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Early behavior problems in school, juvenile delinquency, and adult incarceration: a longitudinal examination of pathways to crime among a ten-year birth cohort in Louisiana

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EARLY BEHAVIOR PROBLEMS IN SCHOOL, JUVENILE DELINQUENCY, AND ADULT INCARCERATION: A LONGITUDINAL EXAMINATION OF PATHWAYS TO CRIME AMONG A TEN-YEAR BIRTH COHORT IN LOUISIANA

A Dissertation

Submitted to the Graduate Faculty of the Louisiana State University and Agricultural and Mechanical College in partial fulfillment of the requirements for the degree of Doctor of Philosophy

in

The School of Social Work

by

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It has been five years since I started this program in Social Work at LSU. During this period, I was exposed to many live projects and evaluations in school, and I became a data-driven person. Also, I am stronger and more responsible than ever before, because I became a proud mom during this period. I would like to appreciate each individual who witnessed my struggle and happiness during this journey.

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ABSTRACT

This study utilizes data resources from three state-level departments in Louisiana, Department of Education (DOE), Office of Juvenile Justice (OJJ), and Department of Public Safety and Corrections (DOC), during the period 1996-2008. The sample involves 7th-12th graders in DOE who were born between 1980 and 1989, with a sample size of N = 408,700 in total.

There are two major parts in this study: (1) examining the school-level risk factors among four different offending patterns and making two comparisons among them: the early starters of crime (n = 14,346) vs. late starters (n = 17,107), and the adolescent-limiteds (n = 10,126) vs. life course persisters (n = 4,220); and (2) examining the criminological risk factors for adult criminality and adult recidivism. The second part contains two substudies, with one examining whether previous juvenile justice contact increases the likelihood of adult criminality; and another examining criminological factors in OJJ that predict future adult recidivism.

Findings from the first part of this study show that all the school-level risk factors, including problem behaviors in school, school engagement variables, and school performance variables, are significantly associated with the criminal outcomes across the four different offending patterns, but they show stronger associations with the young offenders and the life course persisters than other offenders in general. Basic demographics are included in the analyses. Being male, African American, and coming from a low socioeconomic status family were identified as significant risks for involvement in criminal activities, especially among the life course persisters. Previous OJJ contact increases the likelihood of adult criminality. In particular, the frequency and severity of the original crimes, incarceration placement in OJJ, and gang membership are significant predictors of adult recidivism.
This study also included post hoc analyses on the criminal outcomes among the expelled students. The results showed the strong associations between out-of-school expulsion and each offending pattern, especially among the early starters. A cost analysis on the judicial cost per expelled student using Louisiana 2010 state budget showed the price the state paid for this high risk group.
CHAPTER 1: INTRODUCTION

Introduction

Juvenile delinquency and adult crime have been identified as serious social problems in virtually every society. Instead of growing to be productive citizens, juvenile delinquents and young criminals impose significant costs on society in terms of social resources, and cause non-monetary pain to their victims (Cohen, Miller, & Rossman, 1994). Previous research has identified many individual-, family-, school-, and community-level factors that potentially contribute to future involvement in both juvenile and adult justice systems. It is commonly understood that pathways to delinquency and crime are determined by multiple factors in children’s social ecologies, which are typically interrelated in complex ways (Lipsey & Derzon, 1999; Loeber & Farrington, 1998). For example, school dropout is interrelated with several other factors associated with school failure, and these factors are interrelated with several family-level factors associated with various stressors, which are also associated with juvenile delinquency (Christle, Jolivette, & Nelson, 2005; Thornberry, Moore, & Christenson, 1985).

Association between Criminality and School Issues

Risk factors are defined as individual or environment hazards that cause or increase the likelihood of having a negative or harmful outcome (Fraser, Richman, & Galinsky, 1999). Under this definition, risk factors could be the predictors for a certain negative outcome in a causal relationship, and also could be correlational factors associated with a negative outcome in a noncausal relationship. Howell (2003) defined risk factors as those elements in an individual’s life that increase his or her vulnerability to negative developmental outcomes and also increase the probability of maintaining a problem condition or regression to a more serious state, while protective factors are those that can serve to buffer the impact from risk factors, interrupt the causal process operated by risk factors, or prevent the initial occurrence of a risk factor.
For the school-aged population, school-related factors for criminality stand out among risk factors at the individual-, family-, peer-, and community-levels. In the field of criminology, the linkage of school failure and future conviction has been clearly identified (Teasley, 2004). High school dropouts are eight times as likely to be incarcerated as graduates (Bridgeland, Dilulio, & Morrison, 2006). Dropping out is a gradual process of accumulating risk, where students face problems in school on a daily basis, such as discipline problems, academic difficulty, and school disengagement (Gandy & Schulzt, 2007), together with other life issues.

School dropout is neither the earliest nor the only school-related factor that predicts future involvement in the justice system. From a life course perspective, truancy is a potent first step toward dropping out and further life-long social problems (Garry, 1996). Truancy, or chronic absenteeism, is defined as habitual engagement in unexcused and unlawful absence from school without parental knowledge and consent (Bell, Rosen, & Dynlacht, 1994; Zhang, Katsiyannis, Barrett, & Wilson, 2007). Its functional definition varies by state, depending on the age requirement for school attendance, nature of acceptable excuses for absences, and the number of allowable absences. Nationally, 5% to 11% of K-5th grade students were chronic absentees in 1998, and another 11% or more were at risk for chronic absenteeism (Romero & Lee, 2007).

Poor school attendance links to school disengagement, poor academic performance, and then school dropout, and may be associated with physical, mental, or behavioral problems, such as low self-esteem, feeling of rejection, suicide attempts, teen pregnancy, substance abuse, violence, other delinquent behaviors, and even adulthood crimes (NCSE, Tool kit, 2007). Besides being an early warning for dropout and further problems, truancy is directly related to weak school bonding and poor academic performance (Henry, Caspi, Moffitt, Harrington, & Silva, 1996), which in turn, as described by interactional theory, would lead to dropout and more
serious problems. Based on findings from Loeber and Farrington’s study of child delinquency and early intervention, the association between early truancy and later criminality has been well identified (Loeber & Farrington, 2000). Other research has produced similar findings, that early truancy is a stepping stone to school failure and dropout, and more serious delinquency and criminal behavior (Bell, Rosen & Dynlacht, 1994; Bridgeland et al., 2006; Burns, Howell, Wiig, Augimeri, Welsh, Loeber & Petechuk, 2003; Gandy & Shultz, 2007; Garry, 1996; Teasley, 2004).

The Cost of Dropout and Criminality

Dropping out of school is very costly to the individual and to society as a whole. Compared with their counterparts, high school dropouts tend to work as lower-paid employees or have less job opportunities, and are more likely depend on the social welfare system (Cohen, 1998). On average, high school dropouts earn $9,200 less per year than graduates, about one million dollars less over a lifetime.

Far more social costs are incurred if school dropouts become involved in criminal activities at some point in their lives. According to one calculation, the social costs associated with one 30-year-old person's life of crime amount to over $2 million (Cohen, 1998). A one-year cohort of dropouts costs the nation more than $240 billion over their lifetimes, in terms of lost income and tax revenue and the replacement costs and damage associated with the crimes themselves (Dembo & Gulledge, 2009; Schoeneberger, 2011).

Scope of the Problem

The term “juvenile delinquency” refers to common criminal activities as well as status offenses committed by juveniles. Status offenses are illegal activities that are only applied to juveniles due to their age (Siegel & Welsh, 2005). The age limit for a status offense varies according to state law, and is normally between ages 16 and 18. In the U.S., 25% of youth under
age 17, or 17 million youths, are involved in school dropout, substance abuse, or other delinquent activities (Siegel & Welsh, 2005). Juvenile cases under the age of 17 account for 25% of all criminal offenses or 2.2 million arrests in the legal system (Snyder & Sickmund, 2006). The United Nations’ Youth Report (2005) pointed out that the majority of all crimes are committed by juveniles and youths between ages of 14 and 25.

It was estimated that 5.5% to 20% of youth were absent every day, and in some urban cities this absentee rate reaches up to 30% including excused and unexcused absences (Reid, 2005). According to one confidential survey, nearly one in ten 13-year olds was truant at least once a week (Strickland, 1998). The direct consequences of missing too many school days include being behind with academic work, becoming disengaged from school, and finally dropping out of school (Garry, 1996). Every nine seconds a student decides to drop out of school nationally (NESC, 2007). In Louisiana, 786,880 individuals, or 25.2% of the population aged 25 or older, lack a high school diploma or GED (GEDTS, 2006; Louisiana Department of Education, 2006), which made Louisiana rank third in the number of high school dropouts in this country in 2006 (U.S. Census Bureau, 2007).

The connection between school truancy, dropout, and criminal involvement is remarkable. During a recent sample period in Miami more than 71% of 13 to 16 year-olds prosecuted for criminal violations had been truant; In Minneapolis, daytime crime dropped 68% after police began citing truant students; In San Diego, 44% of violent juvenile crime occurs during the school time between 8:30 a.m. and 1:30 p.m. (U.S. Department of Education, 1996). Troubles in school are the early signs of more serious behavioral problem later on (Garry, 1996). It is common to see the co-occurrence of school difficulties and criminal involvement among young people. Studies have shown, for example, that two thirds of male juveniles arrested while truant tested positive for drug use (Romero & Lee, 2007).
Conceptual Frameworks: Developmental Taxonomies of Antisocial Behavior

The proposed study is guided by several conceptual frameworks that are integrated through the perspective of the social ecological context of human development (Germain, 1979). Life course theory is an ecological model of social development that emphasizes the importance of individual development within larger historical, cultural, and relational contexts (Elder, 1998). The emergence of patterns of anti-social behavior is typically differentiated on the basis of individual developmental timing, the forms that the behavior tends to take, and the contexts in which the behavior tends to occur. Not all people who become criminals do so at the same point in their lives. Studies of the developmental trajectories of criminals frequently refer to two major profiles, so-called “early starters” and “late starters”. Early starters of juvenile delinquency are child offenders who begin delinquent activities before the age of 13, while late starters are juvenile offenders whose onset age is between 13 and 16 (Patterson, Reid, & Dishion, 1992). According to one study, child delinquents between the ages of 7 and 12 represent 10% of juvenile offenders, yet are two to three times more likely than older juvenile delinquents to become serious, violent, and chronic offenders (Smink & Heilbrunn, 2005). According to the Cambridge Study in Delinquent Development (Farrington, Ttofi, & Coid, 2009), early starters of adult crime are offenders whose onset age is between 10 and 20, while late starters of adult crime become involved in criminal activities no earlier than 21 years old.

By looking at the length of criminal careers, Moffit (1993) differentiated two offending patterns: the so-called “adolescent-limiteds” and the “life course persisters”. Adolescent-limiteds begin and end delinquent activities during adolescence. The causes of their offenses during this period are presumed to be mainly due to peer influences and the gap between their needs and the capability of pursuing these through legal means (Moffit, 1993). Life course persisters, in contrast, initiate antisocial behaviors at an early age and continue criminal behavioral patterns
into adulthood, typically with a long criminal career. More often than not, this group of chronic offenders tends to commit more violent and serious crimes than their counterparts. Only 5% of offenders, however, fall under this category, yet they are responsible for 50-60% of total crimes in society (Henry, Caspi, Moffitt, & Silva, 1996). The cutoff age differentiating these two profiles is 25, as shown in Elliott’s (1994) study based on the hazard rate using data from the National Youth Survey. After age of 25, the hazard rate of committing crimes was sharply decreased near to zero.

Loeber (1996) described three distinct behavioral profiles of criminal developmental pathways that may progress from minor problematic behaviors to serious delinquency and crime. The overt pathway is characterized by early aggressive social behavior. The covert pathway consists of anti-social behavior represented less by direct aggression and more by covert forms such as lying, stealing, and property destruction. Finally, the pathway of authority conflict is characterized primarily by oppositional and defiant behavior that may progress to a generalized antagonism toward authority (Kelly, Leobel, Keenan, & Delamatre, 1997).

Catalano and Hawkins’ social development model (1995) is a life course theory that integrates social learning theory and social control theory from a developmental perspective. The social development model particularly emphasizes the importance for the child’s personal and social development of engagement in major social institutions, such as family, school, and community. Through strong engagements in social institutions, children are provided essential opportunities to develop prosocial belief and value systems and social skills (Hartwell, 2000; Hawkins & Weis, 1985).
The Pipeline from School to Prison

Population At-Risk

Are there typical developmental profiles of children at risk for entry into the “pipeline” from school to prison, and if so, what might these look like? This section briefly introduces the major risk factors for school truancy, dropout, and criminal involvement at individual-, family-, school-, peer-, and community-levels.

The first notable risks for delinquency and later crime are associated with race and gender. Among this population, African American youth have three times the risk of Caucasian youth, and males have three times the risk compared to females.

Individual risk factors for criminality include aggressiveness (Farrington & Welsh, 2007), early initiation of violence and delinquency and other antisocial behaviors (Howell, 2003; Lipsey & Derzon, 1999), and negative attitudes and beliefs towards conventional values (Elliott, 1994). Other individual risk factors include weak religious beliefs (Sinha, 2007) and impulsive personality (Holmes, Slaughter, & Kashani, 2001).

Parental criminality is a strong risk factor for delinquent youths (Beker & Mednick, 1988; Moffitt, 1993). Child maltreatment in particular, including sexual abuse, physical abuse, emotional abuse, and child neglect, presents a specific set of significant risks (Kleine, 1994; Stouthamer-Loeber, Wei, Homish, & Loeber, 2002). Poor family management, poor parental supervision, poor parent-child involvement and interaction, and punitive discipline have also been identified as delinquency predictors (Kashani, Jones, Bumby, & Thomas, 1999; McCord, 1991), as are weak family ties, negative labeling, family or marital conflict, and separations from family (Farrington & Welsh, 2007; Hawkins, et al., 1998). Other risk factors are parental attitudes favorable to violence, stressful family events, and residential mobility (Henry, Caspi, Moffit, & Silva, 1996).
Many cases of truancy are associated with family poverty and large family size, frequent relocation, family conflict, single parenting, low parenting skills, low valuing of education, and weak parent-child relationships (Alexander, Entwisle, & Kabbani, 2001; Bell, Rosen, & Dynlach, 1994; Corville-Smith, Ryan, Adams, & Dalicandro, 1998).

Among school-related factors, academic failure has been identified as the strongest risk factor for criminal involvement (Denno, 1990; Browning & Huizinga, 1999). Low bonding to school has been found to relate to both male and female delinquency (Elliott, 1994; Libbey, 2004; Hill, Howell, Hawkins, & Battin-Pearson, 1999). Zhang and his colleagues (2010) also found high rates of school transitions to be predictors of juvenile delinquency.

Large school systems in low-income, inner-city urban school districts have been shown to be associated with specific risks for truancy (Bridgeland, Dilulio, & Morrison, 2006), as have inconsistent truancy and school discipline policies (Epstein & Sheldon, 2002), weak parent-school engagement, poor student-teacher relationships (Baker, Sigmon, & Nugent, 2001), unstructured classes, and unchallenging homework (Gandy & Schultz, 2007).

In the social sphere, having delinquent siblings or peers is a strong risk for criminal involvement (Elliott, 1994; Rodgers, Buster, & Rowe, 2001; Slomkowski, Rende, Conger, Simons, & Conger, 2001). Among these risks, the influence of gangs is stronger than influences from other delinquent peers (Hill, Howell, Hawkins, & Battin-Pearson, 1999). Having friends with school-related problems also increases the hazard of having similar problems. Peer rejection or low quality peer interactions have also been identified as risk factors by Lochman and colleagues (2010).

Community-level risk factors for school truancy, dropout, and criminal involvement include poor and disorganized communities, availability of drugs, exposure to violence, including personal victimization, and racial prejudice (Barrett, 2007; Hammond, Linton, Smink,

As described above, criminal involvement shares some of the same risk factors as school truancy and dropout. The major overlapping risk factors that have been identified for both are mainly at the family- and community-level, and include disadvantaged family background, family conflict, and experience of child maltreatment, and unstable and violent communities. In criminology, the educational risk factors that have been most studied focus on school failure and attendance. Studies of adult criminology have as yet ignored many school-related risks that have appeared in the education literature, such as school climate, personal relationships, academic performance, and school discipline policies. This study attempts to fill in some of these missing pieces in the criminology literature by including more school-level risks, thus promising to contribute to this knowledge base.

**Contribution of the Proposed Study to Social Science Knowledge**

Children are our future. This study seeks to address a knowledge gap in criminology by examining school-level risk factors for criminal involvement in both juvenile and adult systems. It is critical for educational systems to identify at-risk populations in school and promote early interventions.

Using administrative data during the period of 1996-2008 from the Department of Education (DOE), Office of Juvenile Justice (OJJ), and Department of Public Safety and Corrections (DOC) in Louisiana, this study tracks students in the Louisiana public school system across 13 years to predict criminal involvement. Associations among demographics and school-
related factors are also explored. This study further compares school-level risk factors for four different groups representing different offending profiles: the early starters vs. late starters (Patterson, Forgatch, Yoerger, & Stoolmiller, 1998) and the adolescent-limiteds vs. life course persisters (Moffit, 1993). Additionally, this study examines if previous contact with the juvenile justice system will increase or decrease the possibility of future DOC involvement. Lastly, this study examines the question of how specific circumstances associated with OJJ involvement might predict later DOC involvement.

**Research Questions**

This study proposes to answer the following research questions:

1. Which demographic characteristics differentiate the four offending profiles identified in the delinquency literature (early starters vs. late starters and adolescent-limiteds vs. life course persisters), including race, gender, socio-economic status, family, and peer group characteristics?

2. How are the four offending patterns differentiated by school-related profiles?

3. Does OJJ involvement (previous arrest) increase or decrease the likelihood of going to DOC?

4. Which criminological factors associated with OJJ circumstances (i.e., age at the first OJJ contact, the frequency of OJJ contacts, the severity of offense, and gang membership) predict later DOC involvement?

5. In what ways are school-related risks associated with later DOC involvement?
CHAPTER 2: LITERATURE REVIEW

Serious school-related behavior problems may be a first step in a life-long trajectory of social problems, including criminal involvement (Garry, 1996). This review examines theory and research critical to understanding the causes of criminal involvement among at-risk youth, especially at the school level. It further discusses best practices and relevant policies addressing the serious social problems of youth, with a particular focus on school-related behavior problems.

Current State of Knowledge

Sophisticated studies exploring the causes of delinquency and crime began in the early part of the last century (Glueck & Glueck, 1950). An important organizing conceptual framework applied to this study has been the life-course perspective, which views human development across the life span, emphasizing the interaction of life events and the social environment (Siegel & Welsh, 2005). Major life-course principles emphasize that individuals travel distinctive pathways toward developmental outcomes, that developmental processes unfold according to different stages during the life span, that important historic forces operate to influence individual developmental pathways, and that individual agency operates at key “choice points” in development (Elder, 1998; Hoge, 2001). Developmental processes associated with pathways, or long-term patterns, stand in contrast to transitions associated with short-term changes in social roles. On occasion, pathways are interrupted by transitions, which might produce disorder in the life course (Elliott, 1994).

The social development model (Hawkins & Weis, 1985) is one developmental theory derived from the life course perspective. It integrates social learning theory (Akers, 1973) and social control theory (Hirschi, 1969) with components of risk and protective factors. It articulates that opportunities, skills, and reinforcement (rewards) of involvement build social bonds to
conventional social institutions. When these bonds are mutually beneficial, and when they operate in conjunction with positive influences from peers and neighborhood, young people are likely to be protected from potential delinquent behaviors (Hawkins et al., 2000).

**Theories Applied to Understand the Causes of Youth Problems**

Following the major components of ecology of human development (Bronfenbrenner, 1979), this study views youth problems in a comprehensive manner. Viewed from the perspective of a social ecological framework (Gorman-Smith, Tolan, & Henry, 2000; Tolan, Guerra, & Kendall, 1995), delinquency is an adaptive outcome of the social environment of the child. Behavioral patterns develop through interactive relations between the child and the major social institutions in the child’s social ecology, including family, school, and community (Hawkins, 1995). The concept of “developmental pathway” involves a process of childhood socialization and interaction between a child and his/her social environment (Holmes, Slaughter, & Kashani, 2001). All the theories that are introduced below are subsumed under this social ecological framework emphasizing multiple risk and protective factors that shape various developmental outcomes.

**Terminologies and Concepts**

Developmental pathways headed toward juvenile delinquency are distinguished by the presence of various characteristics of the individual and his or her social context. One way in which these pathways are distinguished is by the timing in the individual’s life when delinquent behaviors occur. For some young people, delinquent behavior peaks in adolescence and significantly declines or disappears thereafter. For others, delinquency and crime persist into and throughout adulthood. Moffitt (1993) has labeled these patterns “adolescent-limiteds” and “life-course persisters”, respectively. Elliott’s research with the National Youth Survey (1994) supported these two basic delinquent profiles. For one, corresponding to Moffitt’s adolescent
limiteds, criminal involvement peaked at age 16, followed by a sharp decline to near zero around the age of 25. For others, the more chronic persisters, criminal activity continued after age 25, into middle age. This small group of offenders accounts for a disproportionately large amount of crimes in society. About 5% of offenders are persistent offenders, yet they are responsible for 50%-60% of crimes in the U.S. (Henry, Caspi, Moffitt, & Silva, 1996). It is critical to identify this group early and offer them appropriate interventions to interrupt this habitual offending pattern.

Another perspective on developmental pathways toward delinquency and crime is provided by looking at the age of onset. For general criminal offending, age 17 or 18 is regarded as the cutoff to classify early starters and last starters. For juvenile delinquency only, early starters are those child offenders whose onset ages are younger than 12 or 13, and late starters are juvenile offenders aged between 13 and 16 years (Lipsey & Wilson, 1998; Office of the Surgeon General, 2001; Patterson, Reid, & Dishion, 1992). Impulsivity and mental inhibitory control have been identified as significant markers for differential risk between early starters and late starters among juvenile delinquents: Higher impulsivity/lower inhibitory control is associated with risk for early delinquency (Carroll, Hemingway, Bower, Ashman, Houghton, & Durkin, 2006).

Patterson, Forgatch, Yoerger, and Stoolmiller (1998) provided a 3-point, sequential risk-based trajectory for juvenile offending using coercion theory. The three risk-related points in the trajectory were antisocial behaviors by grade four, police arrest before age 14, and having three or more arrests prior to age 18. Disrupted family process, including frequent family transitions, marked social disadvantages, and association with deviant peers were identified as the strongest predictors for entry into this trajectory (Patterson, Reid, & Dishion, 1992).
Combining Moffitt’s (1993) crime classification with Sampson and Laub’s (2005) age-graded theory on crime, the Cambridge Study in Delinquent Development produced new findings on the predictors for four offending patterns (Farrington, Ttofi, & Coid, 2009; Zara & Farrington, 2009): nonoffenders, adolescent-limiteds (convictions only between ages 10 and 20), late-onsets (convictions only between ages 21 and 50), and persistent offenders (convictions occurring between ages 10 and 50). Unlike the cutoff age for adolescents in other studies, this study used age of 20 to classify offenders in general due to the component from age-graded theory, which emphasized informal social controls in a person’s life. Various risks were found to be associated with the different offending patterns. Late-onset, compared with nonoffender, was associated with poor housing, low nonverbal IQ at age 8-10, high neuroticism at age 16, and anti-establishment attitudes and motoring convictions by age 18. Predictors for persisters were low popularity and harsh discipline at ages 8-11, hyperactivity at ages 12-14, and heavy drinking at age 18. Compared with the adolescent-limiteds, the life course persisters significantly associated with low family income, parental conflict, low father-son interaction, frequent truancy, hyperactivity, and frequent lying (Farrington, Ttofi, & Coid, 2009).

Many studies are in agreement on the negative relationship between the onset age of crime and later recidivism (Gendreau, Little, & Goggin, 1996). The younger the age of the child is at the first conviction or at the first arrest, the higher probability of continuation of the offending pattern in adulthood would be (Farrington, Ttofi, & Coid, 2009; Green, Gesten, Greenwald, & Salcedo, 2008). The only study with the opposite finding is a newly conducted birth cohort study by Bacon, Paternoster, and Brame (2009). They found that late, rather than early onset of delinquency, was related to future offending. The current study seeks to contribute to this body of literature by examining the relationship between onset age and future offending.
Within the larger conceptual framework of social ecological theory, two major bodies of theory, reflecting social and developmental perspectives, have made significant contributions to our understanding of the emergence of the problem of juvenile delinquency.

**Social Theories**

Social theories explain delinquency from the perspective of social context. These theories include social construct theories, social process theories, and social conflict theory. Social structure theories explain delinquency as an outcome of low socioeconomic conditions and cultural deviance, such as social disorganization which emphasized an organized community to avoid crime (Shaw & McKay, 1969), and strain theory which viewed crime as a result of frustration and anger (Agnew, 1992). Social process theories view delinquent behaviors a process of socialization. Social learning theory (Akers, 1973) and social control theory (Hirschi, 1969) are considered social process theories. The former argues delinquent behaviors are learned from significant others in a child’s life through processes of reinforcement and punishment, and the latter argues delinquent outcomes result from a weakened commitment to the major social institutions, such as family and school. Social conflict theory views delinquency as a result of economic deprivation and intergroup conflicts.

**Developmental Theories**

From a developmental-ecological perspective, multiple influences from family, community, and institutional systems ultimately impact individual juvenile development and account for linkages between patterns of delinquency and cumulative risks over a life course (Gorman-Smith, Tolan, & Henry, 2000). Under developmental theories, life course theories hold that people grow and change over the life course, influenced by interpersonal relationships, especially as found in family, job, and among peers, by larger social system events, as well as by their own capacities for agentic action. A latent view from this perspective argues that
opportunities for engagement in crime, as found in social contexts, tend to change more so than do individual personalities. The social development model (Hawkins, 1995) and age-graded theory (Sampson & Laub, 2005) are two leading theories from a life course perspective that have been applied to the problem of juvenile delinquency.

