ANALYZING DEVELOPMENTAL PATHWAYS OF GANG MEMBERSHIP: RISK FACTORS, TURNING POINTS AND CONSEQUENCES

By

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To my parents, for the unconditional love and encouragement with which they have always provided me
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By

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Given that no social group is perhaps more criminogenic than the youth gang and the life-course perspective is currently the leading approach in criminology (Esbensen & Melde, 2011), it is surprising to see that not many empirical studies have carefully incorporated the issue of gang membership into the life-course framework. A fundamental but largely unexplored issue is to understand how gang member’s life evolves in a longitudinal sense. In particular, it is not yet clear how heterogeneity in gang membership develops over the life-course.

Against this background, using data from the Rochester Youth Developmental Study (RYDS), this dissertation addresses four main research issues. First, four developmental trajectories of gang membership are identified with Nagin’s (2005) semi-parametric group-based modeling technique. There is strong evidence of within-individual change in probabilities of gang affiliation across the life course. Second, informed by Thornberry and Krohn’s (2001; 2005) interactional theory of delinquency, different sets of risk factors are linked to distinct developmental pathways of gang membership. Further support is found for Klein and Maxson’s (2006) argument that
identifying gang-specific risk factors is crucial for the development of gang control programs. Third, following Sampson and Laub (1993; Laub & Sampson, 2003), life turning events that redirect developmental pathways of gang membership are explored. Results from generalized trajectory group models indicate that the impacts of a) the birth of a first child and b) police contact/arrest as exogenous variables vary across trajectory groups. Last but not least, differential long-term consequences are observed for individuals following distinct gang membership trajectories. Adult role/status fulfillment failure and persisting ties with delinquent associates mediate the relationship between gang membership trajectories and later criminal offending in adulthood.

Overall, the results emphasize the importance of moving beyond a dichotomy of “gang member” versus “not a gang member” and taking into account developmental heterogeneity in gang membership when designing and implementing gang prevention and intervention work. Limitations of the study and directions for future research are also discussed.
Almost a century ago, the pioneer gang researcher Frederic Thrasher (1927) stated that “the gang, in short, is life, often rough and untamed, yet rich in elemental social processes significant to the student of society and human nature; the gang touches in a vital way almost every problem in the life of the community” (p.3). Since then, scholars have made significant progress in understanding those “social processes” important to our comprehension of society and human nature (e.g. Decker & Van Winkle, 1996; Hagedorn, 1988; Klein & Maxson, 2006; Sanchez-Jankowski, 1991; Thornberry, Krohn, Lizotte, Smith, & Tobin, 2003; Vigil, 1988). We now understand that gang members, as compared to other youths, are more extensively involved in crime and delinquency. This conclusion holds across time, space and demographic groups. Further, the strong association between gang membership and offending is not due to individual heterogeneity or self-selection effects. There indeed exists a consistent gang facilitation effect on offending (e.g. Haviland, Nagin, & Rosenbaum, 2007; Melde & Esbensen, 2011).

The notion of a gang “life” in a longitudinal or developmental sense, however, has been less touched on in extant gang literature. This is understandable partly because early gang studies largely relied on field observation of activities of gangs and their members. Although early researchers and detached workers (e.g. Short & Strodtbeck, 1965) gathered a wealth of qualitative information about active gang members, minimal information was collected either before or after their involvement. Consequently, “the general literature on street gangs often fails to highlight life-course
development thereby limiting our understanding of both the antecedents and the consequence of gang membership” (Thornberry et al., 2003, p.4).

Longitudinal designs provide perhaps the best alternative for addressing the progression of gang involvement in a coherent sense (Krohn & Thornberry, 2008). Prospective longitudinal data have enhanced our ability to investigate a variety of substantive issues on gang membership. We now can describe the age of onset, persistence and desistance of gang involvement. It is also important to explore what factors contribute to the initiation, continuation and departure of a gang career. Additional issues like how life chances are affected once adolescents have joined the gang are worth investigating as well. Very importantly, there may be important developmental differences among street gang members.

Yet, what is less often acknowledged is the complexity accompanying this abundance of new information. Researchers often face the dilemma of “how best to explore and communicate the rich set of measurements at their disposal without becoming so bogged down in complexity that the lessons to be learned from the data are lost on them and their audience” (Nagin & Tremblay, 2005, p.875). Laub (2010) recently called for a “descriptive quantitative criminology”, through which we can better discern “the nature of crime and the characteristics of offenders and victims” (p.423).

Nagin’s (2005) semi-parametric group-based modeling technique is such a useful tool that helps us visualize what is going on in the data. The method summarizes individual differences in the developmental progression of offending in the form of distinct trajectories. Very importantly, the existence of the trajectories was not imposed ex ante on the basis of speculation but rather emerged from the data itself.
methodology has the capacity for distinguishing chance variation across individuals from real differences. Meanwhile, the semi-parametric group-based approach is not merely a descriptive tool. Numerous empirical investigations (e.g. Blokland, Nagin, & Nieuwbeerta, 2005; Lacourse, Nagin, Tremblay, Vitaro, & Claes, 2003; Haviland et al., 2007; Nagin & Land, 1993; Nagin, Farrington, & Moffitt, 1995) have demonstrated its value in testing the implications of criminological theory and making causal inferences.

Against this background, the overall purpose of the dissertation research is to respond to the gap in our knowledge of how gang member's life evolves in a longitudinal sense using the semi-parametric group-based approach. In particular, we are interested in how developmental differences exist and develop among gang members. We start this exercise by briefly defining gangs and gang members and assessing the current status of the problem.

Defining Gangs and Gang Members

Misrepresentations of gangs and gang members in the mass media have been well documented in a series of analyses (e.g. Bjerregaard, 2003; Esbensen & Tusinski, 2007; Howell, 2012). For instance, the myth that “once kids join a gang, they’re pretty much lost for good” is a key premise of broadcast media presentation. A street gang is viewed as a permanent “organization” and departure from it is not possible. Findings from empirical studies, however, indicate that the span of gang membership is usually short. The majority of gang youth were in a gang for one year or less (Krohn & Thornberry, 2008). Some other myths or fallacies about youth gangs include “all gangs are alike”, “a wanna-be is a gonna-be”, “gang members spend most of their time planning or committing crimes”, “most youths are pressured to join gangs” and so on (Howell, 2012, p.31-49).
To a large extent, misrepresentations of gangs and gang members are due to a definitional issue, which has also been one of the stickiest issues in academic gang research. Failing to clearly define gangs and gang members makes any discussion of the gang problem inaccurate and confusing. For example, in places without a long tradition of gang activity, police may identify less delinquent and organized social groups as gangs, whereas such “playgroups” may not be labeled as gangs in Los Angeles or Chicago. Then what is a gang? Who is a gang member?

In fact, there is not much consensus on these two seemingly easy questions. A concerted national effort has failed to reach an agreement between researchers and practitioners on what constitutes a gang, a gang member, or a gang incident (Spergel & Bobrowski, 1989). “In general, police departments in large cities apply the term quite narrowly, police in smaller cities and towns less narrowly, most media writers more broadly, and most distressed local citizens very broadly” (Miller, 1992, p.17).” Despite the existing controversy, there are a number of elements typically included in the definition of a gang.

First, everyone agrees that a gang denotes a group of people. Both early definitions of gang given by Puffer (1912) and Thrasher (1927) and later versions presented by Klein (1971) and Short (1996) include words such as “group”, “organization” or “association” in the first sentence of definition. Still, it is important to distinguish between actual youth gangs and groups of youngsters who are disobedient and commit delinquency in concert (Gordon, 1994). Second, the group needs to associate continuously and evidence permanence. Many confederations of young people are generally not recognized as gangs if they form temporally over a special
issue then are disbanded and never seen again. This feature of gangs varies considerably from several months in emergent gang cities to over a half century in traditional gang cities such as Los Angeles and Chicago. Another important element in defining a gang is involvement in an elevated level of criminal activity or commitment to a criminal orientation. Law enforcement and legislative efforts emphatically emphasize this criterion for targeting gangs. One camp of gang researchers, however, denies any connection to illegal activities in the definition to avoid a tautology (Short, 1996; Bjerregaard, 2002). They also argued that putting emphasis on illegal behaviors would overstate the centrality of criminal activity to gang life and concerns. On the other hand, Klein and Maxson (2006) suggested that incorporating criminal involvement or orientation in the definition facilitates rather than hinders gang research. Gang-related crimes vary in their levels, types and circumstances, which can be examined without circularity. In addition, crime is not the only issue researchers are interested in. The dependent variables often include gang size, gender, ethnic composition, cohesiveness, organizational sophistication, community embeddedness, and so on. Last but not least, members share a group identity and view themselves as a gang. Typically, the identity links to a name and often other symbols including colors, hand signs, graffiti, tattoos and certain ways of wearing clothes. A number of definitions of gangs also take turf, or gang-identified territory and organizational structure into consideration. Recent evidence has indicated that these elements are not as essential as some gang researchers previously assumed (Decker, Bynum, & Weisel, 1998; Howell, 2012; Klein, 1995).

Like how criminologists often measure crime and delinquency in empirical studies, a gang member can be either officially labeled by police (or other social
agencies) or self-nominated. Police departments across the country often keep detailed information of identified gang members, which may be linked with other crime databases and provide a valuable source of information about gang activities in the United States. Despite its usefulness, gang researchers have been skeptical and critical about using official records because such information can be dated, based on inaccurate information, or fail to reflect changes in gang affiliation (Curry, 2000; Esbensen, Winfree, He, & Taylor, 2001). In Esbensen and Huizinga's (1993) view, "official data provide rather subjective assessment of gang behavior" (p.566). Self-nomination is now the preferred way of measuring gang membership (Esbensen et al., 2001; Thornberry et al., 2003). Simply asking individuals whether or not they belong to a gang seems to be the best means of identifying who is a gang member. While there is some concern about whether subjects are totally honest in answering such a question, there exists a consensus that valid responses can be obtained when proper research practices are observed in confidential settings. Prior research has also indicated that self-nomination reduces the errors of false identification (Esbensen et al., 2001; Winfree, Fuller, Vigil, & Mays, 1992). Thus, gang members examined in the dissertation research are self-nominated participants in a “non-transitory” youth group whose involvement in criminal acts is part of its group identity.

The Gang Problem and Crime

Beginning with Walter Miller’s efforts in the 1970s, scholars have endeavored to gather systematic information about the scope and nature of gang activities across the nation. Miller (1975; 1992; 2001) compiled interview data, police reports, conference materials and media reports about gangs and reached the conclusion that “the United States, during a time period comprising roughly the last three decades of the 20th
century, experienced gang problems in more identified localities than at any other time in history” (Miller, 2001, p.6). Klein (1995) reported a similarly incredible proliferation of gangs to more American cities and a concomitant increase in the number of gangs and gang members in American Society. According to Klein, there was a 74% increase in the number of gang-involved cities in the 1960s, an 83% increase in the 1970s and a phenomenal 345% increase from 1980 to 1992. Curry, Ball, and Fox (1994) also evaluated the magnitude of the gang problem across the nation. Of the 79 largest city police departments, 91 percent reported the presence of criminally involved groups that they labeled as gangs. The estimated total number of gangs and gang members in 1991 were respectively 4,881 and 249,234. Curry, Ball and Decker (1996) extended the previous study by including additional cities at different scales. They found that 57% of all American cities had a gang problem in 1993; 89% of the cities with a population over 200,000 and 87% of the cities with a population between 150,000 and 200,000 reported a gang problem. Gangs are no longer a large-city problem but have spread to cities of all sizes. Although there has been a slight reversal of the trend in recent years, the gang problem remains a huge concern. Most recent statistics show that there were 28,100 gangs and 731,000 gang members throughout 3,500 jurisdictions in the United States, with roughly one out of every three law enforcement jurisdictions reporting gang problems (Egley & Howell, 2011).

No matter how sharp the increase is in terms of the percentage of cities that are currently experiencing the gang problem and the sheer number of gangs and gang members in American society, it is gang-related crime, particular violence, that concerns the public, scholars and policy makers most. In perhaps the most striking example of
the problem, Egley and Howell (2011) reported that among cities with populations of 100,000 or more, approximately one-quarter of all homicides were gang related. In the capitals of gang activities, Los Angeles and Chicago, one-half and one-third of the homicides were gang related. Klein, Weerman and Thornberry (2006) also reported that gang violence, as compared to non-gang violence, is more likely to occur in public places, to involve more lethal weapons, more assailants, and more victims. Not surprisingly, the social harm and injury caused by gang crime/violence and the associated fear that gangs engendered in the community has been used to justify the enormous amount of money spent on gang prevention and intervention programs.

Indeed, there exists little doubt about the association between gang membership and high rates of criminal involvement. Gang members, as compared with other youths, are more extensively involved in delinquency—especially serious and violent delinquency and have higher rates of offending during active gang membership than they do either before or after gang participation. As Thornberry et al. (2003) stated, this is “perhaps the most robust and consistent observation in criminological research” (p.1). The link between gang membership and offending holds across time, geographic and national boundaries, sex or race/ethnicity division, definitions of gangs and different measurements of offending (Klein & Maxson, 2006; Melde & Esbensen, 2011). Further, it holds up when gang members are compared with highly delinquent, non-gang street offenders (Thornberry, 1998) as well as with non-gang youths surrounded by highly delinquent friends (Battin-Pearson, Hill, Abbott, Catalano, & Hawkins, 1998; Gordon et al., 2004; Thornberry et al., 2003).
With such rapid spread of gangs throughout the country, coupled with the strong correlation between gang membership and serious, violent delinquency, it is not surprising to see an ever-increasing call for research to understand as fully as possible why individuals join gangs, how gang membership facilitates crime, why youth leave gangs once have joined, and the enduring consequences of gang membership. Doing so will lead to important theoretical developments in the study of antisocial behavior and provide empirical foundations for many prevention and intervention policies (Krohn & Thornberry, 2008). This is exactly where gang research should meet with the life-course perspective in criminology.

**Life-Course Criminology is Now Criminology**

In his 2010 Sutherland Address to the American Society of Criminology, Francis Cullen (2011) stated that “Life-course criminology is now criminology; it should replace adolescent-limited criminology as the organizing framework for the study of crime causation; we need to study what happens not only during but also before and after adolescence” (p.310). According to Cullen, this is not to argue that other criminological theories are not important; instead, they should be organized around the life-course perspective. Then what is life-course criminology?

To answer this question, it is helpful to first recall what the traditional perspective is. Generally speaking, traditional criminological theories have aimed to explain between-individual differences in offending. That is, why people with certain features, either at the individual- or macro-level, are more likely to commit delinquency than people without or at a lessened degree of such features. For example, Hirschi (1969) examined why boys lack of social bonds to conventional society were more likely to exhibit problem behaviors than boys with conventional social bonds and Shaw and
McKay (1942) explored why boys from disadvantaged neighborhoods commit more offenses than upper-class boys. These early criminological perspectives also focused primarily on offending during the teenage years and emphasized constructs that are most applicable to those years such as status deprivation/frustration (Cohen, 1955) or the strain between aspirations and what can be legitimately achieved (Cloward & Ohlin, 1960). Moreover, the measured features and offending outcomes were often obtained from cross-sectional surveys. Hence, while they have made important contributions to knowledge, many classic criminological theories were “essentially static theories” and “not developmental in nature” (Farrington, 2005, p.1-2).

On the contrary, life-course criminology allows for the analysis of both between- and within-subject changes in offending throughout life with longitudinal data. Specifically, life-course criminology is a further elaboration of the criminal career paradigm that became prominent in the 1980s (Blumstein, Cohen, Roth, & Visher, 1986; Piquero, Farrington, & Blumstein, 2003). The criminal career approach argues for the partition of the aggregate rate of offending into two primary components—participation and frequency, and a criminal career is thus “the characterization of the longitudinal sequences of crimes committed by an individual offender” (Blumstein et al., 1986, p.12). Mainly as a way of structuring and organizing knowledge about key features of individual offending, the criminal career paradigm laid the groundwork for investigating issues like “why and when people start offending (onset), why and how they continue offending (persistence), why and if offending becomes more frequent or serious (escalation) or specialized, and why and when people stop offending (desistance)”
(Piquero et al., 2003, p.377). Since then, a great deal of empirical attention has been brought to expand the life-course framework.

Influenced by developmental psychology (Lerner, 1986), developmental approaches to the study of crime tend to emphasize the nonrandomness of changes in individuals’ offending behavior during the life cycle (Le Blanc & Frechette, 1989; Le Blanc & Loeber, 1998; Loeber & Le Blanc, 1990). The course of offending is fundamentally an “unfolding” process of some underlying traits for deviancy usually originated in the childhood years, although manifestations of such traits in the course of offenders’ lives may change. The course of offending is essentially “predictable, hierarchical and orderly” (Loeber & LeBlanc, 1990, p.451), and characterized by the notions of progressions, growth, stages and evolution. For instance, Loeber (1990) conceived of the “developmental stacking” of problem behaviors and proposed a three-pathway model of the development of delinquency (Loeber, Wei, Stouthamer-Loeber, Huizinga, & Thornberry, 1999). Moffitt’s (1993) arguments on life-course-persistent offenders also fall into this category.

While acknowledging the existence of individual heterogeneity and laws of human development such as aging, Elder (1998; Elder & Rockwell, 1979) and other life-course theorists reject the determinism that is inextricable to the developmental approach (Dannefer, 1984; Sampson & Laub, 1993; Laub & Sampson, 2003; Thornberry & Krohn, 2005). They instead embrace the idea that human life is often unpredictable and constantly evolving. Human development is viewed as explicitly multidimensional and the effect of any life event is determined by its relation to other events and its timing in the life course. They devote special attention to "link social
structure and social history to the unfolding of human lives” (Laub & Sampson, 2003, p.33). Human agency is also explicitly considered by life-course theorists as playing a crucial role in making choices and constructing one’s life course. The life-course paradigm thus assumes a general causality but allows for the possibility that life circumstances may materially alter an individual’s criminal trajectory above and beyond persistent individual differences (Piquero et al., 2003). In their age-graded theory of informal social control, for instance, Sampson and Laub (2005) argued that, regardless of the number of pathways, the same class of causal mechanisms account for trajectories (pathways) of criminal behavior across the life course. A similar argument has been made by Thornberry and Krohn (2001; 2005).

Findings from criminal career and related studies, in particular, the fact that a fairly small group of offenders had a long criminal career and was responsible for committing the majority of all criminal offenses (Wolfgang, Figlio, & Sellin, 1972; Shannon, 1982), led scholars and policy makers to be concerned about devising programs to identify these frequent offenders in advance and prevent their delinquent development. The risk factor prevention paradigm, imported from medicine and public health research, thus aims to identify the key risk factors for offending and implement prevention methods designed to tackle them (Farrington, 2000; Loeber & Farrington, 1998). There is often a related attempt to locate key protective factors and enhance protection for high-risk subjects. In practice, a key advantage of the risk factor prevention paradigm is that it links theoretical and applied research, reasoning and action, and scholars and practitioners, which is most appropriate to tackle the gang problem.
In a nutshell, life-course criminology incorporates distinct but interrelated paradigms in addressing the following three main issues: the development (onset, escalation, persistence and desistance) of offending, risk and protective factors at different life stages and the effects of life events on the course of development (Farrington, 2005). In spite of theoretical and methodological challenges (Gottfredson & Hirschi, 1986; 1987; 1988) and debates within the life-course perspective, research on “criminal career” and related issues has generated a wealth of information regarding the longitudinal patterning of criminal activity.

**The Present Study: Gang Membership in the Life-Course Perspective**

Given that no social group is perhaps more criminogenic than the youth gang (Melde & Esbensen, 2011) and the life-course perspective is currently the leading approach in criminology, it is surprising to see that not many empirical studies have carefully incorporated the issue of gang membership into the life-course framework. Not much empirical attention, for example, has been paid to the progression of gang membership itself—a very basic but fundamental issue in gang research. This dissertation research thus aims to respond to this research gap by placing the study of gang membership in the life-course framework. It is imperative to explore how life-course theories of criminal behavior may enhance our understanding of gang membership and guide future gang research and policy-making work. Meanwhile, this is also a novel test of empirical validity of extant life-course theories, through which we can make further contributions to the broader literature on individual development of offending. Against this background, the dissertation research has four main aims:

As a starting point, it is important to examine the development of gang membership itself. Various core concepts in life-course criminology can be
constructively applied to gang members because participating in a gang is like going through a “criminal career”: youth join gangs (onset), persist over a certain period of time (persistence), and then typically leave gangs (desistance) (Pyrooz, Sweeten, & Piquero, 2013).

A crucial but largely unanswered question is whether there exist distinct developmental pathways of gang membership. Findings from existing studies indicate that the span of gang membership is usually short (Krohn & Thornberry, 2008). The majority of gang youth were in a gang for one year or less. However, many youth reported being in a gang for two, three and even four or more years, suggesting considerable variability in the duration of gang membership (Gordon et al., 2004; Peterson, Taylor, & Esbensen, 2004; Thornberry et al., 2003). In addition, not many studies have taken the age of onset and developmental stages (timing) in the gang into consideration. These features are as important as the length of gang membership. As mentioned earlier, Nagin’s (2005) semi-parametric group-based modeling technique is an appropriate statistical tool to address the aforementioned issues.

The second research aim is to explore antecedents or risk factors of gang membership. In particular, it is meaningful to see if different sets of push and/or pull factors are linked to distinct developmental pathways of gang membership. Exploring correlates of gang membership have suggested that there are probably diverse paths to gang involvement and looking for a single cause may not be helpful. To date, only a limited number of longitudinal studies have investigated this issue and few results are replicated. In addition, there have been minimal efforts to differentiate risk factors for distinct developmental pathways of gang membership (Krohn & Thornberry, 2008). In
reality, identifying gang-specific risk factors is crucial for developing good gang intervention polices (Klein & Maxson, 2006). Focusing intervention work on key risk factors and allocating scarce resources toward youths who are most likely to become gang members appears to be the most productive approach for now.

Third, it is important and necessary to move beyond risk factors and add time-varying covariates to the pathways. That is, we take into account the influence of key life events that occur during the measurement period of the pathways. Life turning events such as the birth of a first child and police contact/arrest may redirect developmental trajectories of gang membership. Very importantly, the impacts of life turning events may vary across trajectory groups.

Last but not least, it is crucial to examine long-term consequences of possessing a “gang career”. Previous studies have reported “cascading” consequences of gang membership several years into adulthood (Krohn, Ward, Thornberry, Lizotte, & Chu, 2011; Levitt & Venkatesh, 2001a; 2001b; Pyrooz, 2014a; Thornberry et al., 2003). Still, many questions remain. For instance, are there different consequences for distinct trajectory groups? If yes, why and through what mechanisms (mediation)? Not knowing answers to these questions constrains our understanding of the nature of the gang problem.

To address the four main research questions, Chapter 2 offers a review of the literature on gang affiliation and crime. Based on evolving stages of gang membership, this chapter is divided into three sections: “the origins of gang membership”, “gang experience and gang desistance” and “the enduring consequences of gang membership”. Chapter 3 introduces key theoretical concepts in life-course criminology
(e.g. trajectories, turning points and behavior continuity and stability), and two leading life-course theories of general offending are reviewed. Informed by the two previous theories, Chapter 4 proposes a life-course explanation of gang involvement specifically. Research questions and hypotheses are presented. Chapter 5 outlines the methods—data, measures and analytic issues/strategies—used to estimate the developmental trajectories of gang membership and to explore risk factors, turning points and adulthood outcomes of a gang career. The first results chapter (Chapter 6) provides a detailed description of the number, shapes and proportion of individuals belonging to trajectory groups. Trajectory group characteristics (e.g. age of onset, timing and duration) and risk factors linking to distinct trajectories are also discussed. Moving beyond basic understanding of gang membership trajectories, Chapter 7 explores how two potential life turning events redirect developmental pathways of gang affiliation and whether the impacts vary across trajectory groups. The next chapter (Chapter 8) addresses the long-term consequences of following distinct gang membership trajectories and associated mediating factors. Finally, Chapter 9 presents a summary of the principal empirical findings and a detailed discussion of the theoretical and policy values of the results. Both the limitations and directions for future research are also considered.
CHAPTER 2
DECIPHERING GANG MEMBERSHIP ACROSS THE LIFE COURSE

The Origins of Gang Membership

We begin the journey of deciphering gang membership across the life course by examining the origins of gang membership. In other words, we first need to understand why street gangs exist and how individuals become involved in street gangs. Given that the existence of gangs is rooted in community and city conditions, it is not surprising to see that early theories of street gangs have a strong structural orientation—that is, gang behavior is an adolescent response to disadvantaged living conditions, minority status, and blocked opportunities in mainstream society.

A Brief Overview of Early Theories of Street Gangs

In his pioneering study of street gangs, Thrasher (1927) made major contributions to the social disorganization perspective of the Chicago school on crime and delinquency (Shaw & McKay, 1942; Whyte, 1943). He marked the gangs’ physical location in Chicago, and contended that “gangland represents a geographically and socially interstitial area in the city” (p.6). He specifically connected gang participation with five community conditions: community disorganization, ineffective families, poor-quality schooling, association with undesirable peers and lack of leisure-time guidance. The key premise of Thrasher’s theory—and the Chicago school in general—lay on the weakening of social controls in key social institutions, particularly in communities, families, schools and religious institutions.

Cohen (1955) adopted a strain theory orientation arguing that the structural sources of strain lead to deviant adaptations, in particular the delinquent subculture, by the lower class. Departed from Merton’s (1938) emphasis on the inability to gain
material success, Cohen contended that it is the inability to gain status and acceptance in relation to the larger class system that produces the motivation for turning to the delinquent subculture and joining a gang. Status in conventional society is achieved through following the middle-class standards of dress, behavior, scholastic abilities and so on (e.g. good manners, non-aggressive attitudes and behaviors, attention to grades). However, lower-class youths, especially boys, cannot always meet these standards. As a result, the delinquent subculture is cultivated as a reaction to status frustration. Lower-class boys attain status and acceptance by adhering to “malicious” and “negativistic” values in opposition to conventional standards.

Cloward and Ohlin (1960) challenged Cohen’s notion that gang boys are primarily reacting to middle-class values. Instead, they proposed a “differential opportunity” theory of delinquency. Cloward and Ohlin argued that gang boys turn to deviant opportunities in order to achieve goals because opportunities for conformity are limited—not out of negative, malicious reaction to established goals, as Cohen (1955) had suggested. Although deprivation of legitimate opportunities produces a strain toward delinquent subculture and gang participation, what kind of delinquent patterns they would become involved in depend on what illegitimate opportunities are available to them in their community. Cloward and Ohlin further depicted three types of delinquent subcultures and associated gangs: conflict (fighting gangs), criminal (youth gangs organized to commit income-producing offenses) and retreatist (drug addicts).

Miller (1958) offered an exclusively cultural explanation on gang participation, which originated from a cultural conflict perspective (Sellin, 1938). According to Miller, joining a gang is a youthful adaptation to a distinct lower class culture rather than
middle-class expectations or a so-called delinquent subculture. Miller identified six “focal concerns of lower class-culture”: trouble, toughness, smartness, excitement, fate and autonomy. In adhering to the focal concerns of this culture, lower class males achieve status and belonging in the street corner groups.

More recent explanations of gang participation continue to have a structural orientation. Hagedorn (1988) focused on the impact of political and economic environment on gangs and crime. Besides the traditional problem of limited opportunities, the process of de-industrialization further eroded legitimate means in American society, especially in the industrial infrastructure of large, rust-belt cities. Decker and Van Winkle (1996) similarly emphasized the twin processes of de-industrialization and the escape of middle-class and working-class families from urban America. De-industrialization, the increasing level of racial segregation and the concentration of poverty created a distinguishable social class—the underclass (Wilson, 1987), which was permanently locked out of the restructured labor market and sliced off upward mobility routes. Consequently, it enhanced the lure of street gangs.

Vigil (1988; 2002) developed his theory of “multiple marginalization” to explain the existence and proliferation of Chicano youth gangs in Southern California. According to Vigil, the marginalization process occurs in a developmental sequence in which exposure to marginalization in macro-historical and macro-structural factors (e.g. immigration, language barriers and racism) further impacts marginalization in other social institutions (e.g. family, education and economic burden). As a result, the failed social institutions cannot exert social control on marginalized youths, who very often find joining a gang as the coping strategy for stressful urban street life. His insights have
been applied to other contexts and as an explanation of gang participation for other
etnicities and races (e.g. Freng & Esbensen, 2007).

Although structural theories have provided us with important hints on gang
formation and participation, the advent of longitudinal studies has largely shifted
research efforts from a singular theoretical model or the advancement of criminological
theory to more generic causal models (Decker, Melde, & Pyrooz, 2013). Identifying risk
factors for gang affiliation is now an essential approach in gang research.

Risk Factors for Gang Participation

As Thornberry et al. (2003) suggested, there are several advantages of
identifying risk factors, especially those that occur early in the life course, for gang
membership. For instance, identifying factors that increase the risk of joining a gang
suggests fruitful areas for formal causal analyses. Knowledge of risk factors also helps
structure the design of prevention programs by identifying “at risk” youth for whom
efforts are most likely realized.

By definition, risk factors for gang joining are any individual or environmental
hazards that increase an individual’s vulnerability of gang affiliation. Consistent with the
multidimensionality of the life course approach, risk factors are assumed to originate
from multiple domains of an individual’s background (Rutter, 1987). Typically, risk
factors are grouped within the five ecological domains of individual, family, peer, school
and broader community. Risk factors from different domains may add up or accumulate
to increase the probability of adversity. Meanwhile, there are likely to be multiple rather
than single pathways to joining a gang. In other words, the origins of gang membership
are characterized by equifinality (Cicchetti & Rogosch, 1996).
Correlational studies on risk factors

Turning to the empirical literature, a number of cross-sectional studies have identified risk factors for gang membership. Klein and Maxson’s (2006) compilation was drawn predominantly from cross-sectional studies (14 of the 20 studies they reviewed are with a cross-sectional research design). They found that although risk factors for gang involvement are identified in all five domains, the five domains are not equally implicated. Specifically, the characteristics and affective dimensions of peer networks received consistent support in the gang risk factor literature, which is not surprising given that youth become more independent and exercise more control over time and space. Within the family domain, only parental supervision received consistent support as a risk factor. Family poverty, having a single parent, affective ties among family members, parenting styles and family deviance histories are not identified as risk factors in most of the reviewed studies. Two individual-level dimensions—negative life events and problem behaviors—received uniform support from all studies. A third individual characteristic—delinquent belief also received support from the majority of studies. Youths’ experiences in school and neighborhood, however, received either inconclusive or no support as risk factors.

Thornberry and colleagues (2003, p.57-61) also provided a comprehensive review of correlational studies on risk factors for gang membership. Specifically, risk factors were identified in seven domains: area characteristics, family socio-demographic characteristics, parent-child relations, school factors, peer relationships, individual characteristics and prior deviance. Consistent with Klein and Maxson’s review, the

1 Klein and Maxson (2006) suggested that the lack of risk factors from school and neighborhood domains might be due to the nature of the sampling designs of many studies.
The strongest indicators of gang membership include association with deviant peers, especially those who are themselves gang members (Curry & Spergel, 1992; Winfree, Backstrom, & Mays, 1994) and prior experiences of substance use (Bjerregaard & Smith, 1993; Thornberry, Lizotte, Krohn, Farnworth, & Jang, 1994), delinquency (Esbensen & Huizinga, 1993; Maxson, Whitlock, & Klein, 1998) and official contact with the justice system (Yoder, Whitbeck, & Hoyt, 2003).

In general, correlational studies demonstrate that gang membership is associated with deficits in multiple life domains and that risk factors are not entirely consistent across studies. However, because data on risk factors and gang membership are collected simultaneously in cross-sectional studies, it is difficult to examine the temporal dimension embedded in the definition of a risk factor. That is, risk factors should occur prior to gang membership. Longitudinal designs are thus helpful in uncovering “true” risk factors.

**Longitudinal studies on risk factors**

To explore “true” risk factors for gang membership, Thornberry (1998) pointed out that this is best studied with a general, representative sample that follows and compares gang members and non-members across time. To date, there are only a handful of longitudinal studies that have investigated the impact of prior attributes and characteristics on subsequent gang membership. Two of the most comprehensive assessments are presented by Hill, Howell, Hawkins, and Battin-Pearson (1999) using data from the Seattle Social Development Project (SSDP) and by Thornberry et al. (2003) using data from the Rochester Youth Development Study (RYDS).

Hill with colleagues (1999) examined risk factors from ages 10 to 12 of joining a gang between ages 13 and 18. Risk factors were drawn from five domains:
neighborhood, family, school, peers and individual characteristics. They found that factors from every domain of children's experience significantly predicted joining a gang in adolescence. The strongest predictors at ages 10 to 12 were “the availability of marijuana in the neighborhood, many neighborhood youth in trouble, living with one parent and another nonparent adult in the home, having initiated marijuana use, having engaged in violence, low academic achievement, and being identified as learning disabled in school” (Hill et al., 1999, p.313). Results also indicated that exposure to multiple risk factors greatly increases the odds of joining a gang. Youths experiencing 7 or more risk factors had more than 13 times greater odds of joining a gang than those with 0 to 1 risk factors.

Thornberry et al. (2003) examined risk factors measured at either Wave 2 or prior to Wave 2 (before age 14) as predictors of gang membership between Wave 3 and 9 (between ages 14 and 17) of the RYDS. In total, 40 risk factor variables were identified in seven developmental domains (p.62). Because of the highly skewed temporal distribution of female gang membership, we concentrate on the results for males.

For the male subjects in the RYDS, 25 of the 40 risk factors were significantly related to subsequent gang membership in the expected direction. A number of risk factors were observed in each domain when comparing gang members to non-members. Although many risk factors were significantly related to subsequent gang membership, few risk factor variables displayed a large impact based on the size of the odds ratios (OR) of joining a gang. For example, only three variables tripled (OR>3) the odds of being a gang member: experiencing negative life events (OR=3.25), prior general delinquency (OR=3.26) and violent delinquency (OR=4.19). In addition, from
both a variable-based and a domain-based model, the cumulative effects of risk factors on joining a gang were again evidenced.

Thornberry with colleagues (2003) further examined whether the risk factors that predict gang participation also predict the duration of gang membership. They found that stable gang membership was related to two clusters of variables: structural disadvantage and early adolescent risky behaviors. Overall, early risk factors effectively discriminate between gang members and nonmembers, but they are not equally effective in differentiating within the gang member population. “It would appear that developmental variables that unfold during the period of gang membership may be more predictive of the duration of membership” (p.70).

There are additional longitudinal studies on risk factors for gang membership. These include the Denver Youth Survey (Esbensen & Huizinga, 1993; Esbensen, Huizinga, & Weiher, 1993), the Pittsburgh Youth Study (Gordon et al., 2004; Lahey, Gordon, Loeber, Stouthamer-Loeber, & Farrington, 1999) and the Montreal Longitudinal and Experimental study (Craig, Vitaro, Gagnon, & Tremblay, 2002; Gatti, Tremblay, Vitaro, & McDuff, 2005). Overall, this body of literature suggests four things: 1) although results are inconclusive for many risk factors, several risk factors stand out as being of primary importance. They are involvement in prior delinquency and related problem behaviors, involvement in delinquent peer networks, experiencing stressful life events and lack of parental supervision; 2) there are several variables that are often considered as risk factors that have minimal empirical support. These include self-esteem, affective bonds with parents, family poverty and perceived neighborhood disorganization. This reminds us that not all aspects of a particular developmental domain are equally
important. “Zeroing in on the more central aspects, rather than adopting a blanket approach, is crucial for effective intervention” (Krohn & Thornberry, 2008, p.138); 3) no single risk factor exerts a massive impact on the likelihood of joining a gang. However, 4) the accumulation of risk factor variables as well as domains greatly enhances the chances of gang participation (Decker et al., 2013; Krohn & Thornberry, 2008).

**Motivations for Gang Membership**

While identifying risk factors of gang participation is certainly informative and of great practical utility, it is also meaningful to hear what gang members say about their motivations for joining a street gang. This qualitative approach is person-oriented in nature, providing some unique insights on the origins of gang membership.

