes and, after a period of about two years, transition to
According to the findings of this analysis, within-individuals’ likelihood and frequency of selling drugs and of carrying a handgun, and the likelihood of generating income, and the actual income generated from drug sales, property crimes, and from theft were significantly higher during periods right after joining a gang, compared to periods where youth had never been in a gang. The current findings contradict Huff’s (1989) findings that youths’ involvement in drug sales occurs two years after joining a gang. Further research is needed to explain the discrepancy between these results. However, it is possible to that the type and organization in a gang influence members’ roles and responsibilities within the gang (Franzese, Covey, & Menard, 2016; McLean, Densley, & Deuchar, 2018). Neither the current nor the Huff (1989) research incorporated data on the type and organization of the gangs individuals had joined.

These findings also contribute to the existing literature on gangs and on the life-course perspective by analyzing changes in within-individuals’ likelihood of generating income from specific crimes or engaging in specific behaviors. More precisely, previous studies have analyzed whether the amount of illegal income generated (Augustyn et al., 2019) or the frequency with which individuals sold drugs or carried guns varied across stages in a gang (Bjerregaard & Lizotte, 1995; Hagedorn, 1994; Thornberry et al., 1993). No study, however, analyzed whether within-individuals’ likelihood of generating illegal income, or the likelihood of selling drugs or of carrying a handgun varied as youth became gang members, or as they transitioned through stages in a gang. This difference is important because the likelihood of generating illegal income is not the same as the
amount of illegal income generated, and the likelihood of selling drugs or of carrying a handgun is not the same as the frequency of doing it.

This distinction is important for theoretical reasons. Within-individual changes in youths’ likelihood of doing something as they become gang members—or transition through stages in a gang—does not equate to changes in their actual behaviors, or in the frequency of engaging in those behaviors. For example, scholars have established that gangs provide their members with opportunities to generate income from crime (Decker & Van Winkle, 1994; Morselli & Tremblay, 2004; Venkatesh, 2008a). According to this literature, and as demonstrated in this research, as youth become gang members their within-individuals’ likelihood of generating illegal income increases. However, that does not necessarily mean that youths’ illegal income will actually increase as they become gang members—or transition through stages in a gang—or that the frequency with which they engage in income generating crimes will also increase. Further theoretical arguments—using both gang related and life course arguments—and empirical analysis are needed to determine how changes in within-individuals’ likelihoods of doing something derived from gang membership (and transitions through the gang) affects the actual behavior and the frequency of that behavior.

Relatedly, the likelihood of generating income from drug sales, property crimes, and theft (and a combination of these crimes), and the likelihood of selling drugs and of carrying a handgun differ from one another, and are different as individuals enter, continue, and leave the gang. Knowing that within-individual’s probabilities of engaging in these activities are different from one another and that they vary according to stages in a gang could be used by practitioners working with high-risk youth and with gang
members to design interventions to prevent or reduce, according to each individual stage in a gang, their likelihood and frequency of involvement in those crimes. For example, as youth enter a gang, their within-individuals’ probabilities of carrying a handgun are higher than their within-individual probabilities of selling drugs. In addition, their within-individuals’ probabilities of carrying a handgun decrease as they continue and leave the gang. This information could help practitioners working with gang members design strategies to reduce youths’ probabilities of carrying a handgun, specially as they enter a gang, because as they continue and exit the gang their within-individuals’ likelihood of carrying a handgun decrease.
REFERENCES


development in restricted geographies. *Scottish Journal of Criminal Justice Studies, 14,* 96-114.


Becker, G. S. (2009). *Human capital: A theoretical and empirical analysis, with special reference to education.* University of Chicago press. Retrieved from https://d1wqttxts1xzle7.cloudfront.net/58822050/BECKER_HumanCapital_Cp1_3-with-cover-page-v2.pdf?Expires=1642700194&Signature=K~rNZYocw7o2oF7s57C4BwtmNzBpJXGR9TF4BkeQl90gT6b5zsIT1BNaQaAgTzS4hXyDWh2vQWozp~zEF641esWmDzha-2DIBOCvcb5IdvaZD2831FeKhMU0sDoac0g8o6ZMeddkkIZZMIDW7yg2k70lu eRW~Moh3n0DfglSzMPlvRdm0L5acbpJmigCziHCa7KSkvESGboF4Te5ZtW mfHqqlBRCRK5HX~rHvsnpMO5mEUQELQ3tdNENMsbeEW2VU-t4nJ5RGMOItss9Hyvmvj8pNZ-9XKJ9bSkgvACwGyy70iiBGcuUa8M3U194sTO1YbG9oooFl3dAYwDwLR3sA w__&Key-Pair-Id=APKAJLOHF5GSLRBV4ZA


delinquent gangs. Routledge.