The social development model (Hawkins, 1995) is a theory of human behavior and problem prevention that integrates social learning theory and social control theory. From the social learning perspective, the most important process through which juveniles learn to behave antisocially is through peer relationships or other significant figures, when there are significant, immediate social rewards associated with the behavior (Akers, 1973). Social control theory (Hirschi, 1969) asserts that the primary influence on delinquency is likely to be the level of engagement with major social institutions in the child’s life, especially family and school, and adoption of conventional prosocial values. From this perspective, goals for delinquency prevention should reflect these dimensions of social engagement (Hawkins & Weis, 1985).

The social development model explains delinquency by including contextual and interpersonal risk and protective factors from a developmental perspective. Children adopt prosocial or antisocial behavioral patterns and beliefs from the person or the social institution to which they are most firmly bonded (Cohen, 2008). It focused on the childhood socialization process and their bonding to the social unit, such as family, school, peers, and community. In general, socialization processes are conceptualized as involving four major constructs: (1) perceived opportunities for involvement with social institutions, (2) the degree of involvement in these institutions, (3) the social skills required for participation in these institutions, and (4) reinforcement of involvement and participation (Fleming, Catalano, Oxford, & Harachi, 2002). Institutional structural strains and qualities of interpersonal relationships exert influences on the emergence of delinquent behavior over time (Hartwell, 2000). The social development model, as
a prevention model, advocates offering children opportunities, skills, and recognition to
strengthen the bonding (engagement and commitment) to the major social institutions (such as
family, school, and community), and to build healthy beliefs and clear standards to maintain a
healthy lifestyle (Fleming, Catalano, Oxford, & Harachi, 2002).

Another influential conceptual model for the emergence of delinquency has been
provided by Loeber’s (1996) three-pathway framework: (a) an overt pathway, (b) a covert
pathway, and (c) authority conflict (Loeber & Farrington, 2000). The overt pathway reflects a
developmental trajectory from minor aggression to physical fighting, and finally to violence. The
covert pathway describes a pathway from minor covert behaviors (such as lying and stealing), to
property damage, and to moderate or serious delinquency. The authority conflict pathway
typically begins with disruptive behaviors prior to age 12, followed by deviance and authority
avoidance, and finally ending up with status offenses. Children with early onset of delinquency
tend to face higher likelihoods than late starters for progression towards higher levels of to
criminal involvement. Those following more than one of these pathways have higher offending
rates than those only in one pathway (Loeber & Farrington, 2000). The three-pathway
framework has been a very useful model for describing at-risk youth who experience troubles in
school during the adolescent period, start getting involved in status offenses and minor
delinquency, and process to serious crime in adulthood. More detailed examinations of pathways
to delinquency are provided through the analyses of specific risk and protective factors present
throughout the child’s social ecology, as life course theory provides.

Risk Factors for Youth Problems

Definition of Risk Factor

Risk factors are the circumstances that contribute to negative developmental outcomes in
a person’s life (Carr & Vandiver, 2001). In contrast, protective factors are the circumstances that
mitigate the impact of risk factors. Promotive factors are the circumstances that, irrespective of the presence of risk, contribute to growth-oriented developmental outcomes (Fraser, Richman, & Galinsky, 1999). Research from the perspective of these developmental influences has concentrated to a considerable degree on risk and to a much lesser extent on protective and promotive factors.

Leading longitudinal studies on the risk and protective factors of criminal involvement are listed here. The first attempt was made by Glueck and Glueck’s (1950) longitudinal study on 500 men born in late 1920s and early 1930s. It is a still live study and has the longest tracking period in criminology, which makes the study valuable to examine the criminal outcomes in a life span. Longitudinal studies under Office of Juvenile Justice and Delinquency Prevention (OJJDP) explored the causes and the risk factors for general offending, serious and violent offenders, and child offenders in three different sites. The Causes and Correlates of Delinquency study group (Thornberry, Huizinga, & Loeber, 1993) initiated the research to understand the causes of delinquency and crime in three different sites and confirmed the research findings. Then the study group on Serious and Violent Juvenile Offenders (Loeber & Farrington, 1998) continued the project and focused on the serious and violent offenders only. Study group on very young offenders (Loeber & Farrington, 2000) further targeted child offenders to explain the causes and consequences. There are many other small but sound studies on the risk factors too.

The Office of the Surgeon General, under the Department of Health and Human Services (2001), summarized the risk and protective factors at different domains for early onsets (ages 6-11) and late onsets (ages 12-14), respectively. Lipsey and Derzon (1999) conducted a meta-analysis on these studies. Other reviewers of the research findings on risk and protective factors are Gendreau, Little, and Goggin (1996), and Hawkins et al. (1998).
Any discussion of risks, protections, and promotive factors with respect to juvenile delinquency immediately becomes a complex analysis because of the myriad elements of a growing child’s social ecology, and the complex interactions among these, that could potentially exert some level of influence on the child’s developmental outcomes. Circumstances such as general offending, substance abuse, status delinquency (such as truancy and dropping out), serious and violent behaviors, recidivism, gang membership, availability of firearms, teen pregnancy, economic deprivation, family conflict, academic failure, having delinquent peers, and early antisocial problems typically overlap as risk factors, and the presence of multiple risks leads to cumulative effects (Huizinga, Loeber, & Thornberry, 1994; Huizinga, Loeber, Thornberry, & Cothern, 2000). Problematic behavioral outcomes typically have multiple determinants (Loeber & Farrington, 1998).

Furthermore, the effects of risk factors typically differ according to gender, race, and age (Kroneman, Loeber, & Hipwell, 2004; Maschi, Morgen, Brabdley, & Hatcher, 2008; Rumberger, 1983). Most studies on risk and protective factors for delinquency or violence focus on males due to data availability, but females and males tend to respond to the same risk and protective factors differently. For example, Kroneman, Loeber, and Hipwell (2004) found that trusting relationships, positive self-esteem, and identity development offer greater protective and promotive influences for girls compared to boys. Having poor relationships in the family or at school, and the presence of physical or sexual assault were robust predictors of delinquency among girls while not among boys (Hubbard & Pratt, 2002). European American girls are more likely to be first referred as delinquents for status offenses and less likely for more serious crimes, in contrast to African American boys, who typically come into the juvenile justice system as a result of serious crimes (Zhang, Katsiyannis, Barrett, & Willson, 2007).
Age also matters when examining risk and protective factors, a concept reflected in life course theory as developmental “timing”. Family protective factors, for example, play a more important role early in a child’s life than in later adolescence. In middle childhood and adolescence, peer influences and school-related factors, particularly academic achievement, are potent developmental influences (Welsh & Farrington, 2007).

**Risk Factors of Juvenile Delinquency**

**Individual Risk Factors**

Individual factors are commonly stable over time under different environments for a person (Brennan, 1999). Risk factors for various developmental outcomes have been identified *in utero* (Denno, 1990). Pregnancy, delivery complications, and exposure to neurotoxins after birth have been found to be risk factors associated with future delinquent behaviors (Conseure & Rivara, 1997). Aggression or conduct problems in the preschool years and childhood antisocial behaviors are the best predictors for early onset of delinquency among males (Farrington & Welsh, 2007). Child delinquents whose onset age is between 7 and 12 are two to three times more likely to become serious, violent, and chronic offenders than those who become juvenile offenders at later ages (Loeber, Farrington, Petechuk, 2003). Low intelligence is also an important risk factor for juvenile offending (Koolhof, Loeber, Wei, Pardini, & D’Escury, 2007). Other individual risks such as impulsive personality, bold temperament, aggression, high level of anxiety, and low cognitive empathy are all linked to later offending (Holmes, Slaughter, & Kashani, 2001). Childhood mental health problems have also been found to present high risks for delinquency (Dembo, Wareham, Poythress, Meyers, & Schmeidler, 2008). Lack of social cognitive skills has also been identified as a significant risk factor at the individual level for criminality (Barret, 2007; Loeber, Pardini, Stouthamer-Loeber, & Raine, 2007). Life course persisters tend to present a stable pattern of aggression and antisocial behavior over their
lifetimes. Very often, neuropsychological problems and poor social environments are characteristic of their early development (Brennan, 1999).

**Family Factors**

Family-level risk factors for juvenile delinquency that have been identified empirically include low family socioeconomic status, large family size, witnessing of high levels of family stress, parental conflict and separation, and the experience of frequent residential mobility (Farrington & Welsh, 2007; Hawkins, et al., 1998; Henry, Caspi, Moffit, & Silva, 1996). Maternal smoking or drug use is also associated with increased risk for later delinquency (Green, Gesten, Greenwald, & Salcedo, 2009). Criminal behavior within families is also a strong predictor of juvenile criminal involvement (Murray & Farrington, 2005). Teenage motherhood or antisocial parents also predict future criminal outcomes for children (Aaron & Dallaire, 2010; Murray & Farrington, 2005). Instability in parental marital status and mothers’ low education level are also associated with future criminal involvement for children (Lipsey & Derzon, 1999). Children who are exposed to violence, including maltreatment, domestic violence, community violence, and even media violence, have higher chances of becoming violent offenders (Becker & McClosky, 2002; Jonson-Reid, 1998; Loeber, Kalb, & Huizinga, 2001; Mrug, Loosier, & Windle, 2008; Smith & Thornberry, 1995; Stouthamer-Loeber, Wei, Homish, & Loeber, 2002.). Beyond the victimization of child maltreatment, physical injury victims also have a higher probability of engaging in criminal activities (Loeber, Kalb, & Huizinga, 2001). Poor family management practices (Kashani, Jones, Bumby, & Thomas, 1999) and poor parenting skills raise the chance of criminal convictions among children and juveniles (Farrington, 2006). Having a high turnover of caregiver broke the family ties and weakened the family relationship (McCord, 1991), and finally contributed the possible involvement of delinquent activities. On the opposite
side, family bonding and nurturing interactions may serve as protective factors for children in disadvantaged families (Barrett, 2007; McCord, 1991).

**School Factors**

School-related risk factors for juvenile delinquency include the unique dimensions of student factors, relational factors, and factors within the school climate. Academic performance, especially academic failure or grade detention, is an especially strong predictor of delinquency at the level of the individual student, as is truancy (attendance rate below 80%) and early school dropout (Browning & Huizinga, 1999). Other student-level risks include poor attitude (Office of Surgeon General, 2001; Schoeneberger, 2011) and frequent school transitions (Zhang, et al., 2010). A negative association was found between participation in sports and rule-breaking and aggressive behaviors (Burton & Marshall, 2005). Students who receive special education have a high probability of involvement in the juvenile justice system (Zhang, et al., 2010).

School-related relational factors include teacher-student relations and relations among students (Libbey, 2004). Low bonding or commitment to school (Hill, Howell, Hawkins, & Battin-Pearson, 1999) and low levels of teacher satisfaction with a student both contribute to school disengagement, which further puts a student at risk of being delinquent (Henry, Knight, & Thornberry, 2012). School climate factors that present risks for juvenile delinquency include high delinquency rates, inner-city neighborhood location, inadequate rule enforcement, and poorly defined school regulations and norms (Christle, Jolivette, & Nelson, 2005). One study examined exclusionary discipline practices as school-level risk factors and found that suspension was significantly correlated to delinquency (Christle, Jolivette, & Nelson, 2005).

**Peer Factors**

Peer factors tend to exert a heavier impact on risk for juvenile delinquency among school-age children, compared to younger children (Gorman-Smith, Tolan, & Henry, 2000). Peer
relations significantly influence decision-making processes and behavioral patterns among adolescents. Having deviant or delinquent siblings or peers (Rodgers, Buster, & Rowe, 2001; Slomkowski, Rende, Congerm Simons, & Conger, 2001) has also been shown to be a strong risk factor for delinquent behaviors among juveniles (Sullivan, 2006; Kaufmann, Wyman, Forbes-Jones, & Barry, 2007). Peer rejection also predicts future delinquency, and this effect is likely to be mutually reinforcing, where higher levels of delinquency entail rejection by greater numbers of peers (Sullivan, 2006).

Gang membership by definition involves social deviance and delinquency, and these effects on an individual child’s trajectory tend to become condensed and intensified. Typically, these children have weak family ties and low bonding to school and other social institutions (Hill, Howell, Hawkins, & Battin-Pearson, 1999). Gang membership also typically carries high risk for future involvement in serious and violent crimes.

**Community and Neighborhood Factors**

Risk Factors for School-Related Problems

Both excused and unexcused absences lead to low academic performance, especially in math, but, as would be expected, a high proportion of unexcused absences is associated with stronger positive relationships with school difficulties than excused absences (Gottfried, 2009). Attendance patterns from as early as at the first grade predict risk for school disengagement later on (Ensminger & Slusarcick, 1992; Lehr, Sinclair, & Christenson, 2004), and ultimately these risks elevate risks for academic failure and high-school dropout (Kearney, 2008). These outcomes present particular risks for other social problems in adolescence and adulthood, including criminality (Schoeneberher, 2011).

There is no single reason that explains why being absent from school predicts such a vast array of social problems (Gandy & Shultz, 2007; Grooters & Failey, 2002). Indeed, early school absence is best thought of as an important social marker of multiple developmental risks that include individual characteristics, developmental issues, socio-economic influences, and family, school, peer, and community factors (Teasley, 2004; Baker, Sigmon, & Nugent, 2001; Zhang, Katsiyannis, Barrett, & Willson, 2007). The fact that multiple risks associated with truancy are involved in later deleterious outcomes points to the importance of comprehensive interventions that reflect the interests and involvement of multiple stakeholders in the welfare of our children (Henry, Knight, & Thornberry, 2012).

Of all the risks for juvenile delinquency presented in the social ecology, the most dominant factor is low family socioeconomic status. This risk is intimately linked to homelessness, poverty, single-parent families, transportation difficulties (Teasley, 2004), elevated levels of family conflict (Alexander, Entwisle, & Kabbani, 2001), family mobility, and ineffective parental disciplinary practices (Bell, Rosen, & Dynlach, 1994; Corville-Smith, Ryan, Adams, & Dalicandro, 1998), each of which presents additional risks for developing children.
Students whose mothers were teenage mothers (22% of kindergarteners in the U.S.) or mothers with little education (12% of kindergarteners) are over twice as likely as their counterparts to be truant (National Center for Children in Poverty, 2008). Students having siblings who dropped out of school tend to drop out at a high rate (Hickman, Bartholomew, Mathwig, & Heinrich, 2008). Students could be absent from class because they have to take care of young siblings or have fewer resources for learning. Financial barriers to future college attendance could also result in a lack of motivation to benefit from education in the grade school years (Siegle & Welsh, 2005).

Personal factors include poor self-esteem, feelings of academic incompetence, poor relationships with other students, and gang involvement (Franklin & Streeter, 1992; Libbey, 2004; Richman, Bowen, & Woolley, 2004). Physical health problems or disabilities, especially learning disabilities, and emotional disorders (Teasley, 2004; Zhang, Katsiyannis, Barrett, & Wilson, 2007) are common among truants. Other individual-level risks include early parenthood, excessive work outside of school, and substance abuse (Garry, 1996; Richman, Bowen, & Woolley, 2004). Bullying victimization in school increases the risk of becoming habitual truancy (Gastic, 2008; Snyder & Sickmund, 2006).

Gandy and Schultz (2007) showed that large schools in low income, inner-city districts have more serious school problems than their counterparts. It was confirmed in other studies that school size in higher risk communities is a strong predictor of school violence (Eisenbraun, 2007). Unchallenging classes/homework and unsupportive or uncertified teachers also link to school absenteeism (Alexander, Entwisle, & Horsey, 1997; Gandy & Schultz, 2007). Poor academic performance, especially reading skills and mathematics, was a strong predictor of dropping out of high school (Finn & Rock, 1997). In one study, 47% of dropouts said the major reason for leaving school was that the classes were not interesting (Bridgeland, Dilulio, & Morrison, 2006; Teasley, 2004). Other school factors include poor relations with teachers.
(Corville-Smith, Ryan, Adams, & Dalicandro, 1998), inappropriate academic placement, and ineffective and inconsistently applied attendance policies (Bell, Rosen, & Dynlacht, 1994; Teasley, 2004). “Pushing-out” school discipline practices, such as corporal punishment and expulsion, dependence on security measures and law enforcement, and use of undercover agents, also contribute to violence in school (Eisenbraun, 2007; Finn & Voelkl, 1993). Cultural biases in discipline practices tend to push minority students out of school disproportionately (Glanville & Wildhagen, 2007; Johnson, Crosnoe, & Elder, 2001).

Community factors, including the presence of gangs, violence, delinquent peers, and interracial tensions of the community, impact the child’s school experience (Alexander, Entwisle, & Kabbani, 2001; McCluskey, Bryum, & Patchin, 2004; Teasley, 2004). Truancy is prevalent in urban settings and geographic regions with concentrations of poverty and minority populations (Hammond, Linton, Smink, & Drew, 2007). Additionally, Richman, Bowen, and Woolley (2004) reported that public health problems, including higher risk of sexually transmitted diseases and school-age pregnancy, are associated with school failure.

**Criminological Factors for Recidivism**

In behavioral science, generally, the strongest predictor of future behavior is previous behavior (Green, Gesten, Greenwald, & Salcedo, 2008). Criminological factors at an individual level, such as offense type, age at the first crime (Baumer, 1997; Sharpe & Litzelfelner, 2004), and gang membership (Lattimore, Visher, & Linster, 1995), have been identified in several different studies as important risks for future criminal behavior in adulthood.

The linkage of prior offenses with further recidivism is well identified (Cottle, Lee, & Heilbrun, 2001; Rodriguez, 2007), especially for more serious types of offenses. For example, those who commit property crimes may have fewer propensities for future crime than those who commit violent crimes (Rodriguez, 2007; Sharpe & Litzelfelner, 2004). Accordingly, children
with histories of multiple crime records are at higher-risk levels than one-time offenders. Several studies have documented a negative relationship between the onset age of crime and later recidivism (Gendreau, Little, & Goggin, 1996; Green, Gesten, Greenwald, & Salcedo, 2008). The younger the child’s age is at the first conviction, the higher the probability to continue the offending pattern in adulthood (Farrington, Ttofi, & Coid, 2009). Likewise, juveniles with gang affiliations are often more at risk of continuing a life pattern of crime (Hill, Howell, Hawkins, & Battin-Pearson, 1999; Kaufmann, Wyman, Forbes-Jones, & Barry, 2007; Lattimore, Vishner, Linster, 1995). Gang membership tends to intensify the negative impact on a child of delinquent peers or siblings, and increases risk of involvement in serious and violent crimes.

Compared with criminological factors at the individual level, such as gender, race, and previous offenses, there are limited studies on the factors predicting recidivism at the correctional institution level. Type of detention facility, which is an indicator of the severity of legal charge, is one of few criminological predictors for future recidivism. Juveniles placed in secure custody or confinement are at greater risk for recidivism than those placed in non-residential programs (Baumer, 1997; Sharpe & Litzelfelner, 2004), as secure confinement is associated with more serious crimes (delinquent offenses). Children who commit more serious crimes tend to also have more prolonged involvement in the juvenile justice system, and have more exposure to other delinquent youths. Therefore, a child placed in secure care is often exposed to greater risk than a child who is placed on probation and remains in his or her community.

**Risk Factors across Different Age, Race, and Gender Groups**

Many major risk factors for delinquency cut across age groups, including low socioeconomic status, poor parent-child relationship, broken homes, antisocial behaviors, aggression, substance abuse, antisocial or delinquent peers, negative attitudes toward
conventional values, and poor academic performance. The significance of these and other risks for individual children, however, varies according to the timing of exposure in relation to the child’s age and developmental trajectory (Kelley, Loebel, Keenan, & Delamatre, 1997, Sampson & Laub, 1993). In general, family factors influence young children more than older children, but peer relationships become increasingly influential as the child progresses through the early school years. Some significant risk factors are associated exclusively for early onset (age 6-11) and late onset (age 12-14) (Lipsey & Derzon, 1999). Family criminality and poor parental practices, exposure to television violence, and ADHD are risk factors for the early onsets (Ou & Reynolds, 2010). Risk-taking, physical violence, previous delinquency, truancy or dropping out from school, delinquent peers, gang membership, and coming from a neighborhood with exposure to crime, drugs, and disorganization are risk factors for late onset delinquency, while they are not significant for younger children.

According to a summary by the OJJDP’s Study Group on Serious and Violent Juvenile Offenders, the best child predictors of delinquency by age 6-11, were: (a) a prior offense, (b) substance abuse, (c) being a male, (d) coming from a low socioeconomic status family, and (e) having an antisocial parent. The best predictors of delinquency by age 12-14 were: (a) lack of strong social ties, (b) antisocial peers, and (c) prior offense (Hawkins et al., 2000; Lipsey & Derzon, 1999).

Just as risk for delinquency varies with age, risk also varies with gender and race. Being African American or Latino and being male carry higher risks than their counterparts. African American males are over represented in the justice system, particularly in residential placements (Loeb, Farrington, & Petechuk, 2003). Students who attend school with greater proportions of students or teachers of their own race tend to have better school engagement (Johnson, Crosnoe, & Elder, 2001; Rumberger, 1983). Social ties and emotional factors, such as reliable
relationships in family and other social institutions, stress, trauma, and self-esteem and identity, impact more on girls than boys (Kroneman, Loeber, & Hipwell, 2004; McKnight & Loper, 2002).

Co-Occurrence of Risk Factors and Other Problem Behaviors

Under the social ecological framework, no single factor is likely to be responsible for any single developmental outcome. Problem behaviors tend to vary with multiple risk factors (Loeber & Farrington, 1998). The larger the number of accumulated risk factors, the higher the risks for delinquency (Loeber & Farrington, 2000; Paylor, 2010). This is also true for protective and promotive factors. The more positive factors present in a child’s social environment, the better the chance for a child to be resilient in the face of adversity (Burton & Marshall, 2005; Garmezy, 1985).

Usually risk factors are highly interrelated and clustered between and within different domains. For example, family conflict and poor family management at the family level are witnessed more often from a disorganized community where drugs and firearms are available, compared to more stable neighborhoods without these problems. Family and community risk factors, in turn, contribute to school performance, which, in turn, is likely to be associated with future unemployment, welfare system dependency, and raising a child following this negative cycle (Hartwell, 2000).

It is remarkable to see the co-occurrence of serious and violent offenses with other problem behaviors in a child’s life (Huizinga, Loeber, Thornberry, & Cothern, 2000). Cumulative risk factors increase the likelihood of having multiple personal and social problems. The overlap of risks for serious, violent, and chronic offenders is especially potent (Capaldi & Patterson, 1996). Huizinga, Loeber, Thornberry, and Cothern (2000), in a report for OJJDP, found a clear relationship between serious/violent delinquency and other problem behaviors,
such as dropping out of school and substance abuse. The findings provided support for the model of three developmental pathways to delinquency advanced by Loeber and Farrington (1998).

Delinquency is clearly not a single event that may happen randomly in the life of a juvenile. In fact, the amount that is now known about the specific risks for juvenile delinquency provides a great deal of information about how to address the problem. Comprehensive prevention and rehabilitation models for juvenile delinquency, that address the multiple risk factors and reinforce the protective factors in a child’s life, are possible to achieve whenever the public is willing to make this commitment.

**Protective Factors**

Compared with the accumulated knowledge about risk factors, less is known about protective factors for juvenile delinquency and crime. Protective factors are associated with the concepts of resilience and desistance (Fraser, Richman, & Galinsky, 1999). Protective factors are the internal and external forces that help children resist or ameliorate risk. Howell (2003) defined protective factors as those which can serve to buffer risk factors, interrupt the causal processes operated by risk factors, and prevent the initial occurrence of a risk factor. Garmezy (1985) described three broad categories of protective factors: dispositional attributes, family milieu, and attributes of the extra-familiar environment. Positive family relationships and stability, low community crime, high IQ, and sustained attention have been identified as protective factors for desistance from delinquency (Carr & Vandiver, 2001; Christle, Jolivette, & Nelson, 2005).

Protective factors are very helpful in explaining why some children exposed to multiple risk factors do not engage in antisocial behaviors, and why others appear on a path toward serious criminal activity (Hoge, 2001). Problem behaviors normally develop in individuals who have a preponderance of risk factors over protective factors (Browning & Huizinga, 1999), so it is important to reinforce protective factors to prevent delinquent acts. As the number of risk
factors exceeds the number of protective factors, the probability for evasion of harmful developmental outcomes diminishes. In this regard, reinforcement of protective factors can be considered not only an effective prevention for delinquency but also an effective rehabilitation strategy to help guide juvenile delinquents toward productive lives (Fagan, Van Horn, Hawkins, & Arthur, 2007).

Howell (2003) divided major protective factors for delinquency into the following categories based on two main studies (U.S. Department of Health and Human services, 2001; Stouthamer-Loeber, Loeber, Wei, Farrington, & Wikstrom, 2002):

**Individual Factors**

Individual protective factors include high IQ, intolerant attitude toward antisocial deviance, positive social orientation, high personal accountability, capacities for empathy and guilt, and trustworthiness.

**Family Factors**

Family protective factors include good relationships with parents, good family communication, and stability.

**School Factors**

School protective factors include positive commitment to school, strong school motivation, academic achievement, and favorable attitude toward school.

**Peer-Related Factors**

Having a non-delinquent friend is a protective peer-related factor.

**Community and Neighborhood Factors**

Non-disadvantaged neighborhood and low neighborhood crime are two main protective community and neighborhood factors.
Prevention and Rehabilitation Programs

What Works in the Field for Criminality?

In recent decades greater attention has been brought to the development of more rehabilitative programs for juvenile delinquents. Some of these efforts, however, have produced disappointing results (Howell, 2003). Programs, in particular, that reply on immediate or severe punishment or psychological panic, such as “shock therapy”, have not demonstrated effectiveness (Cottle, Lee, & Heibrun, 2001; Gendreau, Little, & Goggin, 1996; Lipsey, 1992).