A typical answer to the question why youths join gangs was provided by a male gang leader interviewed by Hardman (1969):

> Ask them about feeling of not being wanted at home; ask them about feeling left out; ask them about the gang making up for some of these things they didn’t get at home; ask them about the gang making them feel important, wanted, needed. Ask them about the feeling of security that it gives you, always knowing you got the guys backing you up. Ask them about the feeling of importance that they get from being in the gang. (p.179)

Drawing from a wide range of interviews and observations, Curry and Decker (1998; See also Decker & Curry, 2000) also illustrated the reasons of gang participation. Gang members from Chicago, San Diego and St. Louis provided similar reasons about why they joined their gang. Most offered explanations that focused on neighborhoods, family traditions, long-standing friendships, instrumental values, respect and protection:

> The gang was a neighborhood thing, young, ignorant. It’s not like people joined gangs for specific purposes, it’s not like that. (p.64)

> I was recognized because of my big brother and father were members. (p.64)
I ain’t going to say it’s going to be my life but it was just something that came up to me where I was staying. I was just with the fellas and it just happened that I became one of them. (p.65)

Help me make money. Help me protect myself. Really everything. (p.65)

Like if you give respect, you will be respected and not just because you are a part of the organization, because you respect an individual he gonna respect it. If you conduct yourself in a manner, in a way that you want to be treated right then I will treat you the way you want to be treated. (p.64)

Through his cross-cultural study of Los Angeles gangs (Chicano, African American, Vietnamese, and Salvadorian), Vigil (2002) helped further illustrate the attractions of joining a gang as follows:

What established gangs in the neighborhood have to offer is nurture, protection, friendship, emotional support, and other ministrations for unattended, un-chaperoned resident youths. Street socialization fills the void left by inadequate parenting and schooling, especially inadequate familial care and supervision. (p.10)

Over a 10-year period, Sanchez-Jankowski (1991) conducted a participant observation of 37 randomly selected gangs in New York, Boston and Los Angeles. He found that there are a variety of reasons for gang participation including material incentives (both legal and illegal income), respect, recreation, a commitment to local neighborhoods and a place of protection. Sanchez-Jankowski emphasized that “decisions to join are usually thought out, and the individual believes this was the best for his or her interests at that moment” (p.47).

Esbensen and colleagues (Esbensen, Deschenes, & Winfree, 1999; Esbensen & Lynskey, 2001) examined reasons for joining a gang in their national G.R.E.A.T. study. Gang members were asked to circle each separate reason that applied to their situation. In the order of descending importance, Esbensen and colleagues compiled
the following reasons: protection was selected most often (54%), and near-majorities also indicated fun, respect, money and friend in the gang as reasons.

Thornberry et al. (2003) adopted a different approach by taking the free-form responses of Rochester gang members. Various answers were provided and classified into four general categories. More than half of these gang youths specified family/friends in the gang as the primary reason they joined. Other important clusters of reasons include protection, attraction to fun/action and more idiosyncratic responses. In general, adolescent gang members in Rochester focus on rather immediate, situational reasons for gang participation.

Klein and Maxson (2006) asked one further question regarding the motivations for joining street gangs: “how different are they from the reasons that any youth might participate in a peer social group?” (p.158) They offered the same list of 25 reasons to youths in San Diego and Long Beach, and explored the differences between gang and non-gang youths in the reasons they selected for joining their primary peer groups. As expected, the reasons offered by youths were quite different. That is, 16 of the 25 reasons generated differences in gang versus non-gang comparison. Specifically, in the descending order of importance, reasons more common for gang boys include “protection, have a territory, feel a sense of belonging, get money or other things, friend was a member, family member had joined, feel important, do illegal activities and get money from drugs”, whereas reasons more common for non-gang boys include “make friends, participate in group activities, keep out of trouble, meet girls easily, prepare for future, share secrets and get parents’ respect” (p.159). In brief, the common reasons
offered by gang members are diversified. Missing amongst these reasons is the commonly held notion that “most youths are pressured to join gangs” (Howell, 2012).

Moreover, Miller (2001) suggested that media presentations make gangs seem very appealing. “Gang images have served for many decades as a marketable media product—in movies, novels, news features, and television drama; in the 1990s, the substance of gang life was communicated to national audiences through a new medium known as gangsta rap” (p.45). The lifestyle and sensational portrayals of gangs and their members have a significant influence on susceptible youth.

To sum up, gang participation has been found driven by both structural and social-psychological factors/processes. Still, many issues have not been fully addressed. For example, we cannot adequately tell which risk factors are causes and which are more likely to be merely markers or correlated with causes. In addition, we do not know if a similar causal mechanism accounts for all gang members’ situations in spite of the heterogeneity among them.

Gang Experience and Gang Desistance

When referring to members’ experience in a street gang, much empirical attention has been paid to gangs as a crime-facilitating context. In particular, Thornberry, Krohn, Lizotte, and Chard-Wierschem (1993) identified three competing models that may account for the relationship between gang membership and a variety of criminal outcomes. A selection or “kind of person” model posits that adolescents with a strong propensity for antisocial behavior seek out or are recruited into street gangs. These individuals are likely to engage in problem behaviors regardless of their membership in gangs. Gangs do not cause delinquency, but only attract people who are already prone to crime. Alternatively, a facilitation or “kind of group” model argues that
gang members do not have a stronger propensity for antisocial behaviors and, absent joining a gang, are no more likely to engage in delinquency than do non-members. It is the normative structure and group processes of street gangs that bring about high rates of offending behaviors. A third model is an enhancement model that combines the other two. While gang members had characteristics that differentiated them from others prior to involvement, once in the gang, the norms and group processes serve to enhance their involvement in delinquency.

A large body of research has examined this issue. They have used different data sets covering different research sites, samples, time periods, different measures of gang membership and different analytic strategies (Esbensen & Huizinga, 1993; Gatti et al., 2005; Gordon et al., 2004; Haviland & Nagin, 2005; Lacourse et al., 2003; Thornberry et al., 2003; Zhang, Welte, & Wieczorek, 1999). As Krohn and Thornberry (2008) concluded, “the safest conclusion to draw is that there is a minor selection effect, a major facilitation effect, and no evidence consistent with a pure selection model” (p.147). Street gangs do facilitate or elicit increased involvement in delinquency, violence and substance use. The conclusion also applies to research on gang-victimization relationship, especially violent victimization (e.g. DeLisi, Barnes, Beaver, & Gibson, 2009; Ozer & Engel, 2012; Peterson et al., 2004).

While understanding gangs as a crime facilitating context is meaningful, our focus here is rather different: we are to uncover the influence of life events on the course of a “gang career” itself. In other words, we are exploring what covariates or life events may re-direct long term trajectories of gang membership as an exogenous variable. This is an important but rarely examined issue, although gang membership
status itself (e.g. onset/desistance) has been considered as “turning points” for criminal behavior and other life trajectories (e.g. Krohn et al., 2011; Melde & Esbensen, 2011).

More specifically, covariates or life events that occur during the measurement period of a “gang career” can be either exacerbating or mitigating factors of gang membership. These covariates or life events may have differential effects on distinct developmental pathways of gang membership. Given their significance in gang intervention work, we focus mainly on possible mitigating factors.

**Gang Desistance and Mitigating Factors**

As Bushway, Piquero, Broidy, Cauffman, & Mazerolle (2001) suggested, crime desistance can be understood as a process of declining propensity to offend. Consistent with Uggen and Piliavin’s (1998) notion of asymmetrical causation in the desistance process, leaving a street gang is not simply the inverse or opposite of joining. Forces that propel youths to join gangs (e.g. respect, protection, instrumental values) could not account for the motives for gang desistance. By now, far more is known about individuals’ transition into gangs than their transition out of gangs. In Klein and Maxson’s (2006) words, “surprisingly little research has been conducted on gang desistance and the processes of leaving gangs” (p.154).

In a broader sense, researchers have studied the process of desistance from a deviant social group. For instance, Bjorgo (2009) examined the process of desisting from racist groups in European countries. He described leaving racist groups as a culmination of “push” and “pull” factors. Factors that pushed individuals away from such groups include a loss of belief in the ideology, acts that were deemed too radical or extreme, social sanctions against the group and status changes within the group. Factors that pulled individuals away from such groups included maturation, family
responsibilities, employment opportunities and a desire for a conventional life. Cronin (2009) identified a series of changes in terrorist groups that led members of the group to shift their lifestyle, including: loss of popular support, transitions toward a full insurgency, repression or unsuccessful generational transition. As Bjorgo and Horgan (2009) argued, religious cults, terrorist groups, gangs, racist groups were similar with respect to group dynamics of desistance.

Vigil (1988) presented one of the most detailed accounts of exiting the gang. In his analysis of Chicano gangs in Los Angeles, Vigil found that there was a “succession quality” to leaving the gang, “where one event after another adds to a growing awareness of the problems associated with their gang membership” (p.109). Gang members left the gang through a gradual series of steps and commitments, and desistance did not occur in a sudden manner. Vigil observed that “most members of the gang simply mature-out” (p.106), and life turning events such as having a good job or a good girlfriend (or wife) provided an impetus for maturing-out. For instance, an 18-year-old gang boy was adamant about his girlfriend’s role in his desistance:

She really kept me from going sour and hanging out with all of the vatos…She really made me what I am right now…She made me do my homework, she would go and help me read. (p.108)

Violent incidents turn numerous youths against further participation of gang lifestyle. A 17-year-old female gang member reported her experience of maturing-out:

A fight broke out and one guy pulled out a gun. Ralph, the guy we gave a ride to, was shot and he died. I remember once sitting at the corner with some friends and a white chick was walking by. It was at the time of the riot at school so naturally we jumped her. I felt sorry for her because we left her all bloody. I began to think about what I was doing with my life. (p.108)
Vigil also found that if gang involvement continued after high school, prison was a common experience and, for some, a catalyst to disinvolve.ment. For example, a 21-year-old ex-gang member had experienced numerous fights and had used heroin but did not leave the gang. However, after doing three and one-half years in prison for a second-degree murder offense, he became convinced that the gang life was “dead”.

In short, Vigil (1988) characterized the process of leaving the gang as more difficult than joining, in part because the gang provides a source of support and friendship. Gang members often chose not to leave until a suitable substitute has been found. Thus, “the larger portion of gang exit stories reflect a combination of reasons or series of events” (p.109).

Another detailed examination of desistance from gangs is Decker and Lauritsen’s (2002) study of 24 former gang members in St. Louis. Based on life stories told by ex-gang members themselves, Decker and Lauritsen (2004) found that many of them left because of the level of gang related violence:

Because I got to realizing it wasn’t my type of life. I didn’t want to live that type of life. One time, I got seriously stabbed and I was in the hospital for like three months. After I got out of the hospital, I tried to cope with it a little more, but I just faded away from it. (p.57)

Some left because of the threat or fear of personal violence against themselves, their family members and friends:

Because we might get shot. Somebody in our hood got shot last night and the day before that. They killing for no reason. (p.57)

My cousin got shot. (p.57)

That really came to me because when one of my friends got killed and you look at his face, it was hard. It could have been me…It was just hard on me because the reason why he got in was because of me…When I really woke up was when
my friend died because we got in there together. He said I’m gonna get in if you get in. (p.57-58)

As a result, “the ability of violence to motivate individuals to join the gang and strengthen the bonds of membership has an upper limit” (Decker & Van Winkle, 1996, p.272). When that limit is exceeded, the very activity that keeps gang members together appears to compel individuals to leave their gang. Other reasons of desistance that were often cited by ex-gang members include family responsibilities (caring for children and other obligations to family) and moving out of town (severing ties with the gangs in their former neighborhoods of residence):

When I was in the gang I wasn’t spending time with my daughter, I wasn’t taking care of her, I wasn’t doing, that’s mainly why me and my baby’s mother broke up because stuff I was getting in. She didn’t want to be around me, the kind of person that I was then. Now, I have got me a job, I was getting locked up before. (p.58)

You can never get out of the gang. Only way you can quit is to stop hanging around them or move to another state. (p.60)

Overall, Decker and Lauritsen (2002) concluded that the process of leaving street gangs occurred in two different ways. In some of these cases, gang members left the gang abruptly due to a single event (e.g. violent victimization or moving to another city); in other cases, gang members gradually desisted from the group and an accumulation of events preceded the decision (e.g. family, job, maturational reform). “These processes encompass the variability in the duration distribution, resembling life-course desistance concepts such as knifing-off and desistance as a developmental process” (Pyrooz & Decker, 2011, p.419).

Drawing on life experiences of 91 male gang members (ethnic minorities from low-income neighborhoods ranging from 16 to 44 years old) in San Francisco, Moloney,
MacKenzie, Hunt, & Joe-Laidler (2009) examined the meaning of “being a father” on gang member’s decision to persist or desist in gang life and associated risky behaviors. Life histories, in particular an in-depth examination of activities in three key moments: a year prior to the pregnancy, the year during the pregnancy, and what happened after they became fathers, were examined with details. For many of the young men, fatherhood indeed acts as a significant turning point, facilitating important “subjective and affective transformations that led to changes in outlook, priorities and future orientations” (p.305). Recounting fatherhood as a turning point, Xavier (19, Latino) described radical changes in his lifestyle brought about by his girlfriend’s pregnancy:

I didn’t even wanna be out there anymore. I wanted to get a legal job…Instead of being out on the street, I was in the house or the hospital…I wasn’t smoking weed or doing drugs…Being more responsible, more disciplined. And stopping chilling outside as much…I stopped robbing people, stealing cars. (p.312)

Some men explained that the responsibilities of fatherhood necessitated a reorganization of their time and activities. They could no longer maintain a street-oriented life style—spending days and nights out on the streets with fellow gang members, hustling for drug sales or just hanging out with friends, drinking alcohol or smoking marijuana. They now moved from the streets back into home and were simply too busy to participate in gang activities:

Before that, the only thing I really actually would do every day would be kick it with the homies [fellow gang members] … [but after the pregnancy] I didn’t kick it with them at all…I was kicking in hella much indoors with [the mother]. I was hella indoors (Roy, 23, Filipino). (p.313)

The desistance process also required individual choice and agency. Fatherhood indeed brought about personal identity and emotional transformations (Giordano, Schroeder, & Cernkovich, 2007). Numerous respondents reported that they desisted
from gang activities because they wanted to become positive role models for their children—role models they themselves lacked when younger. They re-evaluated their past activities and priorities and realized that now they got something or someone to care for and about. The possession of a future-orientation is a key predictor to successful transitions to adulthood. For some gang fathers, the fact that they can see a future is new:

Fatherhood changed me a whole lot as far as being more responsible, being more true. And knowing that I have to take a different road. I can’t be out there on the streets drinking all the time. I can’t be getting high…I can’t be doing stupid stuff. Because if I’m incarcerated, who’s to watch my two boys? Where would they be? They need a role model (Jesus, 34, Latino). (p.313)

I’m more relaxed, calm. And I love being a father…I was a bad little motherfucker before. Now I’m just a mellow (Raja, 22, Samoan). (p.314)

Fatherhood changed me a lot. I don’t think about gang no more. I think of my kids if anything. Before I do anything negative I always think twice…I love my kids to the death…They get me going everyday every time I wake up…They keep me motivated (Alejandro, 21, Latino). (p.314)

Finally, consistent with Decker and Lauritsen (2002), Moloney et al. (2009) found that although gang fathers’ narratives of change were often dramatic, actual changes in behaviors were gradual, suggesting that “desistance is best understood as a process—gradual and cumulative—rather than as an abrupt or discrete phenomenon” (p.315). Sometimes, it took a long time before the man could seize the “hooks for change” and reorient their day-to-day practices:

I was still off the hook, hella violent. And I didn’t give a fuck if I lived or died…When she was pregnant I didn’t feel shit. When he was born and I seen his little face, that’s when I got a lotta feelings like, that’s my little man right here (Serge, 30, Latino). (p.315)

I really didn’t start being a real father until my last daughter…But I was older by then. I was tired of doing all the shit I was already doing. But she’s changed me a
lot...My last daughter is when I consider myself becoming a father. [Before] my life had no purpose. I didn’t care about anything (Eddie, 30, Latino). (p.316)

While fatherhood can act as a turning point leading to change, this is far from “an automatic process”. Moloney et al. (2009) suggested that fatherhood introduced an additional dimension of masculinity to male gang members. They now held the responsibilities of being “the breadwinner and good provider, the protector and teacher” (p.317). The added pressure on gang fathers, however, may not be successfully met. Financial problems were often cited as the most difficult aspect of being a father, which makes the idea of returning to drug sales (and other sources of illegal income) tempting. Unfortunately, some fathers returned to their gang friends for social and emotional support:

I’m stuck in a box, you know, that I cannot move...I try to save money, I try to take care of my family at the same time. Try to get certification...I just feel I’m tied up, you know (Pablo, 23, Latino). (p.317)

Before I used to always be around a lot of people from like being on the streets and stuff. So I feels lonely now ‘cause it’s just me, me and [my son], or me and my best friend (Roy, 23, Filipino). (p.319)

Sanchez-Jankowski (1991) also argued that leaving the gang was more complicated than simply maturing out as Thrasher and many of the early studies on gangs believed. He speculated six ways gang members could exit from their gangs (p.61-62): (a) drop out of street gangs and pursue various illegal economic activities on their own, (b) move on to another type of organization or association, (c) leave as the gang subdivides, (d) be imprisoned for a considerable part of their lives, (e) death as a consequence of a drug overdose, a violent confrontation, or the risks of lower-class life and (f) take a job and eventually age out. Unfortunately, Sanchez-Jankowski provided no evidence with regard to the prevalence of these exiting mechanisms, as these were
based on his general observations. Importantly, Horowitz (1983) reported that the process of aging out does not appear to be uniformly experienced by all gang members. “Peripheral” or “fringe” members found it easier to leave the gang than did “core” members, due to lesser involvement in gang activities and reduced dependence on the gang for social or instrumental support. This is consistent with Klein’s (1971) research in Los Angeles that core members are better integrated into the gang. Accordingly, it will be interesting to see if mitigating factors deflect distinct developmental trajectories of gang membership downward unevenly.

Moving beyond ethnographic accounts of small samples of ex-gang members or second-hand accounts from gang members who were acquaintances of ex-gang members, more recent studies on gang desistance have used larger samples to address gang leaving processes and effects in a quantitative manner. Using a detention sample of juvenile arrestees in Arizona, Pyrooz, Decker, and Webb (2014) examined one particular aspect of the desistance process—persisting gang ties. Specifically, Pyrooz et al. examined factors that predict social and emotional ties of former gang members to previous gang network and how persisting ties may influence recent victimization experience. They found that school attendance, neighborhood gang activity and length of separation from the gang were significantly associated with persisting gang ties. Persisting gang ties, in turn, exhibited a statistically significant effect on victimizations after desistance. In fact, the effect of the length of desistance “mattered for victimization only to the extent to which one retains gang ties” (Pyrooz et al., 2014, p.507). Indeed, declaring oneself a “former” gang member is not functionally the same thing as having no contacts with former gang associates (Decker & Lauritsen,
“The severing of ties provides a transitional phase between active gang membership and former gang membership” (Pyrooz et al., 2014, p.507).

By focusing on a detained group of adolescents in the Arrestee Drug Abuse Monitoring (ADAM) program in Maricopa County, Arizona, Pyrooz and Decker (2011) examined the interrelationships among three key elements of gang desistance: 1) motives or subjective reasoning for leaving the gang was organized into “push” and “pull” factors. “Push” motives were characterized by internal cognitive transformation about gang life (e.g. “I got tired of the gang lifestyle”, “I wanted to avoid trouble and violence”), and “pull” motives were external “hooks”, fracturing the “grip of the group” and restructuring the life style of gang members (e.g. girlfriend, jobs or children); 2) methods for leaving the gang were categorized as hostile (events or ceremonies involved) versus non-hostile (simply walked away) and 3) persisting gang ties were connections to the former gang network despite having departed. Pyrooz and Decker (2011) found that the modal response for leaving the gang was that “youth just walked away without incident and did so to avoid the nature of the gang lifestyle” (Pyrooz & Decker, 2011, p.421). Two out of three ex-gang members reported leaving streets gang to avoid trouble and violence and the remaining youth left because of turning point factors such as employment or family. Moreover, they observed that motives and methods of departure were interrelated. Ex-gang members encountered minimum resistance from leaving the gang when seizing “pull” factors, but often experienced some ritual violence when leaving to avoid gang lifestyles. They also found that there was no relationship between the motives or methods of leaving the gang and persisting
gang ties—“everyone retained ties at the same rate” (p.422). Retaining such ties again corresponded with arrest for serious offenses and violent victimization.

Drawing on Hagan’s (1993) concept of criminal embeddedness, Pyrooz, Sweeten, and Piquero (2013) extended the notion of “persisting gang ties” to “embeddedness” within gangs. The notion of embeddedness captures individual immersion in enduring deviant social networks, reflecting not only “density of network ties or centrality within a deviant network but also the level of involvement in crime, isolation from prosocial networks, positions of leadership within a deviant network, and adoption of deviant values and identities” (p.242). Existing gang literature tends to treat gang member heterogeneity as a core-fringe dichotomy (e.g. Klein, 1971; Esbensen et al., 2001; Gaes, Wallace, Gilman, Klein-Saffran, & Suppa, 2002) or a stable-transient dichotomy (e.g. Battin-Pearson et al., 1998; Thornberry et al., 2003). This new concept of embeddedness within gangs thus helps deepen our understanding of heterogeneity of gang membership. Using data collected from the Pathways to Desistance Study, Pyrooz and colleagues found that gang embeddedness indeed slows the rate of desistance from gang membership over the full five-year study period. At the two-year follow-up, and thereafter, gang members who were embedded at 1 SD above average were more than twice as likely to remain in the gang as those who were embedded at 1 SD below average. They also found that males, minorities and low self-control individuals persist longer in the gang than their counterparts.

Sweeten, Pyrooz, and Piquero (2013) further distinguished between gang leaving as an event and gang disengagement as a process of decreasing gang embeddedness. According to them, “identification as a gang member would occur at some point when
gang embeddedness is fairly low but increasing, and at some point when gang embeddedness is declining individuals would stop identifying as gang members” (p.25). In other words, gang membership is a manifestation of the latent trait of gang embeddedness. Sweeten and colleagues (2013) examined 226 youths who reported gang membership at the baseline interview and who were interviewed in at least one follow-up wave of the Pathways to Desistance Study. Using multilevel modeling technique to control for both time-varying and time-stable covariates, they found that the effects of both the event and the process of disengaging on self-reported offending function through several mechanisms including less unstructured routine activities, less exposure to antisocial peers, more temperance and less victimization. After controlling for desistance mechanisms, gang membership and gang embeddedness transitions only affect contemporaneous but not lagged offending outcomes. Results also indicated that gang members who disengage from and depart gangs sooner were different from those who remained in the gang. Borrowing from Moffitt's (1993) developmental taxonomy, Sweeten and colleagues (2013) suggested that “those persisting in gang membership during the transition to adulthood may be life-course persistent offenders whereas those leaving gangs as they enter adulthood may be adolescent-limited offenders” (p.24).

Although not focusing specifically on the process of gang desistance, Melde and Esbensen (2011) explored possible gang leaving effects. They employed a propensity score matching approach, comparing individuals who reported persistent gang involvement at times 1 and 2 with those who ceased to associate with a gang at time 2. After adjusting for differences in observable characteristics, they did not observe a
significant difference in delinquency or any desistance mechanisms between gang desisters and gang persisters. However, as they concluded, this may be attributable to attrition bias due to the unmatched cases, lack of equivalence between groups or lack of statistical power.

In sum, understanding mitigating factors and mechanisms that expedite the gang desistance process has important implications for policy makers, practitioners and society at large. Deflecting the developmental trajectories of gang membership downward and reducing the length of time individuals are in street gangs would result in lower rates of offending as well as victimization, not to mention both the direct and collateral cost of incarceration, rehabilitation and re-entry. Although early ethnographic studies have suggested a number of life events or mechanisms that precede members’ desistance from a street gang, only a handful of empirical studies have at most partially tested those propositions. We know far from enough about the effects of possible mitigating factors and mechanisms within the context of gang. As will be discussed in the next chapter, life-course theories on general offending have provided us with insights on the gang desistance process.

**The Enduring Consequences of Gang Membership**

Adolescence, roughly spanning the ages of 12 to 19 years, has been found critical in human development (Lerner & Hess, 1999). Behaviors initiated during adolescence can have important consequences for successful transitions into adult roles and responsibilities (Arnett, 2000). Disruptions in these transitions and deviations from age-appropriate behaviors have negative repercussions that adversely affect subsequent life chances. Thornberry et al. (2003), for instance, identified three representations of disorder in life transitions (failure of completing developmental tasks,
transitions out of order and transitions made off time), which has cumulative, cascading effects, creating hardship in multiple life domains (see also Huizinga & Henry, 2008).

Among the probable contributing factors to disruption in transitions, a sizeable body of research has focused on adolescent delinquency and substance use. Adolescents who are involved in delinquency and substance use are more likely to drop out of school (Kaplan & Liu, 1994; Krohn, Thornberry, Collins-Hall, & Lizotte, 1995), to engage in delinquent peer networks (Hagan, 1997), to become pregnant (or impregnate someone else) and become a teenage parent (Krohn, Lizotte, & Perez, 1997; Thornberry, Smith, & Howard, 1997), and to be unsettled in early adulthood years (Caspi, Wright, Moffitt, & Silva, 1998; Newcomb & Bentler, 1988).

This is even truer for youth gang members. “Since gang members are typically more involved in delinquent activities than non-gang members, it is reasonable to expect that being a member of a gang during adolescence will be associated with disrupted transitions from adolescence to adulthood and, ultimately, will adversely impact life chances” (Krohn & Thornberry, 2008, p.149). There are enduring consequences of gang membership that exist years after the event of gang participation. Despite the substantial significance of this issue, limited evidence exists about the adverse impact of gang membership, over and above general delinquency, on disruptions in later life.

Field researchers rarely get the opportunity to revisit their subjects and settings years after an initial analysis, yet such a procedure is essential for documenting changes over time and understanding the consequences of prior life events. Moore (1991) accomplished this by returning to two longstanding East Los Angeles gangs—
White Fence and Hoyo Maravilla she studied earlier (Moore, 1978). She assembled a list of gang members from her earlier work, from which a sample of 156 men and women were interviewed with depth. Moore identified three types of adult outcomes for former gang members: “squares”, accounting for approximately 40 percent of former gang members, were employed as young adults and lived a conventional family life. However, “tecatos” (heroin addicts) and “cholos” (the undereducated and unemployed), accounting for one-quarter and one-third of the sample respectively, were still involved in gang relationships. The gang remained the first place they turned to when encountering life difficulties.

Hagedorn (1998) also re-interviewed a sample of gang members from Milwaukee, who were originally studied as adolescents when they were in their early 20s (Hagedorn, 1988). Hagedorn found that roughly a third of male gang members had a high school diploma and about the same number were able to get employment. The rate of high school graduation was about the same for female gang members. In addition, nearly 9 of 10 female gang members were mothers by their early 20s, with about 60% on welfare. Overall, the picture of former gang members’ lives was dire. High rates of early parenthood, unemployment, illiteracy and broken family relations made the adolescence-adulthood transition difficult for many of the subjects, which further limited subsequent life chances.

While ethnographic studies present detailed descriptions of ex-gang members’ lives, the trade-off is that they do not control for factors other than gang membership that might lead to adulthood disadvantages such as self-selection mechanism, memory recall issues and other unobserved factors. Thus, to adequately examine the impact of
gang membership on subsequent life chances, it is necessary to follow ex-gang members and compare them with non-gang member longitudinally.

As a joint study that aims to integrate the usual economic and ethnographic approaches to empirical research, Levitt and Venkatesh (2001a; 2001b) studied a sample of 118 males between 17 and 26 years of age that resided in one public housing complex in a disadvantaged neighborhood of Chicago in 1991. At that time, 38 of the 118 males were active gang participants. Roughly ten years later, they launched an extensive data collection effort to reconstruct study subjects’ economic and social histories. About 76 percent (N = 90) of the original sample was included in the follow-up analysis because 13 subjects could not be located, 11 were deceased and 4 refused to participate.

In their initial analysis, they found that gang members obtained less education and employment in the legitimate sector, had higher rates of arrest and incarceration, and earned a greater percentage of income from illegal sources than non-gang members did. However, once background factors such as GPA and family environment were controlled in a multivariate context, the effect of gang membership shrank dramatically. No differences were observed for high school graduation, current employment, public housing residence and current incarceration. Nevertheless, gang membership remained a significant predictor of ever having been incarcerated, number of times shot, and the percentage of income from illegal sources. These findings suggest that the harmful effects of gang membership mainly manifest in outcomes of direct criminological relevance.
Following a sample of 1,000 at-risk youth from age 13 through 22 in Rochester, NY, Thornberry et al. (2003) examined the effects of gang membership on several precocious or off-time transitions: dropping out of school, early pregnancy, teenage parenthood, early nest leaving, unstable employment and cohabitation. In addition to these precocious transitions, they also examined the extent to which adolescent gang membership enhances the chances of being arrested during early adulthood, between ages 19 and 22.

For males, Thornberry et al. (2003) distinguished between short-term gang members, those who report being members for less than a year, and stable gang members who were members for a year or more. Bivariate analyses indicated that short-term members were more likely to impregnate a girl and to cohabit than were non-members. Stable members were more likely to drop out of school, impregnate a girl, be a teenage parent, have unstable employment patterns and cohabit than were non-members. When comparing differences by gang membership status, stable gang members were more likely to drop out of school and become a teenage parent than short-term members did. Significant differences were also observed for females. Female subjects who were ever a member of a street gang were found more likely to drop out of high school, leave the nest early, get pregnant early, become a teenage parent and be unemployed.

Moreover, precocious transitions often occur together, in part because of common causes and in part because of cumulative disadvantage triggered by each of these precocious transitions. Thornberry and colleagues (2003) examined whether gang
membership was related to experiencing multiple off-time transitions\textsuperscript{2}. For males, stable gang members experienced on average 2.42 precocious transitions, whereas short-term members and non-members experienced 1.51 and 1.15 precocious transitions respectively. The differences were statistically significant when comparing stable members with both short-term members and non-members. For females, the pattern was similar. Gang members (2.30) experienced a significantly higher number of off-time transitions than did non-members (1.67).

Thornberry et al. (2003) further examined whether controlling for eight background variables, including prior delinquency and negative life events, would eliminate the relationship between gang membership and precocious transitions. For males, stable gang membership remained a significant predictor for all precocious transitions except for early nest leaving. Short-term members were more likely to experience cohabitation than abstainers. There also existed a strong effect of stable gang membership on experiencing multiple disorderly transitions. For females, gang membership increased the odds of early pregnancy, teenage parenthood and unstable employment after controlling for the other eight variables. Gang membership also significantly increased the number of disorderly transitions experienced by female respondents.

Finally, Thornberry et al. (2003) explored whether earlier gang membership was directly and indirectly, through the impact on precocious transitions, related to being arrested as an adult. For males, stable gang membership was a significant predictor of

\footnote{Five transitions were included in this analysis: dropping out of school, early nest leaving, teen parenthood, unemployment and cohabitation. Early pregnancy was not included because of its overlap with teen parenthood.}
adult arrest after controlling for the mean number of disorderly transitions and the other eight control variables. They also observed that a substantial part of the total effect of gang membership was indirect, operating through the experience of multiple precocious transitions. The same pattern held for female subjects as well. In sum, the results confirmed that “being a member of a gang increases the likelihood that youths will experience off-time and unsuccessful transitions” (p.179), which, in turn, leads to devastating effects in multiple life domains.

Krohn et al. (2011) extended the previous study by assessing even longer-term effects of adolescent gang membership. Their analysis was based on data covering the 17-year period from when the subjects were approximately 14 years old till they were approximately 31 years of age. They focused specifically on male respondents with valid data on all relevant measures and those who were not incarcerated in the final two waves of the RYDS (N = 412). To capture the level of exposure to the gang environment in adolescent years, the study defined gang involvement as the number of waves in which a respondent was involved in a gang, ranging from 0 (never in a gang) to 8 (gang participation in all waves). Overall, approximately 28 percent of the sample reported at least one wave of gang membership.

Using structural equation modeling technique and holding constant the effects of several control variables (wave 1-3), Krohn and colleagues (2011) found that subjects with more gang involvement in adolescence (wave 2-9) were more likely to experience life transition problems from adolescence to adulthood (wave 2-12), which ultimately led to unsuccessful fulfillment of adult roles and statuses (e.g. economic hardship and family problems) (wave 13). Further, they observed that both experiencing economic
hardship and family problems in adulthood had significant direct effects on the likelihood of arrest in adulthood (wave 13-14). Experiencing family problems in adulthood also influenced involvement in street crime in adulthood (wave 13-14). In sum, they found overall support for the idea that “gang involvement in adolescence may ultimately contribute to offending in adulthood via an indirect process that unfolds over the life course through its effect on the transition to adulthood and subsequent impact on life chances in economic and family arenas” (p. 1015).

More recently, Pyrooz (2014a) examined the effects of adolescent gang membership on educational attainment over a 12-year period. He addressed two important limitations of prior research on the enduring consequences of gang membership. First, adulthood outcomes were usually measured at only one or two time points. The associated problem is that the consequences of gang membership may vary over time. Not evaluating the longitudinal nature of these outcomes limits our understanding of the consequences of gang membership. Second, selection bias often challenges the validity of the findings from prior research, which only controls a limited number of variables that may be linked to either gang membership or outcomes.

Using data from the 1997 cohort of the National Longitudinal Survey of Youth (NLSY97), Pyrooz (2014a) employed the propensity score matching technique to assess the cumulative and longitudinal effects of gang membership on a series of educational outcomes. Through adjusting for nonrandom selection into gangs, adolescent gang members were compared annually to their matched counterparts from 1998 to 2009.
Pyrooz found that the negative effects of adolescent gang participation on educational attainment persisted over and above selection processes. On average, gang abstainers completed 12.2 years of education versus gang joiners’ 11.6 years of education, indicating a difference between earning a high school diploma and falling short of that critical benchmark. With regard to educational milestones, gang abstainers were more likely to obtain a high school diploma and to graduate from a four-year college. Pyrooz further plotted the effects of gang joining on educational attainment on a wave-by-wave basis over 12 years after treatment, and concluded that “joining a gang has long-lasting effects on educational attainment that accumulate and do not diminish over time” (p.71).

In conclusion, results indicate that the effects of gang membership are not confined to periods of active gang membership. Individuals with a history of gang membership are more likely to experience precocious transitions, obtain less education, be unemployed, suffer economic hardships and familial problems in adulthood, and engage in street crime and under arrest many years after they joined a gang. Thus, in addition to the immediate facilitating effects of gang membership on offending and victimization, there exist long-term consequences of gang membership in multiple life domains.

Questions remain, however, about the enduring consequences of adolescent gang membership. As discussed earlier, there exists heterogeneity among gang members. Yet, limited empirical attention has been paid to understanding possible, differential life outcomes across distinct categories of gang members. Are certain consequences limited to a sub-category of gang members? If yes, why and through
what mechanisms (mediation)? Providing answers to these questions is of great theoretical and practical significance. Given that gang members have only recently been investigated within the life-course perspective, developmental theories of gang membership are still at a primitive stage (Krohn & Thornberry, 2008). Accordingly, it is necessary and helpful to review what life-course theories say about criminal offending in general and see how that will enhance our understanding of gang membership across the life span.
CHAPTER 3
THE LIFE-COURSE PERSPECTIVE IN CRIMINOLOGY

Explaining the Age-Crime Curve

The emergence of the life-course orientation in contemporary criminology can be traced back to the intriguing relationship between age and crime. Hirschi and Gottfredson (1983) argued that the age distribution of crime is one of the few facts agreed on in criminology. Referred to as a “law of nature” by Goring (1913), the aggregate age-crime curve appears as a bell-shaped distribution that is positively skewed: the crime rate increases sharply during the early teenage years, reaches a peak in the middle to late teens, declines rapidly in early adulthood and then continues to fall off throughout life gradually. The same pattern has been demonstrated using multiple sources of measurement—official arrest reports, self-reports of offending and victims’ reports of their offenders (Sampson & Laub, 1993). Given these characteristics, it comes to no surprise that criminologists have devoted most prior attention to studying the behavior of adolescents and young adults.

Hirschi and Gottfredson (1983) further argued that the age effect is profoundly “invariant”, persisting regardless of sex, race, country, time or offenses. Age has “an apparently direct” effect on crime and does not operate though other criminological constructs. “Efforts to explain the age effect with the theoretical and empirical variables currently available to criminology are doomed to failure” (p.567). Presumably, it is through some biological (maturational) or other nonsocial mechanism that changes in age could directly cause changes in crime.

The claim of “invariance” is justified only to a point because Hirschi and Gottfredson were not entirely clear about their definition (Tittle & Grasmick, 1997). If
Hirschi and Gottfredson referred “invariance” as similarity in the shape of the curves representing the relationship between age and various kinds of crime for different populations, existing evidence is consistent with their hypothesis. Nevertheless, parameters of the age-crime curve, including magnitude, central tendency, dispersion and skewness, vary considerably with time, place, demographic groups and crime types (Farrington, 1986).

Even if there exists an “invariant” unimodal age-crime curve across social and cultural conditions and no mechanism in current criminological theory/research seems to account for it, it is still incorrect to interpret this aggregate pattern as representation of individual offending trajectory (Blumstein, Cohen, & Farrington, 1988). The aggregate crime rate (i.e. the age-crime curve) is obtained by dividing the total amount of crime by the total population. In other words, the aggregate rate is the product of participation rate (active offenders divided by the total population) and average offending frequency of active offenders. Empirical evaluations suggest that there is no consistent variation in individual offending frequency that is similar to the average offending pattern in the aggregate rate (Blumstein et al., 1988; Farrington, 1986). Henceforth, despite the early criticism of not bringing meanings derived from a conception of crime or a theory of criminality to the “career” concept (Gottfredson & Hirschi, 1988), research on criminal career or “longitudinal sequences of crimes committed by an individual offender” blooms (Blumstein et al., 1986, p.12).