Weapon carrying on school property among middle school students. *Archives of pediatrics & adolescent medicine, 153*(1), 21-26.


girls and gang boys: Results from a multisite survey. *Youth & Society, 31*(1), 27-53.


Farrington, D. P. (2003). Developmental and life-course criminology: Key theoretical and
empirical issues—the 2002 Sutherland Award address. *Criminology, 41*(2), 221-225.


Franzese, R. J., Covey, H. C., & Menard, S. (2016). *Youth gangs*. Charles C Thomas Publisher.


capital. *American sociological review*, 78(6), 925-948.


Crime and the Underclass in a Rustbelt City. Lake View Press, PO Box 578279, Chicago, IL 60657.


National Gang Center. What is a gang? Retrieved from https://www.nationalgangcenter.gov/about/FAQ


and Persistence (Doctoral dissertation, California State University, Long Beach).


Stata Corp (2017) Stata Statistical Software: Release 15. College Station, TX: StataCorp LLC.


gang involvement among African American and Hispanic women. *Youth &

activities theory. *International Journal of Offender Therapy and Comparative
Criminology, 46*(5), 555-568.


183-216.

transitions and its consequences: Exploring changes related to joining and leaving
gangs in two countries. *European Journal of Criminology, 12*(1), 70-91.

enforcement agencies*. US Department of Justice.

negative binomial distribution. *Ecology, 77*(8), 2549-2557.

Widdowson, A. O. (2018). Residential Mobility and Desistance from Crime and
Substance Use during the Transition to Adulthood. [Doctoral Dissertation, Florida
State University]. DigiNole: FSU’s Digital Repository.

adult offending: Considering the role of partner's socioeconomic
characteristics. *Criminology, 59*(1), 158-190.

Widdowson, A. O., & Siennick, S. E. (2021). The effects of residential mobility on
criminal persistence and desistance during the transition to adulthood. *Journal of
research in crime and delinquency, 58*(2), 151-191.

Williams, J., & Sickles, R. C. (2002). An analysis of the crime as work model: Evidence
from the 1958 Philadelphia birth cohort study. *Journal of Human Resources, 479-
509.

reported delinquency, and youth gangs: A new twist on a general theory of crime
and delinquency. *Youth & Society, 26*(2), 147-177.


CURRICULUM VITAE

L. Sergio Garduno

2301 S. 3rd St., Brigman Hall, Louisville, KY 40292  E-mail: lsgard01@louisville.edu

Education:

**Ph.D. Candidate in Criminal Justice**  
Graduation expected date – Summer 2022  
University of Louisville  
Louisville, KY

**M.A. in Criminology**  
May 2014  
Florida State University  
Tallahassee, FL

**M.A. in Marketing and International Business**  
May 2004  
Universidad de las Américas Puebla (*University of the Americas Puebla*) Puebla, Mexico

**B.A. in International Relations**  
August 2001  
Universidad de las Américas Puebla (*University of the Americas Puebla*) Puebla, Mexico

Teaching Interests and Experience:

Teaching Interests: criminological theory, gangs, juvenile delinquency, prisons, and research methods and statistics.

**Assistant Professor**  
Fall 2021 – Present  
Department of Anthropology, Sociology, and Criminology-Troy University  
Troy, AL

**Undergraduate Course Taught** – Criminal Behavior  
Fall 2020 & Spring 2021  
University of Louisville, Department of Criminal Justice  
Louisville, KY

**Online Teaching Assistant** (2 courses) - Graduate Assistant  
Fall 2013  
Florida State University, College of Criminology & Criminal Justice  
Tallahassee, FL

**Undergraduate Course Taught** - Principles of Marketing (2 sessions)  
Summer 2009
Peer Reviewed Publications:


Manuscripts in Progress:

Garduno, L. Sergio. "Does race moderate the effect of Adverse Childhood Experiences on youth’s levels of depression and anger?" (Working paper).