As punishment-oriented delinquency interventions have failed to demonstrate effectiveness (Bazemore, Stinchcomb, & Leip, 2004; Howell, 1995; Perelman & Clements, 2009), a shift to non-traditional approaches to crime, such as is embodied in the public health approach, has been recognized as increasingly promising for interventions for young offenders (U.S. Department of Health and Human Services, 2001). The public health approach targets three major levels of prevention: universal populations (universal approaches), those under great risk (selected approaches), and those already demonstrated symptoms (indicated approaches). This approach identifies the causes of the problem and the group at-risk, first, then emphasizes prevention, testing the effectiveness of intervention, dissemination of findings, and finally, applications under different circumstances (U.S. Department of Health and Human Services, 2001).

The Comprehensive Strategy (Howell, 2003) applies the public health approach to justice system involvement for the multipurpose of prevention, rehabilitation, and aftercare. This model targets youths at different risk levels: general youths, at-risk youths, delinquent youths, and offenders who are released from the justice system back to the community, using different strategies according to their risk levels. It was based on the following six principles: strengthening the family; supporting core social institutions, including schools; promoting
community-based prevention as the most cost-effective approach; intervening immediately and effectively to stop progression to more serious crimes (Zigler, Taussig, & Black, 1992); establishing a system of graduated sanctions for juvenile offenders; and identifying and controlling the small but disproportionally influential group of serious, violent, and chronic offenders (Coolbaugh & Hansel, 2000). Its dual objectives are to promote the healthy development of youths and ensure the safety of the community. Through an effective rehabilitation program, child well-being will be improved, as well as the security of the wider society (Burns et al., 2003; Howell, 2003).

Graduated sanctions as a component of the Comprehensive Strategy (Juvenile Sanctions Center, 2003) are integrated intervention strategies targeting youth offenders at different risk levels. The model provides several level of severity of sanctions: immediate interventions for first-time offenders; intermediate sanctions for first-time serious or violent offenders, and for the habitual minor offenders; community confinement for serious offenders; incarceration for the most violent youths, and aftercare for those who are released from the residential programs (Juvenile Sanctions Center, 2003). The framework includes a risk-needs assessment based on the structured assessment, a disposition matrix linking offenders with appropriate programs for them, and a protocol for evaluating programs. The programs assess the risk-needs of juvenile delinquents, place them into proper programs to match their risk level and developmental needs, and offer services focused on their personal characteristics with skills training and behavioral learning.

Lipsey and Wilson (1998) did a meta-analysis on 200 evaluations of programs and found four types of treatment showing the most positive effects on noninstitutionalized offenders: interpersonal skills training, individual counseling, and behavioral programs. The programs with the most positive effects on institutionalized offenders were: teaching family homes (a residential
group home program for troubled children and their families), behavioral programs, community-residential interventions, and multiple services from different social institutions. Supervision and sanctions did not show visible effectiveness on recidivism prevention, while rehabilitation treatment consistently showed positive and large effectiveness (Lipsey & Cullen, 2007).

**What Works for School Children?**

Truancy is an early warning of multiple problems in a child’s life and risk of involvement in future criminal activities (Onifade, Nyandoro, Davidson, & Campbell, 2010; Thornberry, Moore, & Christenson, 1985). The mission of a truancy program is to not only improve attendance, but also to interrupt linkages to future problems by identifying risk factors and offering comprehensive services to the child and family to address them (Dembo & Gulledge, 2009; Huck, 2011). OJJDP’s Study Group on Very Young Offenders (2003) recognized several promising prevention programs in a school setting for delinquency: classroom and behavior management, multicomponent classroom-based programs, social competence promotion curriculums, conflict resolution and violence prevention curriculums, bullying prevention, after-school recreation programs, mentoring programs, and school organization programs. Sinha (2007) also identified a church-based alternative education program that worked for truancy prevention.

The U.S. Department of Education (1996) outlined five primary elements of a comprehensive community and educational strategy to combat truancy, based on an evaluation of several model truancy reduction initiatives: (1) involvement of parents in all truancy prevention activities, (2) firm sanctions for truancy, (3) meaningful incentives for parental responsibility, (4) ongoing truancy prevention programs in school, and (5) involvement of local law enforcement in truancy reduction efforts.
Teasley (2004) summarized the best practices for truancy intervention at individual, school, family, and community levels. Peer tutoring and mentoring showed promising effectiveness on attendance at the individual level. School-based interventions focused on the changes of classroom and school structure, such as classroom size, school policy regarding to the attendance, quality of teacher and curriculum, interpersonal relationships between students and teachers, and interactive engagement between school, families, and community (Lehr, Hansen, Sinclaire, & Christenson, 2003). Especially for young students, it is essential to include parents’ participation in school activities. School-family-community collaboration has been identified as a key ingredient for prevention models for at-risk students (Epstein & Sheldon, 2002).

Two promising programs identified by Gandy and Schultz (2007) incorporate cognitive-behavioral therapy with caregiver training (Heyne, 2002), and court referral with community-based services (Fantuzzo, Grim & Hazan, 2005). More recently, Sutphen, Ford, and Flaherty (2010) identified six promising interventions for truancy: positive and negative contingency management, school reorganization, punitive measures, community partnerships, and family-oriented activities targeting relation building and family support. A meta-analysis study on dropout programs found alternative educational programs, such as Career Academies (Kemple & Rock, 1996), and mentoring programs, such as Check and Connect (Lehr, Sinclair, & Christenson, 2004), to be effective (Klima, Miller, & Nunlist, 2009). The other model programs were: project REACH, a collaborative truancy program involving school-community partnership, school social worker, and parents (Grooters & Faidley, 2002), diversionary juvenile court intervention (Mueller & Stoddard, 2006); the CASASTART model, a neighborhood-based, school-centered program targeting high-risk youth 8-13 years old, their families, and their communities (Murray & Belenko, 2005); and school-based social work family service (Pritchard & Williams, 2001).
Multisystemic Programs

Supported by social ecological theory and findings on risk factors at different system levels, multi-faceted or multi-systematic programs hold promise for the prevention or rehabilitation of delinquency (Underwood, Von Dresner, & Phillips, 2006). These programs are based on the integration of services from different agencies, targeted at reduction of risk and reinforcement of protective factors. Multisystematic interventions should be comprehensive in two ways: dealing with co-occurring problems using comprehensive resources, and addressing multiple risks, targeting youths at different risk levels (Huizinga, Loeber, & Thornberry, 1994). Several recognized multisystematic model programs include: Families and Schools Together (FAST, McDonald & Frey, 1999), Functional Family Therapy (FFT, Sexton & Alexander, 2000), and Multisystematic Therapy (MST, Henggeler, Pickrel, & Brondino, 1999). FAST’s framework is to enhance the protective factors for children who exhibit problem behaviors from the family, school, and community. It helps the high risk young children to build relationships through family therapy and multifamily group approach. FFT is a family-based intervention applying a comprehensive mode in a clinical setting. The goal of FFT is to enhance family communication, parenting skills, and problem solving skills. It addresses delinquent behavior, substance abuse, and mental disorders among different racial groups (Alexander, Pugh, & Parsons, 1998). MST is a family- and community-based treatment program for delinquent youths who were at risk for out-of-home placements (Underwood, Von Dresner, & Phillips, 2006). The goal of MST is to reduce delinquency and enhance juvenile well-being by addressing the environmental factors and delivering services at home and in the community.
Policy Responses to School Problems

The No Child Left Behind Act

The central aim of the No Child Left Behind Act of 2001 is that all students—regardless of economic status, race, race, language spoken at home, or disability—attain proficiency in reading, math, and science by 2014 (Center for Public Education, 2006). This Act keeps the original idea of the Elementary and Secondary School Act of 1965 that provides targeted resources to help ensure that disadvantaged students have access to a quality public education. NCLB holds schools accountable for students’ academic outcomes, focusing resources on proven educational methods. The Act addresses the truancy issue by requiring states to include attendance rate as one indicator of academic progress in the annual report to the federal government in order to receive federal funding (Center for Public Education, 2006).

Zero Tolerance School Safety and Discipline Policies

The so-called “Zero Tolerance” policy was originally developed as an approach to drug enforcement. The term became widely adopted in schools in the early 1990s, however, as a philosophy or policy that mandates the application of predetermined consequences, most often severe and punitive in nature, for misbehavior at school. This policy is intended to be applied in most settings regardless of the seriousness of behavior, mitigating circumstances, or situational contexts for certain offenses, including truancy (Skiba et al., 2006). It has shown no effects or even negative effects in evaluations in school settings, with respect to the prevention of problem behaviors based on punishment (Howell, 2003). It appears, in fact, that school suspension and expulsion are moderately associated with a higher likelihood of school dropout and failure to graduate on time in the long term (Losen, & Skiba, 2000).
Temporary Assistance to Needy Families

The creation of the U.S. Department of Health and Human Services’ Temporary Assistance for Needy Families (TANF) program included rhetoric focused on the preservation of two-parent families and the primacy of parental roles in child support (McNeil, Stewart, & Kaufman, 2000). Some states consider children’s school attendance as a requirement of eligibility for cash benefits from TANF. New York State has community initiatives such as the Tuition Assistance Program and the Parents Count Program to help children from lower-income families acquire resources to finish school. Parenting programs are another community initiative under some TANF plans intended to strengthen family ties and get parents more involved in their children’s school. Thus, directly or indirectly, TANF addresses the truancy issue by requiring parents to interact with schools and by attempting to provide stabilizing resources to families and children.

Race to the Top (RttT, 2009)

The center of the Obama administration's education reform is a national competition for more than $10 billion in school-related funds. The competitive disbursement of RttT funds is based on notions of whether a state is ready to do what works for a better education system. RttT requires a data system to track students’ records in school and advocate teachers’ professional development. Its intention is to strengthen school accountability and ensure that teachers are well-trained. Different from NCLB, RttT not only requires a data-archive process for the academic assessment, but also a data-driven process for policy-making. Students’ attendance rates are one of the school performance criteria for the RttT competition.

New Attendance Law in Louisiana (2010)

The new attendance law in Louisiana requires all students to attend school at least 167 days out of 177 in an academic year. The attendance law in the past required that high-school
students attend 162 days, and that younger students attend 160 days in a school year. The increase in required days of attendance was enacted with the belief that strengthening mandated standards will lead to better educated children. It is likely, however, to also result in more referrals for truancy, owing now to higher expectations for attendance.

Other Policies

Weed and Seeds was launched in 1991 by the U.S. Department of Justice as a means of generating comprehensive, community-based methods of crime control (McCluskey, Bynum, & Patchin, 2004). Weed and Seeds combines the law enforcement and community-based methods to control and prevent truancy at the same time by embracing community engagement and problem solving. Each Weed and Seed site is required to establish a multiservice center to deliver youth- and adult-oriented services emphasizing the economic development, job opportunities, and overall quality in the community.

Implications of Literature Review

Conclusions

This literature review draws upon and integrates knowledge from the fields of criminology and school truancy/dropout. It starts with the major theoretical frameworks used to explain youth problems in school and the justice system from a life course perspective. Developmental theories, the social development model (Hawkins & Weis, 1985), the 3-pathway framework (Loeber, 1996), and Moffitt’s (1993) classification of offending patterns are presented. A main focus of this review section is on risk factors at individual, family, school, and community levels for both criminal engagement and school problems. It further explains different risk factors across age, gender, and race groups. The consensus view that has emerged from this research on the co-occurrence of risk factors and multiplicity of problems leads to a discussion of promising interventions for at-risk youth. Then, specific, promising model
interventions that address delinquency and truancy are introduced. Finally, relevant policies that potentially impact services for youth are discussed.

Research Implications

The review of the current knowledge base in criminology and school truancy/dropout has revealed several gaps. First, the list of risk factors at the school level specifically for later criminal involvement should be addressed, departing from the findings for school truancy and dropout. Second, knowledge of criminological factors at the institutional level presenting risk for recidivism is very limited. The experiences of previous contact(s) in the justice system need to be examined in this regard. Third, due to the nature of available data resources, the majority of research in criminology has only targeted male and/or African American offenders. Further, previous studies have mostly examined risk factors associated with one specific negative outcome, such as school dropout, violence, delinquency, or chronic offending. Although those risk factors share some degree of similarity, there are few studies that have compared differences or similarities across different offending patterns. Lastly, truant offenders and delinquent youths who dropped out of school are ubiquitous in the justice system. Having a history of behavior problems in school is not easily separable from criminal engagement (Christle, Jolivette, & Nelson, 2005). School-related behavior problems may be warning sign of more serious delinquent activities to come, or part of multiple problems the child has. There is a need for better understanding of the correlation between the behavior problems in school and criminal involvement.

The current study uses state-wide longitudinal data from DOE, OJJ, and DOC to track a person in Louisiana up to 13 years. Intensive school-level risk factors, such as academic performance in major courses, discipline charges, attendance patterns, as well as demographic information, are examined to predict criminal involvement for four different offending patterns.
respectively. This study also compares similarities and differences between risk factors for criminal involvement and school-related problems, and seeks to explain how educational factors relate to different offending patterns. The major contribution of this study will be to fill in the gap in the knowledge base where no previous study has examined school-level factors associated with these four types of criminal involvement: the early starters of crime, late starters, the adolescent-limiteds, and the life course persisters.

**Concluding Statement**

Truancy is the first link in a series of problems at school and is the early warning for other more serious problems in a child’s future, such as criminal involvement (Garry, 1996). From a life course perspective, truancy may lead to dropout, and dropout may in turn result in lower income or joblessness and higher risk for criminal involvement (Henry, Caspi, Moffitt, Harrington, & Silva, 1999).

Studies on the risk factors for school truancy or dropout share similarities among risk factors for juvenile delinquency at individual, family, and community levels, but showed a different scope at a school level. School-related risk factors in truancy literature are in a broader and more detailed manner than they are in delinquency literature. Besides academic performance and dropout in delinquency literature, school climate, interpersonal relationships, and problem behaviors in school are also identified in truancy literature. The co-occurrence of school problems and criminal involvement points to a need to examine the significant risk factors accounting for both. The exploration of criminological risk factors for future offending also promises to be a valuable contribution to criminology, especially at the correctional institution level.

Fortunately, increasing attention is being brought to the problems associated with truancy. Whether it is the federal level No Child Left Behind or school-level attendance policies,
new truancy prevention programs can be found in many districts. This study seeks to discover insights into the school-level problems that link to the four major offending patterns, which could provide guidelines for education systems in targeting at-risk students, and point the way to early interventions.
CHAPTER 3: METHODOLOGY

Conceptual Framework

This chapter provides a detailed description of the research methodology for the current study. It starts with the main research questions and the design, and is followed by the definitions of key terms. Data resources, research subjects, measurements of the independent and dependent variables, and data analysis procedures are also presented in this section.

Purpose

This longitudinal, cohort study uses secondary administrative datasets to retrieve the different educational profiles for early and late starters of crime who entered into the criminal justice system, and the different educational profiles for the so-called “adolescent-limiteds” and the “life course persisters”. Furthermore, this study reveals a pathway for those who had school problems first, then became involved in delinquent activities as juveniles, and were subsequently incarcerated for adult crimes. Special attention is also given to the involvement of the juvenile justice system in this “pipeline” from school to prison.

Research Questions

This study addresses the following research questions:

1. What associations exist among selected demographic characteristics and educational risk factors?

2. Which demographic characteristics and educational risk factors are associated with juveniles who had an early onset of crime (adjudicated cases), compared with those who had a late onset of crime in adulthood, and how are they different from each other?

3. Which demographic and educational risk factors are associated with the “adolescent-limiteds” and the “life course persisters” groups, and how are they different from each other?
4. Does Office of Juvenile Justice (OJJ) involvement increase or decrease the likelihood of Department of Corrections (DOC) involvement for students with school behavior problems?

Hypothesis 1: OJJ involvement will increase the likelihood of DOC involvement.

5. To what extent are selected criminological factors (i.e., age at the first OJJ contact, the frequency of OJJ contacts, the severity of offense, and gang membership) predictive of a persistent criminal pathway?

Hypothesis 2: The earlier a child enters OJJ, the greater the probability of committing more crimes in adulthood.

Hypothesis 3: The higher the frequency of OJJ contact, the greater the likelihood of involvement in further criminal activities.

Hypothesis 4: The greater the severity of OJJ offense, the greater the likelihood of DOC involvement.

Hypothesis 5: Gang membership increases the likelihood of DOC involvement in the future.

Research questions 1-3 and 5 are relational in design. For research question 4, a quasi-experimental design is applied to examine the hypothesized causal relationship between the independent variables and the dependent variable (adult criminality).

Data Management

Data Resources and Structure

This study uses live individual-level administrative data from the Louisiana Department of Education (DOE), the Louisiana Office of Juvenile Justice (OJJ), and the Louisiana Department of Safety and Corrections (DOC) covering a period of 13 years from 1996 to 2008. The raw variable lists from the three state-level departments are presented in Appendix A.
DOE has three datasets in a yearly database: enrollment data, discipline data, and assessment data. Enrollment data consist of yearly records for all students in the Louisiana public school system from 1996 to 2008 and are appended together to become a single dataset. It mainly includes basic demographics and attendance information, such as absent school days, truancy flags, and dropout flags. Every student in the enrollment dataset has entries corresponding to each year the student enrolled in the public school system. A student would have a data entry for each school year that the student stayed in DOE. Under certain circumstances a student could have multiple entries within a school year, indicating possible unexpected school transitions.

Discipline data provide records for students who were charged with behavioral infractions of school rules; a student could have zero to many entries within a school year. Assessment data consist of standardized test scores for 3rd graders and higher. Standardized test scores were first recorded in 1999, whereas the enrollment and discipline DOE datasets were started in 1996.

OJJ data provide records for all juveniles involved in OJJ and the judicial placements for each episode. This study, however, tracks only the first contact with OJJ as an indicator of OJJ involvement, hence “OJJ status”. The same process of data management is used for the DOC dataset, which provides records for adult offenders; only the first contact with DOC is kept. Study participants were identified across the DOE, OJJ, and DOC datasets through their Social Security numbers (SSN), last names, and dates of birth.

**Data Management Process**

Educational profiles and demographics will be examined for the four subgroups of criminal involvement: (1) students who had OJJ records (early starters), (2) students who had DOC involvement but had no previous OJJ involvement (late starters), (3) students who had OJJ
records but did not have DOC involvement (adolescent-limiteds), and (4) the students who had both OJJ records and DOC involvement (life course persisters).

The first step of the overall data management is to identify the raw variables of interest in the original datasets from the three state-level departments. Irrelevant variables are deleted and new aggregated variables are converted, recoded, generated, and computed for each dataset. Multiple cases and missing values are treated before the merging process. In the final merged working dataset, each student had one record only, containing all study variables.

The data management procedure is described in Figure 1.

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**Figure 1**
**Data Management Procedure**

After cleaning each of the three DOE datasets, they were merged together by SSN (used as the student ID number in DOE), last name, and date of birth. Only students who were born 1980-1989 and in grades 7-12 were included in this study. The youngest age at which a person can be sentenced to the DOC in Louisiana is 17, which would make 1980 the earliest birth year in the dataset. The final merged DOE dataset consists only of those students for whom assessment, enrollment, and discipline data were available. Figure 2 shows the merging process for the three DOE datasets. The overlapping area of E and A represents the subjects in the DOE merged database (may or may not have discipline charges).
Every student who had records in both DOE and OJJ is assigned an OJJ status. Those cases in OJJ but not in DOE are dropped from the working dataset; therefore, the resulting dataset includes DOE students, some of whom had OJJ contact and some of whom did not. This merging process is shown in Figure 3. The overlapping area represents the early starters in OJJ with DOE records (OJJ status).

DOC has a “descriptive” dataset with records of last name and date of birth, and a “master” dataset with records of the social security number. To get all three merging criteria (SSN, last name, and date of birth) in DOC, the two are merged together based on the unique DOC number. This process is shown in Figure 4 on the left. After deleting the duplicates and irrelevant variables in DOC, the third merging stage is to merge DOC with the previous merged
dataset using SSN, last name, and date of birth. Similar to the merging stage of DOE with OJJ, each student with records in both DOE and DOC is assigned a DOC status. The other DOC cases without records in DOE are excluded from this study. This merging process is shown in Figure 4 on the right.

Figure 4
Process of Merging DOC with DOE and OJJ Data File

Figure 3
Process of Merging DOE Merge with OJJ Data File
The merged area between DOE and DOC represents the students who had DOC involvement (DOC status). The merged area among DOE, OJJ, and DOC represents the students in DOE who had records in both juvenile and adult justice systems (Both Status). They are the life course persisters in this study. The students who had OJJ involvement, but were not incarcerated in DOC in adulthood, are adolescent-limiteds in this study (OJJ only). Students who had DOC involvement only in adulthood and no prior OJJ involvement are the late starters (DOC only) in this study. As shown in Figure 3, the early starters are those occupying the overlapping area between DOE and OJJ.

The final dataset consists of the students in DOE with and without records in OJJ and/or in DOC. The four subgroups make possible two comparisons in this study: early starters vs. late starters and the adolescent-limiteds vs. the life course persisters.

**Operationalization of Key Terms**

**Early Starters vs. Late Starters**

Early starters vs. late starters are juvenile delinquency-related terms that distinguish the different ages of onset of criminal involvement. Early starters of crime are those who start their criminal activities at a very young age, usually before age 14 (Patterson, Forgatch, Yoerger, & Stoolmiller, 1998), but then stop this pattern in adulthood. Late starters are a counterpart of the early starters, usually showing an offending pattern at a late age, commonly after age 17.

In this study, the early starters are those juveniles with OJJ conviction(s) before age 17, an indicator of delinquent activity at an early age. The late starters are those DOC offenders who did not have criminal involvement until age 17 and older. In Louisiana, 17 is the cutoff age between the juvenile and adult justice systems. Their records in DOC and the absence of records in OJJ are used in this study to indicate a late onset of criminal involvement.
Adolescent-Limiteds vs. Life Course Persisters

Adolescent-limiteds vs. life course persisters (Moffitt, 1993) are terms that distinguish whether the criminal activities peak in adolescence, and then effectively cease, or continue into adulthood. Those who have serious behavioral problems only in adolescence are labeled adolescent-limiteds. Even without any intervention, their problem behaviors tend to stop as they mature or are interrupted by life events, such as marriage, employment, or military service (Sampson & Laub, 1993). The counterparts of adolescent-limiteds are the life-course persisters, who continue the problem behavior pattern into adulthood and develop a habitual offending pattern. This small group of offenders is responsible for the majority of criminal activities in society (Henry, Caspi, Moffitt, & Silva, 1996).

In this study, the adolescent-limiteds are those who had OJJ contacts before age 17, then no further involvement, while the life course persisters are those who first had school problems, then OJJ involvement, and finally ended up in the DOC. Due to the limited data period for the 10-year cohort, the available DOC records in 2008 cover only the age range of 19-28, so those identified as life course persisters in this study may more accurately be labeled as potential life course persisters.

Demographics

Demographic information provides the participants’ racial identity, gender, age, and socioeconomic status. These variables are usually used as control variables in multivariate analyses.

In this study, gender and race are included in the regression models as control variables. The eligibility of free/reduced lunch, which indicates a low socioeconomic status of a student’s family, is also included as a control variable.
Criminological Factors

Selected criminological factors are used to predict DOC involvement among the OJJ clients when controlling for demographics and school-related risk factors. This group of indicators measures the severity of criminal involvement during the adolescent years in OJJ. Five variables are used as criminological factors: age at the first OJJ contact, gang membership, the most serious charge in OJJ, the number of OJJ charges, and the number of OJJ contacts. The last two are indicators of frequency of offenses that a student committed.

Due to the dual roles of the juvenile court in juvenile cases (child welfare and juvenile justice), the OJJ dataset contains both Family In Need of Services (FINS) cases and delinquency cases. The FINS cases mainly indicate family problems associated with child maltreatment, therefore, they are excluded. OJJ clients whose ages at the first OJJ contact exceeded 17 are also excluded, to allow a proper comparison between the early and late starters of crime for this study. It was revealed in previous studies that the earlier a child started serious behavioral problems, the greater the chances that the child would step into a career of crime (Farrington, Ttofi, & Coid, 2009; Green, Gesten, Greenwald, & Salcedo, 2008). The H2 for criminological risk factors is that the age at the first OJJ contact is negatively related to DOC involvement. The H3 is that the greater frequency of student involvement with OJJ, the higher the probability that the student would have DOC contact. The most severe charge a child received in OJJ is used to indicate the severity of the delinquent behavior among the adjudicated cases. It is hypothesized (H4) that having a charge of parole or secured custody increases the possibility of further DOC involvement compared with probation. Gang membership is a strong indicator of weak family ties and future antisocial behaviors (Hill, Howell, Hawkins, & Battin-Pearson, 1999). Finally, it is hypothesized (H5) that gang membership increases the probability of future DOC involvement.
School-Related Factors

Social-ecological frameworks emphasize the importance of the school environment among other social system influences in a child’s life that include individual, family, peer, and community systems (Gorman-Smith, Tolan, & Henry, 2000). The major education-related risk factors were reviewed in the previous chapter. In this study, educational factors are categorized into three domains: school-related behavior problems, school engagement, and school performance.

School-Related Behavior Problems

In this study, behavior problems in school are measured by the total number of school discipline charges a student had, on average across the school career. The more discipline charges the student had, the higher the level of severity of problem behaviors in school. Additionally, different types of school discipline charges, such as in-school and out-of-school expulsion and in-school and out-of-school suspension, are compared when examining the relationship between behavioral problems in school and criminal outcomes. As explained by DOE, out-of-school suspension is removal for at least one full day; out-of-school expulsion is removing a student for at least the remainder of the school semester; in-school suspension is a temporary removal from the classroom to an alternative setting on the same campus for at least one school day; and in-school expulsion is removal for a period of time from the classroom to an alternative setting on the same campus.