Trajectories, Transitions and Turning Points

Deciphering individual offending patterns across the life span requires a comprehensive understanding of human development in general. Human life course has been conceived as a “sequence of culturally defined age-graded roles and social
transitions that are enacted over time” (Caspi, Elder, & Herbener, 1990, p.15). These sequences are best described in three key analytic concepts. A trajectory is “a pathway or line of development over the life span, such as work life, marriage, parenthood, self-esteem, or criminal behavior” (Sampson & Laub, 1993, p.8). Thornberry (1997) discussed several important dimensions of trajectories. First, entrance refers to the fact that “not all individuals enter into all developmental trajectories” (p.4). For example, not every teenager involved in delinquency and thus these individuals do not enter into a criminal trajectory. Second, people attain a varying degree of success in accomplishing the developmental tasks embedded in the trajectories they entered. Gang membership, for instance, can be thought of as a trajectory. People who enter the gang trajectory join at different ages, stay for varying periods of time and become more or less involved in the gang lifestyle. It is worth mentioning that the notion of a trajectory need not refer to the pathways across the entire life span. When employing the idea of trajectories, scholars typically explore how the shape of trajectories represents the long-term patterns of interested behaviors.

While trajectories refer to long-term patterns of development in major social institutions, transitions are “life events that are embedded in trajectories and evolve over shorter time spans” (Sampson & Laub, 1993, p.8). These transitions maintain or alter individual trajectories. A criminal career, for instance, is comprised of numerous offending events. Some major incidents bring special meaning and thus characterize his or her criminal trajectory. In other cases, life transitions can serve as turning points in one’s trajectory. What distinguishes turning points from ordinary transitions is that the occurrence of the former disrupts or redirects an existing trajectory. Sampson and Laub
(1993; Laub & Sampson, 2003), for example, have considered marriage and family, employment/work, military service and justice system involvement as potential turning points that may redirect individual offending trajectories.

The duration, timing and ordering of major life transitions also have significant impacts on the life course (Caspi, Elder, & Herbener, 1990). Thornberry and colleagues (Thornberry, 1997; Thornberry et al., 2003; Krohn et al., 2011) pointed out that off-age transitions, especially precocious or early transitions, can create disorder in the developmental sequence and decrease the chances of success in the trajectory. Since life as a whole is composed of interwoven trajectories, disorderly transitions in one life pathway often have adverse consequences for other trajectories. Additionally, the quality or character of the event is also important (Sampson & Laub, 1993; Laub & Sampson, 2003). For instance, it is the marital attachment and job stability that redirect individuals away from the offending pathway (e.g. Horney, Osgood, & Marshall, 1995; Uggen, 2000).

For some individuals, turning points result in abrupt shifts in life trajectory that knifes off the past from the future. For most people, however, turning points are conceptualized as “part of a process over time and not as a dramatic lasting change that takes place at any one time” (Pickles & Rutter, 1991, p.134; Sampson & Laub, 1997). This process-oriented understanding of turning points leads our attention to new initiation points and incremental changes, which sets in motion dynamic processes that shape future outcomes (Rutter & Rutter, 1993). In this case, the immediate impact of a turning point may not be apparent. Detectable changes originated from turning points can only be recognized over long time periods.
Stability and Change in Criminal Offending

Against this background, theorists and researchers could no longer focus solely on childhood or adolescence for understanding crime and delinquency (Sampson & Laub, 1993). Robin’s paradox, for instance, needs to be explained (Robins, 1978): retrospectively speaking, adult antisocial behavior virtually requires childhood antisocial behavior; on the other hand, prospectively studying antisocial children reveals that the vast majority do not become adult offenders. Accordingly, the paradox centers on two fundamental issues the life-course perspective attempts to address—stability and change in criminal offending.

There is remarkable stability in offending over time. In study after study, the strongest predictor of future criminal behavior remains past criminal and delinquent behavior (e.g. Loeber, 1982; McCord, 1983; Moffitt, 1990). Specifically, stability refers to between-individual continuity in behaviors as opposed to absolute stability in behavior. It is “the preservation of a set of individual ranks on a quality within a constant population over a specified amount of time” (Alwin, 1994, p.139). Behavioral changes within-individuals, however, are real and likely to occur (Sampson & Laub, 1992).

Life-course theorists brought in additional concepts to reconcile the relative stability in rank orders and the absolute change in behavior representations. Homotypic continuity refers to the stability in the same types of problem behavior over time. A trait or behavior demonstrates homotypic continuity if it can be measured by the same set of indicators over time. As people age, however, a broader range of behavioral options are acquired. Antisocial adolescents and adults will engage in a variety of illicit and imprudent behaviors in which young antisocial children cannot participate. Heterotypic continuity is thus observed when representations of problem behavior are different over
time but still caused by the same underlying characteristics. It draws our attention to the
linkages between the diverse manifestations of antisocial behavior.

The next question is what explains continuity and change in criminal behavior
over time. In general, criminologists have identified two classes of theoretical
perspectives—persistent (population) heterogeneity and state dependence (Nagin &
Paternoster, 1991; Paternoster, Dean, Piquero, Mazerolle, & Brame, 1997; Piquero et
al., 2003). Population heterogeneity theorists, such as Gottfredson and Hirsch, maintain
that the positive association between past and future criminal behavior is spurious in
nature. Prior criminal involvement is simply an indicator of persisting criminal propensity
and has no direct causal impact on the likelihood of committing crime in the future.
These differences in criminal propensity, either due to constitutional factors and
personality traits (e.g. Wilson & Herrnstein, 1985) or differences in upbringing (e.g.
Gottfredson & Hirschi, 1990), are established relatively early in life and are time stable.
Thus, criminal propensity will reverberate throughout the life span and across a variety
of life domains. Role transitions and novel experiences are not likely to alter individual
capacities toward crime because they are made in response to underlying traits in
conjunction with available opportunities. Gang involvement, for example, is just another
indicator of some underlying criminal characteristics.

A second explanation for continuity in offending recognizes a genuine causal link
between past and future criminal acts. From the state dependence perspective, prior
offending generates a range of immediate and future consequences that set up a
temporal contagion process. Through any number of possible mechanisms (e.g. Agnew,
2006; Akers, 1998; Hirschi, 1969), prior criminal involvement “reduces internal
inhibitions or external constraints to future crime or increases the motivation to commit crime" (Nagin & Farrington, 1992, p.235). Future opportunities for prosocial growth are also constrained. Many antisocial youths thus become enmeshed in the sticky web of consequences generated from their conduct or cumulative continuity (Wright, Tibbetts, & Daigle, 2008).

Contrary to the static approach of persistent heterogeneity, state dependence theories further acknowledge that positive life experiences have the potential to redirect life trajectories of offenders. If negative life events can alter the life of an offender for worse, the opposite should be also true. Prior research has identified specific turning points across the life span that may alter the likelihood of future misbehavior. Some important turning points include the acquisition of quality employment, marriage to a good spouse, changes in routine activities or cognitive transformations that accompany aging and maturation (Giordano, Cernkovich, & Rudolph, 2002; Sampson & Laub, 1993; Laub & Sampson, 2003). It is worth pointing out that state dependence theorists do not view individual traits as unimportant. They merely place less emphasis on individual heterogeneity and more emphasis on life events and state. Gang joining and membership, for instance, has been appreciated as both a consequence of prior life experience and a cause of future misbehaviors (Krohn et al., 2011; Thornberry et al., 2003).

Life-Course Theories of General Offending

Now there is a general consensus that population heterogeneity and state dependence are not mutually exclusive concepts (Nagin & Paternoster, 2000; Sampson & Laub, 1995). The two concepts supplement each other to explain the initiation, maintenance and desistance of antisocial behavior. As exemplary examples of
integrated theories of population heterogeneity and state dependence, Thornberry’s interactional theory of delinquency (Thornberry, 1987; Thornberry & Krohn, 2001; 2005) and Sampson and Laub’s (1993; Laub & Sampson, 2003) age-graded theory of informal social control are used to inform our understanding of gang membership across the life span.

**Interactional Theory of Delinquency**

There are three fundamental premises to an interactional theory of delinquency. First, interactional theory addresses the issues of delinquency in a life-course perspective. An interactional perspective posits that delinquency is not caused by some static underlying traits that are stable across time and heterogeneously distributed in the population. In contrast, “the causes of offending vary systematically with stages of the life course and with the success or failure with which the life course has been traversed” (Thornberry & Krohn, 2001, p.293). Second, interactional theory adopts a reciprocal causal structure. Rather than surrounding environment acting upon the individual, it is the bidirectionality or interactions between the person and his/her environment that determines behavior patterns. Delinquency and many of its causes are involved in mutually reinforcing causal loops as delinquent careers unfold. For instance, while delinquent peer affiliation may increase delinquency, delinquency is likely to further isolate the person in delinquent social networks. This reciprocity is also observed among causal factors themselves (e.g. parental attachment and delinquent peer affiliation). Third, interactional theory takes into account the impact of social structure factors (e.g. social class, race and neighborhood) on the development of individual delinquent careers. The effects of many social-psychological process variables vary by structural position in society.
Thornberry and Krohn (2005) also elaborated on the notion of equifinality (Cicchetti & Rogosch, 1996), meaning that many potential combinations can produce the same result. While there are multiple causes for individual offending, not all causal factors need to be activated to produce the outcome. The causal force varies across people according to the number of causal factors and the strength or extremity of any particular causal variable. “Offending at all ages is the result of the total magnitude of all relevant causal forces” (Osgood, 2005, p.199). Additionally, the presence or absence of offsetting variables is also important for the occurrence of delinquency. In short, as the magnitude of the causal force increases and the magnitude of offsetting variables decreases, individual’s involvement in delinquency becomes more likely, and the severity of delinquency will also increase. These basic building blocks of interactional theory are used to respond to questions about continuity and change in delinquent behavior over time.

While virtually all developmental theories suggest a relationship between early onset and continuity in offending, and between late onset and change in offending (desistance), there is less agreement about the strength of the relationship and its implications for theory. Unlike typological perspectives (Moffitt, 1993; Patterson, Capaldi, & Bank, 1991) that conceived “age of onset” as the key defining attribute for categorizing different types of delinquents, interactional theory takes a fundamentally different view. Thornberry and Krohn (2001; 2005) refuted the idea that offending population can be divided into different categories with separate etiological explanations defined by age of onset. While some offenders do start early and some do start late, longitudinal data suggest that onset is better conceived of as earlier or later,
continuously distributed over childhood, adolescence, and even into the early adult years (Eggleston & Laub, 2002). To them, a unified theory may better explain the timing of onset and varying duration of criminal careers.

Among earlier starters some offenders will persist, but many others will desist. Similarly, among later starters some offenders will desist relatively quickly, but others will continue their delinquency. Interactional theory thus perceives “the relationship between early onset and later persistence as moderate, at best” (Thornberry & Krohn, 2005, p.185). Specifically, Thornberry and Krohn (2005) proposed two developmental processes that help to account for the continuity in offending. First, there is stability in the causal processes across the life course. For example, families experiencing extreme levels of disadvantage do not often escape from that adversity, and the development of children raised under such circumstances is constantly compromised. Similarly, there is continuity in ineffective parenting practices, in part caused by the constancy of the social environment in which these families often find themselves (Patterson, Reid, & Dishion, 1992). Prior research has also evidenced that negative temperamental traits and neuropsychological deficits are relatively stable across the life span (Capsi, Bem, & Elder, 1989; Moffitt, Lynam, & Silva, 1994).

The second process that accounts for continuity concerns the developmental consequences of earlier events. From a state dependence perspective, prolonged involvement in antisocial behavior, especially more serious forms of antisocial behavior, generates a range of negative consequences that set up a temporal contagion process. Additionally, these negative consequences are likely to evoke undesirable, reciprocal relationships with the surrounding environment. For instance, persistent antisocial
behavior will continue to elicit coercive responses from the parent as the child ages (Lee & Bates, 1985). Children who have learned coercive behavior styles in the family are apt to extend them to other life domains such as peer relationships and school behaviors. Consequently, aggressive children are likely to be rejected by conventional peers and thus have to affiliate with one another (Cairns & Cairns, 1994; Coie & Dodge, 1998). Aggressive children are also at risk for school failure. The coercive training they received in the family and the isolation from prosocial peers increase the chances of early academic adjustment problems, even controlling for prior academic competence (Ladd, 1990). As these youth age, they are not prepared to meet the developmental challenges of adolescent and adult life. They often fail to complete developmental tasks (e.g. drop out of school), and make life transitions out of order and/or off time (e.g. early cohabitation or teenage parenthood). Furthermore, they are likely to suffer from heavy alcohol or drug use. “All of this reduces the formation of social bonds and social capital and increases embeddedness in deviant networks and belief systems, foreclosing conventional lifestyles and entrapping the individual in deviant lifestyles” (Thornberry & Krohn, 2005, p.198). Thus, a process of “cumulative consequences” (Moffitt, 1993) is established.

Although delinquent careers of many individuals are marked by high levels of continuity, there is also a substantial degree of change in levels of offending. Thornberry and Krohn (2001; 2005) discussed three general processes that can help account for de-escalation and desistance of crime. First, they contended that as the age of onset increases, the strength of the causal force diminishes. That is, “the causal factors are less numerous, less extreme, and less intertwined. Because of that, they are also less
likely to be highly stable over time” (Thornberry & Krohn, 2005, p.201). When those causal factors of offending are not reaching an extraordinary level, positive changes are possible, and thus provide turning points in one’s delinquent trajectory. A second explanation associated with the movement away from active offending is that the causal factors that lead to the initial antisocial behavior are not intensely coupled. For instance, there are many youth with deficits in some areas, such as having a difficult temperament, who have compensating assets in other areas such as having good parents or educational resources. These youth are less likely to experience the tight interweaving of deficits brought about by feedback effects from delinquent behaviors. As Thornberry and Krohn (2005) suggested, “some protective factors may enable even early onset offenders the opportunity to change the course of their lives” (p.202). Third, some prevention and treatment program works (e.g. Andrews & Bonta, 2010; Lipsey & Wilson, 1998), and youth exposed to those program have earlier desistance. Overall, although the earlier the offending career begins, the more difficult it is for positive changes to occur, “onset is not destiny” (Thornberry & Krohn, 2005, p.186).

Thornberry and Krohn (2001; 2005) explicitly discussed the initiation of antisocial behavior in four broad developmental stages: the preschool years, childhood, adolescence and late adolescence/early adulthood. Rather than having sharp boundaries, these developmental stages are viewed as areas or regions of gradual, continuous process of human development.

A small portion of the population initiates antisocial behavior during the preschool years (Krohn, Thornberry, Rivera, & Le Blanc, 2001). As discussed above, these children are more likely than others to persist in delinquency, especially serious
delinquency, across the life span. Their very early onset can be explained by the combination and interaction of neuropsychological deficit and difficult temperament (e.g. negative emotionality and impulsivity), ineffective parenting (e.g. physical punishment and low parental attachment), and position in the social structure (e.g. unemployment, family poverty and neighborhood disadvantage). Importantly, these risk factors are likely to be causally interwoven. As previous studies have shown, young children with negative temperament qualities are more subject to parental hostility and physical punishment (e.g. Lee & Bates, 1985; Rutter & Quinton, 1984), which, in turn, leads to maladaptive and uncontrolled responses in child (e.g. Moffitt, 1993; Belsky, Woodworth, & Crnic, 1996). Meanwhile, these influences exist in a broader social context and, to a large extent, are brought about by that context. Structural adversity reinforces individual and parental deficits.

For a sizable portion of the population, involvement in antisocial behavior begins during the elementary school years, approximately from ages 6 through 12. Onset is less common at the younger ages and becomes more common as the individual approaches adolescence. Thornberry and Krohn (2005) hypothesize that “childhood onset of antisocial behavior, especially at the younger end of this developmental stage, is associated with growing up in families and neighborhoods characterized by poverty and disorganization” (p.192). Structural adversity increases stressors such as parental depression, negative life events and financial worries, which, in turn, impede effective parenting and eventually lead to delinquency (Conger et al., 1994; Jang & Smith, 1997). As the child ages and moves toward the upper end of this developmental stage, greater school and peer effects should also be taken into account. Structural adversity and
ineffective parenting compromise the child’s ability to succeed in school, leading to weakened bonds to school and teachers. Deviant opportunity structures also become accessible to these children. As a result, they are enmeshed in street gangs, drug markets and what Hagan (1992) has labeled “deviance service centers” in many impoverished neighborhoods.

For the population as a whole, the modal age of onset occurs in early to mid adolescence, from approximately age 12 to age 16. Interactional theory hypothesizes that individuals who initiate delinquency around this developmental stage are unlikely to have been exposed to the more extreme and interwoven causal forces described up to this point. Instead, striving for “age-appropriate autonomy” may be the main cause of delinquency for them (Conger, 1991). Prior to adolescence, these youngsters are embedded in conventional networks and their behaviors are largely controlled by parents and teachers. To prepare for entering and succeeding in the adult world, adolescents are expected to make more of their own decisions and to be more responsible for those decisions. “With this added responsibility comes the expectation of more adult-like behavior” (Thornberry & Krohn, 2005, p.193). In making efforts to forge their own identities, adolescents seek distance from parents, teachers and more generally adult authority. The resulting conflict and alienation from parents/teachers reduce the impact of conventional bonds and supervision on the behavior of these youngsters. On the other hand, adolescents gravitate toward each other as their dominant social networks. Peers replace parents, or at least are added to parents, as major sources of social approval and support (McGuire, 2007; Uchino, 2004). However, since age-graded peers are undergoing the same process of searching for autonomy at
roughly the same time, adolescent peer groups are closed to adult authority while praising behaviors that demonstrate rebellion from adult authority. Thus, youngsters who were buffered from risk at earlier ages by strong prosocial bonds are in a particularly precarious position during this stage of their lives.

Finally, Thornberry and Krohn (2005) discussed the onset of delinquency that occurs during late adolescent/early adulthood. According to them, these late bloomers have reduced human capital, especially lower intelligence and lower academic competence, and thus are less successful in building social capital than other adolescents. However, they are likely to hold a relatively advantageous structural position and are buffered from the effects of individual deficits by a supportive family and school environment at early ages. Once they are freed from the protection during emerging adulthood (Arnett, 2000), deficits in human capital become a serious disadvantage for them to acquire meaningful employment and establish a quality relationship with a partner, which, in turn, increases the attraction of deviant friends. This explanation is consistent with the few empirical studies that have examined late bloomers of delinquency (Krohn, Gibson, & Thornberry, 2013).

**An Age-Graded Theory of Informal Social Control**

Sampson and Laub (1993) proposed another life-course theory to explain individual development of offending. Like interactional theory, Sampson and Laub were discontent with the ontogenetic portrayal of human development, through which age was inappropriately used as an "omnibus variable" (Dannefer, 1984). From their point of view, changes in offending behaviors are entirely possible and are equally important as continuity in delinquency.
Specifically, Sampson and Laub’s (1993) age-graded theory of informal social control integrates the life-course framework with social control theory. The integrated theory differs from Hirschi’s (1969) static version of social control by focusing on changing social bonds over the life course. According to Sampson and Laub (1993), there are three major themes of the theory. First, structural context (e.g. neighborhood disadvantage or broken homes) influences crime and delinquency through its effects on informal family and school social controls. Second, weak social bonds explain continuity in antisocial behavior across adolescence and adulthood. Adolescent delinquency predicts weak adult social bonds as evidenced by low educational attainment, unstable employment pattern, and poor quality marital attachment, which eventually lead to adult offending. Negative effects of formal and informal sanctions also deteriorate prosocial opportunities in adulthood. Third, salient life events and socialization experiences in adulthood can counteract the influence of early life experiences. Transitions in life such as good marriage, stable jobs and successful military experiences may alter pre-designated life trajectories. “Pathways to both crime and conformity are modified by key institutions of social control in transition to adulthood, independent of prior differences in criminal propensity” (Laub, Sampson, & Sweeten, 2006, p.317).

While maintaining that social bonds are crucial for explaining offending behaviors in the life course, Laub and Sampson (2003) extended the age-graded theory to include theoretical elements such as routine activities and human agency for understanding desistance of crime. Through their long-term follow-up study of the Gluecks’ sample, Laub & Sampson (2003) found that the process of desistance occurs for virtually all offenders (e.g. serious and minor, violent and nonviolent) albeit at different rates and
ages. They considered persistent offenders (who desist most slowly) “social nomads” (Foucault, 1995). In contrast to the men who desisted from crime at a faster rate, the life of the persistent offender was marked by marginality and a lack of linking structure at each phase of the life course that led to even more crime-facilitating situations.

While there may be multiple pathways to desistance, the general mechanism follows a similar pattern (Laub & Sampson, 2003). Individual offenders must knife off from their past life experiences (immediate environment) and establish “structured role stability” across various life domains. Desistance from crime is a process rather than an event, which must be continually revitalized. Laub and Sampson (2003) specifically mentioned four major self-described turning points implicated in the desistance process: marriage and family, employment, military experiences and reform school/justice system involvement. Each of these institutional or structural turning points creates new situations that “1) knife off the past from the present; 2) provide not only supervision and monitoring but opportunities for social support and growth; 3) bring change and structure to routine activities and 4) provide an opportunity for identity transformation” (p.148-149). While some offenders may consciously seek to better their lives (Maruna, 2001; Giordano et al., 2002), most offenders “desist in response to structurally induced turning points that serve as the catalyst for sustaining long-term behavior change” (p.149).

To sum up, Thornberry’s interactional theory of delinquency is used as a general framework to guide the current research in understanding the development of gang membership across the life span. Consistent with the fundamental premises of Thornberry’s theory, we consider that risk factors of joining a street gang vary
systematically with stages of the life course. Individuals who join a street gang early in life tend to possess negative qualities that late joiners are devoid of. These negative qualities interact with the surrounding environment and contribute to the continuity of gang involvement. However, the relationship between early onset and continuity in offending is not deterministic. Major life events such as having a child or justice system involvement may function as turning points in one’s gang career and lead to positive changes. Sampson and Laub’s theory specifies the general mechanism of desistance from crime. Following Sampson and Laub, gang desistance is not an event but a gradual process, which needs to be continually revitalized. Ex-gang members must knife off from their past life experiences and establish structured role stability across various life domains. Moreover, Thornberry and Krohn (2001; 2005) argued that late joiners may present some unique challenges to gang prevention and intervention efforts. Late blooming offenders tend to have reduced human capital and are easily attracted to deviant social network once they are freed from family/school protection. Prior research has demonstrated that it is not unusual for these late bloomers to commit serious crimes for a relatively long period of time (Krohn, Gibson, & Thornberry, 2013). Accordingly, when examining the long-term consequences of gang membership, it is important to take into account the duration, timing and shape of a gang career.
Prior Research on Gang Membership Trajectories

It is undeniable that the life-course perspective is underdeveloped within gang research (Krohn & Thornberry, 2008; Moloney et al., 2009). As Venkatesh (2003) argued, an individual’s motivations for, and investments in time and energy into gang activities may change over time, “especially over the life course as youth mature and move in and through other social institutions. This basic principle of sociological reasoning, the hallmark in life-course research, has been missing in street gang scholarship” (p.9). Longitudinal panel studies, for instance, have been shown well suited to document onset, continuity and desistance in gang membership across developmental stages. However, to our knowledge, only two studies have made efforts to locate the contours of gang careers in the life-course.

Lacourse et al. (2003) estimated developmental trajectories of gang membership\(^1\) using panel data collected from low-income French-speaking boys in Montreal, Canada (the Montreal Longitudinal Experimental Study). Boys were assessed annually between ages 11 and 17 by responding to a self-report questionnaire. Three trajectory groups emerged in the Montreal sample: the majority of adolescents (74.4%) exhibited stable, low probabilities of gang involvement during their teen years; a childhood onset group (12.8%) began with high probabilities of affiliation that slightly increased through age 14 and dropped off thereafter; and an adolescent onset group (12.8%) had a near zero probability at age 11 but rose quickly to a peak at ages 15.

\(^1\) Gang membership was measured as follows: “During the past 12 months, were you part of a group or a gang that did reprehensible acts?” (Lacourse et al., p.186). Gatti et al. (2005) and Thornberry (1998) used the same measure in the analysis of gang effects with the Montreal data.
From then on, the probability began declining gradually. The two trajectories of active gang affiliation were differentiated by the age of onset and developmental stages in a gang. However, because the study period ends at age 17, it eliminates the opportunity to examine when these individuals disengage from the gang as well as their duration in the gang.

Using data from the 1997 cohort of the National Longitudinal Survey of Youth (NLSY97), Pyrooz (2014b) estimated the dynamic and cumulative prevalence of gang membership among a nationally representative sample and indentified six distinct age-graded patterns of gang membership\(^2\) from early adolescence (age 10) to young adulthood (age 23). Gangs were referred 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”. Following a long line of individual-level gang research (e.g. Esbensen et al., 2001; Thornberry et al., 2003), self-nomination is used to operationalize gang membership.

Results indicate that approximately 8% of the sample reported participation in a gang during the study period. Respondents were reporting first-time gang membership throughout the period of study (the modal age of onset is 13), suggesting that “gang onset is not limited to well-defined age grouping (i.e. early adolescence)” (p.11). The modal age of gang membership is 15, where about 1 in 3 respondents who reported ever in a gang were active in a gang. Three gang membership trajectories revolve around the period of adolescence. The adolescence limited (33%), early adolescence (14%) and late adolescence (26%) trajectories all take on symmetric forms, but

\(^2\) Pyrooz estimated developmental trajectories of gang membership only with adolescents who reported ever in a gang (N=726).
differences exist between the apexes of these gang careers. Tenure in the gang for these individuals (73%) usually lasts no longer than 2 years.

The remaining three trajectory groups are “markedly different due to the persistent involvement in gangs and/or age of onset that diverges from research on gangs” (Pyrooz, 2014b, p. 361). The early persistent trajectory (6%) was comparable to Lacourse et al.’s (2003) childhood onset trajectory group, which exhibited high probability of gang membership during pre- and early-adolescence. For the late persistent trajectory (4%), the probability of gang membership escalated considerably around ages 12-14. Unlike the adolescence limited group, however, the late persistent group did not drop off but maintained a relatively high probability of gang affiliation well into early adulthood. Both early and late persistent groups remained in gangs for 5 or more years. Finally, Pyrooz discovered an adult onset (17%) trajectory, where individuals initiated their involvement in gangs as young adults (mean age of initiation=20 years old). Pyrooz further examined the correlates of distinct gang membership pathways and observed consistent statistical differences in gender, race and household structure across groups.

When we compare trajectory groups derived from Lacourse et al. (2003) with those obtained by Pyrooz (2014b), there are two points worth some additional discussion. First, Pyrooz obtained extra trajectory groups of gang affiliation that were not seen in the Lacourse et al. study. Three factors account for such differences. Lacourse et al. included a general sample of boys (N=969) regardless if they were ever in a gang or not during the study period. In fact, of the 969 subjects examined in the Lacourse et al. study, approximately 75% were following the “never” group. On the other
hand, Pyrooz included the gang subset of the 1997 cohort of the National Longitudinal Survey of Youth (NLSY97), which contained among the largest subsamples of gang members \((N=726)\) studied longitudinally. As Pyrooz (2014b) stated, “If there are idiosyncratic patterns of gang membership, these data are most capable of identifying them” (p.355). The Lacourse et al. study also covered a shorter span of life (ages 11-17) than that of the Pyrooz study (ages 10-23). Further, boys in the Lacourse et al. study were from a homogeneous French-speaking sample resided in low socioeconomic areas of Montreal (Canada), whereas the NLSY97 data are nationally representative. Accordingly, a different sample size, length of follow-up and inherent heterogeneity across samples would explain the different age-graded patterns across studies.

Second, Pyrooz emphasized the significance of using a nationally representative sample to address the patterning of gang membership. He argued that prior research on the prevalence and duration of gang membership is constrained by sample selectivity (e.g. school youths, high risk youths), hampering our ability to generalize the findings to the whole country. While this is true when referring to descriptive information with national implications, gang prevention and intervention strategies might be better drafted at the local level (Howell, 2012). For example, the initial step of implementing the Comprehensive Gang Model (National Gang Center, 2010) is for local community and its leaders to acknowledge and assess the nature and scope of the youth gang problem. However, trajectory groups of gang membership derived from a national sample might not be an optimal tool to address local problems. Individuals from different socio-economic and cultural backgrounds across the country are pulled together and
thus distinct trajectories may reflect the patterning of gang membership at multiple locations rather than diversified patterns of gang problem at one location. Pyrooz’s adult onset group, for instance, may only contain individuals from established gang cities (e.g. Los Angeles or Chicago) where street gangs continue to pick up “leftover” high-risk “wanna-bes”.

Understanding Criminal Trajectory Profiles

Although numerous empirical studies have employed the semi-parametric group-based modeling or latent growth analysis methodology (LCGA) to depict developmental patterns of criminal offending, not all researchers share the opinion that categories of offenders uncovered by this approach demonstrate “real” criminal trajectory profiles (Bauer & Curran, 2003; Sampson, Laub, & Eggleston, 2004; Skardhamar, 2010). Some concerns about the meaning of developmental trajectory groups are discussed here.

While all longitudinal methods suffer from the potential “extrapolation” problem, the semi-parametric group-based approach, according to Sampson et al. (2004), is particularly vulnerable to misappropriation. The group-based modeling technique “begins with the methodological assumption that groups exist, often leading to the notion that a wide array of group configurations is possible” (p.41). Non-sophisticated users are tempted to conclude that developmental trajectory groups indeed exist because they are discovered. Yet, “seemingly distinct groups can be found in samples in which no groups at all are present” (Skardhamar, 2010, p.311). Thus, it is not necessarily correct that we need taxonomic theories to explain diverse developmental patterns of offending. Eggleston, Laub, and Sampson (2004) further argued that length of follow-up and the inclusion of incarceration and mortality information alter the group number, shape, and individual classification in trajectory research, implying that the
suggested diagnostics for classifying individuals accurately into groups may not be reliable indicators of the “distinctness” of groups.

This brings us to a discussion of what exactly is meant by the term “group” in semi-parametric, group-based approach. Nagin and Tremblay (2005) suggested not viewing trajectory groups as literal depictions of reality but as approximations to the (continuous) population distribution of individual-level propensity for offending behavior over time. Categorical groupings are used as a heuristic summary for more complex realities. It is scientifically incorrect and dangerous to reify trajectory groups as nonexistent realities, which creates the impression that groups are immutable and individuals follow group-level trajectory in lock step. As Nagin and Tremblay (2005) warned, human history is replete with tragedies in which a fictional group-based separation provokes draconian responses to socially undesirable “them”.

Brame, Paternoster, and Piquero (2012) further declared that the controversial issue is not that group-based methods identify distinct clusters of offenders, but how to characterize the meaning the groups have. They argued that it is entirely appropriate for researchers to empirically identify groups and test hypotheses from extant theory regarding the existence of these groups and their attributes. No matter what predictions a theory makes (e.g. the number of distinct trajectory groups, the correlates of developmental trajectories or the consequences of following a particular trajectory group), we can follow a deductive logic to see if that prediction is consistent with the available data. There is no inherent deficiency of the group-based approach to determine the validity of taxonomic or any other theory in criminology.
Moreover, when a group-based trajectory model is estimated with no theory in hand (e.g. developmental trajectories of gang membership), it remains for some meaning or etiological significance to be assigned to those “groups”. Since each trajectory group can be viewed as a specific cluster of individuals with a similar developmental path, it is theoretically important to explore how trajectory groups came into existence, the features of those groups and what, if anything, should be done about them. Sometimes, a revision of an original theory is necessary (Moffitt, 2006). As Brame et al. (2012) stated, “the end result is a set of groups or clusters whose meaning must be interpreted in the context of theory that is already established or theory yet to be developed” (p.482). The examination of distinct criminal trajectory profiles cannot be a strictly empirical exercise. It is certainly a theoretical question.

**Gang Membership Trajectories for the Current Study**

Following model selection techniques suggested by Nagin (2005), a four-group model is identified as best. The model is defined by one trajectory following a simple intercept-only function and three trajectories following quadratic functions of age. Figure 4-1 depicts the trajectories of the best fitting model. Consistent with the Lacourse et al. (2003) study, the great majority of our respondents (71.4%) show stable, low probabilities of being part of a street gang during their adolescent and early adulthood years. The “quick desistance” group (15.8%) is characterized by individuals who affiliate early to street gangs. This group begins with relatively high probabilities of affiliation that slightly increase through age 14 and drop off thereafter. By the age of 18, probabilities of gang affiliation for this group decline to a level that is virtually indistinguishable from

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3 Statistical fit information and other details regarding these trajectories will be presented in Chapter 6.
the “very low” trajectory. The “late adolescence” group (10.5%), on the other hand, begins with low probabilities at early adolescence. These probabilities rise to a peak around age 17 but decline after that. At age 21, the predicted probability of gang membership for this group declines to a near-zero level. Finally, individuals following the “high risk persistence” trajectory have consistently high and slightly increasing risk of gang affiliation before age 18. These probabilities gradually decrease thereafter and become insignificant after age 22. In short, the three trajectories of active gang affiliation differ by the age of onset and developmental stages in street gangs. However, because the study period begins around age 13, we cannot fully assess the length of time in a street gang for our subjects. Based on the currently available data, it seems that individuals following the “high risk persistence” trajectory stay in street gangs for the longest time, followed by the “late-adolescence” group and “quick desistance” group.

**Theoretical Context of Gang Membership Trajectories**

While presenting developmental patterning of gang affiliation is meaningful, it is equally important to situate developmental pathways within an appropriate theoretical context. Unfortunately, neither of the two previous studies on gang membership trajectories has elaborated on theoretical implications of their identified trajectory groups. Lacourse et al. (2003) very briefly mentioned that their findings suggest that “there is a mixture of age dependent pathways of delinquent group affiliation. These findings are similar to theoretical descriptions of early and late onset pathways of problem behaviors suggested by Moffitt (1993) and Patterson et al. (1997)” (Lacourse et al., 2003, p.194). Although useful theoretical constructs may be derived from these typological theories, they do not provide the best explanation of gang affiliation trajectories. For instance, Moffitt’s theory is defined by behavioral stability associated
with age of onset of problem behavior. Early starters exhibit antisocial tendencies at a very young age and, as the developmental paradigm implies, continue to behavior in antisocial ways throughout their lives. The probability of committing delinquency for early starters should remain relatively high across the entire adolescence, and we do not expect to observe a sharp decline in the probability of gang membership as the “quick desistance” group represents. In other words, according to Moffitt (1993), early starters are not early desistors, and there should not be a crossing between the “quick desistance” and “late adolescence” trajectories.

Krohn and Thornberry (2008) suggested that younger teenagers are more apt to join a street gang because of the influence of a friend or older family member whereas those who join at an older age may be seeking the thrill of engaging in dangerous behavior, trying to obtain protection, or simply looking into profit from their membership. Joining a gang at a relatively young age may be transitory in nature and as youth become more mature, they realize that gang membership is not in their interest. An early start of gang involvement may actually lead to instability in gang affiliation, whereas joining in later teenage years represent a more deliberate choice on the youth’s part that involves greater commitment to the gang and the behaviors that are part of the gang lifestyle. This line of argument is consistent with Thornberry and Krohn’s (2005) viewpoint that the relationship between early onset and later persistence of offending is moderate at best. However, Krohn and Thornberry (2008) did not specify the existence of high risk persistent gang members.

A Life-Course Explanation of Gang Involvement

Given that street gang membership has only recently been investigated within the life course framework, relatively few theoretical efforts have been made to elaborate
on the evolvement of gang membership across the life span. As mentioned earlier, two leading life course theories of general offending are used to guide the current research. Thornberry and Krohn’s interactional theory (2001; 2005) is used to explain the age of onset, developmental stages and duration in a street gang. In addition to that, Sampson and Laub’s theory (1993; Laub & Sampson, 2003) helps us uncover possible life turning events that redirect developmental trajectories of gang affiliation.

**Initiation of gang membership**

Although structural theories of street gangs reviewed in Chapter 2 have provided us with important hints on gang formation and participation, various theoretical issues have not been adequately addressed. In particular, prior theories did not elaborate on why particular adolescents join gangs while other similarly situated youth do not. Our understanding of the role of social-psychological factors such as parenting behaviors and peer relationships—fundamental in many theories of general offending—is not fully developed in theories of gangs.

In order to expand our understanding of the initiation of gang membership, Thornberry et al. (2003) presented a causal model derived from interactional theory. Consistent with the premises of interactional theory and traditional theories of gangs, the causal process of joining a gang begins with structural disadvantage. Specifically, gang members are likely to be minorities and come from disorganized neighborhoods, and from non-intact families with lower level of parental education. These structural variables, however, are not directly linked to gang membership. A number of indirect paths exist between structural disadvantage and gang participation. Disadvantaged structural position leads to a reduction in conventional social bonds especially attachment between parent and child and school performance. Both structural
disadvantage and attenuated prosocial social bonds increase antisocial influence such as associations with delinquent peers and holding delinquent beliefs, as well as early dating. From a life-course perspective, the consequences of structural disadvantage, including reductions in conventional social bonds and enhancements in antisocial influences, disrupt the normal course of adolescent development. As a result, there are increased levels of delinquency and violence, as well as life stress, all of which eventually lead to gang membership. Thornberry and colleagues (2003) tested their path model through a series of logistic regression analyses and found considerable empirical support for the model. Later, Howell and Egley (2005) extended Thornberry and colleagues’ theoretical model to take into consideration precursors of gang affiliation from preschool age through early adolescence, emphasizing a stepping-stone pattern of joining a gang.