Book Chapter:


Other Professional Publications:


International Relations in their Labyrinth). El Colegio de México (The College of Mexico).

Professional Reports:


Professional Presentations:


Angelina Gomes, BA, Emily V. Reyes, BS, L. Sergio Garduno, BA, MA, Rita Rojas, MD, Geraldine Mir Mesejo, MD, Elisa Del Rosario, RN, Lina Jose, MD, Carmen Javier, MD, Catherine Vaughan, RN, Yeycy Donastorg, MD, Scott Hammer, MD, Karen Brudney, MD and Barbara S. Taylor, MD, MS. Poster “Increased prevalence and incidence of impaired fasting glucose, diabetes, and
obesity for HIV+ Hispanics in a resource-limited setting.” Poster presented at the Annual Conference of The Infectious Diseases Society of America October, 2013. San Francisco, CA.

Garduno, L. Sergio. Presentation “HIV Prevention” at the Universidad Madero (Madero University) on February 2009 and at the Universidad de las Américas Puebla (University of the Americas Puebla) on October 2008 and February 2009.


Work Experience:

**Graduate Assistant** to Dr. Gennaro Vito and Dr. Alex Widdowson Fall 2018 – Spring 2021
Department of Criminal Justice, University of Louisville Louisville, KY

**Managing Editor** December 2013 – November 2019
Journal of Criminology & Public Policy
Florida State University, College of Criminology & Criminal Justice Tallahassee, FL
- Responsible for reviewing submissions to the journal
- In charge of keeping the flow of communication between manuscript authors, peer reviewers, the journal’s editors, the copy editor, and the publisher.

**Research Associate** November 2010 – August 2014
University of Texas Health Science Center at San Antonio San Antonio, TX
Department of Medicine / Division of Infectious Diseases
- Responsible for managing and analyzing databases and qualitative information for three HIV research protocols.
- In charge of reviewing literature, proofreading articles and preparing application forms for the Internal Review Board revision process.
- Research liaison for HIV Research Protocols for the Dominican Republic.

**Programs Coordinator** Washington, D.C.
National Hispanic Council on Aging (NHCOA) February 2010 – October 2010
- Responsible for the supervision and evaluation of NHCOA’s community health programs.

**Consultant, Curriculum Developer** Mexico City, Mexico
Universidad Nacional Autónoma de México March 2009 - May 2009
(Mexico’s National Autonomous University)
• Responsible for the development of the course “Law, Public Safety and Justice” for a Masters in Public Safety.

Analysis Coordinator  
Puebla, Mexico
Public Safety Council of the City of Puebla  
November 2008 – May 2009
• Supervised and evaluated the implementation of a city-wide in-school crime prevention program.
• Responsible for encouraging anonymous crime reports among high crime area residents and for analyzing and referring those reports to proper city officials.

HIV Prevention Program Manager  
Gaithersburg, MD
Identity, Inc.  
• Led the planning, coordination and evaluation of an HIV counseling and testing program at five sites. Trained and supervised HIV counselors and peer educators.
• Responsible for maintaining relationships with the local, state and federal government regarding HIV grants. Authored quarterly program status reports.
• Conducted an HIV Prevention and Testing Program for inmates at the Montgomery County Correctional Facility (MD).

Finance Manager – Identity.  
• Managed budgets, process payroll, taxes and the daily accountability for the organization.

Assistant Evaluator and Youth Program Coordinator - Identity.  
• Led the statistical evaluation of all social programs of the organization.
• Responsible for creating evaluation tools, surveys, formats, and managing databases.
• Conducted an after-school life-skills educational curriculum for at high risk Middle and High School Latino youth and their families.

Product Analysis Specialist  
Puebla, Mexico
VOLKSWAGEN of Mexico / Central Marketing  
October 2003 – May 2005
• Generated and presented quantitative and qualitative sensitive information for strategic projects.
• Performed customer service, internal audits and managed databases.

Associations:
Member of the American Society of Criminology.

Volunteer work:
Volunteered with the Montgomery County Police Department  
Fall 2009
Served as a liaison between a community resource officer and the Hispanic community.