School Engagement

Factors in the school engagement domain normally include school attendance, school climate, and the relationships among teachers and students (Christle, Jolivette, & Nelson, 2005; Henry, Knight, & Thornberry, 2012; Hill, Howell, Hawkins, & Battin-Pearson, 1999). In this study, school engagement is measured by four variables: the number of unexpected school
transition(s); total missed school days within a school year, on average; total truancy flags within a school year, on average; and dropout flag. A high number of unexpected transitions during a school year introduces risk for decreased school engagement. More school days missed in a year may indicate lower school engagement. The DOE flags a truant student whenever he/she misses five or more days within a 30-day period. The greater number of truancy flags recorded for a student within a school year is regarded as an indicator of lower school engagement. The DOE datasets contain yearly records for each student. Under some circumstances, there were students with dropout flags who came back to school in the following year and completed high school. A dropout flag is thus considered to be accurate only when it appears at a student’s last entry, indicating that the student dropped out of school permanently.

**School Performance**

Factors under this domain indicate a student’s academic performance, measured by test scores, failure of grade, and special education status (Alexander, Entwisle, & Horsey, 1997; Gandy & Schultz, 2007). In this study, the highest grade a student completed in DOE, special education status, failure of grade (once, twice, or more), and failure on standardized tests (English Language and Art [ELA] and mathematics [MATH]) are regarded as measurements of a student’s academic performance. A higher final grade level attained in DOE indicates better academic performance, but a lower grade level in DOE may be misleading if the student transferred to a private school or moved to another state, and then advanced to a higher grade level there. Unfortunately, this dataset cannot reflect these circumstances, so for a small percentage of the students in the dataset, this particular variable does contain some limitations and must be treated, therefore, with some caution. A large proportion of failures on ELA and MATH, special education status, and failure of grade all indicate poor school performance.
Method and Procedures

Sample

This study uses merged administrative datasets from 1996 to 2008 from three state-level departments in Louisiana: DOE, OJJ, and DOC. The starting point is the entire DOE population during that period (over 12 million entries), which includes more than 1.8 million nonduplicated students who enrolled in the public school system in Louisiana from 1996 to 2008. Once the three DOE data files (enrollment, assessment, and discipline) are merged together, nearly half of the students are excluded because of missing assessment records. The remaining students are then truncated to a 10-year cohort (born 1980-1989) who reached at least 7th grade. There are two major reasons for this filtering process. One is, according to the DOE dropout definition, that only 7th-12th graders could potentially be flagged as dropouts. Another is that due to the 13-year data period (1996-2008) and the 17-year-old minimum age requirement of DOC, only records of these 10-year cohort students could potentially be found in DOC (students born after 1989 are not old enough to have had DOC contact, even if they had been involved in some level of criminal activities).

The chosen 10-year birth cohort is identified within the data presented in Figure 5. It shows all persons in DOC custody in Louisiana in 2009, identified on the horizontal axis by birth year (the two lines represent school drop-outs and graduates). As can be seen in this figure, the birth years 1980-1989 represent the core of the DOC population in Louisiana in 2009, and their numbers, for drop-outs and graduates, are very consistent across the cohort (approximately 60% and 20%, respectively; another 20% of this population were not identified as either in DOE).
Therefore, to summarize, the study subjects from DOE are 7\textsuperscript{th}-12\textsuperscript{th} graders, born 1980-1989, with records in both enrollment and assessment data files, with or without records in the discipline data file, during the 1996-2008 period. The total number in the sample is 407,800 for this study. The final dataset contains four subgroups in DOE: (1) the students labeled as the early starters (OJJ status, \(n = 14,346\)); (2) late starters (DOC only, \(n = 17,107\)); (3) the adolescent-limiteds (OJJ only, \(n = 10,126\)); and (4) the life course persisters (Both Status, \(n = 4,220\)).

Figure 6 below shows the research sample structure in this study. It contains four study groups. Three of them are shown in the figure directly, but the early starters group is not. Offenders in this group are the combined adolescent-limiteds and the life course persisters, indicating contact in OJJ no matter how long the crime career lasted. Each study group is coded 1 for offending status, and 0 for nonoffending status.

DOC involvement is the outcome variable to answer RQs 4 and 5. Offenders in DOC include the late starters and the life course persisters, irrespective of early OJJ contact. The offenders with DOC records are coded 1; all non-DOC offenders are coded 0.
The research subjects are Louisiana 7th-12th graders, born between 1980 and 1989 (inclusive), with records in DOE during the years 1996-2008. The representativeness of the sample in this study is close to the population of study, which is all students in the Louisiana public school system who were also found in OJJ and/or DOC. Three issues of representativeness are described below.

The 10-year cohort is used for this study because the data resources are limited to the 13-year period (1996-2008), and students born after 1989 are too young to have had DOC contact within the timeframe of this study, even if they had been involved in delinquent activities. Those students could possibly have OJJ contact, but whether or not they would have become life course persisters could only be determined by further tracking. Additionally, DOE only flags 7th graders and higher as dropouts, so those students who dropped out in the low grades, transferred to private schools, or moved out of the state are also excluded from the sample pool.
There are three merging stages: (1) the three DOE data files are merged together based on SSN, last name, and birth date; (2) the resulting DOE merged data file is then merged with OJJ using SSN, birth date, and sex; and (3) the merged file of DOE and OJJ is finally merged with DOC (DOC master file and descriptive file) by SSN, last name, and birth date. Each merging process diminishes the sample pool as a result of the merging criteria. A student could be dropped if one of the merging criteria is not matched, or as a result of data entry error. When merging assessment data with the other two DOE datasets, almost half of the students are lost. There are two reasons for the loss. One is that assessment data were not recorded prior to 1999, but the other two DOE data files were begun in 1996. Another is that only students at the 3rd grade level and higher take standardized tests and are recorded in the assessment data.

Because of the limitations described above, the final DOE merged data file only contains 20% of the student body whose records are found and perfectly matched in the three datasets during the years 1996-2008 in Louisiana. The students in this study are 7th-12th graders who had test scores in assessment data and were born during the period of 1980-1989.

Protection of Human Participants

All the data resources in this study are secondary data collected by the three state-level departments. There are essentially no physical, psychological, social, or legal risks to the participants. Some identifying information is used from the datasets, but just for merging purposes. Once the raw datasets are merged together, the analyses are run only on the demographics and the school risk factors. There is no identifying information in the final results. No participants were contacted directly for information; the study data are based entirely on the raw archived administrative records.

Access to the data resources from the three state-level departments is allowed due to the Memorandum of Understanding (MOU) among the three departments and the Office of Social
Services and Research Development (OSSRD) within the School of Social Work at LSU, and in compliance with the Family Education Rights and Privacy Act (FERPA; FERPA/34 CFR Part 99) to conduct research in an educational setting. The Dropout Study, ongoing since 2011, is a broad project encompassing several studies made possible through the use of these data resources. Any Dropout Study-related research is bound to the terms of the MOU; permission from the different state-level departments is required independently.

Due to the personal identities in all datasets, OSSRD takes extra precautions to secure the data. The data are saved on two external hard drives and are used only on a computer that does not access the internet. The external hard drives are kept in a safe with four lockable doors. The data are not allowed to be copied onto any personal or office computers, nor used outside of the social work building.

This study is part of the Dropout Study project and was preceded by several research phases. An application to conduct Dropout Study-related research and authorization to use the different department-level datasets must be submitted annually to the LSU Institutional Review Board (IRB). The author and this study are both included among the approved applicants.

**Issues of Validity**

**Internal Validity**

Internal validity is the term used to describe the conditions affecting a causal relationship between an independent variable (an intervention) and a dependent variable in experimental and quasi-experimental designs (Shadish, Cook, & Campbell, 2002). To answer research question 4 (whether OJJ involvement increases the probability of DOC involvement), a quasi-experimental design is applied. The magnitude of internal validity positively indicates the strength of a causal relationship between an independent variable and a dependent variable. The major threats to internal validity are selection, history, maturation, instrumentation, testing, regression to the
mean, and differential attrition (Shadish, Cook, & Campbell, 2002). In this study, there are several threats to internal validity when examining the students’ OJJ experiences to predict future DOC involvement.

Selection is the major threat to internal validity in the current study. Selection bias would be a threat where systematic differences of characteristics between the experiment group and the control group would account for the observed effect on the outcome variable. Propensity Score Matching (PSM) is an advanced statistical technique for quasi-experimental designs, used to minimize the threat of selection by statistically generating equivalent comparison conditions (more on the use of PSM in this study’s data analysis is provided below). PSM will be used to analyze research question 4. Using PSM to identify a comparison group requires a complete, or near-complete, list of the characteristics of the treatment group. This study has educational profiles only for both the treatment group and the control group; other characteristics at individual, family, and community levels are missing. Therefore, only the educational characteristics of the two groups are comparable, and these may be systematically different at the other levels of indicators, which will be a limitation for the current study. Furthermore, those students who may have been involved in delinquent activities but were not caught by OJJ could be different from those who were caught and were involved in OJJ, even if they share the exact same characteristics at all other levels.

This study examines a 10-year birth cohort, so the threats of history, maturation, regression, and attrition are partially controlled for in both the treatment group and the control group. Although the participants come from a birth cohort, the range of age difference is 10 years. If the distribution of age is different for the treatment group and the comparison group, this difference could be confused with a treatment effect, especially since the sample is composed of individuals at points in their lives when rapid changes may be associated with short
periods of growth. The data resources for the current study are limited to the last 13 years. Due to the limited time period, some students in DOE are excluded because they are not old enough to have had DOC involvement, even though they could potentially be assigned as life course persisters if the data period were extended beyond the 13 years. When the numbers of the potential life course persisters are different for treatment and control groups, different attrition rates could be confused with a treatment effect. However, the benefit of this limited time period is that undue influence from extreme cases is avoided.

Attrition, instrumentation, and testing threats only occur in pre-post designs, so they are not discussed here. Using one-to-one nonreplacement PSM for research question 4, the comparison group would have the same sample size as the treatment group.

**External Validity**

External validity is the extent to which a causal relationship can be generalized to different conditions, different persons, settings, interventions, or outcomes (Anastas, 1999). Threats to the external validity of a research study stem from three different categories: people, places, and time. Therefore, a full description of the characteristics of the study subjects and research settings would provide a starting point from which to assess the degree of external validity of the study.

In this study, the research subjects consist of the 7th-12th graders with assessment data in the Louisiana DOE from 1996 to 2008 who were born during the years 1980-1989. There are four subgroups under this framework: students who had OJJ contact (early starters); students who had records only in DOC (late starters); students who had records only in OJJ (adolescent-limiteds), and students who were involved in both systems (life course persisters). Findings from this study may be generalized only to students with similar demographics and educational factors.
The large sample size of the study (N=407,800) strengthens its external validity. The application of PSM for RQ4 is to statistically create a comparison group, as an alternative to random assignment, also increases external validity.

**Measurement**

This study examines demographics and school-related risk factors for four offending groups: early starters of crime, late starters, the adolescent-limiteds, and life coursepersisters. This study further measures criminological risk factors for adult recidivism. The four group status variables are based on the records of OJJ involvement (the early starters of crime), DOC only involvement (late starters), OJJ only involvement (adolescent-limiteds), and those with records in both systems (life course persisters). All the group status variables are dummy coded as 1/0, where 1 indicates criminal system involvement.

OJJ status (Group 1) identifies students in DOE who also had records in OJJ in the final merged dataset under restrictions.

DOC only (Group 2) identifies students in DOE who also could be found in DOC but not in OJJ in the final merged dataset. DOC only status is coded 1 if Both Status equals 0 and DOC status equals 1.

OJJ only (Group 3) identifies students who had records in OJJ but not in DOC. OJJ only status is coded 1 if Both Status equals 0 and OJJ status equals 1.

Both Status (Group 4) identifies students who had records in both OJJ and DOC. Both Status is coded as 1 if both the OJJ status and DOC status equal 1.

DOC status identifies students who had records in DOC. It is the dependent variable to answer research questions 4 and 5 examining the criminological risk factors for adult crime and recidivism.
Demographic Characteristics

The enrollment dataset from DOE provides very basic individual demographic information. Gender is a categorical variable coded as “Female” and “Male”. Race is also a categorical variable with the value 1 indicating American Indian or Alaskan Native; 2, Asian Pacific Islander; 3, Black (not Hispanic); 4, Hispanic; and 5, White (not Hispanic). American Indian or Alaskan Native and Asian Pacific Islander are combined together as “Others” while the remaining cases are kept the same. Race is dummy coded for later analysis using “White” as the reference group for race.

Eligibility for free/reduced lunch indicates a low family socioeconomic status with the value 1 meaning eligible for free lunch, 2 for reduced lunch, and missing value meaning not eligible for either. The variable of free/reduced lunch is operationalized as a dummy variable first where 1 means eligible and 0 not eligible, calculated each time a student enters into DOE. Then the proportion of eligibility for free/reduced lunch is calculated across a student’s total entries in DOE. The proportion equals the total number of times eligible for free/reduced lunch divided by the total number of DOE entries. The variable is then dichotomized as eligible or not, with eligibility defined as greater than 0.5 across the DOE total years, which would receive a code of 1.

School Discipline Charge History

There are five variables for this group, consisting of four discipline types and a total. The average numbers of the four different discipline charges in DOE are calculated individually. The four categories of discipline charges are: Out-of-School Suspension; Out-of-School Expulsion; In-School Suspension; and In-School Expulsion. The average number of total annual discipline charges in DOE reflects the sum of discipline charges across the four different types divided by the number of years in DOE.
School Engagement Variables

School engagement variables include the total number of unexpected school transitions, annual total number of days absent and total number of truancy flags, each averaged, plus dropout flag. At the start of every school year, each student in DOE receives a new data entry, noting enrollment at that specific school. If a student transfers in the middle of a school year, the student will have a data entry in DOE filed by the new school, in addition to the data entry noted for the beginning of the school year. When a student remains at one school or transfers to another school at the beginning of a new school year, the total number of school years that student attends school will equal the total number of school data entries. This study tracks “unexpected” school transitions, those that occur during the school year, as an indicator of family mobility and students’ risk for low engagement in school (Glanville & Wildhagen, 2007). It is calculated as a student’s total number of school entries in DOE minus the total years that the student enrolled in DOE. This method of calculating unexpected transitions does not capture all school transitions (those that occur before or at the beginning of a school year cannot be distinguished from regular enrollment), but it does indicate multiple transitions, and thus serves as an index for this specific risk.

Average yearly absences in DOE are the sum of all missed school days divided by the number of years a student was enrolled in DOE. This variable measures the severity of absence, on average, across the DOE years.

DOE assigns a truancy flag to any student who misses five days (excused or unexcused) within a 30-day period. Average truancy flags in DOE are the sum of truancy flags divided by the years in DOE, which is an aggregated variable reflecting the average yearly truancy flags in DOE.
A dropout flag with a value “Yes” or “No” is recorded in DOE enrollment data. Under some circumstances, a student could drop out of school temporarily in one school year and come back at some later point. Due to the yearly structure of enrollment data, only a dropout flag on the last entry is considered to be indicative of an actual dropout. Therefore, students’ last entries in DOE are retained in this study for analyses.

**School Performance Variables**

School performance variables include the highest grade a student completes in DOE, special education status, proportion of failures on standardized tests, and school detentions of one, two, or more than two. The variable “grade placement” contains more than 12 values, including prekindergarten and kindergarten. The research subjects in this study are limited to 7th-12th graders at the last entry. Each number indicates the highest grade that a student pursued in DOE.

Special education status is converted from the variable “special education reason” from DOE assessment data. A value of 0 indicates non-special education status and 1 indicates special education status.

“Fail grade” is converted from the “educational progress code,” which contains the values of 01 – promoted to next higher grade; 02 – promoted two or more grades; 03 – retained at same grade level; 04 – demoted to next lower grade; 05 – demoted two or more grades; 06 – completed the education program; 07 – terminated the education program without completing; 08 – does not apply; and 09 – cannot be determined. Grade failure is coded at three levels: once, twice, or more than twice.

The proportion of exam failures on two standardized exams (English Language Arts [ELA] and Mathematics [MATH]) is calculated as the total number of “fails” on ELA and MATH divided by the total number of times a student took these tests. Higher values of the two
proportions mean greater difficulties with these major courses. For students in special education programs, evaluations of exam results as “WST” (working toward standard), “PRE” (prefoundational), or “APP” (approaching basic) are considered failure.

**Criminological Factors**

Criminological factors encompass age at the first OJJ contact, the level of OJJ judicial placement (parole, secure custody, nonsecure custody, and probation), severity of OJJ offense, frequency of OJJ contact, and gang affiliation. OJJ status is defined as students who are found in OJJ in the merged dataset of DOE Merge and OJJ, which is the indicator of the early starters of crime. OJJ status also serves as an independent variable (or a treatment status) to predict DOC involvement (DV) in the multivariate model. Families in Need (FIN) cases are not included because they are mainly child welfare cases not necessarily involving delinquency.

The justice system uses round figures for age, but it is different from the round value in mathematics. For example, a person who is one day younger than 17 years is still considered 16 years-old in the justice system. Age at OJJ contact is calculated in years, rounding downward for any portion of a year.

OJJ contact is measured by two variables: the number of OJJ arrests (OJJ episode) and the total charges in OJJ, each corresponding to different dimensions of frequency of criminal activities. The variable “episode” in the OJJ dataset counts the number of OJJ contacts, or arrests. This variable has a range from one to five, indicating the number of times a student had contact with OJJ. One episode, however, may include multiple delinquent activities either being processed together or at different time periods during that episode. For this reason, the total number of charges in OJJ is also used, as this provides more information on the extent of criminal activities.
The most severe charge a child received in OJJ reflects the severity of a child’s delinquency. The most severe charge in OJJ contains four categories: parole, secure custody, probation, and nonsecure custody. Each category of OJJ charge is dummy coded using probation as the reference group in the multivariate analyses.

Gang membership is converted from a gang variable in OJJ, which contains more than 400 gang codes in Louisiana specifying which gang a student belongs to. If it is missing, membership status is coded as 0, indicating nongang membership status; the remaining cases are coded as 1, indicating gang membership status.

**Research Design**

This is a longitudinal study of a 10-year period birth cohort tracking state-level records from 1996 to 2008 from DOE, OJJ, and DOC in Louisiana. This exploratory study utilizes secondary administrative data from the three departments to explore linkages between educational factors and criminal outcomes, and further detects how each of those educational factors contributes to the four subgroups: early starters, late starters, adolescent-limiteds, and life course persisters. Two comparisons are made: early starters vs. late starters and adolescent-limiteds vs. life course persisters, regarding the demographics and school-related risk factors (problem behaviors in school, school engagement, and school performance) This study also examines the impact of OJJ using a quasi-experimental design to determine whether OJJ involvement increases or decreases the likelihood of DOC involvement. Propensity Score Matching (PSM) is applied to find a comparison group from DOE for those students who had OJJ contacts. PSM is an alternative to random assignment for program evaluations when random assignment is either not feasible or unethical, and is considered a quasi-experimental design. The results from the PSM are used to confirm and compare the results from a classical regression using OJJ involvement as an independent variable and DOC involvement as an outcome.
variable. Finally, this study analyzes criminological factors, such as age at the first OJJ contact and the numbers of OJJ contacts, together with demographics and educational factors to predict further DOC involvement.

Data Analyses

The data management and analyses are conducted using STATA 12 (2012, 64-bit; Long & Freese, 2006).

Power Analysis

A power analysis for this study determines if the sample size is sufficient for the planned statistical analyses, which include four regression models using 29 independent variables for the four subgroups of OJJ status (early starters), DOC only (late starters), OJJ only (adolescent-limiteds), and Both Status (life course persisters). As a general rule for a proper analysis, the number of participants should be at least 10 times more than the total number of the variables in the equation (Knapp, & Campbell-Heider, 1989). The total number of research subjects in this study is 407,800; therefore, the sample size is large enough for the multivariate analysis in all four regression models. The study variables and levels of measurement are shown below.

Table 1
Study Variables and Levels of Measurement

<table>
<thead>
<tr>
<th>Group Status</th>
<th>OJJ status (nominal)</th>
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<tbody>
<tr>
<td></td>
<td>DOC only status (nominal)</td>
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<tr>
<td></td>
<td>OJJ only status (nominal)</td>
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<tr>
<td></td>
<td>Both Status (nominal)</td>
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<td></td>
<td>DOC status (nominal)</td>
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Demographics   Gender (nominal)
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<th>Table Continued</th>
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<tbody>
<tr>
<td>Race (nominal)</td>
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<tr>
<td>Black (nominal)</td>
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<tr>
<td>White (nominal)</td>
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<tr>
<td>Other race (nominal)</td>
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<tr>
<td>Proportion of free/reduced lunch (ratio)</td>
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<tr>
<td>Dummy free/reduced lunch (nominal)</td>
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<td><strong>School Discipline Charge History</strong></td>
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<td><strong>School Engagement</strong></td>
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<td><strong>School Performance</strong></td>
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68
Descriptive Statistics

Descriptive statistics summarize basic information. Frequencies and percentages are used for the nominal level independent variables, and means and standardized deviations are used for the continuous independent variables. After the overall sample is described, two comparisons are made based on the descriptive statistics: early vs. late starters and the adolescent-limiteds vs. the life course persisters.

Bivariate Statistics—Interrelations between Variables

Bivariate analyses detect the presence and magnitude of associations between two variables. The purpose of these analyses will be to provide substantive information about associations between main variables of interest, in addition to identification of potential interaction terms for multivariate analyses.
Tetrachoric correlation in STATA is used to analyze correlations among nominal level variables. In this study, these analyses will include the following variables: grade failure, sex, race, dropout flag, free/reduced lunch eligibility, special education status, legal status in OJJ, and gang membership, analyzed in relation to group status variables, OJJ status, DOC only, OJJ only, and Both Status.

Spearman’s rank correlation in STATA is used to analyze associations between continuous and nominal variables, and between two continuous variables. The variables examined via correlation analyses will include: number of unexpected school transitions, the highest grade in DOE, average yearly absent days in DOE, average yearly truancy flag in DOE, the proportion of eligibility of free/reduced lunch, average yearly discipline charges, the proportion of failed tests on ELA and MATH, number of OJJ contacts, and age at the first OJJ contact, analyzed in relation to group status (OJJ status, DOC only, OJJ only, and Both Status).

Correlational analyses are also used to identify potential interaction terms. Coefficients greater than 0.4, at the 0.01 significance level (Trochim, 2006) will be considered for possible interaction terms in the multivariate analyses.

Kendall’s correlation test in STATA is used to detect correlations among the variables at all levels. It is used to repeat the process of tetrachoric and Spearman’s rank correlations tests. The purpose of this correlation test is to confirm the findings from the prior tests.

**Inferential Statistics**

Multivariate statistical analyses are used to examine the aggregated impact of selected independent variables on dependent variables. The contribution of each independent variable in the model to the variance of the dependent variable is also shown. For the purposes of regression analyses for research questions 2 and 3, the four Group Status nominal variables are considered dependent variables, and the other variables identified above are considered independent.
variables. For research question 5, DOC status is considered the dependent variable, and the rest of other variables are the independent variables.

This study uses four logistic, hierarchical regressions to answer research questions 2 and 3. Two comparisons are made, based on the results from the four regression models, to show different educational profiles and demographics for early starters compared to late starters, and adolescent-limiteds compared to life course persisters.

The regressions for the four subgroups use the same independent variables in their models. Demographics as control variables are placed at the first level, discipline charge history variables are entered at the second level; school engagement variables are the third level, and finally, the school performance variables are the last level in the model. Interactions are also included in the regression model based on the findings from the correlation analyses.

To answer research question 4, (Does OJJ involvement increase or decrease the likelihood of going to DOC?), another regression model (regression No. 5) is run by keeping all the independent variables the same, except using OJJ status as an additional independent variable at the second level. For this analysis, DOC involvement is the dependent variable. Possible interactions are also included in the model.

The final regression model uses criminological factors (age at first OJJ contact, number of OJJ contacts, number of OJJ charges, gang membership, and the most serious charge in OJJ) to predict future DOC involvement among OJJ clients. The analysis answers research question 5 (How does OJJ experience increase/decrease the likelihood of DOC involvement?).

Propensity Score Matching (PSM)

The purpose of using PSM in this study is to confirm the results from the regression No. 5 to answer the question of whether previous OJJ contact increases or decreases DOC involvement. PSM is a fairly new method used in program evaluations when random assignment
is either impossible or unethical (Guo & Fraser, 2010). It is an alternative to random assignment and is considered as a quasi-experimental design. The concept behind PSM is the creation of a comparison group, case by case, based on the probability of being included in the treatment group as determined by the extent to which known characteristics are shared (Heinrich, Maffioli, & Vazquez, 2010). The probability score is calculated across all the independent variables that fully capture the characteristics of the treatment group. Usually the independent variables are the referral criteria of the treatment group and demographic information. The more complete the factor list is, the greater the number of potentially shared characteristics, and the better the comparison can be made (Ponzo, 2012). Once each research subject has a probability score of being referred to the treatment group, the comparison group is identified one by one based on the closest probability score (propensity score) of assignment to the treatment group. In this way, random assignment is mimicked through statistical manipulation (Barth, Guo, & McCrae, 2008). PSM has the merits of quasi-experimental design by controlling the threat of potential selection bias and is applicable for observational studies.

PSM requires a large sample size, known as the “data-hungry method” (Guo & Fraser, 2010), and a representative capture of the characteristics of the treatment group. In this study, sample size is not an issue for the PSM application, but there is a concern regarding the capture of the characteristics of the participants. Most variables in this study are derived from school settings, with little information from family and community sources, which could be a major limitation for this analysis.

There are several types of PSM based on different matching methods. This study uses the one-to-one nearest neighbor matching without replacement method to find a comparison group of OJJ in DOE using DOC involvement as the outcome variable.
CHAPTER 4: RESULTS

This chapter presents the results of the statistical analyses to answer the proposed research questions in chapter 3 by order. The main purpose of this exploratory, longitudinal study is to examine the associations among the school-level risk factors with the four different offending patterns, and to make comparisons of the educational profiles regarding the onset age and duration of criminal career. It further examines whether previous juvenile justice contact increases the likelihood of involvement in the adult criminal justice system and what criminological factors in OJJ predict adult recidivism. A 10-year birth cohort born in 1980-1989 was targeted in 2008 from the Department of Education. All of them completed at least grade seven in the Louisiana public school system. Their aggregated educational records and criminal records are tracked during the period of 1996-2008. The oldest participants in this study were 28-years-old, and the youngest ones were 19-years-old in 2008.