Although Thornberry and colleagues’ theoretical model has depicted a picture of causal processes associated with gang affiliation, an unanswered question is whether the same causal mechanism accounts for all gang members’ situations regardless of their age of onset or developmental stages in a gang. Informed by developmental trajectories of gang membership uncovered in the current investigation, we attempt to expand Thornberry and colleague’s theoretical model to account for unexplained heterogeneity in the initiation of gang membership.

We hypothesize that the early onset of gang affiliation represented by the “high risk persistence” and “quick desistance” groups can be explained by the combination of unfavorable position in the social structure (e.g. neighborhood disadvantage and family poverty), ineffective parenting (e.g. low parental attachment and lack of consistent
discipline) and association with delinquent peers (e.g. peer delinquency and drug use). Prior research has shown that structural disadvantage increases parental stress such as financial worries and negative life events, which, in turn, impede effective parenting. Parents suffering from structural adversities are unable to monitor and provide necessary guidance on the development of problem-solving skills. They have low affective ties and involvement with their children and exhibit inconsistent and explosive physical disciplinary styles. Loeber et al. (2003), for instance, found that families with a harsh child punishment profile are overrepresented in socially disadvantaged neighborhoods. Parental hostility, in turn, leads to maladaptive and uncontrolled reactions in child.

Given the nature of street gangs, peer effects should be particularly important when examining the initiation of gang membership. Forsyth (2010) suggested that youth gangs emerge for many of the same reasons that any adolescent peer group is formed. Developmental psychologists have demonstrated that peer interaction is an essential element in the transition from childhood to adulthood (e.g. Ausubel, 1954; Grusec & Lytton, 1988). Peer groups become a temporary replacement of parents and home during adolescence, providing the setting in which adolescents establish their first identity outside the family. In many ways, peers become an independent source of status, self-esteem and support during a period of life in which rapid, almost frenetic changes are occurring (McGuire, 2007; Uchino, 2004). Through observing and interacting with their peers, “adolescents acquire interactional skills and learn the ‘rules’ about work, dating, sex, interpersonal conflict, and life in general” (Warr, 2002, p.25).
Further, peer groups provide sheer pleasure and fun for youth (Csikszentmihalyi & Larson, 1984).

Unfortunately, children who have learnt coercive behavioral styles in the family are apt to extend them to other life domains such as peer relationships and school behaviors. Because of their aggressive and disruptive behaviors, these children are likely to be rejected by conventional peers, thus opening the door to deviant peer influences. They often have to affiliate with one another, and deviant opportunity structures become accessible to them. Off-time or early patterns of dating is another indicator of entry into problematic peer networks, which, for example, increases the exposure to risky behaviors associated with older dating partners (Thornberry et al., 2003). This group of rejected, alienated, and aggressive children are thus enmeshed in what Hagan (1992) has labeled “deviance service centers” in many impoverished neighborhoods and become suitable targets of recruitment by street gangs.

Although committing delinquent acts with peers would provide “group fun/excitement” and reinforce extreme forms of compliance or agreement (Warr, 2002), we observe a divergence in probabilities of gang affiliation between the “high risk persistence” and “quick desistance” group despite a common early initiation of gang membership. The discontinuity of gang involvement represented by the “quick desistance” trajectory raises an interesting issue to explore. Informed by Thornberry and Krohn’s (2001; 2005) discussion on processes of de-escalation and desistance of crime, we hypothesize two general explanations for this discontinuity. First, not all early gang starters privately accept the group attitudes and beliefs, although some choose to temporarily comply for avoiding exile from the peer group. Coleman (1989), for
example, found that the fear of rejection by peers rises rapidly in early adolescence, reaching a peak at around age 15 before assuming a downward trajectory. As adolescents age, they acquire greater psychological and emotional autonomy and rely less on peers to define themselves. Second, when causal factors of early initiation of gang membership are not intensely coupled and reaching an extraordinary level, protective factors may emerge and enable early onset offenders the opportunity to change the course of their lives. Parents of early “desisters” may eventually realize the inadequacies of prior parenting practices and begin to re-adjust their parenting styles and scrutinize adolescents’ peer networks. On the other hand, “high risk persisters” may truly hold delinquent beliefs and make deliberate choices that involve greater commitment to the gang and the behaviors that are part of the gang lifestyle.

Following the interactional theory of delinquency, we hypothesize that individuals following the “late adolescence” trajectory have reduced human capital such as depression, and are less successful in building social capital than gang abstainers. Prior to late adolescence, these subjects are surrounded by conventional networks and their behaviors are largely controlled by parents and teachers. Once they are freed from such protection during emerging adulthood (Arnett, 2000), deficits in human capital become a serious disadvantage for them to make a smooth transition into adulthood. They often fail to establish a quality relationship with a partner and acquire meaningful employment, which, in turn, increases the attraction of deviant friends and street gangs.

Previous studies have demonstrated that older gang members (including late joiners) present some unique challenges to intervention work. First, mature gang members are found more involved in especially serious violence (Maxson, Gordon, &
Klein, 1985). They often act as catalysts for group violence or the violent settlement of disagreements, and are well respected in gang circles because of their violent reputations (Blumstein, 1995; Harding, 2010). “The evidence suggests it is these older members who often perpetuate lethal violence” (Watkins & Moule, 2014, p.124). In addition, older gang members tend to identify more with the gang as they age and are more capable of organizing street gangs (Decker, Katz, & Webb, 2008). Decker and Curry (2000) found that gang affiliation is not a “master status” among younger adolescents, but it means more for older teenagers and individuals in their 20s. These older members serve as role models and motive current and prospective members toward gang affairs. Thus, individuals following the “high risk persistence” and “late adolescence” groups are assumed more likely to become core members in a street gang than individuals following the “quick desistance” group.

**Life turning points of gang membership**

As reviewed earlier, life turning events are crucial transitions in the process of redirecting an existing trajectory. Specifically, turning points provide opportunities for offenders to knife off from past experience and immediate environment, and generate doubts about staying in a delinquent position. Life turning events also provide continuing social support and essentially change and re-structure routine activities of offenders, which eventually results in cognitive transformation and an identity change (Decker, Pyrooz, & Moule, 2014). Among many life transitions, the birth of a first child has been considered one possible turning point of one’s gang career.

Laub and Sampson (2003) suggested that a change in offending behavior may not necessarily result from having a child alone. Rather, change reveals a continuous investment process in conventional social bonds. As the stakes in conventional ways of
life grow, the incentive for avoiding a gang life style increases. Accordingly, the timing of having a first child is crucial for the desistance process.

From a life course perspective, early parenthood is an off-time transition that disrupts other important pathways to adulthood (Pogarsky, Thornberry, & Lizotte, 2006; Sigle-Rushton, 2005). Becoming a parent at a young age disrupts the formation of needed social and human capital. The early assumption of parental responsibility pulls individuals from investing in education or career development (e.g. dropping out of high school) and pushes them into lower paid, less stable employment, which leads to long-term economic disadvantage (e.g. long-term welfare dependency). Also important to consider is the relationship between early parenthood, economic disadvantage and family conflicts. Individuals who initiate childbearing at young ages are more likely to experience higher levels of relationship breakdown with their partners and other family members (Astone, 1993). The resulting stress and life dissatisfaction further increase the likelihood of the subject’s own antisocial behaviors, especially substance use (Krohn et al., 1997). If early parenthood, especially fatherhood, initiates a retreat from adult responsibilities in general, “the effect could be a long-term disinclination to marry and to assume adult roles and responsibilities (Sigle-Rushton, 2005, p.738)”.

On the other hand, having a first child “on time” in a normative sense increases the chance of a successful transition from adolescence to adulthood (Lizotte et al., In press). Family responsibilities influence gang affiliation through re-structuring everyday routines, especially with regard to one’s peer groups. Osgood and Lee (1993), for instance, found that family obligations reduce leisure activities outside the family. Individuals with family responsibilities are spending more time with domestic partners
than with their same-sex peers. Warr (1998) also noted that the decline of delinquency following the transitions to marriage and family was largely mediated by changes in peer relations—family responsibilities mark “a transition from heavy peer involvement to a preoccupation with one’s spouse and family of procreation” (Warr, 2002, p.105). Thus, having an “on-time” child decreases street gang members’ interactions with former accomplices and thereby reduces the opportunities as well as the motivation to engage in offending behaviors. Additionally, marriage and family also introduce direct social control exerted by family members, which generates both supervision and sustaining social and emotional support. As the Moloney et al. (2009) study has demonstrated, having a family connotes getting “serious” (becoming an adult) and facilitates subjective and affective transformations that lead to changes in one’s identities, priorities and future orientations.

Another potential life turning event for street gang members is questioning or arrest by the police⁴. Following the perspective of (specific) deterrence, state sanctions are assumed to play an important role in curbing one’s offending behaviors. When a street gang member is caught and punished in an appropriate way, he or she is thought to reduce their future criminal acts possibly through understanding the consequences of prior criminal acts and generating doubts about former people and environment surrounding them (Gibbs, 1986). In addition, such formal sanctions should deter most effectively when they “set off” or provoke informal social sanctions including the informal

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⁴ More serious forms of justice system involvement such as incarceration are not considered in the dissertation because they are likely to trigger transformative but not incremental changes. When estimating group-based trajectory models with time-varying covariates, Nagin (2005) assumes that “the event may cause a deviation from the long-term average behavior of most group members, but the deviation is not so large that the average trajectory for the group bears no resemblance to the new trajectory of individuals affected by the event” (p.121).
costs of severed relationships, damage to one’s reputation and loss of other precious resources (Paternoster, 1985; Zimring & Hawkins, 1973). In short, justice system involvement need not lead to absolute desistance. A meaningful deflection in gang affiliation trajectories toward conformity introduces beneficiary effects.

Meanwhile, state sanctions may lead to undesirable labeling effects that reverberate across the life span. Following the deviance amplification perspective, Paternoster and Iovanni (1989) specified the prototypical causal pathway from primary to secondary deviance: a public labeling event following a primary deviant act \(^5\) leads to, in order, the exclusion from conventional activities, the alteration of self-identity, the acquisition of supportive deviant others and, finally, secondary deviance \(^6\). As Becker (1963) concluded, “a final step in the career of a deviant is movement into an organized deviant group” (p.37). Empirical studies have largely confirmed the causal pathway of official labeling, involvement in deviant groups and subsequent delinquency (e.g. Bernburg, Krohn, & Rivera, 2006; Matsueda, 1992; Sampson & Laub, 1997).

Moreover, it is important to recognize that neither deterrent nor labeling effects are invariant across divergent types of offenders. Sherman (1993) contended that it is wrong to ask the simple question of whether state sanctions control crime. “Widely varying results across a range of sanction studies suggest a far more useful question: under what conditions does each type of criminal sanction reduce, increase, or have no effect on future crimes?” (p.445) Compared to more experienced offenders, novice

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\(^5\) While the initial sources of a primary deviant act are many and varied, primary deviance is “rationalized or otherwise dealt with as functions of a socially accept role” (Lemert, 1951, p.75). In other words, participation in primary deviance does not have a sizable influence on an individual’s sense of self or his/her perceived role in conventional society.

\(^6\) According to Lemert (1951), secondary deviances occurs when “a person begins to employ his deviant behavior or a role based upon it as a means of defense, attack, or adjustment to the overt and covert problems created by the consequent societal reaction to him” (p.76).
offenders have been argued to be more likely to experience both deterrent (Matsueda, Kreager, & Huizinga, 2006) and labeling effects (Paternoster & Iovanni, 1989). In one view, novice offenders are more susceptible to specific deterrence due to their greater perceived certainty of punishment following arrest. In another view, labeling effects level off as an individual becomes committed to deviance, indicating that novice offenders are more likely to experience self-degradation. Given that there are hypotheses suggesting that justice system involvement may serve as a turning point in either direction (or no effect), how the effects of questioning or arrest by the police vary across subgroups of gang members is truly an empirical question.

**The enduring consequences of gang membership**

Prior research has indicated that street gangs have a powerful, contemporaneous effect on the lives of the adolescents who become involved with them. More often than not, associated negative consequences extend beyond periods of active gang involvement, even though the length of gang membership rarely lasts more than one to two years (Krohn et al., 2011; Krohn & Thornberry, 2008; Thornberry et al., 2003). The expectations, identity, social networks, and behaviors of gang members are all different from when they were “wanna-bes” (i.e. prior to joining a gang). An intriguing question is what accounts for all these changes.

From a theoretical standpoint, adolescent gang involvement may influence later life chances through two causal pathways⁷. First, gang experience and orientation impede the acquisition of human (“the skills and knowledge that individuals acquire

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⁷ There may be other causal pathways between adolescent gang affiliation and later life failure such as labeling effects and psychological and physical injuries induced by gang-related violence. Although these mechanisms are equally important and interesting to examine, they are beyond the scope of this dissertation.
through education and training”) and social (“the creation of capabilities through socially structured relations between individuals and groups”) capital that facilitates success in later life. Prior research has indicated that adolescent years are “demographically dense” (Rindfuss, 1991), involving transitions in multiple institutional arenas such as completing school education, beginning a stable pattern of employment, getting married and having children. Unfortunately, gang participation disrupts all these capital accumulation processes. Curry and Decker (1998), for instance, found that the greater the commitment to a street gang, the lower the commitment to the cultural system represented by school participation. Even while they are in school, gang members are engaged in non-school-oriented behavior such as skipping classes and that, eventually, lead to dropping out of school. Similarly, Decker and Van Winkle (1996) reported that gang members paid little attention to the daily routines and opportunities of the educational system. “Truancy, tardiness, skipping classes, leaving school before the end of the day all appear to be popular responses to school discipline and rules” (p.190).

Another negative outcome associated with gang participation is that few gang members are involved in the legitimate labor market. The jobs gang members hold are also overwhelmingly in service or retail industries at the lowest level (Sanchez-Jankowski, 1991; Weisfeld & Feldman, 1982). Decker and Van Winkle (1996), for instance, suggested a variety of factors that contribute to the low level of participation in the labor market among street gang members in St. Louis, MO: lack of available jobs in a declining rust-belt city, gang members’ race and presumed criminal tendencies, lack of working skills and lack of workplace discipline. “But the main reason most of our
subjects do not work is because they are gang members, whose lives and time are focused on street and peer-group interactions and activities that they find more rewarding" (p.221-222). When gang members participate in low-level jobs, their primary goal is temporary spending money rather than legitimate, stable employment. Gang life, with associated threats and violence, as well as the lure of drug money, creates a “drop in and drop out” relationship with work for many street gang members.

Family problems are also common among street gang members. Winton (2004) suggested that join a gang “makes you feel big”, which leads to an increased level of domestic abuse within the family. Hostility, fighting and arguing are also caused within the household as a result of problems associated with gang involvement, particularly drug consumption and violence or threatened violence toward family members, which further decrease trust and communication within the family (Curry & Decker, 1998). In addition, lack of education/stable employment often worsens frictions within the family due to gang members’ limited capability of seeking outside help. All together, adolescent gang affiliation decreases the ability of former gang members to acquire necessary human and social capital that, in turn, reduces their chance for success in school, in the job market and in the family. As a result, the probability of continued participation in criminal behavior and being arrested is increased.

A second and related pathway is that street gangs isolate their constituent members from other social networks. Prior research has characterized the gang as a surrogate family (Vigil, 1988), a collective response to adverse social conditions (Hagedorn, 1998) and a group response to perceived threats (Klein, 1971; Moore, 1991). Decker and Van Winkle (1996) reported that “involvement in legitimate social
institutions or with non-gang peers and relatives drops dramatically following gang initiation. In most cases, gang life has an obsessively deadly attraction for our subjects, one which constricts and diminishes their life to the friendship group of the gang” (p.187). As a result, the gang has become the primary reference group and only social network for the subjects. Once a member, former ties to conventional institutions—church, school, employment market and clubs—diminish, as members become more and more enmeshed in a world of serious and violent crime.

In sum, juvenile street gangs can be viewed as “prototypical deviant social networks whose actors are embedded in a culture and behavior system that both facilitates deviant behavior and isolates the individual from prosocial networks” (Thornberry et al., 2003, p.166). Because members of a gang who are more committed to that social network are more likely to experience problematic life outcomes, we hypothesize that individuals following the “high risk persistence” and “late adolescence” trajectories will have a higher rate of street crime and arrest in adulthood than individuals following the “very-low” and “quick desistance” trajectories do. This relationship will be mediated by two general mechanisms: adult role/status fulfillment failure (i.e. lack of education, employment and family problems) and delinquent peer association.
Figure 4-1. Developmental trajectories of gang membership, Wave 2-12
CHAPTER 5
METHODS

Data and Sample

The current research employs data from the Rochester Youth Developmental Study (RYDS), which is an ongoing longitudinal study aimed at understanding the causes of crime and delinquency across the human life course. The RYDS began in 1988 with an original sample of 1000 seventh and eighth grade students in the public schools of Rochester, New York. Since the base rates for serious delinquency and drug use are relatively low (Elliott, Huizinga, & Menard, 1989; Wolfgang, Thornberry, & Figlio, 1987), in creating the original sample, youth at high risk were oversampled in the Rochester study. Specifically, males were oversampled (75% versus 25%) because they are more likely than females to commit delinquent acts. Students from high-crime-rate areas of the city were also oversampled based on the assumption that living in such areas is a significant risk factor for juvenile delinquency. The initial sample was predominantly composed of minority (68% African American, 17% Hispanic, and 15% White) and males (77%).

The RYDS has followed the identified subjects from their early teenage years (age of 14) till age 31, and 14 waves of interviews have been completed in three phases. In Phase 1 of the RYDS, the students (Generation 2) and their primary caretakers (most often the biological mother; Generation 1) were interviewed nine and eight times respectively at 6-month intervals beginning in 1988 and ending in 1992. After a two and a half year gap, in Phase 2, G2 subjects and their parents were interviewed at three annual intervals between 1995 and 1997. In Phase 3, two additional interviews of G2 subjects were conducted at G2’s ages 29 and 31 between
2003 and 2005. The sample retention rates compare favorably to other panel studies of antisocial behaviors. At Wave 12, 85% (846) of the initial 1,000 subjects were re-interviewed, and the completion rate for parent interviews was 83%\(^1\). Eighty percent of G2 subjects were re-interviewed at Waves 13 and 14. The current investigation is limited to male respondents because very few of female respondents were gang members, with most leaving the gang by approximately 15 years of age. All 14 waves of data are used to comprehensively explore the antecedents, experience and consequences of gang participation.

There are several features of the RYDS that make it attractive for the proposed line of research. First, the RYDS data are rich, containing a large number of measures from questions covering a wide range of topics including individual psychological well-being, peer relationships, gang involvement, family structure and relationships, education aspirations and commitments, employment and economic indicators, social support, and one’s offending behavior such as self-reported delinquency, violence and drug-use. In addition to both G1 and G2 self-report surveys, the RYDS also collected school-performance data from Rochester public schools, child maltreatment information from the Department of Social Services and official arrest data from the Rochester police department. As we shall see, this breadth of data is crucial for understanding the development of gang membership in a coherent sense. Another important feature of the RYDS data is the longitudinal, multi-phase component which ensures there are sufficient waves of data to estimate developmental trajectories of gang membership in

\(^1\) In a formal test of differential attrition, Krohn and Thornberry (1998) compared G2 subjects retained to G2 subjects not retained at Wave 12. They found no significant difference between those retained and those not retained along the following dimensions—age, gender, social class, race/ethnicity, family structure, drug use, delinquency, property crime and violent crime.
the critical stage of human development (from early adolescence into emerging adulthood) and assess the long-term consequences in adulthood.

**Measures**

**Gang Membership**

The core variable in this study is gang membership. Consistent with a long line of individual-level gang research, self-nomination is the technique used to measure gang membership. As Esbensen et al. (2001) stated, self-nomination is “a robust measure of gang membership capable of distinguishing gang from non-gang youth” (p.124).

Starting at Wave 2, G2 subjects were asked since the previous interview, whether they were a member of a street gang or “posse²”. If they responded with an affirmative answer, they were asked a series of follow-up questions about the nature of the gang including the name, the number of members, the reason why he/she joined and his/her position in the gang. In previous studies, Thornberry and colleagues (Thornberry et al., 1993; Thornberry et al., 2003) have demonstrated the predictive validity of the self-report measure of gang membership in the RYDS.

**Other Measures**

In addition to the measure of gang membership, the RYDS has collected data on a host of other concepts relevant to the study of gang behavior. We present a brief description of the measures that are used in the dissertation.

**Area characteristics**

Prior research indicates that gang members tend to cluster in socially disadvantaged neighborhoods.

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² This is a terminology adolescents in Rochester often used to refer to street gangs.
Concentrated disadvantage. This is a latent measure assessing the level of economic hardship within the neighborhood where the subjects live. Four standard items from the 1990 U.S. census are used: percentage in poverty, percentage female-headed households, percentage unemployed, and percentage receiving public assistance. The four variables are highly associated and load on the same factor.

Neighborhood disorganization. Neighborhood disorganization is measured by a 17-item scale tapping a variety of neighborhood problems. G1 subjects were asked how serious the following problems were in their neighborhoods: high unemployment, racial/cultural conflict, vandalism, little respect for laws, winos and junkies, prostitution, abandoned houses, sexual assaults or rapes, burglaries and thefts, gambling, poorly kept buildings, organized crime, assaults and muggings, street gangs, homeless people, drug issues, buying and selling stolen goods. Responses were indicated on a 3-point scale from “not a problem” (1), “sort of a problem” (2) to “a big problem” (3). Items have been averaged to provide the mean score and higher scores indicate greater levels of neighborhood disorganization. The Cronbach’s coefficient alpha is 0.96 for this scale.

Individual characteristics

A range of demographic factors and individual experiences/attitudes are linked to gang membership as risk factors.

Race. Race is a nominal variable that has been recorded into a series of dummy coded variables. Specifically, Blacks and Hispanics are coded as “1” on their respective indicator variables, and Whites serve as the reference group.

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3 Factor loadings are 0.903, 0.874, 0.635 and 0.863 respectively for the four variables.
**Depression.** Depress is measured by a 14-item scale tapping the frequency of depressive symptoms (Radloff, 1977). G2 subjects were asked, for instance, how often you “feel you had trouble keeping your mind on what you were doing”, “feel depressed or very sad” or “feel scared or afraid”. Responses were indicated on a 4-point scale from “never” (1), “seldom” (2), “sometimes” (3) to “often” (4). Items have been averaged to provide the mean score and higher scores indicate greater depressive symptoms. The Cronbach’s coefficient alpha equals 0.77 for the scale.

**Self-esteem.** Self-esteem is measured by a 9-item scale derived from the Rosenberg’s (1965) self-esteem scale. G2 subjects were asked whether they agree or disagree with statements like “in general, you are satisfied with yourself”, “at times you think you are no good at all” (reverse coded), “you feel that you have a number of good qualities” or “you can do things as well as most other people”. Responses were indicated on a 4-point scale from “strongly disagree” (1), “disagree” (2), “agree” (3) to “strongly agree” (4). Items have been averaged to provide the mean score and higher scores indicate greater self-esteem. The Cronbach’s coefficient alpha is 0.79 for the scale.

**Aggression.** Aggression is measured by a 12-item sub-scale from the Child Behavioral Checklist (CBCL). G1 was asked to report, for instance, how often G2 has “been cruel, bullying, or mean to others”, “gotten into many fights” or “been stubborn, sullen or irritable”. Responses were indicated on a 3-point scale from “never” (0), “sometimes” (1), to “often” (2). Items have been averaged to provide the mean score and higher scores indicate greater levels of aggression. The Cronbach’s coefficient alpha is 0.85 for the scale.
**Delinquent beliefs.** This variable is a 10-item scale measuring how wrong the subjects feel if they engage in a variety of delinquent acts including “drink alcohol”, “use hard drugs”, “steal something worth $50” or “hit someone with the idea of hurting them”. Responses were indicated from “not wrong at all” (1), “a little bit wrong” (2), “wrong” (3) to “very wrong” (4). Items have been averaged to provide the mean score and higher scores indicate more delinquent values. The Cronbach’s coefficient alpha equals 0.80 for the scale.

**Conventional beliefs.** Conventional beliefs is a 4-item scale measuring how important for G2 subjects “to have a good reputation in the community”, “to study hard for good grades”, “to work hard to get ahead” or “to save money for the future”. Responses were indicated from “not important at all” (1), “not very important” (2), “important” (3) to “very important” (4). Items have been averaged to provide the mean score and higher scores indicate greater conventional values. The Cronbach’s coefficient alpha is 0.63 for the scale.

**Family characteristics and relations**

In addition to individual characteristics, family characteristics and relations are also found important in understanding gang affiliation.

**Family structure.** This is a dichotomous variable indicating whether the subject lives at home with both biological parents or in some other family constellation.

**Poverty level income.** This is a dichotomous variable indicating whether the respondent grows up in a family with poverty-level earnings. To create this measure, the number of individuals in G1’s house was determined and the before-tax income was calculated. These two numbers were then compared against the U.S. Government’s
federal poverty chart. Respondents with family income below the federal poverty line were coded as “1”.

**Parent education.** Parent education refers to the highest level of education completed by the family’s principal wage earner. It ranges from 6 to 13 years.

**Parental attachment.** Parental attachment is an 11-item scale derived from the Hudson Scale of Attitudes toward Parents, measuring warmth and lack of hostility in the parent-child relationship (Hudson, 1982). Respondents were asked, for instance, how often you would say that “you get along with your primary caregiver”, “you feel that you can really trust your primary caregiver” or “you really enjoy your primary caregiver”. Responses were indicated on a 4-point scale from “never” (1), “seldom” (2), “sometimes” (3) to “often” (4). Items have been averaged to provide the mean score and higher scores indicate greater parental attachment. The Cronbach’s coefficient alpha equals 0.83 for the scale.

**Parental supervision.** Parental supervision is a 4-item scale assessing the extent to which the subject feels that his parents are aware of his whereabouts, activities and friends. Respondents were asked how often the caregivers know where he is and who he is with when he is away from home (“never” (1), “seldom” (2), “sometimes” (3) or “often” (4)) as well as how important these two items are (“not at all important” (1), “not very important” (2), “important” (3) or “very important” (4)). Higher values indicate greater parental supervision. The Cronbach’s coefficient alpha equals 0.53 for the scale.

**Parental involvement.** Parental involvement is a 10-item scale measuring the subject’s perception of their parents’ involvement in their daily activities. Respondents
were asked, for instance, how often the caregivers help with important decisions, play sports or games with you and help you with your homework. Response options were “never” (1), “seldom” (2), “sometimes” (3) and “often” (4). Higher average scores indicate greater parental involvement in the subject’s life. The Cronbach’s coefficient alpha equals 0.83 for the scale.

**Parental consistency of discipline.** This variable measures the subject’s perception of their parents’ patterns of discipline. Respondents were asked the following five questions: how often you get away with things; once G1 decides a punishment, how often you get out of it; how often you get punished sometimes, but not other times, for doing the same thing; how often G1 has to ask you to do the same thing more than once; when you get punished, how much the kind of punishment you get depends on G1’s mood. Response options were “never” (1), “seldom” (2), “sometimes” (3) and “often” (4). Items are reverse coded and higher average scores indicate greater consistency in discipline. The Cronbach’s coefficient alpha equals 0.50 for the scale.

**Positive parenting.** This is a 5-item scale measuring how often the parents say or do positive things when the subject behaves in a good manner. Respondents were asked the following five questions: when you have done something that G1 likes or approves of, how often G1 says something nice about it or praises you for it; how often G1 gives you something like a hug, kiss, or pat on the back for it; how often G1 gives you some reward for it like a present, money or food; how often G1 gives you a special privilege like staying up later or a special activity; how often G1 goes someplace or does something special with you as a reward. Responses were indicated on a 4-point scale from “never” (1), “seldom” (2), “sometimes” (3) to “often” (4). Items are averaged to
provide the mean score and higher scores indicate greater positive parenting. The Cronbach’s coefficient alpha equals 0.74 for the scale.

**Child maltreatment.** This is an indicator variable that denotes whether the respondent experienced at least one substantiated incident of maltreatment prior to age 12.

**Peer relationships**

Association with delinquent peers has been found as one of the most robust predictors of adolescent street gang participation.

**Unsupervised time with best friends.** This variable is measured by a 3-item scale in which the respondents reported how often they and their three best friends are unsupervised in situations (“get together where no adults are present”, “drive around with no special place to go” and “get together where someone is using or selling drugs or alcohol”) where criminal activity may occur. Responses ranged from “never” (1) to “every day” (5). The Cronbach’s coefficient alpha equals 0.74 for the scale.

**Peer delinquency.** This is a 7-item scale measuring the proportion of one’s peers that engage in delinquent activities. Respondents were asked, for instance, how many of their friends “used a weapon or force to get money or things from people”, “hit someone with the idea of hurting them” or “stole something worth more than $100”. Responses ranged from “none of them” (1) to “most of them” (4). The Cronbach’s coefficient alpha equals 0.76 for the scale.

**Peer drug use.** This is a 4-item scale measuring the proportion of one’s peers that engage in drug use. Respondents were asked how many of their friends “used hard drugs”, “used crack”, “used marijuana” or “drank alcohol”. Responses ranged from
“none of them” (1) to “most of them” (4). The Cronbach’s coefficient alpha equals 0.70 for the scale.

**School factors**

Failure in the educational arena can also contribute to adolescent gang participation. Individuals with lower levels of commitment/attachment to school tend to be more involved in unconventional activities.

**Commitment to school.** Commitment to school is a 10-item scale assessing one’s level of agreement on the importance of school work. Respondents were asked, for instance, whether “school is boring to you (reverse coded)”, “you don’t really belong at school (reverse coded)”, “you usually finish your homework” or “you try hard at school”. Responses were indicated on a 4-point scale from “strongly disagree” (1), “disagree” (2), “agree” (3) to “strongly agree” (4). Higher scores indicate greater commitment to school. The Cronbach’s coefficient alpha equals 0.76 for the scale.

**Attachment to teacher.** This is a 5-item scale indicating how much the respondent likes and respects his teachers. Questions included “you feel very close to at least one of your teachers” or “you have lots of respect for your teachers”. Responses were indicated on a 4-point scale from “strongly disagree” (1), “disagree” (2), “agree” (3) to “strongly agree” (4). Higher scores indicate greater attachment to teacher. The Cronbach’s coefficient alpha is 0.62 for the scale.

**Academic aptitude.** This variable is a summary measure of the respondent’s scholastic abilities as measured by the California Achievement Tests in reading and math in 1987 (when subjects were approximately 12 years of age). Scores from the reading and math tests were summed and standardized (with a range from 0 to 100). Higher score on this measure indicates greater academic aptitude.
**College aspiration.** This variable measures how important it is for the subject to graduate from high school and go to college. On a four point Likert type scale, response options ranged from "not important at all" (1), "not very important" (2), “important” (3) to “very important” (4). Higher scores indicate greater aspirations for college.

**College expectation.** This variable measures the subject’s own expectation regarding whether he will graduate from high school and go to college. Responses were indicated on a 3-point scale from “no” (1), "depends" (2) to “yes” (3). Higher scores indicate greater expectations for college.

**Life-course transitions and outcomes**

**First-time parenthood status.** For key life events such as having a first child, age dependencies are obvious. First-time parenthood status is indicated by two binary variables, allowing for separate estimates of the impact of having a first child before and after the age of 19 within each gang membership trajectory. *Birthage135_190* distinguished subjects who had a first child between ages 13.5 and 19. For these subjects, the variable equaled 0 for all ages prior to the first birth and equaled 1 for all ages after that. For subjects who never had a child or had a first child after the age of 19, this variable equaled 0 for all ages from 13.5 to 22.5. *Birthage195_225* distinguished subjects who had a first child at age 19.5 or later. For these subjects, the variable equaled 0 for all ages prior to the birth and equaled 1 for all ages after the birth. For subjects who never had a child or had a first child outside of ages 19.5 to 22.5, this variable equaled 0 for all ages from 13.5 to 22.5.

**Police contact/arrest.** This is an indicator variable that denotes whether an individual experienced police inquiry or arrest at each wave of the RYDS. Official records collected from the Rochester Police Department were used to investigate
potential life turning effects of having contact with the criminal justice system. Self-reported arrests at Wave 13/14 were used when examining later adulthood outcomes.

**G2 educational achievement.** This variable is measured as the highest level of education achieved by the respondent at Wave 13 of the RYDS.

**G2 employment status.** This is a dichotomous variable indicating whether the respondent was employed at Wave 13.

**G2 family problem.** This refers a 3-item scale measuring problematic and conflictual interpersonal relations in the respondent’s household at Wave 13. Respondents were asked how often during the past year (excluding children’s fights with each other) “there has been quarreling or arguing in your household”, “household members lose their tempers or blow up for no good reason” or “there have been physical fights in the household, like people hitting, shoving, or throwing objects at each other, threatening with a weapon and so forth”. Responses ranged from “never” (1), “seldom” (2), “sometimes” (3), “often” (4) to “always” (5). The Cronbach’s coefficient alpha is 0.76 for the scale.

**Adulthood street crime.** This variable is measured by the frequency of involvement in any of 13 different street crimes as reported at Wave 14 of the RYDS. These criminal acts include “carried a hidden gun”, “carried other hidden weapons”, “entered or attempted to enter a house to steal or damage something”, “stole a purse, wallet, or picked someone’s pocket”, “stole something from a car”, “stole or attempted to steal a car”, “tired to buy or sell good that were stole”, “attacked someone with a weapon”, “engaged in a gang fight”, “used a weapon or force to commit robbery”, “sold marijuana”, “sold hard drugs (e.g. crack, heroin, or cocaine)” and “sold other drugs (e.g.
tranquilizers, speed, downers, and ecstasy). These offenses are generally considered serious, often elicit public concern and fear, and are the types of offenses that gang members are likely to commit (Krohn et al., 2011). Because of the skewness in the distribution of the variable, a log-transformation was performed.

Overview of Statistical Techniques

Group-Based Modeling of Development

Nagin’s (2005) semi-parametric, group-based modeling technique is employed to estimate developmental trajectories of gang membership. The rationale behind this technique is that there may be qualitatively different pathways of change over age or time across subgroups within a population that are not identifiable ex ante on the basis of measured characteristics such as gender or race. Specifically, two features make Nagin’s group-based method appropriate for the dissertation research. First, unlike hierarchical linear modeling and standard growth curve analysis, the semi-parametric, group-based approach assumes that the population distribution of propensity for the behavior over time is categorical or discrete rather than continuous. Each category within the multinomial mixture is perceived as a point of support, or grouping, for the distribution of heterogeneity in the population. The model estimates a separate point of support for as many distinct groups as can be identified in the data (Piquero, 2008). Rather than an average trajectory representing everyone’s path through time (Raudenbush, 2001), there may be meaningful developmental subgroups that reflect distinct etiologies or origins, respond differently to a major life event and result in differential life outcomes.

Second, Nagin’s group-based method classifies individuals into developmental groups that are empirically defined. In previous studies of street gang members, for
instance, researchers have commonly created theorized groups (e.g. stable vs. non-stable gang members) using a blend of analysis and insight that is inevitably subjective. However, “the use of subjective classification rules is fraught with statistical dangers” (Nagin, 2005, p.2). With subjective classification, we may create groups that reflect only random variation, but miss important but unusual developmental patterns. In addition, the precision of individual classifications cannot be calibrated and conventional statistical tests become unreliable as a result of uncertainties of group assignments. To overcome these problems, Nagin (2005; Nagin & Land, 1993) introduced an alternative approach, based upon a formal statistical model, that empirically classifies individuals retrospectively based on existing longitudinal observations of the studied behavior\(^4\).

Technically, the group-based trajectory model is an application of the finite mixture modeling framework, which is an extension of the conventional maximum likelihood model (Heckman & Singer, 1984). While the specific form of the likelihood function to be maximized depends on the type of data being analyzed, the general form of the likelihood function is given by

\[
P(Y_i) = \sum_j \pi_j P^j(Y_i),
\]

where \(Y_i = \{y_{i1}, y_{i2}, \ldots, y_{iT}\}\) denotes a longitudinal sequence of behavioral measurements on individual \(i\) over \(T\) periods, \(P(Y_i)\) is the unconditional probability of observing individual \(i\)'s longitudinal sequence of behavioral measurements, \(Y_i\). It equals the sum across the \(J\) groups of the probability of \(Y_i\) given \(i\)'s membership in group \(j\) weighted by

\(^4\) An alternative approach to latent class growth modeling is Muthen’s (2001) generalized growth mixture modeling (GGMM). However, Nagin (2005, p.55-56) has noted a number of important drawbacks of the GGMM approach that limit its utility.
the probability of membership in group $j$. $P^j(Y_i)$ is the probability of $Y_i$ given membership into group $j$ and $\pi_j$ is the probability of a randomly chosen individual in the population belonging to trajectory group $j$.

The present study estimates trajectory models in which $Y_{it}$ is a binary variable: whether or not an individual belonged to a gang since the last wave of data collection. This form of the basic model utilizes the concept of a latent variable

$$y_{it}^* = \beta_0^i + \beta_1^i Age_{it} + \beta_2^i Age_{it}^2 + \varepsilon_{it}$$

where $Age_{it}$ and $Age_{it}^2$ are individual $i$’s age and age squared at time $t$, $\beta_0^i$, $\beta_1^i$ and $\beta_2^i$ are the three estimated parameters that determine the shape of the polynomial, and $\varepsilon_{it}$ is a disturbance assumed to follow the extreme value distribution. Under this formulation, it is assumed that the observed binary outcome $y_{it} = 1$ (e.g. individual $i$ is in a street gang at period $t$) if $y_{it}^* > 0$, whereas $y_{it} = 0$ (e.g. individual $i$ is not in a street gang at period $t$) if $y_{it}^* \leq 0$. Let $\alpha_{it}^j$ denotes the probability of $y_{it} = 1$ given membership in group $j$, $P^j(Y_{it} = 1)$. It follows the binary logit distribution:

$$\alpha_{it}^j = \frac{e^{\beta_0^i + \beta_1^i Age_{it} + \beta_2^i Age_{it}^2}}{1 + e^{\beta_0^i + \beta_1^i Age_{it} + \beta_2^i Age_{it}^2}}$$

For each trajectory group $j$, the model yields an estimate of $\alpha_{it}^j$ for each assessment periods. In short, $y_{it}^*$ can be interpreted as an index of latent potential. As this potential increases, $\alpha_{it}^j$ also increases.

To arrive at an appropriate choice on the number and shapes of trajectories, Nagin (2005) suggested a two-stage model selection process. First, we determine the
number of groups to include in the model. A series of models with different numbers of “points of support” (e.g. from one group to a preset maximum number of groups) are estimated and compared against each other. The order of the polynomial defining each group’s trajectories is determined by a preset rule, for example, all trajectories are quadratic. Although this is not a completely settled issue, scholars have recommended the selection of the model with the largest Bayesian Information Criterion (BIC) score. It is worth noting that BIC is a conservative criterion for model selection thereby favoring parsimony (Brame, Nagin & Wasserman, 2006). Given the first-stage decision on number of groups, the focus of the second stage turns to determining the preferred order of the polynomial specifying the shape of each trajectory. According to Nagin (2005), the choice of the preferred order of the polynomial for each trajectory requires substantive knowledge of the phenomenon or behavior under investigation. The model search process cannot be a purely statistical practice.

Once a choice on the number of trajectory groups and their shapes is made, posterior probabilities are computed using the model’s estimated coefficients. Formally, the posterior probability of group membership measures individual i’s probability of membership in group j given his measured behavior in each of the t assessment periods. A maximum-probability assignment rule is used to place individuals into the group to which their posterior membership probability is largest. The posterior probabilities also allow us to assess the relative precision of the best fitting model. The average posterior probability (AvePP) of assignment for each group can be calculated by taking the mean posterior probability for membership in each of the groups for the individuals assigned to that group. Ideally, the assignment probability for each person
should be 1. The rule-of-thumb is that AvePP should be at least 0.70 for all groups. Further, Nagin (2005) has suggested a series of additional diagnostics of assignment accuracy such as “odds of correct classification” and “confidence interval for group membership probabilities”. According to him, an OCC greater than 5.0 for all groups indicates that the model has high assignment accuracy, and a narrow confidence interval of $\hat{\pi}_j$ implies that the probability is accurately estimated. Despite all these statistical criteria and standards, Nagin (2005) concluded that “the objective of the model selection is not the maximization of some statistic of model fit. Rather it is to summarize the distinctive features of the data in as parsimonious a fashion as possible” (p.77).

**Adding Covariates to the Trajectories**

To analyze whether key events (e.g. the birth of a child) that occur during the course of a trajectory (e.g. a gang career) alter the trajectory itself, it is necessary to generalize the basic model to include time-varying covariates beyond age or time. In the context of a group-based model, there are two fundamentally different approaches to model the potential impact of a life turning point (Nagin, 2005). One is to specify a model that permits a test of whether the event alters the trajectory. Analytically, this approach treats the individual’s trajectory group membership as fixed. For example, the information on gang members following a specific trajectory group who do and do not become a parent forms the basis for inferring the impact of having a child on the

$$5 \quad OCC_j = \frac{AvePP_j / (1 - AvePP_j)}{\hat{\pi}_j / (1 - \hat{\pi}_j)}$$

6 However, “there are no formal criteria for determining a confidence interval is sufficiently narrow that its point estimate can be considered accurate” (Nagin, 2005, p.90).
developmental course of gang membership in that group. Another approach is to specify a model that permits a test of whether a life changing event triggers a change in trajectory group membership. Analytically, this approach allows for the possibility that life events may cause individuals to change trajectory group.

As discussed in Chapter 3, life turning points are best understood as part of a process over time and not as a dramatic lasting change that takes place at any one time, thus the former approach has been adopted. In Nagin’s (2005) words, “the model assumes that within a trajectory group change is incremental, not dramatic; the event may cause a deviation from the long-term average behavior of most group members, but the deviation is not so large that the average trajectory for the group bears no resemblance to the new trajectory of individuals affected by the event” (p.121). Life events such as gang related violent victimization may have an impact that is transformative, not incremental. For such events, the assumption of incremental change may be inappropriate.

Technically, in the basic model, a trajectory is described by a polynomial function of age or time. For the logit model form, the trajectory is specific in terms of a latent variable $y_t,*$:

$$y_t,* = \beta_0 + \beta_1 Age_t + \beta_2 Age_t^2 + \varepsilon_t$$

The addition of the covariates $z_{it}$ to the specification of $y_t,*$ is accomplished by including them as covariates:

$$y_t,* = \beta_0 + \beta_1 Age_t + \beta_2 Age_t^2 + \alpha_1 z_{it} + \alpha_2 z_{it} + \cdots + \alpha_L z_{it} + \varepsilon_t$$

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7 To avoid a proliferation of unnecessary notation, the subscript $i$ denoting individuals has been suppressed.
It is worth pointing out that variable $z_{it}$ can be measured on any scale. The $t$ subscript denotes that the model generalization allows for an examination of more than one type of contemporaneous influence on the trajectory. The $t$ subscript indicates time, because the value of $z_{it}$ may change over time.

The model’s estimated coefficients can be interpreted like those of a conventional regression—the estimates measure the change in the response variable associated with changes in the explanatory variables. It is important to notice, however, that the additional trajectory parameters, $\alpha_1^t$, $\alpha_2^t$, ..., $\alpha_L^t$ are superscripted by $j$. This implies that each of these parameters is specific to each trajectory group just like the parameters $\beta_0^1$, $\beta_1^1$ and $\beta_2^1$, which defines the developmental course of the outcome over age or time. The model thus provides an estimate of the effect of a life turning point that is trajectory-group specific. In addition, the generalized model allows us to test whether the impact estimates for turning points vary across trajectory groups through a Wald Test of the equality of coefficient estimates (Wald, 1943). This analysis illustrates the utility of group-based trajectory modeling to conduct a two-stage analysis that distinguishes prevalence and intensity conditional upon prevalence. This distinction is important for many criminological investigations.

**Mediation Analysis**

To investigate possible causal pathways between adolescent gang affiliation and negative life outcomes in adulthood, statistical mediation analyses are conducted. According to MacKinnon, Fairchild, and Fritz (2007), the most widely used method to assess mediation is the causal steps approach outlined in the classic work of Baron and
Kenny (1986). This method uses information from the following three regression equations:

\[ Y = i_1 + cX + e_1 \]  \hspace{1cm} (5-1)

\[ Y = i_2 + c'M + bM + e_2 \]  \hspace{1cm} (5-2)

\[ M = i_3 + aX + e_3 \]  \hspace{1cm} (5-3)

where \( Y \) is the outcome of interest, \( M \) is the mediator, \( X \) is the independent variable, \( i_1, i_2 \) and \( i_3 \) are intercepts, \( c \) is the coefficient relating the independent variable and the outcome variable, \( c' \) is the coefficient relating the independent variable to the outcome variable adjusted for the mediator, \( b \) is the coefficient relating the mediator to the outcome variable adjusted for the independent variable, \( a \) is the coefficient relating the independent variable to the mediator, and \( e_1, e_1 \) and \( e_1 \) are residuals. Equation 5-1 is depicted in Figure 5-1 Panel A, and Equations 5-2 and 5-3 are depicted in Figure 5-1Panel B.

More specifically, four steps are involved in Baron and Kenny’s (1986) approach to establishing mediation: 1) \( X \) significantly predicts \( Y \) in Equation 5-1 \((c \neq 0)\), 2) \( X \) significantly predicts \( M \) in Equation 5-3 \((a \neq 0)\), 3) \( M \) significantly predicts \( Y \) controlling for \( X \) in Equation 5-2 \((b \neq 0)\) and 4) \( c \) must be larger than \( c' \) in absolute value. The mediated effect in the single-mediator model can be calculated in two ways, as either \( a \times b \) or \( c - c' \). When the effect of \( X \) on \( Y \) decreases to zero with the inclusion of \( M \), full or perfect mediation is said to have occurred; when the effect of \( X \) on \( Y \) decreases by a nontrivial amount, but not to zero, partial mediation is said to have occurred (Preacher & Hayes, 2004).
Despite its wide application in social science research, Baron and Kenny’s causal step method is not without shortcomings. First, it suffers from low statistical power under certain situations (Hayes, 2009). The requirement that there is a significant relation of the independent variable to the outcome variable severely reduces power to detect mediation. There are many cases where significant mediation exists but the requirement of a significant relation of $X$ on $Y$ is not obtained (Fritz & MacKinnon, 2007). Another criticism of the causal step method is that “it is not based on a quantification of the very thing it is attempting to test—the intervening effect” (Hayes, 2009, p.410). Rather, the existence of mediation effects is inferred logically by the outcome of a set of hypothesis tests. A significance test associated with $a \times b$ or $c - c'$ should address mediation more directly than a sequence of separate tests not directly involving $a \times b$ or $c - c'$. However, given that we are more interested in uncovering mediating mechanisms than calculating magnitudes of the effects and that there are problems associated with other mediation tests such as the Sobel test\(^8\) (MacKinnon, Lockwood, & Williams, 2004), we adopt Baron and Kenny’s causal step method as a conservative way to establish possible causal pathways between gang affiliation and later life failure.

**Analysis Plan**

The analysis for the present study proceeds in four main steps. 1)

Developmental trajectories of gang membership are estimated using self-reported data from Wave 2 to 12 of the RYDS. The number of trajectory groups, the proportion of

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\(^8\) The Sobel test requires an estimate of the standard error of $a \times b$ or $c - c'$. The ratio of $a \times b$ or $c - c'$ to its standard error is used as a static for significance testing. One major limitation of the Sobel test is that it requires the sampling distribution of the mediated effect to be normal. In reality, the sampling distribution of $a \times b$ or $c - c'$ tends to be asymmetric, with nonzero skewness and kurtosis (Stone & Sobel, 1990). Future research may use computer-intensive methods such as bootstrapping to generate an empirical representation of the sampling distribution of the mediated effects, which is then used for confidence interval estimation and significance testing (Hayes, 2009).
individuals within each trajectory group and the shapes of the gang membership trajectories are explored. We explain the key differences among the gang membership trajectory groups such as the age of onset, developmental stages and length of time in a gang. 2) Theoretically informed risk factors measured at Wave 2 or prior to Wave 2 are linked to gang membership trajectory groups. Multinomial logistic regressions are used to examine which antecedent variables discriminate between developmental pathways of gang membership. To further understand how distinct trajectories of gang affiliation unfold over time, we conduct wave-by-wave comparisons of key covariates across trajectory groups. 3) Potential life turning points are added to the gang membership trajectories. This analysis quantifies the effects of life turning events on each gang membership trajectory group. Although gang membership status itself (e.g. onset/desistance) has been studied as “turning points” for criminal behavior and other life trajectories, to my knowledge, this is the first study, with a rigorous statistical method, to uncover the influence of life events on the course of a “gang career” itself. 4) To examine the enduring consequences of joining a street gang during adolescence, gang membership trajectory groups (more accurately speaking, individual’s probability of membership in each of the trajectory groups) are linked to adulthood outcomes through regression-based approaches. Possible mediation effects are examined.
Figure 5-1. Mediation model.
CHAPTER 6
RESULTS: UNDERSTANDING GANG MEMBERSHIP TRAJECTORIES

Model Selection and Adequacy

Given that modeling choices on the number and shapes of trajectories are made at the outset of an analysis, the outcome of this selection process has important ramifications for all analyses that follow. As mentioned in Chapter 5, Nagin (2005) proposed a two-stage model selection process using the Bayesian Information Criterion (BIC). The first-stage search is to determine the appropriate number of latent classes included in the model. A series of models with a different number of latent classes (i.e. from one group to a preset maximum number of groups) are estimated and compared against each other. The model with the largest BIC score sets the number of groups in the final model. In the second stage, the model is refined to determine the order of the polynomial necessary to capture the within-individual change for each gang membership trajectory group.

Table 6-1 reports BIC scores for quadratic models made up of one to six groups. Two BIC scores are reported: one for a sample size of 662 and another for a sample size of 6558\(^1\). Also reported is a statistic labeled “probability correct model” developed by Schwarz (1978) and Kass and Wasserman (1995). Let \(p_j\) denote the probability that a model with \(j\) group is the correct model from a set of \(J\) different models. This estimate is calculated by:

\[ p_j = \frac{e^{-\text{BIC}_j}}{\sum_{i=1}^{J} e^{-\text{BIC}_i}} \]

---

\(^1\) Individuals with more than six missing assessments were not included in the estimation sample. The smaller \(N\) pertains to the number of individuals in the estimation sample after the deletion of those individuals. The larger sample size counts the total number of assessments used in model estimation across persons and time. “The two BIC scores actually bracket the theoretically correct BIC” (Nagin, 2005, p.68).
\[
\sum_{j} e^{BIC_j - BIC_{max}}
\]

where \( BIC_{max} \) is the maximum BIC score of the \( J \) different models under consideration. Examinations of the BIC scores result in two possible optimal models. The three and four class models have BIC scores that are relatively similar to one another yet substantively lower than the one, two, five and six class models. Specifically, when BIC scores were calculated with \( N=662 \), the four class model has the lowest BIC and the probability of the four-group model being the correct model is 0.947. On the other hand, when BIC scores were calculated with \( N=6558 \), the three group model has the lowest BIC and the probability of the three-group model being the correct one is 0.830.

As suggested by Nagin (2005), the model selection process cannot be a purely statistical practice. In addition to using standard criteria such as the BIC, we must “balance the sometimes competing objectives of model parsimony and capturing the distinctive features of the data” (Nagin, 2005, p.75). In the present study, the four class model is selected for two theoretical reasons. First, the four class model identifies a high-risk persistence group that does not appear in the three class model. Prior research has suggested the existence of this sub-category of street gang members. Although the majority of gang youth were in a street gang for one or two years, many youth reported being in the gang for three, four and even more years (Krohn & Thornberry, 2008). Second, a significant number of individuals who reported being in a street gang for one or two assessment periods would be categorized into the very-low group in the three class model (i.e. indistinguishable from individuals who were never a gang member). Given that explaining heterogeneity among gang members is a key
issue of the current investigation, treating such gang members as non-members is not ideal. In short, the four class model is selected as the best fitting model given that the BIC provides strong support for it and key features of the data are captured by it.

The focus of the second stage search turns to determining the preferred order of the polynomial specifying the shape of each trajectory. For instance, some trajectory groups which are stable across time (e.g. the very-low/non-member group) may adequately be captured with an intercept only, whereas more complex patterns of gang affiliation need to be captured with a quadratic or cubic term. To ensure parsimony in the final model, consistent with the recommendations of Helgeson, Snyder, and Seltman (2004), we remove higher order terms from the model if they fall short of statistical significance. Table 6-2 contains information that compares the all-quadratic trajectory model (i.e. 2, 2, 2, 2) with a more parsimonious four class model (0, 2, 2, 2). The result is in strong favor of the more parsimonious four group model which restricts the order of polynomials to only those that are significant at the highest order (p<0.05). Thus, the final model for the current investigation is defined by one group following a zero-order trajectory and three groups following a quadratic trajectory.

There is one more step before we proceed to interpret the trajectory groups. It is important to assess the extent to which the selected model has accurately assigned individuals to specific latent classes. The posterior probabilities of group membership are a source of valuable information for judging the model’s correspondence with the data. Specifically, the posterior probability of group membership measures individual $i$’s probability of membership in group $j$ given his measured behavior in each of the $t$ assessment periods. That is, every individual receives four estimated probabilities of
group membership in which the total sums to be 1 and individuals are assigned to a particular gang membership trajectory based on “maximum probability” assignment. For instance, for individuals who were actually assigned to the high-risk persistence group, their mean posterior probabilities of belonging to each of the gang membership trajectory are 0.000, 0.074, 0.001, and 0.925, respectively. Table 6-3 reports the average posterior probability (AvePP) of membership in each gang membership trajectory for individuals that were assigned to it. Ideally, the AvePP equals 1. For persons assigned to the very low and high-risk persistence groups, the ideal is close to being achieved. In both cases, the AvePP of assignment is above 0.920. For the quick desistance and late-adolescence groups, these averages are, respectively, 0.805 and 0.777, which are higher than the cutting-point of 0.700 suggested by Nagin (2005).

Other statistics also suggest that individuals have indeed been assigned to developmental trajectories of gang affiliation with adequate precision. Table 6-4 reports the odds of correct classification (OCC$^j$), which is another way of assessing the adequacy of trajectory group assignments. As a conventional cutoff, OCC$^j$ values greater than 5 for all groups indicate that the model has high assignment accuracy. The differences between estimated group probabilities ($\hat{\pi}_j$) and the proportion of the sample assigned to the group ($P$) are also reported in Table 6-4. If individuals were assigned to groups with perfect certainty, the differences would be zero. As evidenced in Table 6-4, the differences are relatively small suggesting low assignment error.

**Trajectory Group Characteristics**

Given that a final four-class model with adequate assignment accuracy has been established for gang affiliation over time, attention is now turned to describing the
relevant features of those estimated trajectories. In Chapter 4 (see Figure 4-1), we have introduced gang membership trajectories for the current investigation. In brief, the majority of the respondents (71.4%) show stable, low probabilities of being part of a street gang during their adolescent and early adulthood years. The “quick desistance” group (15.8%) begins with relatively high probabilities of affiliation that slightly increase through age 14 and drop off thereafter. The “late adolescence” group (10.5%), on the other hand, has low probabilities at early adolescence. These probabilities rise to a peak around age 17 and decline gradually after that. Finally, individuals following the “high-risk persistence” trajectory (2.2%) demonstrate consistently high and stable probabilities till the age of 18. Although these probabilities decline after age 18, they continue to be the highest among all groups. Supplementing the graphical display of the gang membership trajectories, Table 6-5 reports the parameters estimates, standard errors, t-statistics, and p-values for the intercept and growth factors for the four latent classes. Most importantly, quadratic terms for the “early-adolescence”, “late-adolescence” and “high-risk persistence” trajectories are all statistically significant and negative, indicating that the unfolding of one’s gang career is not linear and the probabilities first rise and then decline.

Table 6-6 contains information on gang members’ race/ethnicity across trajectory groups. Overall, gang membership is not a particularly rare phenomenon, at least in Rochester, NY. Around 30% of African American and Hispanic respondents fall into one of the three active gang membership trajectories, whereas the percentage for white respondents is lower (about 15%). What is also obvious is that minority youths are more likely than their white counterparts to become serious participants who followed either
the “late adolescence” or “high-risk persistence” trajectory. We observe a combined 11.27%, 11.76% and 7.14%, respectively, for African American, Hispanic and white respondents. For instance, while only accounting for 17.98% of the whole sample, Hispanic youths represent an alarmingly 38.46% of individuals following the high-risk persistence trajectory. The overrepresentation of minority youths in street gangs is consistent with previous literature.

From a dynamic or developmental perspective, it is important to examine key features associated with the unfolding of gang membership trajectories. Table 6-7 contains information on the onset time of gang membership across trajectory groups. The life-course perspective has suggested that the onset of membership can be an important feature that defines later involvement in a deviant career. Specifically, Year 1 combines data from the interviews at Wave 2 and 3, Year 2 from Waves 4 and 5, Year 3 from Wave 6 and 7, and Year 4 from Waves 8 and 9. Year 5 covers the gap between Phase 1 and 2 of RYDS data collection. Year 6 contains information from Wave 10, Year 7 from Wave 11 and Year 8 from Wave 12. Consistent with the graphical display, individuals in the “quick desistance” and “high-risk persistence” trajectories have a rather early onset of membership. All but one individual have joined the gang by Year 2. On the other hand, individuals following the “late adolescence” trajectory join the gang across multiple years. About half of them join after Year 2. Although the vast majority of individuals following the “very low” trajectory never joined a street gang, a small number of occasional gang members do belong to this group and they joined across multiple years. The chi-squared test of independence rejects the null hypothesis, indicating that
gang membership trajectories and the onset time in year are statistically dependent
($\chi^2=634.044$, d.f.=21, p<0.001).

Another important trajectory group characteristic is the duration of gang membership. Prior research has indicated that individuals stay in the gang for varying periods of time and the duration of membership has significant impacts on crime and delinquency. Thornberry and colleagues (2003), for instance, found that stable gang members exhibit more frequent involvement in delinquency and drugs than short-term members (one year or less). However, one important limitation of previous studies is that gang members are often categorized as stable versus non-stable/short-term based on some subjective classification rules. How valid such subjective criteria are is not without doubt. An alternative approach to examine the issue of stability is to follow trajectory groups that are empirically estimated. The basic data pertaining to the duration of gang membership across trajectory groups are presented in Table 6-8. For individuals who have been assigned to the “high-risk persistence” group, all of them stayed in the gang for five or more waves. The average number of waves of gang involvement for this group equals 6.692. Individuals following the “late adolescence” trajectory participated in the gang between one and five waves. Out of the 57 respondents in this group, about 44% of them stayed in the gang for three and more waves. The average number of waves of gang participation equals 2.509. Respondents in the “quick desistance” group also participated in the gang between one and five waves. Out of the 101 individuals following this trajectory group, about 32% stayed in the gang for three and more waves. The average number of waves of gang involvement for the “quick desistance” group equals 2.049. The vast majority of individuals in the
“very low” group again never participated in gang activities. For the small proportion of individuals who did join a street gang, most of them were in the gang for one single wave. The average number of waves of gang involvement for the “very low” group equals 0.119. Additionally, one-way analysis of variance (ANOVA) is conducted to assess whether there are significant differences across the four trajectory groups in the average number of waves in a street gang. Results indicate that the ANOVA F statistic is highly significant ($F=680.52$, $p<0.001$) and the differences between each pair of comparisons are also significant using the Tukey multiple comparison method.

In Chapter 4, we hypothesized that individuals following the “high-risk persistence” and “late adolescence” trajectories are more likely to become core members in the gang than individuals in the “quick desistance” and “very low” groups. The hypothesis is largely confirmed. Table 6-9 indicates that more than 90% of the individuals in the “high-risk persistence” group were core members of a street gang for at least one time between Wave 2 and 10 of the RYDS data collection. The percentage (66.67%) is also relatively high for individuals in the “late adolescence” trajectory. For individuals in the “quick desistance” group, the percentage decreases to 41.58%. More specifically, the average numbers of waves of core membership for the three groups are respectively 3.615, 1.175 and 0.723. One-way ANOVA F statistic is highly significant ($F=202.53$, $p<0.001$) and the differences between each pair of comparisons are also significant using the Tukey multiple comparison method.

Table 6-10 contains information on the timing of gang involvement across trajectory groups. Gang members are categorized into three developmental stages: early adolescence only, late adolescence/adulthood only, and both. The cutting point
between early- and late-adolescence is at Wave 4 of the RYDS collection, when the subjects were approximately 15 years old. Not surprisingly, for individuals who have been assigned to the “high risk persistence” group, all of them stayed in the gang for both developmental stages. For individuals following the “late adolescence” trajectory, half of them stayed in the gang for late-adolescence/adulthood only and the other half for both early- and late-adolescent/adulthood years. Moreover, about 65% of the individuals following the “quick desistance” trajectory stayed in the gang during early adolescent years only and approximately another 30% stayed for both developmental stages. The chi-squared test of independence rejects the null hypothesis, indicating that gang membership trajectories do reflect differences in when people were involved in a street gang ($\chi^2=761.769$, d.f.=9, $p<0.001$).

In summary, the identified four-class model has provided a dynamic and relatively accurate representation of gang affiliation in the sample. Individuals in the “high risk persistence” group join the gang early and stay in the gang for an extensive period of time. They are also very likely to be core members of a street gang. Although individuals following the “quick desistance” trajectory also have an early initiation of gang membership, a majority of them leave the gang very quickly. Approximately two-thirds stay in the gang only for the early adolescent years. On the other hand, individuals following the “late adolescence” trajectory join the gang later than individuals in the “quick desistance” group do, but they stay for a longer period of time. Finally, the vast majority of individuals who have been assigned to the “very low” group never participate in a gang although some occasional gang members do belong to this group.
The next question is what accounts for these distinct developmental patterns of gang membership.

**Linking Risk Factors to Gang Membership Trajectories**

As mentioned earlier, identifying risk factors for gang membership has important theoretical and practical implications. A sizeable body of research has focused on this, and we have obtained a fairly good understanding of antecedent characteristics and attributes that affect the likelihood of gang participation (Krohn & Thornberry, 2008). However, a less studied but more important issue is the ability of these same risk factors to distinguish sub-types of street gang members. Thornberry and colleagues (2003), for example, have endeavored to identify risk factors that possibly predict the stability of gang membership. Although structural disadvantage and early adolescent risky behaviors (i.e. early dating and early drug use) significantly increase the odds of becoming a stable gang member, overall, early risk factors are found not very effective in differentiating within the gang member population.

One important limitation of the Thornberry et al. (2003) study is that they categorized gang members using an arbitrary classification criterion (stable vs. short-term members). Although such subjective assignment rules are generally reasonable, Nagin (2005) has elaborated on potential pitfalls attendant on their use. For example, in our case, a majority of Thornberry et al.’s stable gang members would be re-categorized into three different trajectories—the “quick desistance”, “late adolescence” and “high risk persistence” groups, which suggests that it is important to not only take into account the duration of gang membership but also the age of onset and developmental stages in the gang. Table 6-11 reports bivariate odds ratios between risk
factors and each pair of comparisons of gang membership trajectories from multinomial logistic regressions.

Specifically, odds ratios indicate the relative risk of a one-unit change in the risk factor on the likelihood of following a particular trajectory compared with the reference group. Odds ratios greater than 1 suggest that the risk factor is associated with an increased likelihood of being in that particular trajectory rather than in the reference trajectory group, whereas odds ratios less than 1 suggest a reduced likelihood of belonging to that particular trajectory. For example, when comparing the “quick desistance” with the “late adolescence” trajectory, an odds ratio of 1.5 indicates that a one-unit increase in a particular attribute leads to about 50% increase in the odds of being in the “quick desistance” versus in the “late adolescence” group. An odds ratio of 0.5 suggests that a one-unit increase in a particular attribute reduces the likelihood of being in the “quick desistance” versus in the “late adolescence” group to half.

As discussed in Chapter 4, age of onset is one of the most important dimensions when exploring developmental pathways of gang affiliation. We hypothesized that when compared to late joiners, early onset of gang membership represented by the “quick desistance” and “high risk persistence” groups can be explained by a combination of unfavorable position in the social structure, ineffective parenting and delinquent peer associations.

When comparing individuals following the “quick desistance” group with those in the “late adolescence” group, risk factors in two domains play an important role. The quality of the relationship between parents and children contributes to the risk of joining a gang early. In families where parents are less attached to their sons and do not
discipline them consistently, the odds that the boy will start an early gang career increase. Consistent with prior research, peer delinquency and peer drug use significantly increase the odds of being in the “quick desistance” group versus in the “late adolescence” group. The same is true when adolescents hang out with friends in unsupervised peer groups and having a girlfriend by Wave 2. In addition, individuals in the “quick desistance” group are more likely to hold delinquent beliefs and commit street crimes at Wave 1 than individuals following the “late adolescence” trajectory although these two risk factors are only marginally significant at p<0.10 level.

When comparing individuals in the “high risk persistence” group with those in the “late adolescence” group, similar risk factors are observed. Parental attachment, parental consistency of discipline, association with delinquent peers and delinquent beliefs are important. Individuals in the “high risk persistence” group are also more likely to commit street crimes/violence and use alcohol and marijuana at Wave 1. Moreover, they are more likely to grow up in families with income below poverty line than late joiners of a street gang, which reflects the impact of unfavorable position in the social structure. On the other hand, neighborhood concentrated disadvantage and disorganization are not found to differentiate between early- and late-starters. This lack of support for risk factors in the neighborhood domain might be due to the nature of the sampling design. Disproportionately sampling families in high risk neighborhoods reduces the variance that may be explained (Klein & Maxson, 2006).

What is more interesting is to explain why individuals following the “late adolescence” trajectory join a street gang later in their life despite relatively low probabilities in early adolescent years. Following Thornberry and Krohn’s interactional
theory of delinquency (2001; 2005), we hypothesized that when compared to gang avoiders, individuals following the “late adolescence” trajectory have reduced human capital, and thus are less successful in building social capital in later life. This hypothesis is largely confirmed. On the one hand, there are no significant differences between late joiners and gang abstainers in the domains of “parent-child relations” and “peer delinquency”, which indicates that individuals following the “late adolescence” trajectory are protected at the beginning by conventional network. On the other hand, individuals following the “late adolescence” trajectory have a significantly higher score of depression than gang avoiders. A one-unit increase in depression leads to about 155.1% increase in the odds of being in the “late adolescence” versus in the “very low” group. In addition, prior involvement in street crime/violence also contributes to an individual’s chance of being in the “late adolescence” group.

Another important question raised in Chapter 4 is what explains the divergence in probabilities of gang affiliation between the “high risk persistence” and the “quick desistance” group given a common early onset of gang membership. In particular, we do not expect early starters also to be early desisters as the “quick desistance” group represents. We proposed two possible explanations in Chapter 4: a) not all early gang starters privately accept the group attitudes and beliefs and b) parents of early starters/desisters re-adjust their parenting styles and scrutinize adolescents’ peer networks. The last column of Table 6-11 indicates that early risk factors are not very effective in discriminating between the two early initiated gang membership trajectories. Only two risk factors manifest significant impacts on the likelihood of belonging to one of the two early onset trajectories. A one-unit increase in alcohol/marijuana use at Wave 1
leads to about 47.3% increase in the odds of being in the “high risk persistence” versus in the “quick desistance” group (street crime is also marginally significant), whereas a one-unit increase in parental attachment decreases the odds of belonging to the “high risk persistence” group to approximately 30%. The result is not surprising given that the homogeneity of the early onset trajectories reduces the explanatory power of the antecedent variables. It appears that developmental variables that unfold during the period of gang involvement may better differentiate the two early initiated trajectories. In the next section, we make wave-by-wave comparisons of key covariates across trajectory groups to explain the divergence in probabilities of gang affiliation between the “high risk persistence” and “quick desistance” group.

**Explaining the Quick Desistance Group**

Following the discussion above, Figure 6-1 presents information on wave by wave comparisons of delinquent beliefs across gang membership trajectory groups between Wave 2 and 9 of the RYDS. Individuals in the “high risk persistence” group have a consistently higher level of delinquent beliefs than individuals following other trajectory groups, and individuals in the “very low” group hold the lowest level of delinquent values. More importantly, although the rate of increase of delinquent beliefs is slower for the “quick desistance” group than for the “high risk persistence” and “late adolescence” groups, its general trend is still upward. To some extent, this is inconsistent with what we would expect if individuals only temporarily join the gang for fun or for avoiding exile from the peer group. In other words, we are not observing a declining trend of delinquent beliefs for the “quick desistance” group.

Another possible explanation we provided for the divergence between the “quick desistance” and “high risk persistence” group is that parents of early desisters re-adjust
their parenting styles and scrutinize adolescents' peer networks. This hypothesis is largely confirmed. Figure 6-2 presents information on wave by wave comparisons of parental supervision across trajectory groups. In general, individuals in the “high risk persistence” group have the lowest level of parental supervision between Wave 2 and 9 of the RYDS, whereas individuals in the “very low” group are supervised most consistently by their parents. It is worth noticing that the general trend of parental supervision for the “high risk persistence”, “late adolescence” and “very low” groups is decreasing between Wave 2 and 9, but the general trend for the “quick desistance” group is flat or slightly increasing. This flat or slightly increasing trend of parental supervision is important to explain the discontinuity of gang involvement of the “quick desistance” group given that parental supervision is expected to diminish during adolescent years. In fact, individuals in the “late adolescence” group experience a steady and sharp decrease in parental supervision. The crossing in parental supervision between the “quick desistance” and “late adolescence” group at approximately Wave 5 of the RYDS also corresponds with the crossing in propensity toward gang affiliation as the trajectory groups model shows. Another important parenting measure—parental attachment shows more complicated patterns (Figure 6-3). However, one thing that is clear is that parental attachment increases consistently for individuals in the “quick desistance” group, which again supports our hypothesis that parents of early starters/desisters re-adjust their parenting styles to protect their children from further involving in delinquent networks.

Additional support for our argument can be seen in Figure 6-4. Individuals in the “high risk persistence” group have consistently the highest level of peer delinquency
between Wave 2 and 9 of the RYDS, whereas individuals in the “very low” group have
the lowest level. More importantly, individuals following the “quick desistance” group
have a stable decreasing trend of peer delinquency, whereas both the “high risk
persistence” and the “late adolescence” group have an increasing general trend. Similar
patterns are also observed for peer drug use (Figure 6-5).

In summary, results from bivariate multinomial logistic regressions and wave by
wave comparisons of key covariates have provided support for our interpretations of
gang membership trajectories proposed in Chapter 4. Early onset of gang affiliation
represented by the “high risk persistence” and “quick desistance” groups are explained
by the combination of unfavorable position in the social structure, ineffective parenting
and delinquent peer association. Prior delinquency also increases the likelihood of
being in one of the early initiated gang membership trajectories. However, having an
early onset does not necessarily mean that the subject will involve in a street gang for
an extended period of time. If parents of early gang joiners can re-adjust parenting
styles and scrutinize adolescents’ peer networks, early starters can also be early
desisters. On the other hand, individuals who join a street gang late tend to have deficits
in human capital (see Figure 6-6 for wave by wave comparisons of depression). Prior to
emerging adulthood (Arnett, 2000), late joiners are buffered from the effects of these
deficits by a supportive family and school environment (see Figure 6-7 for wave by
wave comparisons of commitment to school). Once they leave such protective
environments, deficits in human capital hinder their transition to adulthood and increase
the attraction of deviant friends and street gangs. However, it is worth noting that
analyses done in this chapter are more correlational than causal in nature. Our goal in this chapter is to provide a general understanding of distinct developmental pathways of gang affiliation and set up a theoretical backdrop for analyses on turning points and long-term consequences of gang membership in the next two chapters.