This chapter starts with descriptive statistics analyses first. The overall sample will be described, followed by the description and comparison of demographics and school-related factors among four different offending patterns, namely the early starters vs. late starters and the adolescent-limiteds vs. life course persisters. Secondly, bivariate statistical analyses will be presented to examine associations between each independent and dependent variable. These analyses are also expected to indicate possible interactions among the independent variables for the multivariate analyses.

The final section of this chapter is the results of multivariate statistical analyses. There are three major parts in this section to answer the research questions. Four logistic regression models will be applied and compared for each offending pattern in the 1st part. The 1st model only contains the demographics as control variables, the 2nd one contains the demographics and the school discipline charge history, the 3rd model adds school engagement variables to the
previous model; and the final model contains all the independent variables in this study by adding the school performance variables to the 3rd model.

To answer the question whether previous contact(s) in the juvenile justice system increases the probability of involvement in the adult criminal justice system, two statistical approaches are applied: (1) a hierarchical logistic regression model and (2) a probit regression model after propensity score matching (PSM). The 1st model contains the demographics, OJJ contact (yes or no), school discipline charge history, school engagement variables, and school performance variables in sequence. Different from the 1st model, the 2nd model uses OJJ contact (yes or no) as the treatment status, and all the independent variables in the 1st model are used as the matching criteria for the PSM. This 2nd model is used to confirm the results from the 1st model.

To answer the research question addressing criminological factors pertaining to OJJ involvement that predict adult recidivism, two logistic regression models are applied in the 3rd part. One contains the demographics and the OJJ-related indicators, and another contains demographics, the OJJ-related indicators, and all the school-related variables.

Description of the Participant Characteristics

This section of results presents the characteristics of the overall sample and the four study groups, including the demographics and the school-level risk factors.

The Overall Sample

The overall sample in this study is the students born in 1980-1989 who ever enrolled in the Louisiana public school system between 1996 and 2008 school year. All students completed at least 7th grade. The total number of the participants is 407,800 (N = 407,800). Among them, 198,805 are female students (48.75% of the sample) and 208,995 (51.25%) are male students. Both White and African American students are well represented. There are 180,034 (44.15%)
African American students and 211,086 (51.76%) white students. Asian, Pacific Islander, and Hispanic are grouped together as the “Other” race (n = 16,680, 4.09%). The largest subgroup in this study is the white male students (n = 109,507, 26%).

Among the overall sample, more than half of them were eligible for free/reduced lunch (n = 219,815, 53%). A considerable number of students had a record of one-time grade retention (155,889, 38.23%), and smaller numbers failed a grade twice or more than twice, n = 3,242 (0.79%) and n = 900 (0.22%), respectively. About one-quarter of students did not finish school (n = 91,841, 22.52%). The mean of the highest grade completed is 11th grade. On average, the aggregated total days missed in a school year are just less than 12 days.

Four Offending Patterns

This part presents the description of demographics and school-level risk factors for each offending pattern and compares the differences among them. The students in the 1st study group are the early starters who ever had OJJ contact(s) (also called OJJ status, n = 14,346, 3.5% of the sample). Their counterparts are the late starters who only had DOC involvement without previous record(s) in OJJ (also called DOC only, n = 17,107, 4.2%). The major difference between them is the age of their 1st contact with the criminal system, indicating early or late crime onset. Students in the 3rd study group are the adolescent-limiteds who only had records in OJJ without further record in DOC (also called OJJ only, n = 10,126, 2.5%). Their counterparts are the life course persisters who had records in both juvenile and adult justice systems (also called Both Status, n = 4,220, 1.0%). The major difference between the two is the duration of their crime career.

The Early Starters vs. Late Starters

Males are overly represented in both study groups, especially for the late starters. There are 11,092 (77.32% of early starters) male early starters compared with 14,389 (84.11% of late
starters) male late starters. African-Americans occupied the largest proportion of both groups, with 62.8% of early starters and 61.29% of late starters. Majorities of both groups were eligible for free/reduced lunch in school, but there are more early starters (74.41%) eligible for it than late starters (68.99%). Slightly more than half of the research subjects for the both groups had records of dropping out (55.03% for the early starters vs. 53.84% for late starters). Only two

Table 2
Description of Demographics and School-Level Risk Factors for the Early Starters ($n = 14,346$) and Late Starters ($n = 17,107$)

<table>
<thead>
<tr>
<th>OJJ Status</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex (Male)</td>
<td>11,092</td>
<td>77.32%</td>
<td>14,389</td>
<td>84.11%</td>
</tr>
<tr>
<td>Race (AA)</td>
<td>9,009</td>
<td>62.80%</td>
<td>10,485</td>
<td>61.29%</td>
</tr>
<tr>
<td>DummyFRLunch</td>
<td>10,675</td>
<td>74.41%</td>
<td>11,802</td>
<td>68.99%</td>
</tr>
<tr>
<td>Fail Grade Once</td>
<td>11,166</td>
<td>77.83%</td>
<td>11,965</td>
<td>69.94%</td>
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<td>Dropout Flag</td>
<td>7,895</td>
<td>55.03%</td>
<td>9,210</td>
<td>53.84%</td>
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<td>Special Education</td>
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<td>Secured Custody</td>
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<td>Probation</td>
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<table>
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<th>SD</th>
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<td>1.796</td>
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<td>1.469</td>
<td>10.27</td>
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<td>18.964</td>
<td>11.388</td>
<td>16.751</td>
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<td>0.026</td>
<td>0.071</td>
<td>0.022</td>
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<td>Ave Discipline Charges</td>
<td>0.987</td>
<td>1.06</td>
<td>0.843</td>
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<tr>
<td>Ave OutSchoolSuspens</td>
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<td>0.424</td>
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<td>0.026</td>
<td>0.071</td>
<td>0.187</td>
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<td>Ave InSchoolSuspensio</td>
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<td>0.674</td>
<td>0.383</td>
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<tr>
<td>Ave InSchoolExpulsion</td>
<td>0.02</td>
<td>0.063</td>
<td>0.016</td>
</tr>
<tr>
<td>Proportion Fail ELA</td>
<td>0.19</td>
<td>0.207</td>
<td>0.186</td>
</tr>
<tr>
<td>Proportion Fail MATH</td>
<td>0.19</td>
<td>0.207</td>
<td>0.186</td>
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</tr>
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<td></td>
</tr>
<tr>
<td>Age at 1st OJJ Contact</td>
<td>14.52</td>
<td>1.35</td>
<td></td>
</tr>
</tbody>
</table>
special education students are found in OJJ and one in DOC; the special education variable, therefore, was not considered for further analyses. DOE has a separate dataset for special education students, so this variable is likely not accurately archived in other DOE datasets.

The results described above are presented in Table 2.

The differences are significant between the two study groups on the numbers of unexpected school transitions, the average total absent days in a school year, and the average total discipline charges in a school year. The mean of the numbers of unexpected school transitions for the early starters is close to 3 (2.96) compared to 1.80 for the late starters. The early starters missed two more days on average in a school year (19.00) than the late starters (16.75). Among the four categories of school discipline charges, out-of-school expulsion stands out in differentiating the two groups, with a mean of 0.03 for early starters and 0.19 for late starters.

Among the early starters, the majority of them were on probation ($n = 9,079, 63.29\%$). The mean age at the 1st OJJ contact for the early starters is 14.5-year-old.

**The Adolescent-Limiteds vs. Life Course Persisters**

Table 3 shows the demographics and school-level risk factors for the adolescent-limiteds and life course persisters. The significant differences between the two groups are found in gender, race, and the types of OJJ judicial placement. The two groups share similar school-level risk factors across the school discipline charge history and school engagement variables. One-time grade retention and dropping out are notable differences between the two.

Males represent the majority of offenders for both the adolescent-limiteds and life course persisters. This characteristic is particularly noticeable for the life course persisters. Of the life course persisters, 92.18\% are male, compared to 71.12\% of adolescent-limiteds. African Americans compose 69.52\% among the life course persisters, yet are 59.99\% among adolescent-
limiteds. Most adolescent-limiteds were placed on probation (69.44%) in OJJ, compared to 48.53% among the life course persisters. A higher percentage of life course persisters were placed in secure custody in OJJ compared to adolescent-limiteds (43.25% vs. 22.5%).

The life course persisters tended to do worse in school than the adolescent-limiteds, as seen in comparative rates of grade failure (89.68% vs. 76.23%) and drop out (62.09% vs. 52.09%).

Table 3
Description of Demographics and School-Level Risk Factors for the Adolescent-Limiteds \((n = 10,126)\) and Life Course Persisters \((n = 4,220)\)

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<tr>
<th></th>
<th>OJJ Only</th>
<th>Both Status</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Percentage</td>
</tr>
<tr>
<td>Sex (Male)</td>
<td>7,202</td>
<td>71.12%</td>
</tr>
<tr>
<td>Race (AA)</td>
<td>6,075</td>
<td>59.99%</td>
</tr>
<tr>
<td>DummyFRLunch</td>
<td>7,433</td>
<td>73.41%</td>
</tr>
<tr>
<td>Fail Grade Once</td>
<td>7,719</td>
<td>76.23%</td>
</tr>
<tr>
<td>Dropout Flag</td>
<td>5,275</td>
<td>52.09%</td>
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<td>1</td>
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<td>Secured Custody</td>
<td>2,278</td>
<td>22.50%</td>
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<td>Probation</td>
<td>7,031</td>
<td>69.44%</td>
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<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
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<td>No. of Transitions</td>
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<td>3.131</td>
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<td>0.075</td>
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<td>0.203</td>
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<td>0.203</td>
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</table>
Correlational Analyses

This section provides the results of correlation analyses. Correlation analyses between dependent independent variables are a first step in determining whether further multivariate analyses are warranted. Correlation analyses between two independent variables provide information with respect to potential interaction terms and detect potential problems with collinearity in the multivariate model. In STATA (12th edition), tetrachoric correlations analyze associations between two binary variables, and Spearman’s rank correlations show associations between one binary variable and one continuous variable, or between two continuous variables. In general, a correlation coefficient value between 0.4 and 0.69 is considered moderate, and values higher than 0.69 are considered high (Long & Freese, 2006).

Correlations among Binary Variables

Table 4 contains the tetrachoric correlations among binary variables, including the correlations between each binary independent variable with the one binary dependent variable (Both Status) and the correlations between binary independent variables. Research participants identified as Both Status are those who had criminal records in both juvenile and adult systems. The evaluation of correlations between independent and dependent variables focuses on P-values. The evaluation of correlations between two independent variables, which are indicators of potential interaction terms, focuses on the values of the correlation coefficients.

Almost all of the binary independent variables are significantly correlated (at 0.01 significance level) with the dependent variable (Both Status) except the “other race” category and nonsecure custody placement in OJJ.
Table 4
Tetrachoric Correlations among Binary Variables at 0.01 Significance Level

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<th>FailStatus 2</th>
<th>FailStatus 3</th>
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<th>0.05</th>
<th>0.10</th>
<th>0.14</th>
<th>0.11</th>
<th>0.02</th>
<th>0.02</th>
<th>0.10</th>
<th>0.04</th>
<th>White</th>
<th>Other Race</th>
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<td>0.13*</td>
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<td>-0.13*</td>
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<td>-1.00*</td>
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<tr>
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<td>0.08*</td>
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<td>0.27*</td>
<td>0.22*</td>
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<td>-0.10*</td>
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</tr>
<tr>
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<td>-0.28*</td>
<td>-0.30*</td>
<td>-0.18*</td>
<td>-0.21*</td>
<td>0.20*</td>
<td>0.10*</td>
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<tr>
<td>NonSecuCustody</td>
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<td>0.05</td>
<td>0.07</td>
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<td>-0.02</td>
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<td>Gang</td>
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<td>0.06</td>
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</tr>
</tbody>
</table>

| DropoutFlag    | 1.00         |              |              |     |      |      |      |      |      |      |      |      |        |            |
| DummyFRLunch   | 0.20*        | 1.00         |              |     |      |      |      |      |      |      |      |      |        |            |
| Parole         | 0.06         | 0.10         | 1.00         |     |      |      |      |      |      |      |      |      |        |            |
| SecuCustody    | 0.11*        | 0.07*        | 1.00*        | 1.00|      |      |      |      |      |      |      |      |        |            |
| Probation      | -0.12*       | -0.05*       | -1.0*        | -1.00*| 1.00 |      |      |      |      |      |      |      |        |            |
| NonSecuCustody | 0.07*        | -0.04        | -1.0*        | -1.00*| -1.00*| 1.00 |      |      |      |      |      |      |        |            |
| Gang           | 0.02         | 0.11*        | -0.09        | 0.79* | -0.78*| -0.42*| 1.00 |      |      |      |      |      |        |            |

Note: * 0.01 significance level
Table 5
Spearman’s Rank Correlations among Continuous Variables at 0.01 significance level

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<th>Both Status</th>
<th>No. Trans</th>
<th>Highest Grade</th>
<th>Aver Abs</th>
<th>Aver Trancy</th>
<th>Prop FRL</th>
<th>AveTot Discip</th>
<th>AveOut SchSus</th>
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</thead>
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<tr>
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<td>0.13*</td>
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<tr>
<td>AverTotDisci</td>
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<td>-0.05*</td>
<td>0.08*</td>
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<td>0.12*</td>
<td>0.81*</td>
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<tr>
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<td>-0.09*</td>
<td>0.17*</td>
<td>0.20*</td>
<td>0.12*</td>
<td>0.81*</td>
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<td>0.02</td>
<td>0.02*</td>
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<td>0.29*</td>
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<td>0.12*</td>
<td>0.04*</td>
<td>0.34*</td>
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<td>0.05*</td>
<td>-0.01</td>
<td>0.17*</td>
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<td>0.15*</td>
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<tr>
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<td>-0.03*</td>
<td>0.04*</td>
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<td>-0.12*</td>
<td>0.04*</td>
<td>0.00</td>
<td>-0.01</td>
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<td>0.08*</td>
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<td>0.00</td>
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<td>-0.01</td>
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<th>AveIn SchExp</th>
<th>PropF ELA</th>
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<td>TotChargeOJJ</td>
<td>0.05*</td>
<td>-0.01</td>
<td>0.03*</td>
<td>0.01</td>
<td>0.01</td>
<td>0.01</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>AgeFirstOJJ</td>
<td>-0.02</td>
<td>0.00</td>
<td>-0.01</td>
<td>-0.03*</td>
<td>-0.03*</td>
<td>0.05*</td>
<td>-0.09*</td>
<td>1.00</td>
</tr>
</tbody>
</table>

Note: * 0.01 significance level
Only two potential interactions are identified with correlation coefficient values higher than 0.4. One is between race (white vs. African-American) and eligibility for free/reduced lunch in school. Another is between gang affiliation and OJJ judicial placements (except parole). No potential collinearity was found.

**Correlations among Continuous Variables**

Table 5 shows the Spearman’s rank correlations between each continuous independent variable and the binary dependent variable (Both Status), and between two continuous independent variables. All of the continuous independent variables are significantly associated with Both Status at the 0.01 significance level except in-school suspension and the standardized test scores. No potential interaction is found based on the small values of correlation coefficients at the 0.01 significance level. The proportions of failure on English, Language, and Art (ELA) and math tests are highly correlated and considered as potential collinearity problems. Only the proportion of failure on ELA, therefore, will be retained for the multivariate analyses.

STATA offers Kendall’s correlation test to detect correlations among variables at all measurement levels. The results from Kendall’s correlation tests confirm the results from the tetrachoric and Spearman’s rank correction tests.

**Multivariate Analyses**

This section contains three major parts answering the proposed research questions in sequence: (1) Which demographic characteristics and educational risk factors are associated with early starters, compared with those convicted of crimes late in adulthood, and how are they different from each other? Moreover, which demographic and educational risk factors are associated with the “adolescent-limiteds” and the “life course persisters” groups, and how are they different from each other? (2) Does OJJ involvement increase or decrease the likelihood of going to DOC for students with school problems? (3) To what extent are selected OJJ-related
characteristics (i.e., age at the first OJJ contact, the number of OJJ contacts, the severity of offense, and gang membership) predictive of a criminal “pathway”?

**Risk Factors for Four Offending Patterns**

The 1st part employs logistic regression that analyzes the association of a binary dependent variable with independent variables at different measurement levels. Logistic regression does not require the same assumptions as in OLS regression, such as normality and equality of distribution among continuous independent variables. Logistic regression, therefore, is not vulnerable to problems with colinearity as in OLS regression (Long & Freese, 2006).

The four different offending patterns are binary dependent variables in the analyses, with values 1 for “yes” and 0 for “no”. They are the early starters (DV = OJJ Status), the late starters (DV = DOC only), the adolescent-limiteds (DV = OJJ only), and the life course persisters (DV = Both Status).

To examine the demographics and school-level risk factors, each offending pattern employs four logistic regression models hierarchically. The demographics are entered in the model first, then school discipline charge history, then school engagement variables, and finally, the school performance variables. The demographics include four variables: gender, African-American, other race (leaving white as the reference group), and the proportion of eligibility of free/reduced lunch while in school.

The school discipline charge history has four variables indicating the student’s behavior problems in school. The variables include the total number of discipline charges under each category that a student had on average in a school year. The four categories of school discipline charges are: out-of-school suspension, out-of-school expulsion, in-school suspension, and in-school expulsion.
School engagement variables are measured by four variables: the total absent days in a year on average, the total number of truancy flags that a student had in a year on average, if the student dropped out of school, and the number of unexpected school transitions in total. Five variables measure school performance: the highest grade that a student completed in DOE, the proportion of failure on ELA, and the records of grade retention for once, twice, and more than twice.

The results presented in this part contain three components by order: the overall model fit, classification table, and summary of the model performance. Statistics for the overall model provide Log Likelihood, Wald Chi-Square, level of significance for the model, and pseudo R square (PR², McFadden’s R2) in STATA. Odds Ratio (OR), df (degrees of freedom), and the level of significance are described for the model summaries. Unstandardized Beta coefficients (by default in STATA) are presented in the final model only for each offending pattern.

Large Log Likelihood values indicate questionable fit of the models. A significant Wald Chi-Square indicates the predictors in the model differentiate the offenders and non-offenders for each offending pattern. STATA reports McFadden's R² as one of the Pseudo R-squares for the logistic regressions. The PR² mimics the real R² in the OLS regression to explain the approximate proportion in the logarithmic value of outcome accounted for by the combined impact of the independent variables. McFadden’s R² tends to be smaller than the real R² and values of .2 to .4 are considered highly satisfactory (Long & Freese, 2006). A large percentage of cases that are classified by the model correctly indicate a good model. Regression coefficients (B) show the strength and direction of the associations between each independent variable and the dependent variable when controlling for the rest of the variables in the model. B gives the change in the log odds of the outcome for a one unit increase in the predictor variable. The Odds Ratio (OR) is reported for each predictor, holding other variables constant in the final model for
a better interpretation than using B. An independent variable with an OR that is smaller than 1 indicates a negative association with the dependent variable.

**The Early Starters**

Table 6 provides the logistic regression results for the early starters in four hierarchical models. The outcome variable is OJJ status (N = 407,800, n = 14,346 when OJJ status = 1) indicating if a student was an early starter of crime or not. The 1st model contains demographics only (gender, African American, other race leaving white as the reference group, and the proportion of eligibility of free/reduced lunch). The 2nd one contains the demographics and the school discipline charge history (the total number of school discipline charges annually for each category, on average). The 3rd one adds school engagement variables into the previous model (the total number of annual days absent and truancy flags, on average, the dropout flag, and the total number of school transitions). The 4th one contains school performance variables together with the other variables in the previous model (the highest grade completed in DOE, the proportion of failure on ELA, grade retention once, twice, and many).

Results indicate that the four overall models are all statistically reliable in distinguishing between students who are and are not the early starters. By adding the additional variables into the previous models, the values of PR² increase, which means newly entered variables in subsequent models explain more variance in the dependent variable than the previous ones.

The PR² is 6% in the 1st model that includes 4 predictors (p < 0.01), 11% in the 2nd model that includes 9 predictors (p < 0.01), 18% in the 3rd model that includes 13 predictors (p < 0.01), and 19% in the final mode that includes 18 predictors (p < 0.01). Model fit is confirmed by the significance of the Wald Chi-Square test for each model. In model 1, the Log Likelihood equals -58330.994, df = 4, and Wald Chi-Square = 7580.07 (p< 0.01), indicating the whole model is
Table 6
The Results from the Logistic Regression Models for the Early Starters (n=14,346)

<table>
<thead>
<tr>
<th>OJJ Status</th>
<th>Early Starters</th>
<th>n = 14,346</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model 1</td>
<td>Model 2</td>
<td>Model 3</td>
</tr>
<tr>
<td>PR^2=.06</td>
<td>PR^2=.11</td>
<td>PR^2=.18</td>
</tr>
<tr>
<td>Odds Ratio</td>
<td>Odds Ratio</td>
<td>Odds Ratio</td>
</tr>
<tr>
<td>Sex</td>
<td>3.46**</td>
<td>2.83**</td>
</tr>
<tr>
<td>African American</td>
<td>1.58**</td>
<td>1.33**</td>
</tr>
<tr>
<td>Other Race</td>
<td>0.51**</td>
<td>0.53**</td>
</tr>
<tr>
<td>Prop FRLunch</td>
<td>2.33**</td>
<td>2.07*</td>
</tr>
<tr>
<td>Tot OutSchSuspe</td>
<td></td>
<td>211.62**</td>
</tr>
<tr>
<td>Tot OutSchExpul</td>
<td></td>
<td>4420.65**</td>
</tr>
<tr>
<td>Tot InSchSuspen</td>
<td></td>
<td>124.02**</td>
</tr>
<tr>
<td>Tot InSchExpuls</td>
<td></td>
<td>379.71**</td>
</tr>
<tr>
<td>Ave Absent Days</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ave Truancy Flag</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dropout Flag</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of Transitions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Highest Grade</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prop Fail ELA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fail Grade Once</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fail Grade Twice</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fail Grade Many</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* 0.05 significance level
** 0.01 significance level
significantly better than an empty model. In model 2, the Log Likelihood equals -55445.333, df = 9, and Wald Chi-Square = 13351.39 (p< 0.01). In model 3, the Log Likelihood equals -50818.459, df = 13, and Wald Chi-Square = 22605.07 (p< 0.01). In model 4, the Log Likelihood equals -49609.923, df = 18, and Wald Chi-Square = 24929.20 (p< 0.01).

The value of OR for each predictor changes slightly according to each new model, when additional predictors are entered each time. The percentage of the correctly classified cases in the classification table and the results for each predictor (OR, B, and the significance level) are described for the final model only.

According to the classification table, the model correctly classifies 96.43% of the students who were early starters and who were not. This high percentage indicates a very good performance of the entire model. By controlling the other predictors in the model, the following values of OR are reported in the final model. All predictors are statistically significant at the 0.01 level, except the averaged annual total number of in-school expulsions (p < 0.05). The odds of being an early starter of crime for males are about 3 times that for females (OR = 2.89). For an African American student, the odds of being an early starter are increased by a factor of 1.3 over a white student and by a factor of 0.62 for a student in the “other” racial group. For each one unit increase in the proportion of eligibility for free/reduced lunch, the odds of being an early starter are increased by a factor of 1.27. The largest values for OR were obtained for all four categories of school discipline charges, especially out-of-school expulsion. The ORs are 14.27 for out-of-school suspension, 112.65 for out-of-school expulsion, 12.28 for in-school suspension, and 8.32 for in-school expulsion, respectively. For each additional charge of out-of-school expulsion, the odds of being an early starter increases by a factor of 112.65. The odds of being an early starter for dropouts are 1.57 times than their counterparts. For a one unit increase in the total number of unexpected school transitions, the odds of being an early starter increase by a factor of 1.27. As
expected, the highest grade that a student completed in DOE is negatively associated with the dependent variable. For each unit increase in grade, the odds decrease by a factor of 0.78. A high proportion of failure on ELA indicates a poor academic performance, which is positively associated with the outcome variable. For each unit increase in the proportion of failure on ELA, the odds of being an early starter increase by 1.19. Grade retention is also positively associated with the dependent variable. One-time grade retention increases the odds of being an early starter by 1.74 times, two grade failures increase the odds by 2.52, and the odds of being an early starter increase 3.17 times among the students who failed a grade more than twice.

**The Late Starters**

Table 7 provides the logistic regression results for the late starters in four hierarchical models. The outcome variable is DOC only (N = 407,800, n = 17,107 when DOC only = 1) indicating if a student was a late starter of crime or not. The 1st model contains demographics only (gender, African American, other race, leaving white as the reference group, and the proportion of eligibility for free/reduced lunch). The 2nd one contains the demographics and the school discipline charge history (the total number of school discipline charges annually, on average, for each discipline charge category). The 3rd one adds school engagement variables into the previous model (the total number of annual days absent and truancy flags, on average, the dropout flag, and the total number of school transitions). The 4th one contains school performance variables together with the other variables in the previous model (the highest grade completed in DOE, the proportion of failure on ELA, grade retention once, twice, and many).

Results indicate that the four overall models are all statistically reliable in distinguishing between students who were and were not the late starters in four models. By adding the additional variables into the previous models, the values of PR² increase, which means newly
<table>
<thead>
<tr>
<th>DOC Only</th>
<th>Late Starters</th>
<th>$n = 17,107$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Model 1</td>
<td>Model 2</td>
</tr>
<tr>
<td></td>
<td>PR$^2 = .08$</td>
<td>PR$^2 = .10$</td>
</tr>
<tr>
<td>Odds Ratio</td>
<td>Odds Ratio</td>
<td>Odds Ratio</td>
</tr>
<tr>
<td>Sex</td>
<td>5.48**</td>
<td>4.76**</td>
</tr>
<tr>
<td>African American</td>
<td>1.64**</td>
<td>1.47**</td>
</tr>
<tr>
<td>Other Race</td>
<td>0.64**</td>
<td>0.65**</td>
</tr>
<tr>
<td>Prop FRLunch</td>
<td>1.87**</td>
<td>1.69**</td>
</tr>
<tr>
<td>Tot OutSchSusp</td>
<td>61.95**</td>
<td>8.30**</td>
</tr>
<tr>
<td>Tot OutSchExpuls</td>
<td>455.98**</td>
<td>34.88**</td>
</tr>
<tr>
<td>Tot InSchSuspen</td>
<td>46.84**</td>
<td>7.72*</td>
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<tr>
<td>Tot InSchExpuls</td>
<td>143.04**</td>
<td>16.45**</td>
</tr>
<tr>
<td>Ave Absent Days</td>
<td>1.03**</td>
<td>1.03**</td>
</tr>
<tr>
<td>Ave Truancy Flag</td>
<td>0.10**</td>
<td>0.12**</td>
</tr>
<tr>
<td>Dropout Flag</td>
<td>2.48**</td>
<td>2.31**</td>
</tr>
<tr>
<td>No. of Transitions</td>
<td>1.03**</td>
<td>1.03**</td>
</tr>
<tr>
<td>Highest Grade</td>
<td>0.93**</td>
<td>-0.1**</td>
</tr>
<tr>
<td>Prop Fail ELA</td>
<td>1.02</td>
<td>0.02</td>
</tr>
<tr>
<td>Fail Grade Once</td>
<td>1.64**</td>
<td>0.49**</td>
</tr>
<tr>
<td>Fail Grade Twice</td>
<td>1.29**</td>
<td>0.25**</td>
</tr>
<tr>
<td>Fail Grade Many</td>
<td>1.34*</td>
<td>0.30*</td>
</tr>
</tbody>
</table>

Note: * 0.05 significance level  
** 0.01 significance level
entered variables in subsequent models explain more variance in the dependent variable than the previous ones. The PR² is 8% in the 1st model that includes 4 predictors (p < 0.01), 10% in the 2nd model that includes 9 predictors (p < 0.01), 14% in the 3rd model that includes 13 predictors (p < 0.01), and 15% in the final model that includes 18 predictors (p < 0.01). Model fit is confirmed by the significance of the Wald Chi-Square test for each model. In model 1, Log likelihood equals -65254.336, df = 4, and Wald Chi-Square = 11467.42 (p< 0.01), indicating the whole model is significantly better than an empty model. In model 2, Log likelihood equals -63606.102, df = 9, and Wald Chi-Square = 14763.89 (p< 0.01). In model 3, Log likelihood equals -60741.736, df = 13, and Wald Chi-Square = 20492.62 (p< 0.01). In model 4, Log likelihood equals -60383.386, df = 18, and Wald Chi-Square = 20705.23 (p< 0.01).

The value of OR for each predictor changes slightly according to each new model, when additional predictors are entered each time. The percentage of the correctly classified cases in the classification table and the results for each predictor (OR, B, and the significance level) are described for the final model only.

According to the classification table, the model correctly classifies 95.78% of the students who were late starters and who were not. This high percentage indicates a very good performance of the entire model. By controlling the other predictors in the model, the following values of OR are reported in the final model. All predictors are statistically significant at the 0.01 level, except the averaged total number of annual out-of/in-school suspensions, and having grade retention more than twice (p < 0.05). The odds of being a late starter of crime for males are about 5 times that of females (OR = 4.78). For an African American student, the odds of being a late starter are increased by a factor of 1.4 over a white student, and by .7 in comparison to a student in the “other” racial group. For each one unit increase in the proportion of eligibility for free/reduced lunch, the odds of being a late starter are increased by a factor of 1.31. The largest
ORs were found for all four categories of school discipline charges, especially out-of-school expulsion. The ORs are 6.36 for out-of-school suspension, 22.33 for out-of-school expulsion, 6.01 for in-school suspension, and 12.15 for in-school expulsion, respectively. For each additional charge of out-of-school expulsion, the odds of being a late starter increase by a factor of 22.33. The odds of being a late starter for dropouts are 2.31 times their counterparts. As expected, grade retention is also positively associated with the dependent variable. One time grade retention increases the odds of being an early starter by 1.64 times, two grade failures increase these odds by 1.3, and the odds of being an early starter increase 1.34 times for students who failed grades more than twice.

The most notable differences between the early starters and late starters of crime are found for the predictors of gender, the four discipline charges, proportion of failure on ELA, and grade retention. Males are more likely to become late starters (OR = 4.78) than early starters (OR = 2.89) compared to females in both groups. Although all four categories of discipline charge history strongly differentiate offenders and non-offenders, the odds of being an offender differ between early starters and late starters. For the former, each one unit increase in each category of discipline charge increases the odds of being an early starter sharply. The OR for out-of-school expulsion is 112.65 for early starters, compared to 22.33 for the late starters. Dropouts are more likely to become late starters (OR = 2.31) than early starters (OR = 1.57). The impact of the proportion of failure on ELA among the early starters is no more significant than for late starters. More frequent grade failure indicates a higher probability of being an early starter, but this is not true for the late starters.

The Adolescent-Limiteds

Table 8 provides the logistic regression results for the adolescent limiteds in four hierarchical models. The outcome variable is OJJ only (N = 407,800, n = 110,126 when OJJ only
indicating if a student was an adolescent-limited or not. The 1st model contains demographics only (gender, African American, other race, leaving white as the reference group, and the proportion of eligibility of free/reduced lunch). The 2nd one contains the demographics and the school discipline charge history (the total number of school discipline charges annually, on average, for each discipline charge category). The 3rd one adds school engagement variables into the previous model (the total number of annual days absent and truancy flags, on average, the dropout flag, and the total number of school transitions). The 4th one contains school performance variables together with the other variables in the previous model (the highest grade completed in DOE, the proportion of failure on ELA, grade retention once, twice, and many).

Results indicate that the four overall models are all statistically reliable in distinguishing between students who were and were not the adolescent-limited. By adding the additional variables into the previous models, the values of PR² increase, which means newly entered variables in subsequent models explain more variance in the dependent variable than the previous ones. The PR² is 3% in the 1st model that includes 4 predictors (p < 0.01), 8% in the 2nd model that includes 9 predictors (p < 0.01), 14% in the 3rd model that includes 13 predictors (p < 0.01), and 15% in the final model that includes 18 predictors (p < 0.01). Model fit is confirmed by the significance of the Wald Chi-Square test for each model. In model 1, Log likelihood equals -45616.515, df = 4, and Wald Chi-Square = 3618.01 (p< 0.01), indicating the whole model is significantly better than an empty model. In model 2, Log likelihood equals -43730.041, df = 9, and Wald Chi-Square = 7390.43 (p< 0.01). In model 3, Log likelihood equals -40989.653, df = 13, and Wald Chi-Square = 12871.21 (p< 0.01). In model 4, Log likelihood equals -40219.964, df = 18, and Wald Chi-Square = 17238.85 (p< 0.01).
Table 8  
The Results from the Logistic Regression Models for the Adolescent-Limiteds ($n = 10,126$)

<table>
<thead>
<tr>
<th>OJJ Only</th>
<th>Adolescent-limiteds $n = 10,126$</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Model 1</td>
<td>Model 2</td>
<td>Model 3</td>
<td>Model 4</td>
<td></td>
</tr>
<tr>
<td>PR$^2$=.03</td>
<td>PR$^2$=.08</td>
<td>PR$^2$=.14</td>
<td>PR$^2$=.15</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Odds Ratio</strong></td>
<td><strong>Odds Ratio</strong></td>
<td><strong>Odds Ratio</strong></td>
<td><strong>Odds Ratio</strong></td>
<td><strong>B</strong></td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td>2.44**</td>
<td>1.98**</td>
<td>2.06**</td>
<td>1.96**</td>
<td>0.68**</td>
</tr>
<tr>
<td>African American</td>
<td>1.37**</td>
<td>1.15**</td>
<td>1.09**</td>
<td>1.13**</td>
<td>0.11**</td>
</tr>
<tr>
<td>Other Race</td>
<td>0.52**</td>
<td>0.54**</td>
<td>0.62**</td>
<td>0.62**</td>
<td>-0.5**</td>
</tr>
<tr>
<td>Prop FRLunch</td>
<td>2.37**</td>
<td>2.10**</td>
<td>1.47**</td>
<td>1.32**</td>
<td>0.28**</td>
</tr>
<tr>
<td>Tot OutSchSuspen</td>
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<td>50.95**</td>
<td>17.01*</td>
<td>2.83*</td>
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<tr>
<td>Tot OutSchExpul</td>
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<td>97.13**</td>
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</tr>
<tr>
<td>Tot InSchSuspen</td>
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<tr>
<td>Tot InSchExpuls</td>
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<td>24.78**</td>
<td>8.00</td>
<td>2.08</td>
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<tr>
<td>Ave Absent Days</td>
<td>1.04**</td>
<td>1.03**</td>
<td>0.03**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ave Truancy Flag</td>
<td>0.20**</td>
<td>0.32**</td>
<td>-1.1**</td>
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<td>Dropout Flag</td>
<td>1.78**</td>
<td>1.44**</td>
<td>0.36**</td>
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</tr>
<tr>
<td>No. of Transitions</td>
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<td>1.18**</td>
<td>0.17**</td>
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<td>-0.2**</td>
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<tr>
<td>Prop Fail ELA</td>
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<td>0.23**</td>
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</tr>
<tr>
<td>Fail Grade Once</td>
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<td>0.75**</td>
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<tr>
<td>Fail Grade Many</td>
<td>2.27**</td>
<td>0.82**</td>
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</table>

Note: * 0.05 significance level  
** 0.01 significance level
The value of OR for each predictor changes slightly according to each new model, when additional predictors are entered each time. The percentage of the correctly classified cases in the classification table and the results for each predictor (OR, B, and the significance level) are described for the final model only.

According to the classification table, the model correctly classifies 97.49% of the students who were early starters and who were not. This high percentage indicates a very good performance of the entire model. By controlling the other predictors in the model, the following values of OR are reported in the final model. All predictors are statistically significant at the 0.01 level, except the average annual total number of out-of/in-school suspensions (p < 0.05) and in-school expulsion (p < 0.1). The odds of being an adolescent-limited for males are about 2 times that of females (OR = 1.96). For an African American student, the odds of being an adolescent-limited is increased by a factor of 1.13 over a white student, and .62 compared to a student in the “other” racial group. For each one unit increase in the proportion of eligibility for free/reduced lunch, the odds of being an adolescent-limited are increased by a factor of 1.32. The largest ORs were found for all four categories of school discipline charges, especially the out-of-school expulsion. The OR is 17.01 for out-of-school suspension, 97.13 for out-of-school expulsion, 14.94 for in-school suspension, and 8.00 for in-school expulsion, respectively. For each additional school discipline charge of out-of-school expulsion, the odds of being an adolescent-limited increases by a factor of 112.65. The odds of being an adolescent-limited for dropouts are 1.44 times that of their counterparts. For each one unit increase in the total number of unexpected school transitions, the odds of being an adolescent-limited increase by a factor of 1.18. As expected, the highest grade that a student completed in DOE is negatively associated with the dependent variable. Each one unit increase in grade decreases these odds by a factor of 0.80. A high proportion of failure on ELA indicates a poor academic performance, which is
positively associated with the outcome variable. A one unit increase in the proportion of failure on ELA increases the odds of being an adolescent-limited by 1.27. Grade retention is also positively associated with the dependent variable. One time grade retention increases the odds of being an adolescent-limited by 1.79; two grade failures increase these odds by 2.11; and the odds of being an adolescent-limited increase 2.27 times for students who failed grades more than twice.

The adolescent-limiteds (OJJ only) are a subgroup of the early starters (OJJ status). The results from the two groups are very similar regarding the ORs for each predictor in the model.

**The Life Course Persisters**

Table 9 provides the logistic regression results for the life course persisters in four hierarchical models. The outcome variable is Both Status (N = 407,800, n = 4,220 when Both Status = 1) indicating if a student was a life course persister or not. The 1st model contains demographics only (gender, African American, other race, leaving white as the reference group, and the proportion of eligibility for free/reduced lunch). The 2nd one contains the demographics and the school discipline charge history (the total number of school discipline charges annually, on average, for each discipline charge category). The 3rd one adds school engagement variables into the previous model (the total number of annual days absent and truancy flags, on average, the dropout flag, and the total number of school transitions). The 4th one contains school performance variables together with the other variables in the previous model (the highest grade completed in DOE, the proportion of failure on ELA, grade retention once, twice, and many).

Results indicate that the four overall models are all statistically reliable in distinguishing between students who were and were not life course persisters. By adding the additional variables into the previous models, the values of $PR^2$ increase, which means newly entered variables in the subsequent models explain more variance in the dependent variable than the
previous ones. The PR² is 10% in the 1st model that includes 4 predictors (p < 0.01), 14% in the 2nd model that includes 9 predictors (p < 0.01), 21% in the 3rd model that includes 13 predictors (p < 0.01), and 22% in the final model that includes 18 predictors (p < 0.01). Model fit is confirmed by the significance of the Wald Chi-Square test for each model. In model 1, Log likelihood equals -21083.066, df = 4, and Wald Chi-Square = 4827.04 (p< 0.01), indicating the whole model is significantly better than an empty model. In model 2, Log likelihood equals -20293.63, df = 9, and Wald Chi-Square = 6405.91 (p< 0.01). In model 3, Log likelihood equals -18513.035, df = 13, and Wald Chi-Square = 9967.10 (p< 0.01). In model 4, Log likelihood equals -18048.618, df = 18, and Wald Chi-Square = 11301.17 (p< 0.01).

The predictors are all significantly associated with the dependent variable at the 0.01 significance level in each model, except for the discipline charge variables and the proportion of failure on ELA, which in the final model are not significant. The value of OR for each predictor changes slightly according to each new model, when additional predictors are entered each time. The percentage of the correctly classified cases in the classification table and the results for each predictor (OR, B, and the significance level) are described for the final model only.

According to the classification table, the model correctly classifies 98.96% of the students who were life course persisters and who were not. This high percentage indicates a very good performance of the entire model. By controlling the other predictors in the model, the following values of OR are reported in the final model. The odds of being an early starter of crime for males are about 10 times that of females (OR = 9.73). For an African American student, the odds of being a life course persister is increased by a factor of 1.76 over a white student and .62 compared to a student in the “other” racial group. For each one unit increase in the proportion of eligibility of free/reduced lunch, the odds of being an early starter is increased.
Table 9
The Results from the Logistic Regression Models for the Life Course Persisters

<table>
<thead>
<tr>
<th>Both Status</th>
<th>Life course persisters</th>
<th>$n = 4,220$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model 1</td>
<td>Model 2</td>
<td>Model 3</td>
</tr>
<tr>
<td>PR$^2=.10$</td>
<td>PR$^2=.14$</td>
<td>PR$^2=.21$</td>
</tr>
<tr>
<td>Odds Ratio</td>
<td>Odds Ratio</td>
<td>Odds Ratio</td>
</tr>
<tr>
<td>Sex</td>
<td>11.74**</td>
<td>9.84**</td>
</tr>
<tr>
<td>African American</td>
<td>2.19**</td>
<td>1.88**</td>
</tr>
<tr>
<td>Other Race</td>
<td>0.50**</td>
<td>0.52**</td>
</tr>
<tr>
<td>Prop FRLunch</td>
<td>2.13**</td>
<td>1.91**</td>
</tr>
<tr>
<td>Tot OutSchSuspe</td>
<td>296.62**</td>
<td>10.12</td>
</tr>
<tr>
<td>Tot OutSchExpul</td>
<td>4462.94**</td>
<td>113.89**</td>
</tr>
<tr>
<td>Tot InSchSuspen</td>
<td>187.96**</td>
<td>8.9</td>
</tr>
<tr>
<td>Tot InSchExpuls</td>
<td>683.62**</td>
<td>9.08</td>
</tr>
<tr>
<td>Ave Absent Days</td>
<td>1.04**</td>
<td>1.03**</td>
</tr>
<tr>
<td>Ave Truancy Flag</td>
<td>0.01**</td>
<td>0.01**</td>
</tr>
<tr>
<td>Dropout Flag</td>
<td>2.38**</td>
<td>1.89**</td>
</tr>
<tr>
<td>No. of Transitions</td>
<td>1.21**</td>
<td>1.20**</td>
</tr>
<tr>
<td>Highest Grade</td>
<td></td>
<td>0.76**</td>
</tr>
<tr>
<td>Prop Fail ELA</td>
<td></td>
<td>1.1</td>
</tr>
<tr>
<td>Fail Grade Once</td>
<td></td>
<td>1.78**</td>
</tr>
<tr>
<td>Fail Grade Twice</td>
<td></td>
<td>2.69**</td>
</tr>
<tr>
<td>Fail Grade Many</td>
<td></td>
<td>4.11**</td>
</tr>
</tbody>
</table>

Note: * 0.05 significance level  
** 0.01 significance level
by a factor of 1.19. The discipline charges are not significantly associated with the outcome variable, as they are in the previous analyses. One more school discipline charge of out-of-school expulsion, the odds of being an early starter increases by a factor of 18.07. The odds of being a life course persister for dropouts are 1.89 times that of their counterparts. For each one unit increase in the total number of unexpected school transitions, the odds of being a life course persister increase by a factor of 1.20. As expected, the highest grade that a student completed in DOE is negatively associated with the dependent variable. For each one unit increase in grade completion, the odds of being a life-course persister decrease by a factor of 0.76. Failure on ELA is not a significant predictor for the life course persisters. Grade retention is also positively associated with the dependent variable. One time grade retention increases the odds of being a life course persister by 1.78 times, two grade failures increase the odds by 2.69, and the odds of being a life course persister increase 4.11 times among the students who failed grades more than twice.

Major differences were found on gender and the proportion of failure on ELA between the adolescent-limiteds and the life course persisters. Males were much more likely to become life course persisters (OR = 9.73) than adolescent-limiteds (OR = 1.96) compared to females in both groups. The proportion of failure on ELA is not a significant predictor of the life course persisters as it is for adolescent-limiteds. Having more times of grade detention indicates higher probability of being an adolescent-limit or a life course persister, but fail grade more than twice increase the odds of being a life course persister than an adolescent-limited.

Based on bi-variate associations, interaction terms, eligibility of free/reduced lunch * racial identity and Gang membership * OJJ placement, were created and entered into a fifth regression model. None of these terms was significantly associated with dependent variables, and
PR² values were sharply decreased with their addition. Thus the final results are presented in regression tables 6-9.

**OJJ Contact as a Predictor of DOC Involvement**

The purpose of the 2nd part of the multivariate analyses is to determine whether OJJ contact increases or decreases the likelihood of subsequent DOC involvement. Two approaches are applied in this part: a classic hierarchical logistic regression analysis and a probit regression analysis using PSM. The dependent variable for both analyses is DOC involvement (N = 407,800, n = 14,349 when DOC status=1). The 2nd approach of using PSM is to confirm the results from the 1st statistical approach.

**Logistic Regression**

The hierarchical logistic regression model contains five levels of variables in sequence. The 1st level contains demographics only (gender, African American, other race, leaving white as the reference group, and the proportion of eligibility of free/reduced lunch). OJJ status is entered at the 2nd level by itself. The 3rd contains the demographics, OJJ status, and the school discipline charge history (the total number of school discipline charges annually, on average, for each discipline charge category). The 4th adds school engagement variables into the previous models (the total number of annual days absent and truancy flags, on average, the dropout flag, and the total number of school transitions). The 5th level contains school performance variables together with the other variables in the previous models (the highest grade that completed in DOE, the proportion of failure on ELA, grade retention once, twice, and many).

Results (Table 10) indicate that the overall model is statistically reliable in distinguishing between students who had DOC involvement or not. The PR² of 20% in the final model explains 20% of the variance of the dependent variable (p < 0.01). Model fit is confirmed by the significance of the Wald Chi-Square test. Log likelihood equals -66704.296, df = 19, and Wald
Chi-Square = 29481.05 (p< 0.01), indicating the whole model is significantly better than an empty model.

### Table 10
**OJJ Contact as a Predictor of DOC Involvement**

<table>
<thead>
<tr>
<th>DOC Status</th>
<th>Logistic Regression (PR²=.20)</th>
<th>PSM (PR²=.21)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>OR</td>
</tr>
<tr>
<td>Sex</td>
<td>1.67**</td>
<td>5.29**</td>
</tr>
<tr>
<td>AfricaAmerican</td>
<td>0.35**</td>
<td>1.42**</td>
</tr>
<tr>
<td>Other Race</td>
<td>-0.4**</td>
<td>0.69**</td>
</tr>
<tr>
<td>Prop FRLunch</td>
<td>0.25**</td>
<td>1.28**</td>
</tr>
<tr>
<td>OJJ Status</td>
<td>1.15**</td>
<td>3.15**</td>
</tr>
<tr>
<td>Tot OutSchSuspe</td>
<td>1.62**</td>
<td>5.05**</td>
</tr>
<tr>
<td>Tot OutSchExpul</td>
<td>3.05**</td>
<td>21.09**</td>
</tr>
<tr>
<td>Tot InSchSuspen</td>
<td>1.56*</td>
<td>4.76*</td>
</tr>
<tr>
<td>Tot InSchExpuls</td>
<td>2.29**</td>
<td>9.90**</td>
</tr>
<tr>
<td>AveAbsent Days</td>
<td>0.03**</td>
<td>1.03**</td>
</tr>
<tr>
<td>AveTruancyFlag</td>
<td>-2.6**</td>
<td>0.08**</td>
</tr>
<tr>
<td>Dropout Flag</td>
<td>0.79**</td>
<td>2.21**</td>
</tr>
<tr>
<td>No. Transitions</td>
<td>0.05**</td>
<td>1.05**</td>
</tr>
<tr>
<td>Highest Grade</td>
<td>-0.1**</td>
<td>0.91**</td>
</tr>
<tr>
<td>Prop Fail ELA</td>
<td>0.01</td>
<td>1.01</td>
</tr>
<tr>
<td>Fail Grade Once</td>
<td>0.47**</td>
<td>1.60**</td>
</tr>
<tr>
<td>Fail Grade Twice</td>
<td>0.40**</td>
<td>1.50**</td>
</tr>
<tr>
<td>Fail Grade Many</td>
<td>0.56**</td>
<td>1.73**</td>
</tr>
</tbody>
</table>

Note: * 0.05 significance level
    ** 0.01 significance level

The predictors of demographics, previous OJJ contact, out-of/in-school expulsion charges, and school engagement are all significantly associated with the dependent variable at the 0.01 significance level in each model. Out-of/in- school suspension charges are significant at the 0.01 significance level. Proportion of failure on ELA is not a significant predictor of DOC involvement.
According to the classification table, the model correctly classifies 94.68% of the students who became involved in DOC and those who did not. This high percentage indicates a very good performance of the entire model. By controlling the other predictors in the model, the following values of OR are reported in the final model. The odds of involvement in the adult justice system for males are about 5 times that of females (OR = 5.29). For an African American student, the odds of involvement in DOC are increased by a factor of 1.42 over a white student, and 0.69 in comparison to a student in the “other” racial group. For each one unit increase in the proportion of eligibility for free/reduced lunch, the odds of involvement in DOC are increased by a factor of 1.28. The odds of DOC involvement are more than 3 times (OR = 3.15) for students having previous OJJ contact compared to those who did not have OJJ contact.

The OR for DOC involvement is 5.05 for out-of-school suspension, 21.09 for out-of-school suspension, 4.76 for in-school suspension, and 9.90 for in-school expulsion, respectively. With each additional charge of out-of-school expulsion, the odds of further DOC involvement increases by a factor of 21.09. The odds of DOC involvement for dropouts are 2.21 times higher than their counterparts. As expected, the highest grade that a student completed in DOE is negatively associated with the dependent variable. With each one unit increase in grade completion, the odds of DOC involvement decrease by a factor of 0.91. Failure on ELA is not a significant predictor for DOC involvement. Grade retention is also positively associated with the dependent variable. One time grade retention increases the odds of DOC involvement by 1.60; two grade failures increase the odds by 1.50; and the odds of DOC involvement increase 1.73 times among the students who failed grades more than twice.

**PSM**

For the propensity score matching analysis, all the predictors in the logistic regression were used as the matching criteria and OJJ status was considered the treatment. The process
identifies a comparison group of high-risk students based on the entire matching criteria listed above. One-to-one nearest neighbor non-replacement PSM is applied in this study, which produces two groups of the same sample size \( (n = 14,349) \). Results are shown in Table 11.

**Table 11**

<table>
<thead>
<tr>
<th></th>
<th>DOC Status</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OJJ Status</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>12,329</td>
<td>2,020</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>10,127</td>
<td>4,222</td>
</tr>
</tbody>
</table>

Among 14,349 students who had OJJ contacts, 4,222 had further DOC involvement. Among the same number of students matched by demographics and school-related risk factors, 2,020 had further DOC involvement. That is, previous OJJ clients were more than twice as likely to become involved in DOC as those who did not have OJJ contact. This result confirms the result of the logistic regression where previous OJJ contact was found to increase the odds of DOC involvement. The probit regression after PSM showed all the predictors of DOC involvement are significant at the 0.01 level.

**Criminological Factors in OJJ for Adult Recidivism in DOC**

The 3rd and final part of the multivariate analyses examines the question of OJJ-related predictors (criminological factors) for recidivism in DOC, logically following the previous research question concerning whether OJJ contact increases or decreases the likelihood of DOC involvement.

The criminological factors associated with OJJ involvement include the frequency of crime, indicated by the number of OJJ contacts and the total charges in OJJ, severity of crime, indicated by the most severe charge in OJJ, the age at the 1st OJJ contact, and gang affiliation. The most severe charge in OJJ is measured by the most severe OJJ judicial placement (in
increasing order of severity): parole, non-secure custody and secure custody, using probation as
the reference group.