For causal analyses between gang affiliation and developmental variables that are unfolding over the life course, propensity score methods such as inverse probability of treatment weighting (IPTW) can be used.
Table 6-1. BIC for selection of a Bernoulli model

<table>
<thead>
<tr>
<th>No. of groups</th>
<th>BIC (N=662)</th>
<th>Probability correct model</th>
<th>BIC (N=6558)</th>
<th>Probability correct model</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>-1597.24</td>
<td>0.000</td>
<td>-1600.68</td>
<td>0.000</td>
</tr>
<tr>
<td>2</td>
<td>-1354.03</td>
<td>0.000</td>
<td>-1362.05</td>
<td>0.000</td>
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<td>0.046</td>
<td>-1344.70</td>
<td>0.830</td>
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<td>*4</td>
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<td>0.947</td>
<td>-1346.28</td>
<td>0.170</td>
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<tr>
<td>5</td>
<td>-1334.00</td>
<td>0.007</td>
<td>-1355.79</td>
<td>0.000</td>
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<tr>
<td>6</td>
<td>-1346.99</td>
<td>0.000</td>
<td>-1373.36</td>
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</tbody>
</table>

* indicates selected model

Table 6-2. BIC for selection of two alternative four class models

<table>
<thead>
<tr>
<th>Order of Polynomials</th>
<th>BIC (N=662)</th>
<th>BIC (N=6558)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(2, 2, 2, 2)</td>
<td>-1329.08</td>
<td>-1346.28</td>
</tr>
<tr>
<td>*(0, 2, 2, 2)</td>
<td>-1324.71</td>
<td>-1339.62</td>
</tr>
</tbody>
</table>

* indicates selected model

Table 6-3. Average posterior probabilities for gang membership trajectories

<table>
<thead>
<tr>
<th>Assigned group</th>
<th>Number assigned</th>
<th>Very low</th>
<th>Late adolescence</th>
<th>Quick desistance</th>
<th>High-risk persistence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very low</td>
<td>491</td>
<td>0.932</td>
<td>0.031</td>
<td>0.036</td>
<td>0.001</td>
</tr>
<tr>
<td>Late adolescence</td>
<td>57</td>
<td>0.090</td>
<td>0.777</td>
<td>0.101</td>
<td>0.324</td>
</tr>
<tr>
<td>Quick desistance</td>
<td>101</td>
<td>0.101</td>
<td>0.091</td>
<td>0.805</td>
<td>0.004</td>
</tr>
<tr>
<td>High-risk persistence</td>
<td>13</td>
<td>0.000</td>
<td>0.074</td>
<td>0.001</td>
<td>0.925</td>
</tr>
</tbody>
</table>

Table 6-4. Diagnostics of assignment accuracy

<table>
<thead>
<tr>
<th>Group</th>
<th>( \hat{\pi}_j )</th>
<th>( P_i )</th>
<th>( \hat{\pi}_j - P_i )</th>
<th>( OCC_i )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very low</td>
<td>0.714</td>
<td>0.742</td>
<td>-0.028</td>
<td>5.490</td>
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<td>Late adolescence</td>
<td>0.105</td>
<td>0.086</td>
<td>0.019</td>
<td>29.700</td>
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<td>Quick desistance</td>
<td>0.158</td>
<td>0.153</td>
<td>0.005</td>
<td>22.000</td>
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<tr>
<td>High-risk persistence</td>
<td>0.022</td>
<td>0.020</td>
<td>0.002</td>
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Table 6-5. Parameter estimates for the selected four class model

<table>
<thead>
<tr>
<th>Group</th>
<th>Parameter</th>
<th>Estimate</th>
<th>S.E.</th>
<th>t</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very low</td>
<td>intercept</td>
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<td>0.429</td>
<td>-11.554</td>
<td>0.000</td>
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<td>Late adolescence</td>
<td>Intercept</td>
<td>-70.637</td>
<td>24.009</td>
<td>-2.942</td>
<td>0.003</td>
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<tr>
<td></td>
<td>Linear</td>
<td>83.095</td>
<td>28.652</td>
<td>2.911</td>
<td>0.004</td>
</tr>
<tr>
<td></td>
<td>Quadratic</td>
<td>-24.603</td>
<td>8.430</td>
<td>-2.919</td>
<td>0.004</td>
</tr>
<tr>
<td>Quick desistance</td>
<td>Intercept</td>
<td>-70.933</td>
<td>30.636</td>
<td>-2.315</td>
<td>0.021</td>
</tr>
<tr>
<td></td>
<td>Linear</td>
<td>101.229</td>
<td>40.598</td>
<td>2.493</td>
<td>0.013</td>
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<tr>
<td></td>
<td>Quadratic</td>
<td>-36.020</td>
<td>13.424</td>
<td>-2.683</td>
<td>0.007</td>
</tr>
<tr>
<td>High-risk persistence</td>
<td>Intercept</td>
<td>-43.183</td>
<td>15.289</td>
<td>-2.825</td>
<td>0.005</td>
</tr>
<tr>
<td></td>
<td>Linear</td>
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<td>17.383</td>
<td>3.065</td>
<td>0.002</td>
</tr>
<tr>
<td></td>
<td>quadratic</td>
<td>-15.866</td>
<td>4.859</td>
<td>-3.265</td>
<td>0.001</td>
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</table>

Table 6-6. Race/ethnicity across gang membership trajectories

<table>
<thead>
<tr>
<th>Frequency</th>
<th>African American</th>
<th>Hispanic</th>
<th>White</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Row Pct</td>
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</tr>
<tr>
<td>Col Pct</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td>299</td>
<td>84</td>
<td>108</td>
<td>491</td>
</tr>
<tr>
<td></td>
<td>60.9%</td>
<td>17.1%</td>
<td>22.0%</td>
<td>100.0%</td>
</tr>
<tr>
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<td>71.7%</td>
<td>70.6%</td>
<td>85.7%</td>
<td></td>
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<td>Late adolescence</td>
<td>40</td>
<td>9</td>
<td>8</td>
<td>57</td>
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<td>70.2%</td>
<td>15.8%</td>
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</tr>
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<td></td>
<td>9.6%</td>
<td>7.6%</td>
<td>6.4%</td>
<td></td>
</tr>
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<td>Quick desistance</td>
<td>71</td>
<td>21</td>
<td>9</td>
<td>101</td>
</tr>
<tr>
<td></td>
<td>70.3%</td>
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<td>8.9%</td>
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</tr>
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<td>17.0%</td>
<td>17.7%</td>
<td>7.1%</td>
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<td>7</td>
<td>5</td>
<td>1</td>
<td>13</td>
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<tr>
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<td>1.7%</td>
<td>4.2%</td>
<td>0.8%</td>
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### Table 6-7. Time of onset of gang membership across trajectory groups

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<tr>
<th>Group</th>
<th>Gang membership onset time in year</th>
<th>Never</th>
<th>Yr1</th>
<th>Yr2</th>
<th>Yr3</th>
<th>Yr4</th>
<th>Yr5</th>
<th>Yr6</th>
<th>Yr7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very low</td>
<td></td>
<td>404</td>
<td>18</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>6</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Late adolescence</td>
<td></td>
<td>0</td>
<td>18</td>
<td>14</td>
<td>17</td>
<td>7</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Quick desistance</td>
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<td>0</td>
<td>84</td>
<td>16</td>
<td>1</td>
<td>0</td>
<td>0</td>
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<td>High-risk persistence</td>
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Frequency missing=38

### Table 6-8. Number of waves of gang membership across trajectory groups

<table>
<thead>
<tr>
<th>Group</th>
<th>Number of waves of gang membership</th>
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<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
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</thead>
<tbody>
<tr>
<td>Very low</td>
<td></td>
<td>425</td>
<td>38</td>
<td>3</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Late adolescence</td>
<td></td>
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<td>12</td>
<td>20</td>
<td>12</td>
<td>10</td>
<td>3</td>
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<td>Quick desistance</td>
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<td>28</td>
<td>21</td>
<td>8</td>
<td>3</td>
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<td>0</td>
</tr>
<tr>
<td>High-risk persistence</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>6</td>
<td>3</td>
<td>2</td>
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Frequency missing=22

### Table 6-9. Number of waves of core membership between Wave 2 and 10 across trajectory groups

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<tr>
<th>Group</th>
<th>Number of waves of core membership</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very low</td>
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<td>475</td>
<td>13</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>491</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2.6%</td>
<td>0.7%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>100%</td>
</tr>
<tr>
<td>Late adolescence</td>
<td></td>
<td>19</td>
<td>17</td>
<td>14</td>
<td>6</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>57</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>29.8%</td>
<td>24.6%</td>
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<td>1.8%</td>
<td>0%</td>
<td>0%</td>
<td>100%</td>
</tr>
<tr>
<td>Quick desistance</td>
<td></td>
<td>59</td>
<td>21</td>
<td>14</td>
<td>4</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>101</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td>20.8%</td>
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<td>23.1%</td>
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<td>15.4%</td>
<td>7.7%</td>
<td>15.4%</td>
<td>30.8%</td>
<td>100%</td>
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Table 6-10. Developmental stages of gang membership across trajectory groups

<table>
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<tr>
<th>Frequency Row Pct</th>
<th>Developmental stages</th>
<th>Total</th>
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</thead>
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<tr>
<td></td>
<td>N/A</td>
<td>Early-adolescence only</td>
</tr>
<tr>
<td>Very low</td>
<td>442</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>90.0%</td>
<td>2.9%</td>
</tr>
<tr>
<td>Late adolescence</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Quick desistance</td>
<td>0</td>
<td>64</td>
</tr>
<tr>
<td></td>
<td>0%</td>
<td>63.4%</td>
</tr>
<tr>
<td>High risk persistence</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Table 6-11. Bivariate odds ratios between risk factors and each pair of comparisons</td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------------------------------</td>
<td>-----------------</td>
<td>------------</td>
</tr>
<tr>
<td></td>
<td>Overall $\chi^2$</td>
<td>2 vs. 1</td>
</tr>
<tr>
<td><strong>Area Characteristics</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Concentrated disadvantage</td>
<td>5.288</td>
<td>1.188</td>
</tr>
<tr>
<td>Neighborhood disorganization</td>
<td>3.625</td>
<td>0.925</td>
</tr>
<tr>
<td><strong>Family Sociodemographic Characteristics</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>4.921</td>
<td>1.511</td>
</tr>
<tr>
<td>Hispanic</td>
<td>4.349</td>
<td>0.908</td>
</tr>
<tr>
<td>Parent education</td>
<td>6.164</td>
<td>0.903</td>
</tr>
<tr>
<td>Poverty level income</td>
<td>7.215*</td>
<td>0.740</td>
</tr>
<tr>
<td>Living with both biological parents</td>
<td>11.283*</td>
<td>0.579</td>
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<tr>
<td><strong>Parent-Child Relations</strong></td>
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<td></td>
</tr>
<tr>
<td>Parental attachment</td>
<td>17.438*</td>
<td>1.918*</td>
</tr>
<tr>
<td>Parental supervision</td>
<td>5.976</td>
<td>0.782</td>
</tr>
<tr>
<td>Parental involvement</td>
<td>4.143</td>
<td>0.911</td>
</tr>
<tr>
<td>Parental consistency of discipline</td>
<td>15.903*</td>
<td>1.040</td>
</tr>
<tr>
<td>Positive parenting</td>
<td>3.354</td>
<td>0.936</td>
</tr>
<tr>
<td>Report of child maltreatment</td>
<td>8.247*</td>
<td>2.122*</td>
</tr>
<tr>
<td>Table 6-11. Continued.</td>
<td>Overall $\chi^2$</td>
<td>2 vs.1</td>
</tr>
<tr>
<td>------------------------</td>
<td>-----------------</td>
<td>--------</td>
</tr>
<tr>
<td><strong>School Factors</strong></td>
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<tr>
<td>Academic aptitude</td>
<td>25.111*</td>
<td>0.559*</td>
</tr>
<tr>
<td>Commitment to school</td>
<td>8.658*</td>
<td>1.011</td>
</tr>
<tr>
<td>Attachment to teacher</td>
<td>6.963^</td>
<td>0.742</td>
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<tr>
<td>College aspiration</td>
<td>3.377</td>
<td>0.871</td>
</tr>
<tr>
<td>College expectation</td>
<td>3.142</td>
<td>0.759</td>
</tr>
<tr>
<td><strong>Peer Relationships</strong></td>
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<td></td>
</tr>
<tr>
<td>Peer delinquency</td>
<td>21.083*</td>
<td>2.798</td>
</tr>
<tr>
<td>Peer drug use</td>
<td>31.100*</td>
<td>1.161</td>
</tr>
<tr>
<td>Risky time with friends</td>
<td>39.664*</td>
<td>1.241</td>
</tr>
<tr>
<td>Having a girlfriend</td>
<td>25.158*</td>
<td>1.466</td>
</tr>
<tr>
<td><strong>Individual Characteristics</strong></td>
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<td></td>
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<tr>
<td>Depression</td>
<td>10.725*</td>
<td>2.551*</td>
</tr>
<tr>
<td>Self-esteem</td>
<td>13.319*</td>
<td>0.468*</td>
</tr>
<tr>
<td>Externalizing behaviors</td>
<td>11.824*</td>
<td>1.431</td>
</tr>
<tr>
<td>Conventional values</td>
<td>5.148</td>
<td>1.141</td>
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### Table 6-11. Continued.

<table>
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<th>Early Delinquency</th>
<th>Overall $\chi^2$</th>
<th>2 vs.1</th>
<th>3 vs.1</th>
<th>4 vs.1</th>
<th>3 vs.2</th>
<th>4 vs.2</th>
<th>4 vs.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Street crime</td>
<td>57.308*</td>
<td>1.596*</td>
<td>2.057*</td>
<td>2.983*</td>
<td>1.288^</td>
<td>1.868*</td>
<td>1.450^</td>
</tr>
<tr>
<td>Violence</td>
<td>53.252*</td>
<td>1.718*</td>
<td>2.146*</td>
<td>2.722*</td>
<td>1.249</td>
<td>1.584^</td>
<td>1.268</td>
</tr>
<tr>
<td>Alcohol/marijuana use</td>
<td>31.710*</td>
<td>1.310</td>
<td>1.655*</td>
<td>2.437*</td>
<td>1.263</td>
<td>1.860*</td>
<td>1.473*</td>
</tr>
</tbody>
</table>

Note: 1=very low group; 2=late adolescence group; 3=quick desistance group; 4=high risk persistence group. To preserve temporal order, risk factors are measured either at Wave 2 or prior to Wave 2.

^p<0.10  *p<0.05
Figure 6-1. Wave by wave comparison of delinquent beliefs across trajectory groups

Figure 6-2. Wave by wave comparison of parental supervision across trajectory groups
Figure 6-3. Wave by wave comparison of parental attachment across trajectory groups

Figure 6-4. Wave by wave comparison of peer delinquency across trajectory groups
Figure 6-5. Wave by wave comparison of peer drug use across trajectory groups

![Wave by wave comparison of peer drug use across trajectory groups](image1)

Figure 6-6. Wave by wave comparison of depression across trajectory groups

![Wave by wave comparison of depression across trajectory groups](image2)
Figure 6-7. Wave by wave comparison of commitment to school across trajectory groups
CHAPTER 7
RESULTS: TURNING POINTS WITHIN GANG MEMBERSHIP TRAJECTORIES

While examining developmental pathways of gang membership and associated risk factors is meaningful, an equally important question is what life events may re-direct those long term patterns of gang affiliation. Although gang membership status (e.g. onset/desistance) has been studied as “turning points” for criminal behavior and other life trajectories, not many research efforts have been put into uncovering life changing events within the course of a “gang career” itself. Laub and Sampson (2003) suggested that turning points need to provide opportunities for offenders to knife off from past experience and immediate environment, and generate doubts about staying in a delinquent position (Maruna, 2001; Giordano et al., 2002). These life events provide not only supervision and monitoring but also opportunities for social support and growth, and eventually re-structure everyday routine activities of offenders. Among many life transitions, the birth of a first child is potentially an important life turning event within gang membership trajectories.

Turning Point: The Birth of a First Child

As prelude to describing the results concerning the impact of having a first child on developmental pathways of gang membership, we first report descriptive information on G2’s age at G3’s birth across trajectory groups. In total, 481 G2 male subjects reported that their first child (G3) was involved in the Rochester study. The mean age of having a first child for our respondents is 22.4 years old with a minimum of 15.3 and a maximum of 39.3. More specifically, Table 7-1 shows that on average, individuals following the “very low” trajectory have a first child at approximately 23 years old, whereas the average ages of having a first child for the “late adolescence”, “quick
"desistance" and "high risk persistence" group are 21.2, 20.8 and 20.6 respectively. One-way ANOVA F statistic is statistically significant ($F=7.210$, $p<0.001$), but only the difference between the "very low" and "quick desistance" group is statistically significant using the Tukey multiple comparison method.

It is worth pointing out that G2 subjects who did not have an eligible G3 child when relevant data were collected are treated as missing cases in Table 7-1. In effect, G2 subjects without eligible G3s should be included in later analysis of turning points rather than being treated as missing cases. To include those G2 respondents, we use information from another variable which contains information on "current IG family participation status". If this variable indicates an attribute of "no eligible G3 subject", those G2 subjects are included in later analysis as "never have a child". After this modification, the number of missing cases decreases from 181 to 50 (See Table 7-2).

Before adding time-varying covariates to the trajectories, it is necessary to control confounders that may influence both the occurrence of life turning events and later gang involvement. Table 7-3 reports estimates of the included control variables measured at Wave 1 of the RYDS on trajectory group membership. The results suggest two significant predictors. Early offending behaviors predict membership in the "late adolescence", "quick desistance" and "high risk persistence" group relative to the "very low" group. In addition, peer drug use predicted a significant increase in the probability of membership in the "quick desistance" and "high risk persistence" group relative to the "very low" group. The two variables are thus included as control variables in later analyses of timing-varying covariates.
In Chapter 4, we argued that the birth of a first child could be a possible turning point within one’s gang career and its impact is dependent upon the timing of having that first child. Early parenthood is an off-time transition that disrupts other important pathways to adulthood and restricts opportunities in many life domains (e.g. education, employment and family relations) (Pogarsky et al., 2006; Sigle-Rushton, 2005). On the other hand, having a first child “on time” in a normative sense re-structures one’s everyday routines, especially with regard to delinquent peer networks, and facilitates subjective and affective transformations that lead to changes in one’s identities, priorities and future orientations. People are getting “serious” about becoming an adult (Moloney et al., 2009; Warr, 1998). However, what is less clear is if either the disruption or protection varies across sub-types of gang members. For instance, early parenthood may be generally bad in terms of disrupting a smooth transition to adulthood, but it can still impose protection on those especially high-risk individuals given their already extended involvement in crime and delinquency. No prior research has examined potential life turning effects of having a first child across gang membership trajectories.

Table 7-4 reports parameter estimates of the full model with time-varying covariates and control variables. The results indicate that having a first child before the age of 19 has a significant impact on individuals following the “late adolescence” and “high risk persistence” trajectories. Specifically, early parenthood increases the probabilities of gang membership for late adolescence joiners (b=1.379, p=0.024). This finding is largely consistent with our prior understanding of late blooming offenders. Consistent with Thornberry and Krohn’s interactional theory of delinquency (2001; 2005), when compared to early gang joiners, these individuals were buffered from negative
impacts of having deficits in human capital by a relatively supportive surrounding environment. However, early parenthood abruptly breaks pre-existing protective bonds (Sigle-Rushton, 2005). Individuals in the “late adolescence” group now have to assume additional responsibilities to support their own offspring, which further disrupts the formation of needed social and human capital for a smooth transition into adulthood. They are unlikely to obtain emotional support from a quality relationship with a partner and economic sources from meaningful employment (Astone, 1993). The resulting psychological and financial stress and life dissatisfaction propel them to seek help from deviant friends and the attraction of a street gang looms (Moloney et al., 2009; Vigil, 1988).

On the other hand, having a first child by the age of 19 redirects high risk gang persisters from further participation in a street gang (b = -2.513, p = 0.003). These high-risk early joiners already have low levels of attachment and discipline with their parents and maintain delinquent peer networks and beliefs. In addition, they are more likely to commit street crimes/violence and use alcohol and marijuana than individuals following other trajectories. Accordingly, even if the birth of a first child is not “age appropriate” in a normative sense, it still redirects their life trajectories in many ways (Moloney et al., 2009). As reviewed in Chapter 4, once the first child was born, gang members’ everyday routines were often changed, especially with regard to one’s peer groups. For some gang members, they did not want to be out there anymore. They realized that they needed to take a different route and be more disciplined and responsible. They did not think about gang activities anymore; they think of their kids if anything. For others, they simply could not maintain a street-oriented life style. They were too busy to
participate in gang activities and moved from the streets back into home. Eventually
gang members re-evaluated their past activities and priorities and began to retain some
kind of future-orientation, which is a key predictor of transition out of street gangs. To a
large extent, the findings are consistent with how we have theoretically defined “turning
points”, which is to break existing connections. For one group (“late adolescence”
trajectory), the disconnection turns to the negative side, whereas for the other group
(“high risk persistence” trajectory), it turns positive.

To better illustrate the impact of having a first child before age 19 (i.e. early
parenthood) on gang membership trajectories, Figure 7-1 depicts graphically a
hypothetical scenario in which the birth of a first child occurs at age 17 using the
“plottcov” option in Stata. The “plottcov” function calculates the trajectory of each group
under a user-specified set of values for time-varying covariates (Jones & Nagin, 2007).
Dot symbols are observed data reflecting the average gang membership probabilities. It
is obvious that early parenthood boosts the risk of gang involvement for individuals
following the “late adolescence” trajectory but reduces that risk for individuals in the
“high risk persistence” group. The observed protective effects for high risk persistent
members are stronger than the boosting effects for late joiners.

It is also important to notice that “age appropriate” parenthood does not impose
presumed protective effects on any of the identified gang membership trajectories. For
the two trajectory groups whose coefficient estimates approach statistical significance
(the “late adolescence” \(b=2.038, p=0.149\)) and “high risk persistence” group \(b=1.815, p=0.116\)), having a first child after age 19 (i.e. age-appropriate parenthood) might
actually exacerbate the risk of gang participation. To some extent, this non-significance
of “age appropriate” parenthood on gang affiliation is unexpected. One possible explanation is that although fatherhood introduces a hook for change, older gang members are too embedded in delinquent networks and they refuse or simply cannot seize the opportunity for change (Decker & Curry, 2000; Decker et al., 2008). Moloney et al. (2009), for instance, found that many gang fathers failed to meet the challenge of being “the breadwinner and good provider, the protector and teacher” (p.317). Indeed, fatherhood can act as a turning point leading to change, but it is far from “an automatic process”.

In summary, the results indicate that early parenthood significantly redirects two developmental pathways of gang membership. On the one hand, having a first child by the age of 19 expedites the process of gang participation for late-adolescence joiners; on the other hand, the birth of a first child by age 19 deflects the high risk persistence trajectory downward. “Age appropriate” parenthood, however, is not protecting individuals from gang affiliation as expected. This might be because having an “age appropriate” first child in a normative sense is already too late to change everyday routines of mature gang members. By that time, they have invested a great amount of time and efforts in gang friends and activities, and have built up high “stakes” in unconventional lives.

**Turning Point: Police Contact/Arrest**

Another potential life turning event for street gang members is police contact or arrest. Unlike the birth of a first child, police contact/arrest is imposed from an outside source, which makes its potential life turning effects more controversial. A consensus has not been reached on the effects of police contact or arrest on individual offenders. Proponents of deterrence theory maintain that when an individual is contacted or
arrested by police, he or she is thought to reduce subsequent offending through understanding the consequence of prior delinquent acts. Police contact/arrest may also indirectly inhibit future crime by increasing an individual’s perception of the certainty and severity of punishment (Morris & Piquero, 2013). Labeling theorists, on the other hand, hypothesize a deviance amplification effect, where police contact/arrest is expected to increase subsequent offending via several mechanisms such as: social exclusion, adoption of a deviant identity, commitment to deviant peers and reinforcement of deviant behaviors. Huizinga and Henry (2008) undertook a comprehensive review of longitudinal research on the effect of arrest and justice system sanctions on subsequent offending and found that the most consistent finding is “one of a non-significant deterrent effect with a few studies indicating a harmful crime-exacerbating effect of arrest” (Morris & Piquero, 2013, p.839).

However, neither deterrent nor labeling effects are invariant across individuals. A more important question criminologists need to ask is for whom police contact/arrest deters or labels (e.g. DeJong, 1997; Matsueda et al., 2006; Smith & Gartin, 1989). Huizinga and Henry (2008) suggested that “the effect of arrest and sanctions may also vary by type of offender. Not all individuals commit delinquencies/crime for the same reason. Offenders vary by age, by gender, by stage in a delinquent career, and level of seriousness and frequency of offending. Thus, the effect of an arrest might vary between individuals first arrested at age 10 and those first arrested at age 17” (p.223). A recent approach that has been used to study differential deterrence and/or labeling effects among offenders is group-based trajectory analysis (Muthén, 2001; Nagin, 2005). Consistent with a life course perspective, both the direction and degree of a
treatment (sanction) effect may be trajectory-specific (Thornberry & Krohn, 2005). For instance, combining with a counterfactual analysis approach, Morris and Piquero (2013) found that first-time arrest “substantively amplified subsequent delinquency among the most chronic trajectory group and to a much lesser extent for the medium-risk group, while the arrest effect had virtually no crime-exacerbating effect among low-risk youth” (Morris & Piquero, 2013, p.859). Using a similar analytic approach on violent offending, Ward, Krohn and Gibson (2014) reached a similar conclusion that police contact increases subsequent offending for the low-offending trajectory group, but no significant treatment effect is observed for the non-offending group. These findings are interpreted as support for the deviance amplification hypothesis from labeling theory. Yet, how the effects of police contact/arrest vary across sub-types of gang members is truly an unexplored empirical question.

It is worth noting that unlike the birth of a first child, police contact/arrest is treated as a changing status across each wave. In other words, an individual can go into and out of treatment (sanction) over time. Unlike Morris and Piquero (2013) and Ward et al. (2014), we are not focusing on first-time sanction effects. Instead, the emphasis is on the overall effects of police contact/arrest over the entire period of a gang career. Although both deterrence and labeling effects should be strongest for the first-time police contact/arrest event, a second- or third-time arrest is not theoretically unimportant (Liberman, Kirk, & Kim, 2014; Morris & Piquero, 2013). In effect, prior research has not clearly delineated the differential effects of a first-time police contact/arrest versus subsequent incidents. Given that our goal is to understand how

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1 Treatment effect estimates were unavailable for the high-offending trajectory group because covariance balance was not achieved for the high-offending trajectory group (Ward, Krohn, & Gibson, 2014).
police contact/arrest would redirect developmental trajectories of gang membership over the entire assessment period, we consider it appropriate to examine police contact/arrest as a time-varying covariate that has a changing status across each wave of data collection.

Specifically, the average number of police contacts/arrests for our respondents is 1.609 with a minimum of 0 and a maximum of 9. Descriptive statistics on police contact/arrest across gang membership trajectory groups are reported in Table 7-5. Not surprisingly, individuals in the “high risk persistence” group have the highest average number of police contacts/arrests (3.154) between Wave 2 and 12 of the RYDS and individuals following the “very low” trajectory have the lowest average number (1.273). Individuals following the “late adolescence” and “quick desistance” trajectories have approximately the same average number of police contacts/arrests (2.404 and 2.594 respectively). One-way ANOVA F statistic is statistically significant ($F=17.880, p<0.001$), and the differences in mean numbers of police contacts/arrests between the “very low” and the other three active gang membership trajectory groups are also significant using the Tukey multiple comparison method.

Table 7-6 reports parameter estimates of the full model with time-varying covariates (police contact/arrest) and control variables. The results indicate that police contacts/arrests that occur during one’s gang career do not have the desired deterrence effects. For all four identified gang membership trajectories, police contact/arrest increases the probabilities of gang affiliation, although coefficient estimates do not reach statistical significance at $p<0.05$ level. For individuals following the two relatively low-risk trajectory groups (the “very low” group: $b=1.155, p=0.067$; the “quick desistance” group:
b=0.484, p=0.088), coefficient estimates approach statistical significance at a marginal level (p<0.10). Figure 7-2 depicts graphically a hypothetical scenario in which two incidences of police contact/arrest occurred when the respondents were at age 15 and 21. Dot symbols are observed data reflecting the average gang membership probabilities. We observe that the probabilities of gang membership in all four trajectory groups rise a bit when police contact/arrest occurs.

In general, the findings are consistent with prior research on the effects of police contact/arrest. We did not observe deterrence effects of police contact/arrest for any of the four identified gang membership trajectories. Watkins, Huebner and Decker (2008) suggested that gang membership is influential and appears to overwhelm any impact of perceptual deterrence. The often spontaneous and chaotic nature of gang crimes, in particular violence, also contradicts “an image of the rational, calculating gang youth, weighing the certainty and severity of potential punishments for gang crime” (Maxson, Matsuda, & Hennigan, 2011, p.518). In addition, labeling effects seem to manifest among individuals following the relatively low risk gang membership trajectories. To some extent, this is inconsistent with Morris and Piquero (2013) and Ward et al. (2014) because they observed labeling effects among relatively high, instead of low, risk general offenders.

It is important, however, to take into consideration the nature of being a street gang member. Sherman (1993) noted that the effect of a sanction depends on several factors including the person’s interpretation of the sanction, how bonded they are to the sanctioner, and their emotional reaction. Past research indicates that gangs have oppositional cultures, representing “an institutionalized rejection of the values of adult
authority” (Moore & Vigil, 1989, p.31). Each rejection of the gang from conventional social institutions merely reinforces its cohesiveness and its dependence upon itself (Klein & Maxson, 2006). Lien (2002) noted that gang members viewed themselves as the victims of oppression, the unfair targets of racism and inequality, which is consistent with Esbensen and colleagues’ findings that gang members often expressed less guilt and mobilized more techniques of neutralization for committing deviant behavior than other youth did (Esbensen & Deschenes, 1998; Esbensen & Huizinga, 1993).

Accordingly, the threat of policing practices is likely to be discounted by gang members and strong collective social identities motivate members to challenge rather than defer to threats of police contact/arrest, which solidifies youth identification with the group (Klein, 1995). As discussed earlier, individuals following the “high risk persistence” and “late adolescence” trajectories are embedded in street gangs. “Backfire” effects of police contact/arrest are thus more likely to be observed among relatively low risk gang members due to potentially greater marginal effects. Future research should consider obtaining data from respondents’ perceptions of the sanctioning event.

To conclude, Chapter 7 allows for estimation of the impact of life turning events (i.e. the birth of a first child and police contact/arrest) on each trajectory of gang membership while controlling for individual characteristics that may affect both the individual’s trajectory and the likelihood of experiencing the transition. Following the life course perspective, this methodological approach provides “statistical expression to the concepts of trajectories and turning points” (Nagin, Pagani, Tremblay, & Vitaro, 2003, p.344). However, it is important to reiterate that the group-based trajectory framework is not immune to the hazard of inferring causality from non-experimental data (Nagin,
2005). Although we have used terms like “impact” or “effect on” to describe the statistical association between a covariate and the form of a trajectory, true causality is not yet established due to the problem of endogeneity. Future research may use propensity score methods for longitudinal studies such as the inverse probability of treatment weighting (IPTW) method to explore cause-and-effect relationships between life turning events and gang affiliation (e.g. Hong & Raudenbush, 2008; Robins, Greenland, & Hu, 1999; Robins, Hernán, & Brumback, 2000).
Table 7-1. G2’s age at G3’s birth across trajectory groups

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Mean</th>
<th>Std Dev</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very low</td>
<td>344</td>
<td>23.035</td>
<td>4.789</td>
</tr>
<tr>
<td>Late adolescence</td>
<td>41</td>
<td>21.195</td>
<td>4.143</td>
</tr>
<tr>
<td>Quick desistance</td>
<td>84</td>
<td>20.846</td>
<td>3.632</td>
</tr>
<tr>
<td>High-risk persistence</td>
<td>12</td>
<td>20.608</td>
<td>1.616</td>
</tr>
</tbody>
</table>

Frequency missing=181

Table 7-2. Age distribution of having a first child across trajectory groups

<table>
<thead>
<tr>
<th>Group</th>
<th>Parenthood (≤19)</th>
<th>Parenthood (&gt;19)</th>
<th>No eligible G3</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very low</td>
<td>73</td>
<td>271</td>
<td>111</td>
<td>455</td>
</tr>
<tr>
<td></td>
<td>16.0%</td>
<td>59.6%</td>
<td>24.4%</td>
<td>100%</td>
</tr>
<tr>
<td>Late adolescence</td>
<td>31.4%</td>
<td>49.0%</td>
<td>19.6%</td>
<td>100%</td>
</tr>
<tr>
<td>Quick desistance</td>
<td>32.3%</td>
<td>58.1%</td>
<td>9.6%</td>
<td>100%</td>
</tr>
<tr>
<td>High-risk persistence</td>
<td>15.4%</td>
<td>76.9%</td>
<td>7.7%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Frequency missing=50
Table 7-3. Control variables on the probability of trajectory group membership (“very low” as contrast group)

<table>
<thead>
<tr>
<th></th>
<th>Late adolescence</th>
<th>Quick desistance</th>
<th>High risk persistence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coefficient estimate</td>
<td>p-value</td>
<td>Coefficient estimate</td>
</tr>
<tr>
<td>General offending</td>
<td>0.386</td>
<td>0.064^</td>
<td>0.772</td>
</tr>
<tr>
<td>Peer delinquency</td>
<td>1.121</td>
<td>0.541</td>
<td>-1.302</td>
</tr>
<tr>
<td>Peer drug use</td>
<td>-3.890</td>
<td>0.140</td>
<td>2.447</td>
</tr>
<tr>
<td>Delinquent beliefs</td>
<td>0.176</td>
<td>0.851</td>
<td>0.353</td>
</tr>
<tr>
<td>Parental attachment</td>
<td>0.161</td>
<td>0.768</td>
<td>0.477</td>
</tr>
<tr>
<td>Parental discipline</td>
<td>-0.231</td>
<td>0.584</td>
<td>-0.144</td>
</tr>
<tr>
<td>African American</td>
<td>0.878</td>
<td>0.139</td>
<td>1.068</td>
</tr>
<tr>
<td>Hispanic</td>
<td>0.887</td>
<td>0.254</td>
<td>0.892</td>
</tr>
<tr>
<td>Poverty level income</td>
<td>-0.130</td>
<td>0.777</td>
<td>0.266</td>
</tr>
</tbody>
</table>

^p<0.10 *p<0.05
Table 7-4. The impact of having a first child on gang membership trajectories

<table>
<thead>
<tr>
<th></th>
<th>Very low</th>
<th>Late adolescence</th>
<th>Quick desistance</th>
<th>High risk persistence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coefficient estimate</td>
<td>p-value</td>
<td>Coefficient estimate</td>
<td>p-value</td>
</tr>
<tr>
<td>Age</td>
<td>--</td>
<td>--</td>
<td>70.713</td>
<td>0.001*</td>
</tr>
<tr>
<td>Age^2</td>
<td>--</td>
<td>--</td>
<td>-21.039</td>
<td>0.001*</td>
</tr>
<tr>
<td>Parenthood (≤19)</td>
<td>-9.535</td>
<td>0.913</td>
<td>1.379</td>
<td>0.024*</td>
</tr>
<tr>
<td>Parenthood (&gt;19)</td>
<td>0.053</td>
<td>0.962</td>
<td>2.038</td>
<td>0.149</td>
</tr>
<tr>
<td>General offending</td>
<td>--</td>
<td>--</td>
<td>0.577</td>
<td>0.001*</td>
</tr>
<tr>
<td>Peer drug use</td>
<td>--</td>
<td>--</td>
<td>-4.636</td>
<td>0.119</td>
</tr>
</tbody>
</table>

^p<0.10 *p<0.05
<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Mean</th>
<th>Std Dev</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very low</td>
<td>491</td>
<td>1.273</td>
<td>1.853</td>
<td>0</td>
<td>9</td>
</tr>
<tr>
<td>Late adolescence</td>
<td>57</td>
<td>2.404</td>
<td>2.506</td>
<td>0</td>
<td>9</td>
</tr>
<tr>
<td>Quick desistance</td>
<td>101</td>
<td>2.594</td>
<td>2.466</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>High-risk persistence</td>
<td>13</td>
<td>3.154</td>
<td>2.267</td>
<td>1</td>
<td>7</td>
</tr>
</tbody>
</table>
Table 7-6. The impact of police contact/arrest on gang membership trajectories

<table>
<thead>
<tr>
<th></th>
<th>Very low</th>
<th>Coefficient estimate</th>
<th>p-value</th>
<th>Late adolescence</th>
<th>Coefficient estimate</th>
<th>p-value</th>
<th>Quick desistance</th>
<th>Coefficient estimate</th>
<th>p-value</th>
<th>High risk persistence</th>
<th>Coefficient estimate</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>--</td>
<td>--</td>
<td>80.963</td>
<td>90.656</td>
<td>0.012*</td>
<td></td>
<td>46.110</td>
<td>0.002*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age^2</td>
<td>--</td>
<td>--</td>
<td>-23.729</td>
<td>-32.425</td>
<td>0.007*</td>
<td></td>
<td>-13.940</td>
<td>&lt;0.001*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Police contact/arrest</td>
<td>1.155</td>
<td>0.067^</td>
<td>0.413</td>
<td>0.254</td>
<td>0.484</td>
<td>0.088^</td>
<td>0.566</td>
<td>0.293</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General offending</td>
<td>--</td>
<td>--</td>
<td>0.565</td>
<td>0.743</td>
<td>&lt;0.001*</td>
<td>0.759</td>
<td>&lt;0.001*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peer drug use</td>
<td>--</td>
<td>--</td>
<td>-3.767</td>
<td>1.620</td>
<td>0.022*</td>
<td>2.287</td>
<td>0.034*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

^p<0.10  *p<0.05
Figure 7-1. The impact of early parenthood on gang membership trajectories

Figure 7-2. The impact of police contact/arrest on gang membership trajectories
The Impact of Gang Membership on Later Life Outcomes

Prior research has indicated a clear relationship between street gang membership and high rates of criminal involvement. Gang members, as compared with their peers who are not in gangs, are more extensively involved in delinquency—especially serious and violent delinquency (Curry, Decker, & Pyrooz, 2013; Krohn & Thornberry, 2008; Thornberry et al., 1993). Negative consequences associated with gang membership extend beyond periods of active gang participation, even though the duration of gang membership often lasts only for one to two years. An emerging body of research has begun to unpack the “black box” of gang membership, identifying the causal mechanisms that mediate adolescent gang membership and later negative life outcomes. Individuals with a history of gang membership have been found more likely to experience precocious life transitions (e.g. cohabitation and teen parenthood), obtain less education, be unemployed, experience economic and family problems, and engage in criminal acts and get arrested many years after their membership (e.g. Melde & Esbensen, 2011; Krohn et al., 2011; Pyrooz, 2014a).