Two separate models are applied; one includes the demographics and the criminological
risk factors; another includes demographics, criminological factors, discipline history, school
engagement, and school performance variables. For model 1, the 1st level contains demographics
only (gender, African American, other race, leaving white as the reference group, and the
proportion of eligibility of free/reduced lunch). The criminological factors are entered at the 2nd
level. For model 2, keeping the same variables in the first two levels, the 3rd level contains the
school discipline charge history (the total averaged annual number of school discipline charges,
for each discipline charge type). The 4th level includes school engagement variables with the
previous model (the total number of annual days absent and truancy flags, on average, the
dropout flag, and the total number of school transitions). The 5th level contains school
performance variables together with the other variables in the previous model (the highest grade
completed in DOE, the proportion of failure on ELA, grade retention once, twice, and many).

Results (Table 12) indicate that the two overall models are statistically reliable in
distinguishing between students who recidivated in DOC and those who did not. The \( \text{PR}^2 \) of 10%
found for both two models indicates school-related factors did not improve the predictive power
of the model much. The Wald test confirmed the overall model fit for both models. Log
likelihood equals -7942.515, df = 11, and Wald Chi-Square = 1503.13 (\( p < 0.01 \)), indicating the
whole model is significantly better than an empty model for the 1st model. Log likelihood equals
-7838.795, df = 25, and Wald Chi-Square = 1346.51 (\( p < 0.01 \)) for the 2nd model. According to
the classification table for the 2nd model, the model correctly classifies 71.07% of the students
involved in DOC compared to those who did not. This percentage is acceptable in social science.
Table 12
Criminological Indicators to Predict Adult Recidivism in DOC

<table>
<thead>
<tr>
<th>DOC Status</th>
<th>Model 1</th>
<th>Model 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PR²=0.1</td>
<td>PR²=0.1</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>OR</td>
</tr>
<tr>
<td>Sex</td>
<td>1.48**</td>
<td>4.40**</td>
</tr>
<tr>
<td>African American</td>
<td>0.32**</td>
<td>1.38**</td>
</tr>
<tr>
<td>Other Race</td>
<td>-0.12</td>
<td>0.89</td>
</tr>
<tr>
<td>PropFRLunch</td>
<td>0.08</td>
<td>1.08</td>
</tr>
<tr>
<td>No.OJJ Contacts</td>
<td>0.21**</td>
<td>1.24**</td>
</tr>
<tr>
<td>Parole</td>
<td>0.68**</td>
<td>1.97**</td>
</tr>
<tr>
<td>Secured Custody</td>
<td>0.76**</td>
<td>2.14**</td>
</tr>
<tr>
<td>NonSecuCustody</td>
<td>0.35**</td>
<td>1.41**</td>
</tr>
<tr>
<td>Age1stOJJ</td>
<td>0.02</td>
<td>1.02</td>
</tr>
<tr>
<td>Gang</td>
<td>0.53**</td>
<td>1.71**</td>
</tr>
<tr>
<td>Tot Charges OJJ</td>
<td>0.11**</td>
<td>1.12**</td>
</tr>
<tr>
<td>Tot OutSchSuspe</td>
<td>-2.31</td>
<td>0.1</td>
</tr>
<tr>
<td>Tot OutSchExpul</td>
<td>-1.68</td>
<td>0.19</td>
</tr>
<tr>
<td>Tot InSchSuspen</td>
<td>-2.25</td>
<td>0.11</td>
</tr>
<tr>
<td>Tot InSchExpuls</td>
<td>-1.71</td>
<td>0.18</td>
</tr>
<tr>
<td>Ave Absent Days</td>
<td>0.01**</td>
<td>1.0**</td>
</tr>
<tr>
<td>Ave Truancy Flag</td>
<td>-2.7**</td>
<td>0.1**</td>
</tr>
<tr>
<td>Dropout Flag</td>
<td>0.3**</td>
<td>1.3**</td>
</tr>
<tr>
<td>No. of Transitions</td>
<td>0.01</td>
<td>1.01</td>
</tr>
<tr>
<td>Highest Grade</td>
<td>-0.03*</td>
<td>.97*</td>
</tr>
<tr>
<td>Prop Fail ELA</td>
<td>-0.04</td>
<td>1.04</td>
</tr>
<tr>
<td>Fail Grade Once</td>
<td>0.08</td>
<td>1.08</td>
</tr>
<tr>
<td>Fail Grade Twice</td>
<td>0.1</td>
<td>1.1</td>
</tr>
<tr>
<td>Fail Grade Many</td>
<td>0.3</td>
<td>1.36</td>
</tr>
</tbody>
</table>

Note: * 0.05 significance level  
** 0.01 significance level

By holding the other predictors constant in the model, the following values of OR are reported in the 2nd model. The odds of recidivism in the adult justice system for males are about 5 times that of females (OR = 4.5). For an African American student, the odds of recidivism in
DOC are increased by a factor of 1.3 over a white student. The “other” racial group and eligibility for free/reduced lunch are not significant predictors of DOC recidivism.

In Model 1, all the criminological risk factors are significant at the 0.01 level, except the age at the 1st OJJ contact and number of OJJ contacts (at the 0.05 significance level). For each one unit increase in the total number of OJJ contacts, the odds of DOC recidivism is increased by a factor of 1.2. The other criminological factors are all significant at the 0.01 level. The odds of DOC recidivism is 1.8 for students who were sentenced to parole in OJJ, 2.0 for students who had secure custody in OJJ, and 1.4 for nonsecure custody, compared to OJJ clients with sentences of probation. Gang membership increases the odds of adult recidivism by a factor of 1.7 compared with nongang members.

None of the school discipline charges significantly differentiates DOC recidivists. The odds of DOC recidivism for dropouts are 1.3 times higher than their counterparts. None of the school performance variables are significantly associated with DOC recidivism, except the highest grade a student completed in DOC, but only significant at 0.05 level with a Odds ratio close to 1 (OR = 0.97). This means school-related risk factors are not strong predictors for adult recidivism.

**Out-of-School Expulsion across Different Offending Patterns**

Although out-of-school expulsion was not considered as a separate research question in this study, it stands out among the findings across the four offending patterns. Further analyses of this specific school discipline charge are therefore warranted.

The percentage of students who had out-of-school expulsion is presented among school dropouts and among the four different offending patterns, comparing the percentages of students with and without out-of-school expulsion among drop-outs. Among drop-outs, more than 60% had been expelled from school at some point (Table 13). Table 13 also shows that students who
had out-of-school expulsions at some point were represented at higher percentages among each offending pattern than they were among school dropouts.

Table 13
Comparison between Out-of-School Expulsion Students and Dropouts in Percentage

<table>
<thead>
<tr>
<th></th>
<th>Out-of-school Expulsion (3.11% in DOE)</th>
<th>Non Out-of-school Expulsion (96.89% in DOE)</th>
<th>Students Who Drop out of School (22.52% in DOE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dropouts</td>
<td>60.26% (7,634)</td>
<td>21.31%</td>
<td>100%</td>
</tr>
<tr>
<td>Early starters</td>
<td>17.72% (2,245)</td>
<td>3.06%</td>
<td>8.60%</td>
</tr>
<tr>
<td>Late starters</td>
<td>14.80% (1,875)</td>
<td>3.85%</td>
<td>10.03%</td>
</tr>
<tr>
<td>Adolescent-limiteds</td>
<td>11.84% (1,500)</td>
<td>2.18%</td>
<td>5.72%</td>
</tr>
<tr>
<td>Life course persisters</td>
<td>5.88% (745)</td>
<td>0.88%</td>
<td>2.85%</td>
</tr>
</tbody>
</table>

Three models are applied to examine how out-of-school discipline charges impact the different offending patterns. The 1\textsuperscript{st} model only includes the demographics; the 2\textsuperscript{nd} model adds out-of-school discipline charge as an extra independent variable into the previous model; and the final model includes the rest of the school-related factors and the variables in the previous model. Results are shown in Table 14.

For the early starters of crime, having out-of-school expulsion explains an extra 1.6% of variance in the dependent variable. The OR is 572.21, which compares students who did not have this discipline charge, holding the demographics constant in the model. In the final model, the odds of being an early starter are 101.2 more for those having out-of-school expulsion than those who did not have this discipline charge, holding the other variables constant in the model.

For the late starters, having out-of-school expulsion explains an extra 0.7% of variance in the dependent variable. The OR is 86.87 in comparison to students who did not have this discipline charge, holding the demographics constant in the model. In the final model, the odds of being a late starter are 4.35 more for those having out-of-school expulsion than those who did not have this discipline charge, holding the other variables constant in the model.
### Table 14
Results of Out-School Expulsion across Types of Criminal Involvement

<table>
<thead>
<tr>
<th>Offending Patterns</th>
<th>Model 2</th>
<th>Model 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PR^2 Change</td>
<td>OR</td>
</tr>
<tr>
<td>OJJ (PR^2=0.19)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Early Starters</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Out-S Expulsion</td>
<td>1.60%</td>
<td>572.21</td>
</tr>
<tr>
<td>Out-S Suspension</td>
<td>0.33</td>
<td>1.4</td>
</tr>
<tr>
<td>In-S Suspension</td>
<td>0.18</td>
<td>1.2</td>
</tr>
<tr>
<td>In-S-Expulsion</td>
<td>-0.11</td>
<td>0.9</td>
</tr>
<tr>
<td>DOCOnly (PR^2=.15)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Late Starters</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Out-S Expulsion</td>
<td>0.70%</td>
<td>86.87</td>
</tr>
<tr>
<td>Out-S Suspension</td>
<td>0.27</td>
<td>1.31</td>
</tr>
<tr>
<td>In-S Suspension</td>
<td>0.21</td>
<td>1.23</td>
</tr>
<tr>
<td>In-S-Expulsion</td>
<td>1.02</td>
<td>2.77</td>
</tr>
<tr>
<td>OJJ Only (PR^2=.15)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adolescent-Limiteds</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Out-S Expulsion</td>
<td>1.20%</td>
<td>261.71</td>
</tr>
<tr>
<td>Out-S Suspension</td>
<td>0.33</td>
<td>1.39</td>
</tr>
<tr>
<td>In-S Suspension</td>
<td>0.19</td>
<td>1.21</td>
</tr>
<tr>
<td>In-S-Expulsion</td>
<td>-0.33</td>
<td>0.72</td>
</tr>
<tr>
<td>Both Stat (PR^2=.22)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Life Course Persisters</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Out-S Expulsion</td>
<td>1.33%</td>
<td>202.87</td>
</tr>
<tr>
<td>Out-S Suspension</td>
<td>0.22</td>
<td>1.25</td>
</tr>
<tr>
<td>In-S Suspension</td>
<td>0.13</td>
<td>1.14</td>
</tr>
<tr>
<td>In-S-Expulsion</td>
<td>0.13</td>
<td>1.14</td>
</tr>
</tbody>
</table>

Note: * 0.05 significance level; ** 0.01 significance level
For the adolescent-limiteds, having out-of-school expulsion explains an extra 1.2% of variance in the dependent variable. The OR is 5261.71 in comparison to students who did not have this discipline charge, holding the demographics constant in the model. In the final model, the odds of being an adolescent-limited are 7.34 more for those having out-of-school expulsion than those who did not have this discipline charge, holding the other variables constant in the model.

For the life course persisters, having out-of-school expulsion explains an extra 1.3% of variance in the dependent variable. The OR is 202.87 in comparison to students who did not have this discipline charge, holding the demographics constant in the model. In the final model, the odds of being a life course persister are 7.23 more for those having out-of-school expulsion than those who did not have this discipline charge, holding the other variables constant in the model.

**Ten-Year Cohort vs. One-Year Data**

To address the issue of multiple birth cohorts in this study having different tracking periods in DOC, a one-year birth cohort born in 1984 was examined using the same analyses as above. No significant differences were found between the ten-year and one-year cohorts, with the exception of one variable, the “truancy flag”. This may be because age distributes evenly in DOC for the birth cohort of 1980-1989 that accounts for the age difference among the 10-year cohort. Truancy flag is a significant predictor of each of the four criminal pathways for the 10-year cohort with very small ORs, but not for the one-year cohort.
CHAPTER 5: DISCUSSION AND CONCLUSION

Among recent news items in Louisiana are these: Louisiana dropout rate ranks 3rd in the nation in 2011 (http://www.publicpolicyforum.org/pdfs/2011RacineReport.pdf); Louisiana ranks as the most violent state in the U.S. for the 20th time in 2012 (http://www.wwltv.com/news/local/Louisiana-Most-Violent-State-in-the-US-150605415.html); and the incarceration rate in Louisiana is No. 1 in the world in 2012 (http://www.nola.com/crime/index.ssf/2012/05/louisiana_is_the_worlds_prison.html). These frightening statistics indicate that Louisiana will have to address critical changes concerning the welfare of its children and juveniles.

The purpose of this study is to help identify students in school who are at high risk for criminal careers, and provide needed information that could help to disrupt the “pipeline” from school to prison, and promote promising early interventions. To make Louisianan a better place to learn and a safer place to live, the results of this study support that position that keeping students in school and on track toward graduation is a critical social goal; for those already involved in the criminal justice system, keeping them in the community as long as possible and offering them opportunities to avoid recidivism must be considered among our primary priorities. This study also examined the criminological risk factors associated with OJJ involvement that predict recidivism in DOC. The results confirm that residential placement in OJJ needs to be limited after considering the nature of the crimes.

While the linkage between school failure and criminal involvement is well defined in the literature, this study provides more detailed information concerning specific linkages between school-related factors and the Louisiana criminal justice system. Four different offending patterns were examined and compared based on the demographics and school-related risk factors: the early starters vs. late starters and the adolescent-limited vs. life course persisters.
Out-of-school expulsion stands out among the other significant risk factors in a school setting as a predictor of these criminal pathways, especially for the early starters involved in the juvenile justice system at a young age.

This chapter summarizes the findings from the last chapter and discusses their implications. The chapter will be arranged by the order of the proposed research questions.

**The Associations among Main Variables of Interest**

Correlation analyses between each independent and dependent variable are the first step in detecting associations for the multivariate analyses. Possible interaction terms in the multivariate analyses are also determined by the correlation tests. Almost all the independent variables of interest were significantly correlated with the dependent variables at the 0.01 significance level, except the binary variable “other ethnicity” (4% of the study sample), which may be due to relatively small n for this designation. Three significant correlation coefficients were larger than 0.4, which is considered a moderate to high correlation at the 0.01 significance level. These represent two potential interaction terms: family poverty (operationalized as eligibility of free/reduced lunch) with race (African-American) \( b = 0.55 \), and gang membership and OJJ placement (secure custody, \( b = 0.78 \)). One potential problem with collinearity was also identified in these analyses (failure on ELA and MATH, \( b = 1.0 \)).

The significant findings for these potential interaction terms are not surprising. The correlation coefficient shows a positive association between family poverty and being African American and a negative association between poverty and being White. The association between low socioeconomic status and being African American has long been confirmed in the social sciences. The finding that gang membership has a positive association with secure custody placement in OJJ indicates gang members tended to be placed in secure custody more often than non-gang members. The level of placement in OJJ is used as an indicator of the severity level of
the crime a juvenile committed (in the absence of other data to indicate this). Being placed in
secure custody implies a high level of severity of the offense, while probation is considered an
indicator of low offense severity. Juveniles in gangs are known to be involved in much more
intensive criminal activities and tend to commit more serious crimes than non-gang members
(Hill, Howell, Hawkins, & Battin-Pearson, 1999). The findings of this study are consistent with
these assertions.

ELA and MATH test failure are used as core measures of students’ academic
performance (Browning & Huizinga, 1999). While a high correlation between these indices was
expected, the finding of a perfect correlation merits some comment. Since these variables were
computed as proportions consisting of number of exam failures in relation to total number of
times the exams were taken, it is thus possible to see how the average of these proportions over
the 13 year period would become, at the level of the individual, essentially identical.

**The Early Starters vs. Late Starters**

The first comparative analysis among the 4 criminal profiles is between early and late
starters. The only distinguishing difference between these two groups is the onset age for
criminal activity, as indicated in arrest records. The early starters are offenders whose first
contact in the juvenile justice system occurred before age 17. Their counterparts, the late starters,
are those whose first criminal records are found in DOC at or after the age of 17. This section is
divided into two parts. The 1st part compares the different profiles of the two groups regarding
their demographics and school-related factors. The 2nd part compares the Odds Ratios (OR) for
each predictor in the logistic regression between the two groups. ORs show how well a predictor
differentiates the two offending patterns.
Descriptive Statistics

Demographics

The percentage of males is higher in the late starters group, 84.11% compared to 77.32% for the early starters group. As these figures show, male offenders are over-represented in both groups, but more so among the late starters. From another perspective, a higher percentage of females came into contact with the criminal justice system early, the opposite pattern as observed for males. OJJ records include status offenses, including truancy, and these offenses have been identified more among female cases than males (Kroneman, Loeber, & Hipwell, 2004; McKnight & Loper, 2002). Records in DOC, in contrast, involve only criminal offenses.

African Americans are over-represented in both groups, as expected based on the national statistics (Johnson, Crosnoe, & Elder, 2001). Little difference is shown between the two groups: These percentages are 62.80% for the early starters and 61.29% for the late starters.

Eligibility of free/reduced lunch, the variable used to indicate family poverty, was somewhat more common among the early starters (74.41%0) than the late starters (68.99%), though very high for both. Apart from early or late criminal onset, poverty has been shown to play a major role in criminal involvement, with particularly strong effects on juveniles (provide cite). Children from disadvantaged families are at high risk for early criminal involvement, owing to various vulnerabilities throughout the social ecology, including family stress, lack of educational opportunities, lack of social support, and dangerous communities, as documented in the criminology literature (Farrington & Welsh, 2007; Hawkins, et al., 1998; Henry, Caspi, Moffit, & Silva, 1996).

Problem Behaviors in School

Problem behaviors in school are measured by the average total number of school discipline charges that a student had annually in DOE. This number also is calculated for each
category of school discipline charge, in/out-of school suspension and in/out-of school expulsion. The discipline charge history shows a higher mean among the early starters than the late starters for each category of discipline charge, except out-of-school expulsion. Having more problem behaviors in school was associated with higher risk for juvenile criminality. The same variables predicted late-starting criminality, but these associations were weaker compared to those for the early starters. Out-of-school expulsion, in particular, has a long-term impact on a student regarding his/her or her criminal outcomes. This finding will be discussed in more depth, below.

**School Engagement**

The majority of all offenders are school dropouts, but the difference in numbers of drop-outs between early and late starters is small (55.03% vs. 53.83%). The students in the early starters group transferred schools more often (mean = 2.96) than those in the late starters group (mean = 1.8), which was used as one of the indicators of low school engagement (Glanville & Wildhagen, 2007). The annual total days absent on average was higher among the early starters (mean = 18.94) than the late starters (mean = 16.75), as was the average number of truancy flags across the DOE years. The students in the early starters group, therefore, were found to be lower on most of the indices of school engagement than their counterparts, in general. This suggests that early criminal involvement is associated with early estrangement from this vital social institution.

**School Performance**

There are more students among the early starters group who failed a grade (77.83%) compared to late starters (69.94%), and the mean of the highest grade a student completed in DOE is slightly lower among the early starters (9.8 vs. 10.3). Students in the early starters group also failed standardized tests on ELA and MATH slightly more frequently (mean = 0.19) than late starters (mean = 0.18). Early criminality is thus associated with poor academic performance,
particularly as indicated by grade failure. This finding is consistent with the assertion that early-starting criminality is associated with estrangement and disengagement from school, the primary social institution that offers opportunities for learning the social, academic, and professional skills needed for successful entry into the workforce.

**Logistic Regression**

The comparison between the early starters and late starters is made based on the results from the final regression model with demographics and all school-related risk factors included. The description of separated models for both groups is reported in the previous chapter.

**Demographics**

The regression results do not vary substantially from the results for bi-variate analyses with respect to the demographic characteristics of race, gender, and family poverty. The odds for males to be early criminal starters are 2.89 compared to females, and these odds are 4.78, males to females, for late starters. As discussed above, the gender difference among late starters is larger than among early starters. Both groups have very similar ORs for African Americans compared to White (OR = 1.30 for the early starters; OR = 1.36 for the late starters), which indicates that being African American is associated with a higher probability, 1.3 times as high, for having a criminal record compared to Whites. The students in the “other” racial group have low probabilities of records in both juvenile (OR = 0.62) and adult systems (OR = 0.70) compared with White students. Poverty puts students at high risk for criminality almost equally for early and starters (ORs = 1.27 and 1.31, respectively).

**Discipline Charge History**

The largest differences in the regression analyses between early and late starters were found when comparing school discipline charges. Each of the four categories of discipline charge significantly differentiated the groups at the 0.05 significance level. Each additional out-of –
school suspension increased the odds of being an early starter by a factor of 14.27, and the odds of being a late starter by 6.36. Out-of-school expulsion, in particular, appears to have an extreme impact on students’ criminal outcomes. These odds are 112.65 for each additional out-of-school expulsion among the early starters, and 22.33 among the late starters. Similar, though less potent results were found for students who had in-school suspension (OR = 12.28 among the early starters; OR = 6.01 among the late starters) and in-school expulsion (OR = 8.32 among the early starters; OR = 12.15 among the late starters). Overall, the discipline charge history is a strong predictor of offending, especially for the early starters. These findings confirm the findings discussed above for the descriptive statistics.

**School Engagement**

Dropout status predicts both offending statuses at the 0.01 significance level, but it has a stronger association with the late starters (OR = 2.31 vs. 1.57). Each additional unexpected school transition increases the odds of being an early starter by a factor of 1.21, but almost no impact was found for late starters (OR = 1.03). The average annual total for missing school days has a slight positive impact on students’ criminal outcomes equally for the early starters and late starters (OR = 1.03 for both). This may due to the large range of this variable from 0 to 130. Unexpectedly, average annual truancy flags were negatively associated with offending status for both groups (OR = 0.12 for both). It seems that fewer truancy flags predicted future offending. One possible reason could be the limited variance of this variable with a minimum value of 0 and maximum value of 2.

**School Performance**

Risk variables under the school performance category had stronger impacts on the early starters than the late starters. The highest grade a student completed in DOE has a negative association with offending status for both early and late starters at the .001 significance level,
but the magnitude of the association is larger for the former ($B = -0.03$, $OR = 0.78$) than the latter ($B = -0.1$, $OR = 0.93$). Standardized test failure significantly predicts the status of early starters of crime with a small value of $OR$ ($OR = 1.19$), but this predictor is not significant for the late starters. Grade failure is a strong predictor for the early starters ($OR = 1.74$, $p = 0.01$). This risk increases as the number of times a student failed a grade increases more than once ($OR = 2.52$, $p = 0.01$) and more than twice ($OR = 3.17$, $p = 0.01$). Compared with students who never failed a grade, students who failed a grade once were 1.74 times more likely to come into contact with the juvenile justice system. This number is 2.52 times more likely for students who failed grades twice and 3.17 times more for those who failed grades more than twice. Grade failure also was associated significantly with late starters at the 0.05 level, but having failed a grade more than once did not increase the odds of being a late starter. These odds were, for one-time failure, 1.64, 1.29 for failure of grade twice, and 1.34 for failure of grade more than twice, compared to those who never failed.

To summarize, overall, school-related risk factors impact the early starters of crime to a greater extent than late starters, although these risks are significant for both groups. Among the early starters, students had more school discipline charges, missed more days, more school transitions, more failure on both ELA and MATH, lower grade completion, more grade retention, and were more likely to drop out of school than the students identified as late starters.

**The Adolescent-Limiteds vs. Life Course Persisters**

The second comparison is provided for adolescent-limiteds and life course persisters. The only distinguishing difference between these two groups is the duration of the crime career. The adolescent-limiteds are the young offenders whose criminal activities are confined to the adolescent period before the age of 17, as indicated by their criminal records in OJJ. Their counterparts are the life course persisters, whose criminal activities continued in their adulthood
including and after the age of 17, as indicated by their criminal records in both OJJ and DOC. This section is divided into two parts. The 1st part compares the different profiles of the two groups regarding their demographics and school-related factors. The 2nd compares the Odds Ratios (OR) for each predictor in the logistic regression between the two groups. ORs show how well a predictor differentiates the offending patterns.

Descriptive Statistics

Demographics

Male offenders are overly represented in both groups, but they tend to be a more significant factor among the life course persisters than the adolescent-limiteds. The percentage of males in the life course persisters group is extremely high, 92.18%, compared to 71.12% of adolescent-limiteds. Only about 8% of life course persisters are females.

African Americans are over-represented in both groups; especially among the life course persisters. The percentage is 69.53% for the life course persisters and 59.99% for the adolescent-limiteds.

Eligibility of free/reduced lunch, the measure for family poverty, has a high percentage among the two groups (76.82% for the life course persisters; 73.41% for the adolescent-limiteds). No matter how long a crime career lasts, poverty plays an important role in involvement in criminal activities; but it matters slightly more among the life course persisters.

Problem Behaviors in School

Problem behaviors in school are measured by the average total number of school discipline charges that a student had annually in DOE. This number also is calculated for each category of school discipline charge, in/out-of school suspension and in/out-of school expulsion. The discipline charge history shows a higher mean among the life course persisters than the
adolescent-limiteds for each category of discipline charge. Having more problem behaviors in school elevates a student’s risk for having a longer criminal career.

**School Engagement**

The majority of the offenders are dropouts. The dropout rate among the life course persisters was 62.09% compared to 52.09% among the adolescent-limiteds. The students in the life course persisters group transferred school more often (mean = 3.17) than those in the adolescent-limiteds group (mean = 2.87), which was one of the indicators of low school engagement (Corville-Smith, Ryan, Adams, & Dalicandro, 1998). The annual total days absent on average was slightly higher among the life course persisters (mean = 19.84) than the adolescent-limiteds (mean = 18.60). However, the former group has a slightly lower average truancy flag than the latter (means = .02 and .03, respectively) across the DOE years, which is the opposite direction of effect compared to the average annual total days absent. This may due to the limited variance of the variable as discussed above. The students in the life course persisters group show low school engagement than their counterparts in general.