The current state of research on gang effects across the life course, however, overlooks developmental heterogeneity among gang members. Little empirical attention has been paid to understanding differential outcomes across sub-types of gang members. The vast majority of studies that have explored the enduring consequences of gang membership make distinctions only between “gang joiners” and “gang abstainers”. In addition, that distinction is often made at a single time point. Previous studies have demonstrated that similar levels of propensity for offending may be
observed at one point in time, but there are important differences at other time points (Dong & Krohn, In press). Other studies like Thornberry et al. (2003) and Krohn et al. (2011) have gone one step further to take into account the duration of gang membership and concluded that “the longer the adolescent stayed in the gang, the more disruption he or she experiences during emerging adulthood and in adulthood itself” (Krohn et al., 2011, p.1016). However, as discussed in Chapter 6, a gang career is characterized not only by the duration of membership, but also by its timing and persistence or desistance. For instance, two individuals may stay in a gang for a comparable period of time; one starts early and declines dramatically (quick desistors), whereas the other starts at a relatively low level and increases sharply (late-adolescence joiners). Whether or how later life outcomes would be differentially affected by such heterogeneity is an important question. By combining all gang members into one general category, we underestimate the impacts of different shapes of gang membership trajectories on adulthood outcomes.

Following the Krohn et al. (2011) study, two offending outcomes in adulthood are examined in the current research. Table 8-1 contains information on the frequency of involvement in street crimes at Wave 14 of the RYDS across trajectory groups. Recall that a log transformation is applied due to the skewness in the distribution of the variable\(^1\). After the log transformation, the average number of street crimes across the analysis sample (N=533) is 0.540 with a minimum of 0 and a maximum of 6.589. As expected, individuals following the “high risk persistence” trajectory (1.674) have the highest average number of street crimes, followed by individuals in the “late...

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1 The log transformation formula: \( \log_{a}4^{stri} = \log(a^{stri} + 1) \)
adolescence” (1.334), “quick desistance” (0.725) and “very low” group (0.388). One-way ANOVA F statistic is statistically significant ($F=7.710$, $p<0.001$), and the differences in average numbers of street crimes between the “very low” and the “high risk persistence” and “late adolescence” group are also significant using the Tukey multiple comparison method.

Table 8-2 reports descriptive statistics on the dichotomous indicator measuring whether an individual self-reported an arrest during Wave 13 or 14 of the RYDS. Whereas the street crime measure taps continued involvement in relatively serious criminal offenses, this measure examines whether ex-gang members also are more likely to have contact with the criminal justice system in adulthood\(^2\). Across the whole analysis sample ($N=565$), about 20% of the respondents were arrested at age 29 or 31. Not surprisingly, individuals following the “very low” group (15.13%) have the lowest rate of arrest, whereas individuals in the “late adolescence” group (34.04%) have the highest rate. Individuals following the “high risk persistence” (27.27%) and “quick desistance” (26.19%) groups have about the same rate of arrest. The chi-squared test of independence rejects the null hypothesis, indicating that gang membership trajectories and the rate of arrest in adulthood are not statistically independent ($\chi^2=14.519$, d.f.=3, $p=0.002$).

Table 8-3 shows ordinary least squares equations predicting adulthood street crimes at Wave 14 of the RYDS. Three trajectory variables indicating the probabilities of each subject belonging to trajectory groups 2 (“late adolescence” group), 3 (“quick desistance” group), and 4 (“high risk persistence” group) are included in the model with

\(^{2}\) No subject self-reported as a street gang member at Wave 12 of the RYDS.
control variables. Group1 ("very low" group) is the omitted reference group. The F test for the model is statistically significant ($p<0.001$), although the R-square is small ($R^2=0.069$). Specifically, when compared to individuals following the "very low" trajectory, individuals in the "late adolescence" ($b=1.391$, $p<0.001$) and "high risk persistence" ($b=1.379$, $p=0.006$) group are more likely to commit street crimes at Wave 14. Standardized coefficient estimates further indicate that membership in the "late adolescence" group ($\beta=0.204$) is more problematic than membership in the "high risk persistence" group ($\beta=0.117$). Individuals following the "quick desistance" trajectory, however, are not more likely than gang avoiders to commit street crimes in adulthood.

Table 8-4 shows the results from logistic regression in which arrest in adulthood is regressed on trajectory groups and control variables. The overall model again is statistically significant ($p=0.004$). When compared to individuals in the "very low" group, individuals following the "late adolescence" trajectory ($b=1.281$, $p=0.002$) are more likely to get arrested in adulthood. For late gang joiners, the odds of being arrested at Wave 13/14 are 3.6 times as large as the odds for gang avoiders. On the other hand, individuals following the "high risk persistence" and "quick desistance" trajectory are not more likely than gang avoiders to get arrested.

In brief, the results suggest that early onset is not necessarily deterministic in understanding negative life consequences of gang membership as developmental theories of general offending would otherwise argue (e.g. Moffitt's developmental taxonomy theory). Early gang joiners can be early desisters and their offending behaviors in adulthood are not very different from low-risk avoiders. On the other hand, the timing of gang affiliation seems to be more important than early onset when
examining gang effects across the life course. Previous literature suggests that as adolescents age, their involvement in crime and gangs increases. Older gang members are more involved in serious crimes and often act as catalysts for group violence. They are well respected in gang circle because of their violent reputations (Maxson et al., 1985; Watkins & Moule, 2014). In addition, mature gang members tend to identify more with the gang. Decker and Curry (2000), for instance, found that gang involvement is not a “master status” among younger adolescents. “Immersion in gang life is not complete and adolescent activities and concerns dominate the lives of these adolescents; adolescence is a time of fleeting allegiances, to friends, interests and gangs” (p.481). Gang affiliation, however, means more for older teenagers and individuals in their 20s.

Moreover, although the duration of gang affiliation has been found critical in previous studies of gang effects across the life-course (e.g. Krohn et al., 2011; Thornberry et al., 2003), the results indicate that its impact on later life outcomes may require further explanation. Individuals following the “high risk persistence” trajectory, on average, stay in a gang for more than 6 waves of data collection. Not surprisingly, they self-reported committing more street crimes in adulthood than low-risk gang avoiders. However, when compared to individuals following the “late adolescence” trajectory who are also mature members but, on average, stay in a gang for only two and half waves, membership in the “high risk persistence” group does not appear more problematic. In effect, standardized coefficient estimates indicate that membership in the “late adolescence” group has a stronger effect on adulthood street crimes than membership in the “high risk persistence” group. It is also surprising to observe that individuals in the
“high risk persistence” group are not more likely to get arrested in adulthood than low-risk gang avoiders, but late-adolescence joiners are.

To explain the unanticipated findings, it may be helpful to temporarily shift the level of explanation from individual-level gang membership to micro-level group dynamics (McGloin & Decker, 2010; Short, 1985). Although there are competing views about whether street gangs are organizations, most gangs do report some form of authority or leadership (Decker & Van Winkle, 1996; Decker et al., 1998; Hagedorn, 1988; Klein & Maxson, 2006; Sanchez-Jankowski, 1991). Specifically, Decker and Van Winkle (1996) argued that “age in combination with length of time in the gang was noted as a major criterion that set leaders apart from other members. In particular, the old gangster, or OG, was a role identified with leadership” (p. 97). To a large extent, the developmental pathway of our identified high risk persistent members fits Decker and Van Winkle’s description of authoritative figures in a street gang. As demonstrated in Chapter 6, high risk persistent members joined the gang early and stayed in the gang for an extensive period of time. More importantly, they were “embedded” in the gang and self-reported core membership for multiple waves of data.

With the aging of these members, they tend to assume a role of directing and organizing their gangs (Decker et al., 2008). Decker, Bynum, and Weisel (1998) suggested that gang leaders perform functions different than those of regular members. “Leaders make sure all laws and policies are being adhered to; give orders; are supposed to be thinkers; sit back and just put out a plan or whatever to their generals” (p. 405). A related point is that the elite members understand that given their tenure with the gang (prolonged membership and the regular perpetration of serious violence), they
are now more likely to come to the attention of the police and the cost of criminal activity increases (Watkins & Moule, 2014; Weisfeld & Feldman, 1982). Criminal sentences become more likely and longer, especially for repeat offenders. Accordingly, high risk persistent members may no longer be “frontline warriors” but assume some authoritative duties. When that transition takes place, general offending outcomes later in life may somehow be attenuated (Venkatesh, 2008). Unfortunately, we are not able to fully test the aforementioned group dynamics with currently available data. However, one critical dimension of being an authoritative figure is to “deliver”. This is especially true in the case of being able to provide drugs for street sales and procure income (Decker et al., 1998; Decker & Van Winkle, 1996; Sanchez-Jankowski, 1991). As Table 8-5 shows, individuals following the “high risk persistence” trajectory indeed continue to sell drugs at the highest level.

**Mediating Mechanisms of Gang Effects in the Life Course**

An equally important question is what accounts for the observed gang effects in the life course. Prior research has conceptualized gang membership as a developmental “snare” that diminishes “the probabilities of later success by eliminating opportunities for breaking the chain of cumulative continuity” (Moffitt, 1993, p.684). On the one hand, gang experience and orientation disrupts the processes of capital accumulation in multiple institutional arenas such as education, employment and family relations. Ex-gang members experience difficult transitions into adulthood (Krohn et al., 2011; Melde & Esbensen, 2011; Pyrooz, 2014a; Thornberry et al., 2013). On the other hand, adolescent gang affiliation leads to social isolation from prosocial networks. Gang members, whose affiliation is often publicly known, elicit negative, even hostile, responses from surrounding environments. Even after disengagement from the gang,
surrounding environments treat former gang members as if they were active members. As a result, ex-members continue to view themselves as “others” and self-select or create environments that support their life style. They often have to continue to hang out with delinquent peers (not necessarily gang members) for psychological and economic support (Ariza, Cebulla, Aldridge, Shute, & Ross, 2014; Melde & Esbensen, 2014).

Table 8-6 contains information on mediation analysis of street crimes in adulthood. Unlike Krohn et al. (2011) who found that adolescent gang involvement leads to precocious life transitions and family problems, which eventually influence street crimes in adulthood, only peer delinquency and peer substance use are found in the current investigation as potential mediators of the relationship between gang membership trajectories and street crimes at Wave 14. Specifically, both peer delinquency ($\beta=0.094$, $p=0.046$) and substance use ($\beta=0.111$, $p=0.015$) have modest main effects on street crimes. More importantly, the $\beta$ coefficient of the “late adolescence” group (T2) reduces from 0.204 in Table 8-3 to 0.189 and 0.191 respectively when peer delinquency and substance use are included in the model, indicating that partial mediation has occurred. In addition, the $\beta$ coefficient of the “high risk persistence” group (T4) reduces from 0.117 to 0.111 when associations with delinquent peers are taken into account, suggesting the occurrence of partial mediation for this trajectory group.

Table 8-7 reports results from mediation analysis of arrest in adulthood. Consistent with Krohn et al. (2011), the respondent’s annual income, educational

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3 It is worth mentioning that potential mediators considered in Chapter 8 are all significantly predicted by gang membership trajectories, which meets the requirement of Step 2 in Baron and Kenny’s (1986) approach to establishing mediation. For the purpose of succinctness, those models are not presented in the dissertation.
achievement and family problems mediate the relationship between gang membership trajectories and arrest at Wave 13/14. Holding other variables constant, every one-unit increase in annual income leads to about 20% decrease in the odds of being arrested. Similarly, for each additional year of education, there is a 15% decrease in the odds of being arrested. On the other hand, for every one-unit increase in family problems, we expect to see about an 80% increase in the odds of being arrested. More importantly, the odds ratio of the “late adolescence” group (T2) reduces from 3.600 in Table 8-4 to 3.317, 3.360 and 3.267 respectively when annual income, years of education and family problems are included in the model, indicating the occurrence of partial mediation. In addition, peer substance use also mediates the relationship between gang membership trajectories and arrest. Controlling for other variables, a one-unit increase in peer substance use leads to more than 240% increase in the odds of being arrested. The odds ratio of the “late adolescence group” (T2) reduces from 3.600 to 3.043 when peer substance use is taken into account.

Given that both adult role/status fulfillment failure and delinquent peer associations significantly mediate the relationship between developmental pathways of gang affiliation and arrest in adulthood, it is necessary to estimate a comprehensive model that simultaneously examines the two mediating mechanisms. Table 8-8 shows that when the respondent’s annual income, years of education, family problems and peer substance use are simultaneously included in the model, the odds ratio of the “late adolescence” group (T2) further reduces to 2.614. Annual income, family problems and peer substance use remain statistically significant, although their effect sizes are reduced. Educational achievement now becomes insignificant (O.R.=0.897, p=0.209).
Moreover, peer substance use seems to have a stronger effect on arrest (O.R.=2.927, p<0.001) than other potential mediators.

In summary, gang affiliation has long-lasting impacts on ex-members’ life many years after they participated in a gang. Particularly, if their membership extends into late adolescence and early adulthood, negative consequences are aggravated. Interestingly, we observed that self-reported street crimes in adulthood are only mediated by connections with delinquent peers, whereas contact with the criminal justice system is mediated by both adult role/status fulfillment failure and peer substance use. One possible explanation is that contact with the criminal justice system is influenced by additional factors other than criminal offending itself (Liberman et al., 2014), and those extra-legal factors (e.g. annual income or family problems) are not revealed when examining self-reported street crimes. As Table 8-9 shows, when street crime at Wave 14 is included as an additional predictor of police arrest, gang membership trajectory variables are no longer statistically significant, suggesting the occurrence of full mediation. However, annual income, family problems and peer substance use remain statistically significant, although their effect sizes become smaller. This supports the argument that extra-legal factors beyond criminal offending influence ex-gang members’ contact with the criminal justice system.
Table 8-1. Frequency of involvement in street crimes across trajectory groups

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Mean</th>
<th>Std Dev</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very low</td>
<td>401</td>
<td>0.388</td>
<td>1.312</td>
<td>0</td>
<td>6.423</td>
</tr>
<tr>
<td>Late adolescence</td>
<td>41</td>
<td>1.334</td>
<td>2.383</td>
<td>0</td>
<td>6.436</td>
</tr>
<tr>
<td>Quick desistance</td>
<td>79</td>
<td>0.725</td>
<td>1.652</td>
<td>0</td>
<td>5.919</td>
</tr>
<tr>
<td>High-risk persistence</td>
<td>12</td>
<td>1.674</td>
<td>2.830</td>
<td>0</td>
<td>6.589</td>
</tr>
</tbody>
</table>

Frequency missing=129

Table 8-2. The rate of arrest across trajectory groups

<table>
<thead>
<tr>
<th>Group</th>
<th>Yes</th>
<th>No</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very low</td>
<td>64</td>
<td>359</td>
<td>423</td>
</tr>
<tr>
<td></td>
<td>15.13%</td>
<td>84.87%</td>
<td>100.00%</td>
</tr>
<tr>
<td>Late adolescence</td>
<td>16</td>
<td>31</td>
<td>47</td>
</tr>
<tr>
<td></td>
<td>34.04%</td>
<td>65.96%</td>
<td>100.00%</td>
</tr>
<tr>
<td>Quick desistance</td>
<td>22</td>
<td>62</td>
<td>84</td>
</tr>
<tr>
<td></td>
<td>26.19%</td>
<td>73.81%</td>
<td>100.00%</td>
</tr>
<tr>
<td>High-risk persistence</td>
<td>3</td>
<td>8</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>27.27%</td>
<td>72.73%</td>
<td>100.00%</td>
</tr>
</tbody>
</table>

Frequency missing=97

Table 8-3. Regression of street crimes (Wave 14) on trajectory groups and control variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>b (s.e.)</th>
<th>β</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>0.425 (1.039)</td>
<td>--</td>
<td>0.682</td>
</tr>
<tr>
<td>Late adolescence group (T2)</td>
<td>1.391 (0.306)</td>
<td>0.204</td>
<td>&lt;0.001*</td>
</tr>
<tr>
<td>Quick desistance group (T3)</td>
<td>0.258 (0.238)</td>
<td>0.049</td>
<td>0.278</td>
</tr>
<tr>
<td>High risk persistence group (T4)</td>
<td>1.379 (0.502)</td>
<td>0.117</td>
<td>0.006*</td>
</tr>
<tr>
<td>White</td>
<td>-0.193 (0.189)</td>
<td>-0.049</td>
<td>0.308</td>
</tr>
<tr>
<td>Hispanic</td>
<td>0.273 (0.183)</td>
<td>0.068</td>
<td>0.137</td>
</tr>
<tr>
<td>Neighborhood disadvantage</td>
<td>0.083 (0.074)</td>
<td>0.053</td>
<td>0.264</td>
</tr>
<tr>
<td>Parental education</td>
<td>0.016 (0.033)</td>
<td>0.023</td>
<td>0.625</td>
</tr>
<tr>
<td>Commitment to school</td>
<td>0.126 (0.216)</td>
<td>0.028</td>
<td>0.559</td>
</tr>
<tr>
<td>Conventional values</td>
<td>-0.186 (0.238)</td>
<td>-0.037</td>
<td>0.435</td>
</tr>
<tr>
<td>Aggression</td>
<td>0.137 (0.196)</td>
<td>0.032</td>
<td>0.484</td>
</tr>
<tr>
<td>Prior delinquency</td>
<td>-0.105 (0.080)</td>
<td>-0.063</td>
<td>0.188</td>
</tr>
</tbody>
</table>

*p<0.05
Table 8-4. Regression of arrest (Wave 13/14) on trajectory groups and control variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>b (s.e.)</th>
<th>O.R.</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-1.283 (1.728)</td>
<td>--</td>
<td>0.458</td>
</tr>
<tr>
<td>Late adolescence group (T2)</td>
<td>1.281 (0.417)</td>
<td>3.600</td>
<td>0.002*</td>
</tr>
<tr>
<td>Quick desistance group (T3)</td>
<td>0.559 (0.372)</td>
<td>1.749</td>
<td>0.133</td>
</tr>
<tr>
<td>High risk persistence group (T4)</td>
<td>0.430 (0.806)</td>
<td>1.537</td>
<td>0.593</td>
</tr>
<tr>
<td>White</td>
<td>-0.733 (0.363)</td>
<td>0.480</td>
<td>0.044*</td>
</tr>
<tr>
<td>Hispanic</td>
<td>-0.384 (0.322)</td>
<td>0.681</td>
<td>0.233</td>
</tr>
<tr>
<td>Neighborhood disadvantage</td>
<td>0.169 (0.131)</td>
<td>1.184</td>
<td>0.196</td>
</tr>
<tr>
<td>Parental education</td>
<td>0.041 (0.058)</td>
<td>1.042</td>
<td>0.481</td>
</tr>
<tr>
<td>Commitment to school</td>
<td>-0.076 (0.370)</td>
<td>0.927</td>
<td>0.838</td>
</tr>
<tr>
<td>Conventional values</td>
<td>-0.221 (0.397)</td>
<td>0.802</td>
<td>0.578</td>
</tr>
<tr>
<td>Aggression</td>
<td>0.527 (0.319)</td>
<td>1.694</td>
<td>0.098</td>
</tr>
<tr>
<td>Prior delinquency</td>
<td>0.071 (0.123)</td>
<td>1.074</td>
<td>0.562</td>
</tr>
</tbody>
</table>

*p<0.05

Table 8-5. Regression of drug sales (Wave 14) on trajectory groups and control variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>b (s.e.)</th>
<th>β</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>0.612 (0.555)</td>
<td>--</td>
<td>0.271</td>
</tr>
<tr>
<td>Late adolescence group (T2)</td>
<td>0.345 (0.165)</td>
<td>0.094</td>
<td>0.037*</td>
</tr>
<tr>
<td>Quick desistance group (T3)</td>
<td>0.251 (0.128)</td>
<td>0.088</td>
<td>0.049*</td>
</tr>
<tr>
<td>High risk persistence group (T4)</td>
<td>0.850 (0.271)</td>
<td>0.134</td>
<td>0.002*</td>
</tr>
<tr>
<td>White</td>
<td>0.003 (0.102)</td>
<td>0.001</td>
<td>0.980</td>
</tr>
<tr>
<td>Hispanic</td>
<td>0.167 (0.099)</td>
<td>0.077</td>
<td>0.091</td>
</tr>
<tr>
<td>Neighborhood disadvantage</td>
<td>0.072 (0.040)</td>
<td>0.086</td>
<td>0.073</td>
</tr>
<tr>
<td>Parental education</td>
<td>0.013 (0.018)</td>
<td>0.034</td>
<td>0.452</td>
</tr>
<tr>
<td>Commitment to school</td>
<td>-0.024 (0.116)</td>
<td>-0.010</td>
<td>0.838</td>
</tr>
<tr>
<td>Conventional values</td>
<td>-0.192 (0.128)</td>
<td>-0.071</td>
<td>0.135</td>
</tr>
<tr>
<td>Aggression</td>
<td>0.148 (0.103)</td>
<td>0.065</td>
<td>0.153</td>
</tr>
<tr>
<td>Prior delinquency</td>
<td>-0.007 (0.043)</td>
<td>-0.008</td>
<td>0.868</td>
</tr>
</tbody>
</table>

*p<0.05
Table 8-6. Mediation analysis of street crimes in adulthood

<table>
<thead>
<tr>
<th>Variables</th>
<th>b (s.e.)</th>
<th>β</th>
<th>p-value</th>
<th>b (s.e.)</th>
<th>β</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-0.226 (1.077)</td>
<td>--</td>
<td>0.834</td>
<td>-0.124 (1.058)</td>
<td>--</td>
<td>0.907</td>
</tr>
<tr>
<td>Late adolescence group (T2)</td>
<td>1.285 (0.310)</td>
<td>0.189</td>
<td>&lt;0.001*</td>
<td>1.300 (0.307)</td>
<td>0.191</td>
<td>&lt;0.001*</td>
</tr>
<tr>
<td>Quick desistance group (T3)</td>
<td>0.237 (0.237)</td>
<td>0.045</td>
<td>0.318</td>
<td>0.224 (0.237)</td>
<td>0.042</td>
<td>0.346</td>
</tr>
<tr>
<td>High risk persistence group (T4)</td>
<td>1.307 (0.502)</td>
<td>0.111</td>
<td>0.009*</td>
<td>1.314 (0.501)</td>
<td>0.111</td>
<td>0.009*</td>
</tr>
<tr>
<td>Peer delinquency (Wave 13)</td>
<td>0.442 (0.221)</td>
<td>0.094</td>
<td>0.046*</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Peer substance use (Wave 13)</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>0.395 (0.162)</td>
<td>0.111</td>
<td>0.015*</td>
</tr>
<tr>
<td>White</td>
<td>-0.157 (0.189)</td>
<td>-0.040</td>
<td>0.408</td>
<td>-0.219 (0.188)</td>
<td>-0.056</td>
<td>0.244</td>
</tr>
<tr>
<td>Hispanic</td>
<td>0.267 (0.183)</td>
<td>0.066</td>
<td>0.144</td>
<td>0.239 (0.183)</td>
<td>0.059</td>
<td>0.191</td>
</tr>
<tr>
<td>Neighborhood disadvantage</td>
<td>0.075 (0.074)</td>
<td>0.048</td>
<td>0.312</td>
<td>0.078 (0.074)</td>
<td>0.050</td>
<td>0.289</td>
</tr>
<tr>
<td>Parental education</td>
<td>0.017 (0.033)</td>
<td>0.024</td>
<td>0.612</td>
<td>0.007 (0.033)</td>
<td>0.010</td>
<td>0.842</td>
</tr>
<tr>
<td>Commitment to school</td>
<td>0.127 (0.216)</td>
<td>0.028</td>
<td>0.557</td>
<td>0.123 (0.215)</td>
<td>0.027</td>
<td>0.567</td>
</tr>
<tr>
<td>Conventional values</td>
<td>-0.138 (0.240)</td>
<td>-0.028</td>
<td>0.564</td>
<td>-0.164 (0.238)</td>
<td>-0.033</td>
<td>0.491</td>
</tr>
<tr>
<td>Aggression</td>
<td>0.084 (0.195)</td>
<td>0.020</td>
<td>0.668</td>
<td>0.067 (0.195)</td>
<td>0.016</td>
<td>0.732</td>
</tr>
<tr>
<td>Prior delinquency</td>
<td>-0.110 (0.080)</td>
<td>-0.066</td>
<td>0.166</td>
<td>-0.120 (0.080)</td>
<td>-0.072</td>
<td>0.131</td>
</tr>
</tbody>
</table>

*p<0.05
Table 8-7. Mediation analysis of arrest in adulthood

<table>
<thead>
<tr>
<th>Variables</th>
<th>O.R.</th>
<th>p-value</th>
<th>O.R.</th>
<th>p-value</th>
<th>O.R.</th>
<th>p-value</th>
<th>O.R.</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>--</td>
<td>0.075</td>
<td>--</td>
<td>0.666</td>
<td>--</td>
<td>0.921</td>
<td>--</td>
<td>0.140</td>
</tr>
<tr>
<td>Late adolescence group (T2)</td>
<td>3.043</td>
<td>0.011*</td>
<td>3.317</td>
<td>0.004*</td>
<td>3.360</td>
<td>0.004*</td>
<td>3.267</td>
<td>0.005*</td>
</tr>
<tr>
<td>Quick desistance group (T3)</td>
<td>1.657</td>
<td>0.187</td>
<td>1.608</td>
<td>0.208</td>
<td>1.595</td>
<td>0.214</td>
<td>1.723</td>
<td>0.150</td>
</tr>
<tr>
<td>High risk persistence group (T4)</td>
<td>1.271</td>
<td>0.772</td>
<td>1.383</td>
<td>0.690</td>
<td>1.354</td>
<td>0.709</td>
<td>1.276</td>
<td>0.764</td>
</tr>
<tr>
<td>Peer substance use (Wave 13)</td>
<td>3.414</td>
<td>&lt;0.001*</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Annual income (Wave 13)</td>
<td>--</td>
<td>--</td>
<td>0.799</td>
<td>0.030*</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Years of education (Wave 13)</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>0.848</td>
<td>0.048*</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Family problem (Wave 13)</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>1.791</td>
<td>0.001*</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>White</td>
<td>0.418</td>
<td>0.019*</td>
<td>0.543</td>
<td>0.096</td>
<td>0.462</td>
<td>0.034*</td>
<td>0.497</td>
<td>0.056</td>
</tr>
<tr>
<td>Hispanic</td>
<td>0.624</td>
<td>0.158</td>
<td>0.749</td>
<td>0.376</td>
<td>0.633</td>
<td>0.160</td>
<td>0.695</td>
<td>0.265</td>
</tr>
<tr>
<td>Neighborhood disadvantage</td>
<td>1.156</td>
<td>0.277</td>
<td>1.162</td>
<td>0.256</td>
<td>1.179</td>
<td>0.208</td>
<td>1.174</td>
<td>0.228</td>
</tr>
<tr>
<td>Parental education</td>
<td>1.017</td>
<td>0.775</td>
<td>1.052</td>
<td>0.383</td>
<td>1.075</td>
<td>0.239</td>
<td>1.049</td>
<td>0.420</td>
</tr>
<tr>
<td>Commitment to school</td>
<td>0.908</td>
<td>0.800</td>
<td>1.008</td>
<td>0.984</td>
<td>1.052</td>
<td>0.892</td>
<td>0.933</td>
<td>0.853</td>
</tr>
<tr>
<td>Conventional values</td>
<td>0.881</td>
<td>0.759</td>
<td>0.736</td>
<td>0.447</td>
<td>0.770</td>
<td>0.516</td>
<td>0.890</td>
<td>0.771</td>
</tr>
<tr>
<td>Aggression</td>
<td>1.603</td>
<td>0.153</td>
<td>1.639</td>
<td>0.131</td>
<td>1.650</td>
<td>0.137</td>
<td>1.670</td>
<td>0.126</td>
</tr>
<tr>
<td>Prior delinquency</td>
<td>1.017</td>
<td>0.897</td>
<td>1.057</td>
<td>0.659</td>
<td>1.054</td>
<td>0.672</td>
<td>1.084</td>
<td>0.518</td>
</tr>
</tbody>
</table>

P<0.05*
Table 8-8. Mediation analysis of arrest in adulthood—comprehensive model

<table>
<thead>
<tr>
<th>Variables</th>
<th>b (s.e.)</th>
<th>O.R.</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-2.343 (2.122)</td>
<td>--</td>
<td>0.270</td>
</tr>
<tr>
<td>Late adolescence group (T2)</td>
<td>0.961 (0.447)</td>
<td>2.614</td>
<td>0.032*</td>
</tr>
<tr>
<td>Quick desistance group (T3)</td>
<td>0.399 (0.392)</td>
<td>1.490</td>
<td>0.309</td>
</tr>
<tr>
<td>High risk persistence group (T4)</td>
<td>-0.047 (0.846)</td>
<td>0.954</td>
<td>0.956</td>
</tr>
<tr>
<td>Peer substance use (Wave 13)</td>
<td>1.074 (0.293)</td>
<td>2.927</td>
<td>&lt;0.001*</td>
</tr>
<tr>
<td>Annual income (Wave 13)</td>
<td>-0.224 (0.111)</td>
<td>0.799</td>
<td>0.043*</td>
</tr>
<tr>
<td>Years of education (Wave 13)</td>
<td>-0.109 (0.087)</td>
<td>0.897</td>
<td>0.209</td>
</tr>
<tr>
<td>Family problem (Wave 13)</td>
<td>0.397 (0.188)</td>
<td>1.487</td>
<td>0.034*</td>
</tr>
<tr>
<td>White</td>
<td>-0.722 (0.376)</td>
<td>0.486</td>
<td>0.055</td>
</tr>
<tr>
<td>Hispanic</td>
<td>-0.421 (0.347)</td>
<td>0.656</td>
<td>0.225</td>
</tr>
<tr>
<td>Neighborhood disadvantage</td>
<td>0.115 (0.135)</td>
<td>1.122</td>
<td>0.397</td>
</tr>
<tr>
<td>Parental education</td>
<td>0.058 (0.063)</td>
<td>1.060</td>
<td>0.365</td>
</tr>
<tr>
<td>Commitment to school</td>
<td>0.080 (0.396)</td>
<td>1.083</td>
<td>0.838</td>
</tr>
<tr>
<td>Conventional values</td>
<td>-0.224 (0.427)</td>
<td>0.799</td>
<td>0.600</td>
</tr>
<tr>
<td>Aggression</td>
<td>0.412 (0.338)</td>
<td>1.510</td>
<td>0.223</td>
</tr>
<tr>
<td>Prior delinquency</td>
<td>-0.005 (0.133)</td>
<td>0.995</td>
<td>0.972</td>
</tr>
</tbody>
</table>

*p<0.05
Table 8-9. Mediation analysis of arrest with information on self-reported street crimes

<table>
<thead>
<tr>
<th>Variables</th>
<th>b (s.e.)</th>
<th>O.R.</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-2.124 (2.150)</td>
<td>--</td>
<td>0.323</td>
</tr>
<tr>
<td>Late adolescence group (T2)</td>
<td>0.658 (0.464)</td>
<td>1.931</td>
<td>0.157</td>
</tr>
<tr>
<td>Quick desistance group (T3)</td>
<td>0.297 (0.399)</td>
<td>1.346</td>
<td>0.457</td>
</tr>
<tr>
<td>High risk persistence group (T4)</td>
<td>-0.288 (0.872)</td>
<td>0.750</td>
<td>0.741</td>
</tr>
<tr>
<td>Street Crime (Wave 14)</td>
<td>0.238 (0.069)</td>
<td>1.269</td>
<td>0.001*</td>
</tr>
<tr>
<td>Peer substance use (Wave 13)</td>
<td>0.988 (0.284)</td>
<td>2.686</td>
<td>0.001*</td>
</tr>
<tr>
<td>Annual income (Wave 13)</td>
<td>-0.238 (0.112)</td>
<td>0.788</td>
<td>0.034*</td>
</tr>
<tr>
<td>Years of education (Wave 13)</td>
<td>-0.147 (0.090)</td>
<td>0.863</td>
<td>0.102</td>
</tr>
<tr>
<td>Family problem (Wave 13)</td>
<td>0.379 (0.194)</td>
<td>1.461</td>
<td>0.050*</td>
</tr>
<tr>
<td>White</td>
<td>-0.692 (0.382)</td>
<td>0.501</td>
<td>0.070</td>
</tr>
<tr>
<td>Hispanic</td>
<td>-0.542 (0.356)</td>
<td>0.582</td>
<td>0.128</td>
</tr>
<tr>
<td>Neighborhood disadvantage</td>
<td>0.083 (0.138)</td>
<td>1.087</td>
<td>0.549</td>
</tr>
<tr>
<td>Parental education</td>
<td>0.062 (0.064)</td>
<td>1.064</td>
<td>0.330</td>
</tr>
<tr>
<td>Commitment to school</td>
<td>0.111 (0.401)</td>
<td>1.117</td>
<td>0.782</td>
</tr>
<tr>
<td>Conventional values</td>
<td>-0.180 (0.428)</td>
<td>0.835</td>
<td>0.674</td>
</tr>
<tr>
<td>Aggression</td>
<td>0.451 (0.338)</td>
<td>1.570</td>
<td>0.182</td>
</tr>
<tr>
<td>Prior delinquency</td>
<td>0.040 (0.132)</td>
<td>1.041</td>
<td>0.762</td>
</tr>
</tbody>
</table>

*p<0.05
A decade ago, Thornberry and colleagues (2003) concluded their award-winning book by stating that “previous studies of gangs and gang members have not, by and large, placed the study of gang members in a life-course perspective. As a consequence there are a variety of important topics in the study of gangs about which we have inadequate information” (p.181). Since then, a growing body of research has adopted longitudinal designs to obtain a better understanding of gang “life” in a developmental sense. Krohn and Thornberry (2008) later identified six critical issues that need to be addressed when examining gang membership in a longitudinal sense: the identification of risk factors, separating facilitation and selection effects, tracing the duration of gang membership, separating causes and consequences, establishing short- and long-term consequences of gang membership, and developmental differences in gang membership.

It is undeniable that significant progress has been made. We now understand that risk factors of gang membership come from multiple life domains and that it is the accumulation of risk that strongly relates to the chances of becoming a gang member; we now understand that empirical evidence suggests a minor selection effect, a major facilitation effect and no evidence of a pure selection model of gang effects; we now understand that there exists considerable variability in the duration of gang membership, although the majority of youth stay in a gang for a relatively short period of time; we now understand that reciprocal relationships exist between gang affiliation and family and peer variables, and we now understand that negative consequences associated with gang affiliation extend beyond periods of active gang participation and
across both criminal and non-criminal life domains (Decker et al., 2013; Thornberry & Krohn, 2008).

However, to date, we still know little about developmental differences or heterogeneity in gang membership. For instance, we do not yet know what contributes to the varying age of onset, timing and duration of gang membership, and how variation in such gang career domains influence later life outcomes. Against this background, this dissertation adopted a semi-parametric group-based approach to characterize heterogeneity in development of gang membership over the life-course. Based on that, risk factors, turning points and consequences of following distinct developmental pathways of gang membership were examined.

**Summary of Findings**

**Developmental Trajectories of Gang Membership**

Estimating developmental trajectories of gang membership was the first aim of this dissertation. Analyzing data from the male subsample of the RYDS, a four-class trajectory group model is found as the best fitting model, which is defined by one group following a zero-order trajectory and three groups following a quadratic trajectory. Results from chi-square tests of independence and one-way ANOVAs (with corresponding Tukey tests) in Chapter 6 indicated that the four-class model provides an accurate representation of gang affiliation across the life course between the ages of 13.5 and 22.5. A majority of male subjects (71.4%) have very low probabilities of being part of a street gang during their adolescent and early adult years. Individuals following the “very low” trajectory are unlikely to have participated in a gang, although some occasional gang members are assigned to this group. The “quick desistance” group (15.8%) is characterized by individuals who affiliate early with a gang. A majority of
them, however, leave the gang rather quickly. Less than 30% of individuals following this trajectory stay in the gang for both early adolescence and late adolescence/adulthood, and less than half of them have ever self-reported core membership. On the other hand, individuals following the “late adolescence” trajectory (10.5%) initiate membership mainly during late adolescent years, but, on average, stay in a gang for longer periods of time compared to individuals in the “quick desistance” group. Although not as involved as high risk persisters in a gang, late adolescence joiners are also more likely than quick desisters to assume core membership. Finally, 2.2% of the respondents follow the “high risk persistence” trajectory. Individuals in this group join the gang early and stay in the gang for an extensive period of time. In effect, all of them stay in a gang during early adolescence to late adolescence/adulthood. High-risk persistent gang members are also very likely to be core members of a street gang. Overall, there is strong evidence of within-individual change in probabilities of gang involvement for the three active gang membership trajectory groups. There is also some evidence of between-individual change in probabilities of gang affiliation.

**Risk Factors Predicting Gang Membership Trajectories**

The second research aim was to identify risk factors associated with distinct gang membership trajectories. Prior research has suggested that diverse paths to gang affiliation are likely and that looking for a single cause might not be helpful. Informed by Thornberry and Krohn’s (2001; 2005) interactional theory of delinquency, bivariate logistic regression results indicated that early initiation of gang involvement represented by the “high risk persistence” and “quick desistance” groups are associated with unfavorable position in the social structure, ineffective parenting and delinquent peer associations. Prior delinquent beliefs and acts also increase the likelihood of early
initiation. However, an early initiation of gang membership does not necessarily lead to a prolonged period of time in the gang. We observed that a significant proportion of early starters leave the gang fairly quickly assuming that their parents re-adjust parenting styles and scrutinize adolescents’ peer networks. On the other hand, individuals who join a gang during late adolescence tend to have deficits in human capital (e.g. depression). Prior to late adolescence/early adulthood, they are buffered from negative effects of such deficits by a supportive environment. Once they leave these constraining environments, deficits in human capital hinder their transition to adulthood, and corresponding life difficulties increase the attraction of deviant friends and eventually street gangs. In addition, prior delinquent acts also increase the likelihood of late adolescence gang participation.

**Turning Points within Gang Membership Trajectories**

The third research aim was to move beyond static risk factors and take into account the influence of key life events that occur during the measurement period of the pathways. Specifically, we investigated how a) the birth of a first child and b) police contact/arrest redirect the identified gang membership trajectories as exogenous variables. This is an important but rarely examined issue, although gang membership status itself has been examined as a “turning point” for criminal behavior and other life trajectories. Through generalized trajectory group models that include time-varying covariates beyond age, we found that the impacts of life turning points vary across trajectory groups. Early parenthood (≤19 years of age) significantly redirects two developmental pathways of gang affiliation. For late adolescence gang joiners, gang participation is precipitated by having a first child by age 19, whereas for high risk persistent members, the birth of a first child by age 19 is associated with a decreasing
probability of gang affiliation over time. “Age appropriate” parenthood (>19 years of age), however, is not protecting individuals from gang membership as expected. With regard to police contact/arrest, consistent with prior research, deterrent effects are not observed for across any of the four identified gang membership trajectories. In effect, labeling effects seem to manifest among individuals following the “very low” and “quick desistance” trajectory groups.

The Enduring Consequences of Possessing a “Gang Career”

The final research aim was to examine long-term consequences of following distinct gang membership trajectories and associated mediating mechanisms. By combining all gang members into one general category, the impacts of developmental heterogeneity on later life outcomes are underestimated. Specifically, individuals’ probabilities of membership in each of the trajectory groups are linked to adulthood street crimes and arrest through regression-based approaches, and possible mediation effects are explored through Baron and Kenny’s (1986) four step procedures.

Results from ordinary least squares regressions indicate that when compared to individuals following the “very low” trajectory, individuals in the “late adolescence” and “high risk persistence” group are more likely to commit street crimes during adulthood. Standardized coefficient estimates suggest that membership in the “late adolescence” group is even more problematic than membership in the “high risk persistence” group. On the other hand, individuals following the “quick desistance” trajectory are not more likely than individuals in the “very low” group to commit street crimes in adulthood. Mediation analyses indicate that adulthood street crimes are only mediated through associating with delinquent peers.
Logistic regression results show that when compared to individuals in the “very low” group, individuals following the “late adolescence” trajectory are more likely to get arrested in adulthood. For them, the odds of being arrested at Wave 13/14 are 3.6 times as large as the odds for gang avoiders. However, individuals following the “high risk persistence” and “quick desistance” trajectory are not more likely than gang avoiders to get arrested. Mediation analyses further suggest that contact with the criminal justice is mediated by both adult role/status fulfillment failure and peer substance use.

**Theoretical and Policy Implications**

The findings reported here have a number of implications for the study of street gang membership in a life-course perspective. In particular, heterogeneity in gang membership over the life-course is explicitly addressed in the current investigation. In this section, we begin with a discussion of the implications for the theoretical perspective we have adopted and then move to a discussion of several policy issues stemming from our findings.

**Theoretical Implications**

Until recently, gang membership has largely been treated as a dichotomy (but see exception in Pyrooz et al., 2013). Pyrooz (2013) insightfully suggested why a dichotomy of “gang member” versus “not a gang member” is attractive for researchers as well as practitioners. For researchers, the single question, whether you are a gang member or not, is straightforward. By allowing the respondent to self-identify as a gang member, we avoid the definitional debate surrounding gangs and gang membership. For practitioners, the dichotomy is a neat classification schema that “avoids complications in defining and sanctioning those at the different social positions of influence in the gang (e.g. at the fringe or the core)” (p.431). Moreover, there is support
for the reliability and validity of this classification scheme: similar groups of gang members are identified from self-reported and official data and a range of attitudinal and behavioral changes are associated with gang membership in a theoretically expected way (Curry, 2000; Esbensen et al., 2001). Indeed, the use of self-nomination and a dichotomy of “gang member” vs. “non-gang member” have advanced the gang literature forward in important and significant ways.

However, simply because the dichotomy is convenient and, to some extent, “works” does not justify it as the only or best way to comprehend gang membership. The history of gang research has portrayed a more complex picture than that (e.g. Hughes, 2013; McGloin, 2007; Thrasher, 1927; Sanchez-Jankowski, 1991; Yablonsky, 1962). Viewing gang membership as homogenous and static ignores the reality that “there is dynamic heterogeneity between and within individuals in their levels of immersion in and around gangs” (Pyrooz, 2013, p.432). Life course theories of offending thus have guided our research on developmental heterogeneity among gang members. In the meantime, results from the study also contribute to the broader literature on developmental patterns of offending among individuals.

The life-course conceptual framework implies that the origins of gang membership are likely to be multidimensional and contingent on when gang participation occurs in a person’s life (or age-graded). The causes of membership are unlikely to be set early in the life course on the basis of some underlying traits that are stable across time and heterogeneously distributed in the population. Specifically, the results confirmed Thornberry and Krohn’s interactional theory of delinquency (2001; 2005) in that early adolescent gang participation is explained by the combination of
an unfavorable position in the social structure, ineffective parenting and delinquent peer associations. Risk factor analyses also confirm that individuals who initiate gang membership during mid to late adolescence are unlikely to have been exposed to extreme and interwoven causal forces of gang affiliation early in life. These late joiners are likely to be drawn from a relatively advantageous structural position and have prosocial bonds to offset the consequences of exposure to any major risk factors that do exist. However, consistent with interactional theory of delinquency, late joiners are found with reduced human capital and are less successful in building social capital than other adolescents. Once they enter emerging adulthood and attempt to establish autonomy, deficits in human capital become a serious disadvantage for them to acquire meaningful employment and establish a quality relationship with a partner, which, in turn, increases the attraction of deviant friends.

Although interactional theory of delinquency does not specify the existence of a “quick desistance” group, Thornberry and Krohn (2005) viewed “the relationship between early onset and later persistence as moderate, at best” (p.185). While there is a clear association between early onset and length of criminal careers, to a substantial degree, these two dimensions of antisocial careers are also independent. Unlike developmental perspectives that conceive “age of onset” as a determining factor and emphasize the nonrandomness of changes in individuals’ offending during the life cycle, Thornberry and Krohn (2005) contended that “among earlier starters some offenders will persist, but many others will desist, a hypothesis that is consistent with Robin’s original observation” (p.185). Thornberry and Krohn (2005) further argued that when the causal factors that give rise to initial offending are not intensely coupled and reaching
an extraordinary level, protection may emerge and enable early onset offenders the opportunity to change the course of their lives. As was observed in Chapter 6, parents of early “desisters” eventually realize the inadequacies of prior parenting practices, and begin to increase their level of supervision and scrutinize adolescents’ peer networks.

Moreover, it is worth mentioning that some results from Chapter 6 are less consistent with conclusions drawn from previous studies and warrant further investigation. For example, Krohn and Thornberry (2008) mentioned affective bonds with parents as one of the several variables that are often proposed as risk factors for gang membership but enjoy little, if any, empirical support. In Montreal, Rochester and Seattle, parental attachment is not significantly related to gang membership (Hill et al., 1999; LeBlanc & Lanctot, 1998; Thornberry et al., 2003). However, once we take into account developmental heterogeneity in gang membership in the current investigation, parental attachment is one of the most important risk factors—not only differentiating “gang members” from “non-gang members” but also distinguishing sub-categories of street gang members. Self-esteem is another measure that differentiates sub-types of gang members from gang avoiders once developmental differences in gang membership are accounted for.

Additionally, prior research indicates that the impact of individual risk factors seems rather modest and none exert large impacts on the likelihood of being a gang member (Krohn & Thornberry, 2008). For example, both Hill et al. (1999) and Thornberry et al. (2003) found that the strongest predictors of gang membership often have odds ratios between 3 and 4 for youth with those characteristics. However, when developmental heterogeneity is taken into account, bivariate odds ratios between risk
factors and following a particular gang membership trajectory versus a reference group can be as high as 35 (i.e. peer delinquency when comparing high risk persisters with gang avoiders; see Table 6-11). To some extent, the large increase in magnitude of odds ratio is not surprising given that the highest-risk gang members are now being compared with the least-risk members. On the other hand, the initial level of peer delinquency is not differentiating late joiners from gang avoiders. Thus, by combining all gang members into one general category, the impacts of particular risk factors are either underestimated or overestimated depending on which pair of comparisons we refer to.

Sampson and Laub’s age-graded theory of crime (1993; Laub & Sampson, 2003) has guided our discussion on turning points within gang membership trajectories. According to Sampson and Laub, desistance is a process rather than an event, and it must be continually renewed. Sampson and Laub conceptualize life turning events as part of a gradual process rather than a discrete change that takes place at particular point in time. Fortunately, Nagin’s (2005) semi-parametric group-based model adopts the same approach when modeling the influence of time-varying covariates that occur during the measurement period of the trajectory. “The event may cause a deviation from the long-term average behavior of most group members, but the deviation is not so large that the average trajectory for the group bears no resemblance to the new trajectory of individuals affected by the event” (p.121). By focusing on within-group variation, the statistical estimate of the turning point’s impact is limited to individuals with similar developmental histories. To some extent, it addresses a potential objection that turning points are a result of selection bias (Sampson & Laub, 2005).
Prior research suggests that the birth of a first child is a potential life turning event within one’s offending trajectory and that the timing of having that first child is important. Early parenthood is often considered an “off-time” transition that disrupts other important pathways to adulthood and restricts life opportunities in many aspects, whereas having a first child “on time” in a normative sense signifies being “serious” about becoming an adult (Moloney et al., 2009; Pogarsky et al., 2006; Sigle-Rushton, 2005). Findings from Chapter 7 further qualify the role of having a first child as a life turning point for street gang members. First, “age appropriate” parenthood does not protect individuals from gang affiliation no matter which trajectory group they follow. Given previous findings on parenthood and general offending, this no-effect of “age appropriate” parenthood on gang affiliation requires further explanation. There are two possible explanations: 1) as Figure 4-1 shows, probabilities of gang affiliation for active trajectories are all declining after the age of 18. It could be difficult to observe significant protective effects of “age appropriate” parenthood given this general trend of gang departure; 2) older gang members tend to identify more with the gang. Decker and Curry (2000) contended that gang affiliation is a “master status” for older teenagers and individuals in their 20s. Although parenthood introduces a hook for change, older gang members are deeply embedded in delinquent networks and life styles, and they refuse or simply cannot seize the opportunity for change.

Second, the impact of early parenthood on gang affiliation varies by gang membership trajectories. Although early parenthood is generally harmful in disrupting a smooth transition to adulthood, it still imposes protection on those especially high-risk individuals given their early involvement in a gang. When the first child was born, to
some extent, those members must secure a balance between family and gang activities. As was suggested by Decker and Van Winkle (1996), if forced to choose, the vast majority of gang members would choose their family over their gang. On the other hand, early parenthood increases the probabilities of gang membership for late adolescence joiners. Consistent with our earlier discussion of late onset members, early parenthood breaks pre-existing protective bonds and further disrupts the formation of needed human and social capital for a smooth transition to adulthood. The resulting psychological and financial stress and life dissatisfaction propel them to seek help from deviant friends and street gangs. Accordingly, findings reported here are consistent with how we have theoretically defined “turning points”, which is to break connections to already established environments.

The findings on police contact/arrest as a life turning event within one’s gang career again demonstrates the significance of accounting for developmental heterogeneity among gang members. Although deterrence effects are not observed for any of the gang membership trajectories, potential “backfire” effects manifest among relatively low-risk members. Prior research has suggested that street gangs have an oppositional culture. Suppression of the gang from conventional authority reinforces its cohesiveness and its dependence upon itself (Klein & Maxson, 2006). Gang members view themselves as the unfair targets of racism, inequality and oppression. They express less guilt and mobilize more techniques of neutralization for criminal offending than other youth did (Esbensen & Deschenes, 1998; Esbensen & Huizinga, 1993). In particular, for relatively low-risk members, even if they attempt to isolate themselves from the gang, surrounding environments including the police tend to treat them as if
they were active and regular members. To a substantial extent, police contact/arrest sustains and reinforces relatively low-risk members’ status as a gang member. Thus, “backfire” effects of police contact/arrest are more likely to be discerned among relatively low risk members due to potentially greater marginal effects. Consistent with Sherman’s (1993) argument that the effect of a sanction depends on a variety of factors, understanding how developmental differences may influence a gang member’s interpretation of the sanction and his/her emotional reaction is meaningful.

The life-course perspective further hints that the age of onset, duration and timing of gang participation may impact life outcomes in adulthood. The general offending literature has linked earlier initiation of antisocial behavior to a prolonged criminal career that is characterized by adversity. Previous studies indicate that an early onset of antisocial behavior is likely to be a result of extreme and interwoven deficits in multiple life domains (e.g. Moffitt, 1993; Patterson et al., 1992; Thornberry & Krohn, 2005). Importantly, there is stability in the causal deficits across the life span (Wright et al., 2008). For example, families experiencing extreme levels of poverty and neighborhood disadvantage often cannot escape from that adversity, and the development of children raised under such circumstance is constantly compromised. Partly because of the constancy of the social environment in which these families often find themselves, there is continuity in ineffective parenting practice. Criminal associates and opportunities are also more densely gathered at particular places than at others. In the meantime, all antisocial conduct generates negative consequences that set up a temporal contagion process. For instance, when children display high rates of misbehavior, they are likely to experience coercion from caregivers, to be excluded by
conventional peers and thus affiliate with one another, to stir the ire of teachers, to be labeled as deviant, and to fail in school. As these youth age, they are not prepared to meet the developmental challenges of adult years. They fail to complete developmental tasks or make life transitions out of order and off time. Eventually participation in criminal behavior as a young adult lands them in jail, prison or the morgue. Given the interlocking nature of life pathways, “many antisocial youths become enmeshed in the sticky web of consequences generated from their conduct. This is called cumulative continuity” (Wright et al., 2008, p.40).

Moreover, the timing of involvement could also be important when understanding the enduring consequences of delinquency. As discussed earlier, the causes of delinquency vary systematically with stages of the life course, and late onset offenders could possess unique characteristics that lead to adverse life outcomes. For example, Thornberry and Krohn (2005) proposed a U-shaped distribution between age of onset and the level of continuity in offending. According to them, late bloomers continue offending because their deficits in human capital increase the difficulty of making a successful transition to adult roles. A reciprocal relationship between continuing economic and relationship problems and offending is likely to extend well into the adult years for the late bloomers.

Prior research, however, has not specifically linked the aforementioned features of a criminal career to street gang members and explored how such features impact their later life outcomes. In effect, gang members are not just general offenders; they are influenced by micro-level features like gang structure/organization, cohesiveness or culture (e.g. Decker & Van Winkle, 1996; Klein & Maxson, 2006; Vigil, 1988). Findings
from Chapter 8 demonstrate that gang members with distinct features of a gang career indeed bear different life outcomes. In contrast with what developmental theorists would otherwise argue, early onset is not deterministic in understanding life outcomes of gang members. A significant portion of early joiners leave the gang rather quickly and their adulthood outcomes are not very different from low-risk avoiders. The timing of gang affiliation appears more important than early onset when exploring gang effects across the life course. Late adolescence joiners commit more street crimes and are more likely to get arrested in adulthood than low-risk avoiders. Although previous research has found the duration of gang involvement important in understanding the enduring consequences of gang membership (e.g. Krohn et al., 2011; Thornberry et al., 2003), the current study broadens our understanding of its impact. That is, a long tenure in the gang may not directly lead to criminal offending later in life because of a role transition. Specifically, the length of time in a gang combining with age is a major criterion that differentiates gang leaders from other members. These elite members assume a role of organizing and directing their gangs. They are supposed to be thinkers, and sit back, put out a plan and give orders (Decker et al., 2008). Accordingly, high risk persistent members are no longer “frontline warriors” but assume more authoritative roles. When this transition takes place, general offending outcomes are somehow attenuated (Venkatesh, 2008). However, they are still likely to deliver drugs for street sales and procure income (Decker et al., 1998).

Policy Implications

Based on our research findings and conceptual implications for the study of street gang membership, several policy issues merit detailed consideration. First and foremost, gang prevention and intervention should move beyond a dichotomy of “gang
member” versus “non-gang member” and recognize the existence of developmental differences in gang membership. The logic for gang prevention and intervention is straightforward: stopping youth from joining gangs and reducing delinquent behaviors of gang members (Pyrooz, 2013; Thornberry et al., 2003). Prior gang control efforts, however, are not very successful in achieving the goals (either no statistically significant effects or with small effect sizes). One of the most important reasons is that previous programs do not target those most at risk of gang involvement at different periods of development (Klein & Maxson, 2006; Papachristos, 2013). In reality, appropriate targeting at individual levels of gang risk is challenging for both researchers and practitioners. In addition, making distinctions at a single time point often cannot fully capture heterogeneity among gang members. There is the attraction of universal gang prevention and intervention programs that avoid the issue of target selection entirely. However, as was suggested by Maxson (2013), more intensive and targeted strategies might be feasible and more cost-effective because of their potential for larger effect sizes.

Although replication studies are needed, findings from the current study provide preliminary support for Maxson (2013). There is evidence that distinct developmental pathways of gang membership exist. The four-class trajectory group model is unlikely to be a statistical artifact: different sets of risk factors are linked to distinct developmental patterns of gang affiliation in a theoretically expected way. The impact of life turning events and the enduring consequences of gang participation also vary across distinct gang membership trajectories. Accordingly, not differentiating sub-categories of gang members in a developmental sense limits our capability to identify subjects for
appropriate programming. Consistent with Hennigan, Maxson, Sloane, Kolnick and Vindel (2014), an understanding of developmental heterogeneity among gang members will aid in the shift from primary prevention (i.e. activity programs open to all) to secondary intervention (i.e. focusing highly structured interventions on youth identified as the ones most likely to join a gang). As was argued by Thornberry et al. (2003) and Klein and Maxson (2006), findings from basic research like this is not to customize gang programs but to allow practitioners to steer participants toward the most appropriate programs (client selection) that have demonstrated effectiveness in reducing delinquency and promoting social competencies.

A second and related policy implication is that identifying gang-specific risk factors is crucial for the development of gang control programs. There have been debates on whether identifying gang-specific risk factors is necessary for gang prevention and intervention. Esbensen, Peterson, Taylor and Freng (2009), for instance, found little evidence to suggest that the correlates of gang membership differ from the correlates of violent offending. The odds ratios of risk factors predicting gang membership and violent offending are also similar\(^1\). Howell (2012) contended that “general delinquency, violence, and gang involvement share a common set of risk factors” (p.123). On the other hand, Klein and Maxson (2006) argued that while gang members commit a lot of crimes, and some very serious crimes, not all serious and violent offenders belong to street gangs. “Gang programs should be modeled from solid

\(^1\) Esbensen and colleagues (2009) identified two significant differences: low feelings of guilt (2.22 vs. 1.41) and high commitment to negative peers (2.32 vs. 1.38) are more strongly related to gang membership than to violent offending.
research on the specific factors that predict gang membership and not the conventional wisdom of generic applicability of findings from analyses of crime patterns” (p.140).

To some extent, findings from the current study define a new dimension of “gang-specific risk factors”, thus provide support for Klein and Maxson’s argument. Rather than just predicting membership as a whole from non-gang membership, gang-specific risk factors should be associated with an increased likelihood of following a particular developmental pathway compared with a reference category. As discussed above, once developmental differences in gang membership are taken into account, the impacts of particular risk factors are substantially enhanced. Specifically, prevention and intervention efforts should place emphasis on delinquent peer networks and their socializing influences because the odds ratios for peer variables are no longer between 3 and 4 but often in double digits. This is consistent with our earlier argument that gang members are not just general offenders but under influence of micro-level group processes. Favorable attitudes about breaking the law and parental consistency of discipline also impose great impact on the differentiation of sub-categories of gang members. Moreover, we find evidence that parental attachment is an important gang-specific risk factor, although previous studies fail to identify it as a risk factor for overall gang membership. While comprehensive and multifaceted programs that target multiple deficits in the individual’s development are necessary and important, special gang reduction efforts may be put on those characteristics that have sizable effects of distinguishing sub-types of street gang members, especially the highest-risk gang members.
Third, relatively early prevention and intervention programs should be given priority. Using a nationally representative sample, Pyrooz (2014b) demonstrated that the modal age of onset of gang participation is 13 and the modal age of gang membership is 15. Thornberry and colleagues (2003) found that gang membership in Rochester was most common between grades 8 and 10. Thus, “waiting beyond this window to prevent youths from joining gangs may well be too late” (p.199). Results from Chapter 7 also imply that gang reduction efforts are unlikely to be successful once gang members reach adulthood. Previous literature suggests that as adolescents age, their involvement in crime and gangs increases. Older members tend to identify more with the gang and obtain a “master status” of being a gang member (Decker & Curry, 2000). Although life turning events introduce hooks for change, mature members are embedded in delinquent networks and life styles, and thus refuse or simply cannot seize the opportunity for change. The same logic applies to any gang prevention and intervention efforts. Moreover, results from Chapter 8 indicate that despite an early onset, if gang involvement is terminated before the transition into adulthood, negative consequences are minimized (i.e. individuals who belong to the “quick desistance” trajectory group). With regard to high-risk persistent members, “delayed interventions will have to deal with not only gang membership but also a host of interlocking deficits generated, at least in part, by gang membership” (Thornberry et al., 2003, p.199). In other words, early programs have less to overcome and therefore are more likely to achieve the goals of reducing gang membership and associated delinquency.

In the meantime, early intervention efforts should not be too aggressive. The current study notes that the vast majority of early gang joiners leave the gang fairly
quickly and their long-term consequences of gang affiliation are not that dire. However, for example, many schools now have enacted “zero tolerance” policies in response to gang presence and other security risks (Arciaga, Sakamoto, & Jones, 2010). Youths in violation of these policies are typically expelled from school. Although gang-affiliated kids clearly pose a problem for school officials and have to be managed accordingly, zero-tolerance policies may have gone too far, penalizing students for relatively minor infractions and thus barring them the opportunity to gain an education, which is fundamental to other life chances. For instance, although gang signs and dress patterns should not be tolerated in school settings, there is a wide variety of responses to these items besides suspensions or expulsion. An overall “conservative” early intervention strategy may be desirable.

Fourth, a call for early prevention and intervention does not mean that late onset gang members are to be ignored. The current investigation indicates that membership in the “late adolescence” trajectory is even more problematic than membership in the “high risk persistence” group when exploring the long-term consequences of gang affiliation; late joiners are likely to commit serious and violent crimes and get arrested in adulthood. The results also suggest that these late joiners are likely to have reduced human capital (i.e. depression) accompanying with a history of problem behaviors. If the findings are replicated in future research, extra efforts should be put to improve at-risk adolescents’ life skills and knowledge as well as address their potential counseling needs for mental health and delinquency issues. Wright et al. (2008), for instance, mentioned that adolescents are usually forced to rely on their parents to receive counseling services. This means that they have to get parents’ permission to receive
these services and face parents’ inquiries regarding potentially embarrassing information. This arraignment makes it very difficult for adolescents to get the help they need. Barriers to obtain services should be removed.

A fifth policy caveat is that deterrence-based gang intervention strategies are unlikely to be successful. Findings from Chapter 7 demonstrate that police arrest/contact has not achieved the desired deterrence effects. In effect, backfire effects manifest among individuals following the relatively low risk gang membership trajectories. Two major reasons may account for the ineffectiveness of the well-intentioned strategies: 1) the often spontaneous and chaotic nature of gang crimes, in particular retaliatory violence, contradicts an image of gang members who respond “rationally” to suppression efforts. Gang members are unlikely to weigh the consequences of gang activity, redress the balance between cost and benefit, and withdraw from street gangs. As was suggested by Klein (1995), deterrence-based gang intervention, to a substantial degree, merely reflects what the suppressors already know how to do. “Success is not in the effect but in the doing” (p.161-162); 2) deterrence-based gang intervention strategies often overlook the group nature of street gangs. There is barely any “calculus of the gang members’ perceptions, values, and entrapment in the social psychology of group process” (Klein, 1995, p.160). However, group processes will disturb the intended message and even reverse the effect. Prior research properly points out that gangs have oppositional cultures and thus represent “an institutionalized rejection of the values of adult authority—especially as exhibited in the Anglo-dominated schools and the police department” (Moore & Vigil, 1989, p.31). Each rejection of the gang and each threat of punishment function as incentives to gang
cohesiveness. The gang settings repudiate the legitimacy of rejecters or punishers, deny the wrongfulness of many offenses and encourage the bravado that accompanies antisocial deeds and utterances. As a result, “the operation of deterrence is greatly complicated when group pressures may not only inhibit the expression of the fear of sanctions but also in some instances covert stigmata into status symbols” (Klein, 1995, p.186). As many scholars have repeatedly asserted, higher priority should be given to efforts at prevention and treatment (Howell, 2000; 2003; 2012; Klein, 1995; 2011; Klein & Maxson, 2006).

Last but not least, our findings suggest that future gang treatment efforts should pay special attention to gang members’ persisting ties to delinquent associates. Recent longitudinal studies have emphasized the causal mechanism of adult role/status fulfillment failure between adolescent gang affiliation and adult offending (e.g. Krohn et al., 2011; Thornberry et al., 2003). The current investigation, however, finds that ex-gang-members’ self-reported street crimes in adulthood are only mediated by connections with delinquent peers, although contact with the criminal justice system is influenced by additional factors (i.e. economic status and family problems) other than criminal offending itself. Decker and Lauritsen (2002) argued that declaring oneself a “former” gang member is not functionally the same thing as having no contacts with former gang associates (see also Pyrooz et al., 2014). Although in the current study we cannot directly assess whether delinquent associates in adulthood were former gang friends, ex-gang members are likely to maintain resources within delinquent peer networks, especially for alcohol- and drug-related purposes (Moore, 1991). Thus, treatment programs that are aimed at reducing the negative impact of gang membership
should not only provide services that help former gang members with their re-adjustment of adult lives (e.g. education, employment or family relations), but also combat continuing delinquent peer influence.

**Limitations and Future Research**

Despite best efforts to address important theoretical and policy-relevant questions regarding gang membership in the life course, this dissertation is certainly not without limitations. In this final section, we discuss several important limitations worthy of note and lay out an agenda for future research.

First, while it was argued that the RYDS data set is among the best available to address the main research questions of the current investigation, two points are still worth noting: 1) the findings of this study were derived from a high-risk, predominantly African American sample in Rochester, New York, a new or “emergent” gang city. Unlike traditional gang cities in which street gangs have existed for many decades, gangs emerged in Rochester in the mid 1980s (Thornberry et al., 2003). Prior research suggests that the gang composition, structure, activities and residents’ reactions to gangs differ in emergent versus traditional cities (e.g. Curry, 2000; Klein, 1996; Howell, 2012). It is not yet clear to what extent the findings reported in this dissertation are influenced by context and whether they are replicable in other cities, especially traditional gang cities such as Los Angeles or Chicago; 2) we used a male-only sample. Although previous studies have identified similarities in risk factors and delinquency facilitating effects between male and female gang members, important differences still exist (Miller, 2001; Moore, 1991; Thornberry et al., 2003). For instance, in Rochester, New York, gang membership is more tightly clustered at younger ages for the girls than for the boys and female gang members are less likely to have a prolonged gang career.
In effect, we identified fewer developmental trajectories of gang membership than Pyrooz (2014b) did with a nationally representative sample (NLSY97). It is largely unknown if such differences are due to Pyrooz’s larger sample size of gang members (both genders), a younger age as the starting point of membership or truly reflecting distinct developmental pathways of gang affiliation in other contexts not like Rochester, New York.

Second, although Nagin’s (2005) semi-parametric, group-based modeling technique moves beyond past methodology to summarize individual differences in the developmental progression of gang membership in the form of distinct trajectories and include time-varying covariates beyond age to provide statistical expression to the life-course concept of turning points, this technique is not flawless. Bushway, Sweeten and Nieuwbeerta (2009) found that group-based trajectory models tend to flatten out curves and deemphasize change. In particular, group-based trajectory models “do a poor job of capturing the trajectories of individuals who offend late in the life-course. The method uses the average trend to compensate for instability in the individual trajectories” (Bushway et al., 2009, p.280-281). In our case, adult onset gang members (N=17) have been pushed into either the “late-adolescence” trajectory or the “very-low” trajectory. How this might influence our conclusions on risk factors, turning points and long-term consequences of gang affiliation is unknown and worthy of future investigation. Another issue is the small sample size (N=13 or 2.2%) for the “high-risk persistence” group. A lack of statistical power could have partly explained why few variables are identified as confounders that influence both the occurrence of life turning events and later gang
involvement in Chapter 7 and why late adolescence joiners appear to experience more severe negative life outcomes than high-risk persistent members in Chapter 8.

Third, it is important to recognize that developmental pathways of self-reported gang affiliation are not necessarily reflecting changing levels of gang commitment. Pyrooz and colleagues (Pyrooz et al., 2013; Sweeten et al., 2013) have introduced a new concept, gang embeddedness, to capture individual immersion in street gangs, “reflecting varying degrees of involvement, identification, and status among gang members—the adhesion of the gang member to the gang” (Pyrooz et al., 2013, p.243). According to Pyrooz and colleagues, self-identification as a gang member is a manifestation of the latent trait of gang embeddedness. A future gang member may increase his/her level of embeddedness in a gang prior to joining; likewise, a former gang member is likely to have residual or non-zero levels of gang embeddedness after leaving. As was stated by Sweeten et al. (2013), “identification as a gang member would occur at some point when gang embeddedness is fairly low but increasing, and at some point when gang embeddedness is declining individuals would stop identifying as gang members” (p.25).

Following this line of argument, Pyrooz (2013) further contended that nothing is inherently criminal about gang membership. “The social mechanisms linked to group processes, not simply gang status, are responsible for heightened levels of violence and criminal activity within gangs” (p.433). In effect, Pyrooz used the concept of gang embeddedness to explain an “inconvenient” truth associated with the revised Gang

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2 Pyrooz et al. (2013) constructed the gang embeddedness scale using a mixed-graded response model based on five items: frequency of contact with the gang, position in the gang, importance of the gang, the balance of non-gang to gang peers, and frequency of gang-involved assaults.
Resistance Education and Training (G.R.E.A.T) program. That is, G.R.E.A.T leads to a reduction in the odds of self-reported gang affiliation but not corresponding differences in criminal offending. According to Pyrooz, gang prevention and intervention programs should worry less about status and more about mechanisms. Accordingly, future studies should make efforts to collect data on gang embeddedness and, in a broader sense, gang organizational and socialization characteristics (Decker et al., 2008). In addition, researchers may build on the construct of embeddedness by exploring the social network characteristics of the gang (Krohn, 1986). It is imperative to investigate developmental patterns of gang embeddedness and see how such patterns might differ from self-reported gang affiliation trajectories (Dong, Gibson, & Krohn, 2015).

Fourth, although risk factor analyses are descriptively informative when exploring new research frontiers, they are also theoretically limited. For instance, risk factors are often identified from bivariate analyses, “providing a somewhat atomized view of gang members that is focused on individual variables” (Thornberry et al., 2003, p.77). A risk factor approach cannot determine which factors are true causes and which are merely markers or correlated with causes. It also fails to establish the causal processes that intervene between risk factors and outcomes, and to bridge the gap between risk factor research and more complex criminological theories (Farrington, 2000). Decker et al. (2013) suggested that the gang risk factor literature needs to clarify independent, additive, interactive (or non-linear), and sequential effects of risk factors and promote advances in gang theories. Ideally, prevention and intervention efforts should be targeted on causes rather than correlates of gang participation. However, risk factor analyses and other analytic strategies which are descriptive in nature (e.g. wave-by-
wave comparisons of developmental variables across trajectory groups in Chapter 6) cannot differentiate causes from correlates. As was suggested by Farrington (2000), future research should adopt more rigorous research designs, including intervention experiments and quasi-experimental, within-individual analyses, to understand what are the most influential predictive factors (in terms of both level of risk and strength of effect) for different types of gang members.

Fifth, the current investigation is among the first studies that add life turning events as time-varying covariates to gang membership trajectories. Although important findings are generated in the study, this is only the initial step to explore the life-course notion of turning points in gang careers. For example, Laub and Sampson (2003) depicted possible mediating mechanisms through which the birth of a first child or police contact/arrest may function as turning points that redirect one’s gang career. The current study, however, could not directly test those mediating mechanisms. The observed differential effects of life turning events across trajectory groups are accounted for largely by theoretical speculations. Unfortunately, we are not aware of any studies that have examined mediating mechanisms once time-varying covariates are added to developmental trajectories. This could be an area where theoretical inquiries further push forward methodological advances. In the meantime, it is worth reiterating that group-based trajectory framework is not immune to the hazard of inferring causality from non-experiment data (Nagin, 2005). Due to the problem of endogeneity, true causality is not established even though we have used terms like “impact” or “effect on” to describe the relationship between life turning events and gang membership trajectories. How propensity score methods for longitudinal designs such
as the inverse probability of treatment weighting (IPTW) may be integrated with group-based trajectory modeling for causal inferences is another important area to explore\(^3\).

Sixth, the current study moves beyond prior research through examining how distinct developmental patterns of gang affiliation (rather than an overall category of gang members) negatively impact later life outcomes. Individuals' probabilities of membership in each of the trajectory groups are linked to adulthood outcomes and possible mediation effects are tested. Although meaningful findings are noted, future research may expand the current work in two ways: 1) to investigate causal pathways between adolescent gang participation and negative consequences in adulthood, we used Baron and Kenny's (1986) causal step method to establish a single-mediator model (MacKinnon et al., 2007). However, as Krohn et al. (2011) demonstrated, there are cascading effects of adolescent gang involvement across the life course. In other words, a chain of negative events are likely to emerge following gang involvement. Thus, path modeling or structural equation modeling techniques would be appropriate for fully addressing gang effects across the life course. Unfortunately, we are not aware of any studies that have incorporated trajectory groups within a path or structural equation model; 2) a related point is that there may be other causal pathways beyond adult role/status fulfillment failure and continuing delinquent peer association that explain the enduring consequences of gang participation. Given the delinquent nature of

\(^3\) It is worth mentioning that Haviland, Nagin and colleagues (Haviland & Nagin, 2005; Haviland, Nagin, Rosenbaum, 2007; Haviland, Nagin, Rosenbaum, & Tremblay, 2008) have made significant progress to combine group-based trajectory modeling and propensity score matching for causal inferences in non-experimental longitudinal data. However, to date, their methodology is only good for estimating first-time treatment effects. On the other hand, IPTW allows researchers to assess whether there is intra-individual change in probabilities of gang involvement that is a function of intra-individual changes in treatment status while weighing the data to address confounding (Hong & Raudenbush, 2008; Robins et al., 1999; Robins et al., 2000; Sampson, Laub, & Wimer, 2006).
street gangs, law-violating acts are likely to lead to incarceration (with gang enhancement penalties). In addition to formal social control, the growth of gang databases and the exchange of information across jurisdictions mean that the gang label will “stick” with an individual and have long-lasting effects. Psychological (e.g. post-traumatic stress disorder) and physical injuries (e.g. physical incapacitation or addiction to substances) induced by gang-related activities, particularly violence, could also contribute to the difficulties of living a conventional life (Juette & Berger, 2008; Wood, Foy, Layne, Pynoos, & James, 2002). Gang-induced incarceration, labeling or harm may occur prior to or simultaneously with adult role/status fulfillment failure and continuing delinquent peer association. How these causal pathways co-exist and influence each other will be an important research issue, if we really want to unpack the “black box” of gang membership.

A major goal at the outset of the dissertation was to respond to the gap in the knowledge of how gang members’ lives unfold over the life course. In particular, we were interested in how developmental differences exist and develop among gang members. With this general purpose in mind, we estimated and analyzed developmental pathways of gang membership and the associated risk factors, turning points and consequences. Other researchers will hopefully agree with the conceptual and methodological approaches we have adopted and thus benefit from our endeavor into a largely unexplored area of gang research. We believe that the current investigation has raised thoughtful issues and new questions for researchers, practitioners and policy-makers. Yet, as this final section shows, this is only an initial step to provide answers to acute questions regarding street gang membership. Since
street gang members are not created equal, we might best help them in the future by understanding developmental heterogeneity among them.
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BIOGRAPHICAL SKETCH

Beidi Dong was born and raised in Chongqing, China. He attended college at the University of Hong Kong from 2004 to 2008. He graduated in May 2008, receiving his Bachelor of Social Sciences degree with a major in sociology and a minor in politics and public administration. He earned his Master of Arts (2012) and Doctor of Philosophy (2015) degrees from the University of Florida, where he majored in criminology, law and society. His substantive areas of research include developmental and life-course criminology, youth gangs and violence, and crime and place. In addition to these substantive research areas, he is also interested in advanced quantitative methodology.