**School Performance**

There are more students among life course persisters groups who failed a grade (81.68%) than in the adolescent-limiteds group (76.23%). The mean of the highest grade a student completed in DOE is slightly lower among the life course persisters (mean = 9.6) than the adolescent-limiteds (mean = 9.9). Students in the life course persisters group also failed standardized tests on ELA and MATH more frequently (mean = 0.19) than adolescent-limiteds (mean = 0.18). Generally speaking, offenders with a longer period of criminal involvement were found to have poorer records on academic performance than their counterparts.
Criminological Risk Factors

Criminological risk factors are the OJJ-related factors, used to predict adult incarceration. The level of placement is used to indicate the severity level of the original offenses in OJJ. A higher percentage of life course persisters group had been placed in secure custody in OJJ (43.25%) compared to adolescent-limiteds (22.50%), while a greater percentage of adolescent-limiteds were placed on probation, 69.44%, compared to 48.53% among life course persisters. Life course persisters, thus, tended to be distinguished from adolescent-limiteds on the basis of higher severity level of crimes during their adolescence. These results indicate an association between severity of charges in the juvenile justice system and future adult recidivism.

The same pattern pertains to frequency of crimes, which is measured by the total charges in OJJ and the total contacts with OJJ. The life course persisters were charged more times in OJJ (mean = 1.62) than their counterparts (mean = 1.38). With respect to the total number of OJJ contacts, the difference between the two groups is small (mean = 1.07 for the life course persisters; mean = 1.05 for the adolescent-limiteds). One OJJ contact could contain multiple charges. It thus appears that total number of OJJ charges measures crime frequency better than OJJ contacts.

Logistic Regression

The comparison between the life course persisters and the adolescent-limiteds is made based on the results from the final model with demographics and all school-related risk factors in this study. Descriptions of the separate models for both groups are reported in the previous chapter.

Demographics

The odds for males to be life course persisters are 9.93 compared with females, while the odds are 1.96 for adolescent-limiteds to be male. As discussed above, the gender difference
among the life course persisters is much larger than among adolescent-limiteds. Both groups are overly represented by African Americans compared with White (OR = 1.76 for the life course persisters; OR = 1.13 for the adolescent-limiteds). No difference was found between the groups on the OR for the “other” race category compared with White (OR = 0.62); the “other” racial group had a lower probability of involvement in criminal activities than Whites for both offending groups. Poverty elevates students’ risk for criminality for the adolescent-limiteds (OR = 1.32) to a great extent than for life-course persisters (OR=1.19). This result confirms the previous findings on poverty’s particular impact on juveniles.

**Discipline Charge History**

The largest differences were found when comparing school discipline charges between the life course persisters and the adolescent-limiteds. All three categories of discipline charges, except in-school expulsion, significantly differentiated the offending status of adolescent-limiteds at the 0.05 significance level, while they are not significant for the life course persisters group. Each additional out-of–school suspension increased the odds of membership among adolescent-limiteds by a factor of 17.01. Out-of-school expulsion, as noted for the other conditions, impacts students to an extreme degree in relation to criminal outcomes. Each additional out-of-school expulsion is associated with an OR of 97.13 for membership among adolescent-limiteds. Similar results were found for adolescent-limiteds who had in-school suspension histories (OR = 14.94). In-school expulsion, however, was not significant (OR = 8.00). Overall, the three of the four different categories of discipline charges were predictors of adolescent-limited status. None of the school discipline charges predicted life course persister status. Problem behaviors in school, thus, were found to have strong associations with the adolescent-limited profile but not the life course persister profile. The negative impact of
problem behaviors in school on criminality over the life-course is probably minimized gradually over time, and the criminal pathway itself tends to become self-reinforcing.

**School Engagement**

Dropout status predicts both offending statuses at the .01 significance level, but it has a stronger association with the life course persisters (OR = 1.89) than the adolescent-limiteds (OR = 1.44). With respect to school transitions, each additional episode of unexpected school transition increases the odds of being an offender by a factor of 1.2 for both groups. The average annual total days absent has a slightly positive impact on students' criminal outcomes, equally for the life course persisters and adolescent-limiteds (OR = 1.03 for both). This relatively negligible effect may due to the very large range of this variable from 0 to 130. The finding for average annual truancy flags of a negative association with offending status for both groups (ORs = 0.12) was unexpected and presents interpretive challenges. Fewer truancy flags predicted future offending. One possible reason could be the limited variance of this variable with a minimum value of 0 and maximum value of 2.

**School Performance**

The highest grade a student completed in DOE was negatively associated with offending status for both groups at the .01 significance level, but the magnitude of this association is slightly larger for the life course persister group (B = -0.03, OR = 0.76) than for adolescent-limiteds (B = -0.2, OR = 0.80). Failure on standardized tests significantly predicts the status of the adolescent-limiteds with an OR of 1.19, but this predictor is not significant for life-course persisters. Each one unit increase in the proportion of failure on ELA increases the odds of being an adolescent-limited by a factor of 1.27. One-time grade failure is a strong predictor for both groups at the .01 significance level (OR = 1.78 for both). The risk of membership among life-course persisters increased when the number of times a student failed a grade was more than one.
(OR = 2.69) and more than twice (OR = 4.11). This increasing tendency of probability is also true for the adolescent-limiteds, but the magnitude is smaller than for the life course persisters. Compared with students who never failed a grade, students who failed a grade twice are 2.11 times more likely to be adolescent-limiteds, and 4.11 times more likely among those who failed a grade more than twice.

To summarize the findings from the logistic regressions, overall, school-related risk factors impact the life course persisters more than the adolescent-limiteds, although these effects are negative and significant for both groups. Among the life course persisters group, students missed more days, more school transitions, failed more on both ELA and MATH, completed fewer grades, and failed more grades than the students identified as adolescent-limiteds.

Several statistically significant findings emerged from the two comparative analyses (early starters of crime vs. late starters and the adolescent-limiteds vs. life course persisters). With respect to demographics: (1) Males predict the life course persisters best (OR = 9.73), compared to the other conditions (OR = 4.78 among the late starters; OR = 2.89 among the early starters; and OR = 1.96 among the adolescent-limiteds); (2) African Americans are overly represented among all groups but this difference is largest among the life course persisters (OR = 1.76, compared to OR< 1.4 for the other three groups); (3) Poverty also is a significant predictor for all four study groups (OR = 1.2 among the life course persisters; and OR = 1.3 among the other three groups).

With respect to history of school discipline charges, problem behaviors in school, measured by school discipline charges, predict three of the four offending patterns very well, especially among the early starters and the adolescent-limiteds, the exception being life-course persisters. Each category of discipline charge had a high OR across these offending patterns, indicating that for each additional discipline charge in school, the odds of being an offender
increased several times. Out-of-school expulsion stands out from among the other school discipline charges (OR = 112.65 among the early starters; OR = 97.13 among the adolescent-limiteds; and OR = 22.33 among the late starters). The results indicate a strong association between problem behaviors in school and the criminality among young offenders, with the exception of the life-course persisters.

With respect to school engagement, dropout flag has the biggest predictive capacity among the late starters (OR = 2.31), although it is positively associated with all the offending patterns (OR = 1.89 among the life course persister; OR = 1.57 among the early starters; and OR = 1.44 among the adolescent-limiteds); the total number of unexpected school transitions slightly differentiates offending status among the three study groups (OR = 1.20), except among the late starters (OR = 1.03); the total annual absent days on average are positively associated with the four offending patterns with a small impact (OR = 1.03 for four groups); and the total numbers of annual truancy flags on average have surprising negative associations with all four offending patterns, which may be due to the limited variance in this variable.

With respect to school performance, the highest grade a student completed in DOE is negatively related to all four offending patterns with a small OR among the young offenders (OR = 0.8 for both early starters and adolescent-limiteds); failure on standardized tests only predicts the young offenders (OR = 1.2 for both early starters and adolescent-limiteds), but it is not a significant predictor among the late starters and life course persisters; and grade failure of once, twice, and more than twice all predict offending status across four offending patterns, especially among the early starters (OR = 3.17 for students who failed grade more than twice) and the life course persisters (OR = 4.11 for students who failed grade more than twice).

Overall, Male African Americans are overly represented among the late starters of crime and life course persisters. Poverty is positively associated with criminality across the different
offending patterns. Problem behaviors in school have a strong association with young offenders, including the early starters and adolescent-limiteds. Out-of-school expulsion has the highest predictive capacity for the offending patterns among the school-related factors. Students with poor academic performance have higher probabilities of being the early starters of crime and further life course persisters than their counterparts. The findings on the school engagement variables are mixed.

**OJJ Contact as a Predictor of Adult Criminality in DOC**

To examine if previous OJJ contact predicts adult recidivism in DOC (DV = DOC status, 1 for yes and 0 for no among DOE students), two models are applied: a classic hierarchical logistic regression and a probit regression after PSM to confirm the findings from the prior model. For the 1st model, demographics are entered at the 1st level, including gender, African American, other ethnicity, and proportion of eligibility of free/reduced lunch in DOE. OJJ status is the independent variable of most interest and entered at the 2nd level by itself. Whoever had OJJ contact(s) are assigned 1 for OJJ status, otherwise they are coded 0. The disciplinary history (four categories of discipline charges), school engagement variables (total absent days and truancy flag, each of these indicators reflecting the average annual number of days missed and truancy flags assigned, respectively, dropout flag, and number of unexpected school transitions), and school performance variables (the highest grade completed in school, a proportion of fail on ELA, grade detention once, twice, and more than twice) are entered at the 3rd, 4th, and 5th levels respectively. Results show that OJJ contact predicts adult recidivism (OR = 3), controlling for the demographics and school-related risk factors (problem behaviors in school, school engagement, and school performance).

For the 2nd model, all the predictors in the logistic regression are used as PSM matching criteria, except OJJ status, which is utilized as the treatment status for PSM, by looking at the
DOC outcome. Results for this model reinforce findings from the prior model that OJJ contact(s) predicts adult recidivism by a factor of 2. That is, students having OJJ contact have twice the likelihood of going to DOC than those who did not go to OJJ.

**Hierarchical Logistics Regression**

Students with previous OJJ contact(s) are more than three times more likely to commit crimes as an adult leading to DOC involvement than those who did not have records in OJJ. Nothing surprising is found in terms of the demographic and the school-related risk factors regarding prediction of DOC status. Males are more than five times more likely than females to commit crimes in DOC; African Americans are 1.42 times more likely to be in the DOC than are Whites, and poverty increases the odds of DOC involvement by a factor of 1.28. All discipline charges significantly predict DOC involvement. Among them, out-of-school expulsion increases the odds by a factor of 21.09, and in-school expulsion increases the odds by a factor of 9.9. Dropout flag increases the probability of adult criminality by a factor of 2.21. Having grade detention at least once increases the odds of DOC involvement by a factor of 1.5 to 1.7. Failing the ELA section of standardized tests of interest is not a significant predictor of adult criminality. These results are similar to the findings for the late starters of crime group, which makes up more than 80% of the population in DOC (the other 20% are the life course persisters who also had OJJ criminal records).

**PSM**

Propensity score matching (PSM) is a fairly new method used in program evaluations when random assignment is very difficult or impossible for logistical or ethical reasons (Guo & Fraser, 2010). It is an alternative to random assignment and is considered a quasi-experimental design. The objective of PSM is to create a statistical comparison group based on secondary data, case by case with a treatment group of interest, based on the probability of being included in the
treatment group as determined by the extent to which known characteristics are shared. PSM has the merits of quasi-experimental design by controlling the threat of potential selection bias and is applicable for observational studies. This study uses the “one-to-one nearest neighbor matching without replacement” method to find a comparison group of OJJ in the DOE dataset using DOC involvement as the outcome variable. “One-to-one nearest neighbor matching without replacement” means the cases in the treated and untreated group are matched by the closest value of probability of going to DOC and taken out from the pool after they are matched.

Statistical results employing a PSM group reinforce findings from the logistic regression. Due to the PSM method employed, the treatment (OJJ status) and PSM comparison groups have the same sample size (n = 14,349). This PSM group was identified by using demographics and all school-related risk factors, including discipline charges, school engagement variables, and school performance variables. The primary difference of interest between these groups is that students in the treatment group had OJJ records, while the students in the comparison group did not have comparable record(s) considering that they were never in the OJJ. Though 4,222 students in the treatment group went to DOC, only 2,020 of the PSM-created comparison group did so. Thus, students who had OJJ records were more than 2 times more likely to become involved in the DOC than those who did not have OJJ records. Although the OR is 3 in the 1st model and 2 in the 2nd model, the direction and significance of findings regarding adult criminality between the two groups of interest are the same in both models. The 2nd model is a more rigorous test of hypotheses considering the merits of utilizing PSM for the study.

**Criminological Risk Factors for Adult Recidivism**

The above results suggest that, broadly speaking, previous OJJ contact(s) increase the likelihood of future adult criminality as measured by DOC contact. This section answers the question of which criminological risk factors leading to OJJ involvement affect the likelihood of
future adult involvement in DOC. The DOC involvement is also called adult recidivism for RQ 5 (different from the definition in the previous substudy on RQ 4), because all the subjects in this substudy already had previous contact with OJJ. Age at initial OJJ contact and gang membership are the two individual-level criminological factors. Institutional-level criminological factors include the most severe charge experienced by an individual in OJJ, number of OJJ contacts, and total number of charges in OJJ. The most severe charge in OJJ is used in this study to indicate the severity of the crime contributing to OJJ involvement. It is rank ordered from most to least severe, in this order: parole, secure custody, nonsecure custody, probation.

Two hierarchical logistic regression models were used to examine the criminological factors in OJJ, with DOC status as the DV: the 1st model includes the demographic and criminological factors; the 2nd model includes those factors examined in the 1st model and adds school-related factors. There are not many differences in findings between the two models regarding criminological risk factors, and only the inclusion of dropout flag differentiates the status of adult offenders from adult nonoffenders among the school-related factors by a factor of 1.3, compared with students who did not drop out of school. School-related factors do not yield a significant overall impact on adult recidivism. This inference is supported by the \( PR^2 \) difference between the two models. The \( PR^2 \) in the 1st model is almost the same as in the 2nd model, which indicates that extra variance of adult recidivism is not explained by adding school-related variables.

All criminological risk factors in OJJ significantly predict DOC involvement, except the age at the first OJJ contact. Based on the previous studies on juvenile delinquency (Welsh & Farrington, 2007), it was hypothesized that the younger a child is upon contact with the justice system, the higher the probability would be that the child would commit further delinquent acts. Only one study had a different finding regarding the age of onset (Bacon, Paternoster, and
Brame, 2009), but that study may not be very comparable considering that it examines adult criminality instead of juvenile delinquency.

Findings suggest that juveniles affiliated with gangs are 1.7 times more likely than those who are not to encounter the DOC. Gang membership offers juveniles a greatly increased probability of becoming involved in delinquent activities, more serious and violent crimes, and to be associated with other delinquent peers.

Among the four categories of OJJ placement in this study, juveniles who were in parole or placed in secure custody are about two times more likely than those on probation to encounter the DOC in adulthood. Nonsecure custody also increases the odds of DOC involvement by a factor of 1.4 compared with those on probation. One additional instance of contact in OJJ increases the odds of adult DOC involvement by a factor of 1.2, while there is a 1.1 greater chance that someone in OJJ will encounter the DOC (OR = 1.1).

The findings indicate relative benefits for students receiving probation compared with incarceration in the juvenile justice system. Under the social development model framework, keeping juveniles in the community (in school) is a way to keep them on the right track regarding their developmental needs. Similar to the findings from other studies, the occurrence of supervision and sanctions did not have a notable degree of influence on DOC contact prevention, while rehabilitation treatment consistently showed a positive and notable degree of effectiveness controlling for the severity of crime (Lipsey & Cullen, 2007).

**Out-of-School Expulsion**

Out-of-school expulsion is identified as the strongest predictor across the four different offending patterns (only at the 0.1 significance level, however, for the life course persisters). Traditionally, high school dropouts have received the most attention in the education literature and practice, while students who were expelled from school are often overlooked. Stakeholders
in the field of education have an idea of the negative impact of out-of-school expulsion, but may not be aware of the true ramifications of this policy. Instead of keeping them in school and offering appropriate instruction and services to address their needs and issues, schools tend to remove those at-risk students from the classroom altogether and to figuratively “put them into the street.” The findings from models examining all four offending patterns demonstrate a need to evaluate expulsion policies.

Three models are applied for each offending pattern (the early starters of crime, late starters, adolescent-limiteds, and life course persisters). The 1st model only includes demographic factors, the 2nd model adds out-of-school expulsion into the previous model, and the 3rd model includes all the interest variables in this study, including the demographics and the school-related risk factors (discipline charges, school engagement, and school performance variables).

The PR^2 changes are reported to indicate extra variance in the dependent variables that is explained by out-of-school expulsion when adding this variable into the previous model. The results show an increase across all four offending patterns from 0.7% (among the late starters) to 1.6% (among the early starters). In the 2nd model, the ORs are extremely large for all four groups at the 0.01 significance level, especially among the early starters (OR = 572.21; OR = 261.71 among the adolescent-limiteds; OR = 202.87 among the life course persisters; and OR = 86.87 among the late starters). Compared with the students who were not expelled from school, those who had this experience are 572.21 times more likely of being early starters. Results suggest that out-of-school discipline charges increase the probability that students will become involved with delinquent activities at an early stage, and that these students will be at higher risk to continue their offending pattern into adulthood by a huge factor of 202.87.

After adding the rest of the school-related variables into the model, out-of-school expulsion maintains its significance across all four offending groups. The value of OR is 101.2
among the early starters, 7.34 among the adolescent-limiteds, 7.23 among the life course persisters, and 4.35 among the late starters. This discipline charge impacts young offenders more than adults in terms of affecting future DOC involvement. Although in/out-of-school suspension is a significant predictor for each study group, the odds never go beyond 1.5 with one more time of being charged. Schools need to be very cautious about assigning discipline charges to students, particularly out-of-school expulsion. It directly pushes students, who are already identified having problem behaviors, out from school to the street. Instead of keeping them in school, out-of-school expulsion offers at-risk students more opportunities to affiliate with deviant peers outside of school and involve delinquent activities.

Cost Analysis on Out-of-School Expulsion

Based on the cost analysis on dropouts who went to DOC for the period of 2010-2011 in Louisiana (Xu, et al., 2011), the annual average DOC cost per person is $4,750, not including other costs on the state budget, nonmonetary costs, and the loss of tax benefits. 70% of OJJ cases are under probation or parole, which cost $17.07 per person per day. 23% of OJJ cases are in secure care, which cost 136.26 per person per day. And 7% of OJJ cases are in nonsecure care, which cost $119.49 per person per day (OJJ, 2011). The annual average OJJ cost per person equals (17.07 * 0.7 + 136.26 * 0.23 + 119.49 * 0.07) * 365.25 = $18,865, which is (18,865/4,750) = 3.97 times of DOC cost. Lewis, Terrell, and Guin’s study (2008) on the “life of crime” in Louisiana had an estimation of $151,179 per offender in 2010 dollars.

There are 12,669 students in total among the 10-year cohort who experienced an out-of-school expulsion during the period of 1996-2008. Among them, 7,634 students drop out of school. The judicial costs among the students who were expelled from school include three components: offenders in OJJ (n = 1,500), in DOC (n = 1,875), and those who had records in both systems (n = 745). Together, the annual average cost of DOC and OJJ per student who was
expelled from school equates to \((4,750 \times 1,875 + 18,865 \times 1,500)/12,669 = 2,937\). The average judicial cost of a student who is identified as a life course persist is \((151,179 \times 745)/12,669 = 8,890\), using the estimation from Lewis, Terrell, and Guin (2008). In total, the judicial cost on average per student who was expelled from school is 2,937 (average cost in DOC and OJJ) + 8,890 (average cost on the life course persisters) = $11,827 in 2010 dollars.

Here is another method to calculate the cost of per out-of-school expulsion on average:

1,500 school dropouts cost DOC $7,121,440 in the 2010 budget in Louisiana (Xu, et al., 2011). Thus, 7,634 dropouts in the 10-year cohort who were expelled from school would cost DOC $36,234,381, which is \((36,234,381/12,669) = 2,860\) per expelled student in DOC. The average OJJ cost per student who was expelled is \((18,865/4,750) \times (1,500/1,875) \times 2,861 = 9,090\). The total amount of judicial cost on average per expelled student is 2,861 (average cost in DOC) + 9,090 (average cost in OJJ) + 8,890 (average cost on the life course persisters) = $20,841 in 2010 dollars.

To summarize the findings above, one out-of-school expulsion could cost the state from $11.9k to $20.8k on average in the one-year judicial budget (2010) in Louisiana. This number is underestimated though, because (1) the cost is judicial cost only, no other school system costs, nonmonetary costs (such as effects on society, injury caused to victims of crime, etc.), or losses of tax revenue are included; and (2) this cost analysis only estimates the cost in the one-year involvement in justice system. Other cost analyses on crime usually use four-year involvement in OJJ and ten-year involvement in DOC (Cohen, 1998), so the final cost could be as much as 10-times the cost reported here.

**Merits and Limitations**

The first notable merit of this study is the data resources used. Longitudinal data are expensive, especially with such a large sample size from public education, juvenile justice, and
adult criminal systems. This study enjoys the richness of the information from three state departments for each individual of interest in Louisiana during a 13-year period (1996-2008). These data resources make it possible to include both gender and different racial groups for analyses, which fills a common gap in criminology studies due to the lack of representativeness of subjects beyond African American males.

This study also fills several gaps in the criminology literature: (1) the comparison among four different offending patterns; (2) detailed risk factors in a school setting; and (3) institutional level criminological risk factors for adult recidivism. As reviewed in Chapter 2, the majority of studies of this type examine educational and criminal outcomes separately. This study links the two issues together and shows a clear association between them. It goes further to examine and compare four different offending patterns instead of focusing on one. An association between educational factors and criminal outcomes is thus not only identified, but also compared across different patterns. In-depth information at the school level in this study provides extra knowledge to a criminological understanding of the many nuances in a school setting, which in the past only existed in the education literature. Although factors contributing to adult recidivism are not new topics, there are very few studies of this type at the institutional level, such as judicial placement. This study has an opportunity to expand the knowledge base in this area.

Although out-of-school expulsion is identified as a “pushing out” policy for students, the main concerns about this policy comes regarding the issues of school truancy or dropout. The linkage between expulsion and criminal outcomes is a missing piece in the knowledge base. This study offers to facilitate our understanding of this problem across different offending patterns. The cost analyses on the judicial costs among expelled students using Louisiana state budget (2010) shows the extremely high price that the society paid for this group.
There are some limitations to this study. The outstanding one is also this study’s biggest positive—data resources. As with any research employing secondary data, this study faces a difficulty in identifying the most ideal measurements for the variables of interest. The study is data-driven, and as such, the research questions are raised according to the availability of the existing information. The list of risk factors in a school setting may not be fully captured, or some significant factors in other studies may not be well defined in the raw dataset. Further, there are issues surrounding potential data entry errors and missing values in the raw data.

A 13-year data tracking period is used for this study, which is not long enough to examine longer term criminal outcomes over the entire “life course.” Life course persisters thus would be more accurately called young persisters with the oldest cohort (born in 1980 as of 2008) in the final dataset at age of 28 and the youngest at 19. A study of genuine life course persisters would require an observation period longer than 13 years. The same issue pertains to the examination of adult recidivism.

The profiles of the four offending groups include an incomplete list of demographic and risk characteristics in a school setting. As such, findings present an incomplete picture of the offenders among four different patterns mainly in a school setting. What is unknown is how they look at home and in community. This issue presents a concern when applying PSM, which requires a relatively complete list of characteristics to match the control group with the treatment group. Thus the results using PSM are limited. The two groups are comparable in a school setting. They may be very different however regarding risk factors based on their family background, which usually are significant for young offenders.

This study is based on the administrative records in the three state-level departments, thus the measurement of the variables are limited on the availability of the information. As mentioned in the previous chapter, this study uses the highest grade a student completed to indicate level of
school performance. This is true only among the students in the public school system. If a child transferred to private school or moved to another state, this measurement is no longer accurate to indicate their school performance. This kind of measurement error happens to other variables as well, such as the group status. The current study classifies different offending pattern based on their criminal records in juvenile or the adult justice system in Louisiana alone.

Also as mentioned, the DOE keeps separate data files for special education students, who were not included in the present study. A comprehensive study of educational risks and crime should include this population.

One may question the age difference among the 10-year cohort in DOC. The youngest ones born in 1989 were 19 years-old in 2008, which gives them a 3-year period to have had the opportunity to come into contact with the adult criminal system, while the oldest ones born in 1980 were 28 years-old in 2008 with a period of 9 more years to be involved in adult criminality. Despite this, a previous study demonstrates little difference among the 10-year cohort in terms of being represented in DOC, as students in each birth year were distributed in DOC stably and evenly (Xu, et al., 2011). The author repeated this previous study using the birth cohort of 1984. The results are similar to the results using the 10-year birth cohort, so they are not reported in this document. The merit of using the longer period of birth cohort is obvious regarding the tracking of youth development.

**Policy Implications and Future Research Agenda**

**Policy Implications**

Two major policy implications are relevant to the problems discussed pertaining to school and the juvenile justice system. For those students with serious behavioral problems in school, out-of-school expulsion is not the best answer for them, as this pushes them further away from school, and finally to the justice system. School administrations should be very cautious
about using out-of-school expulsion for high-risk students and identify the alternatives to offer to this group of students. If they are already on the edge of a cliff, so to speak, one push could cause them to fall. And their later rescue would be much harder than pulling them back from the edge before a fall occurs. This study provides the early warnings (risk factors) in a school setting to help identify students with problems, where there is opportunity for early intervention. As shown in several multisystem-model programs in the previous chapter, early interventions should address the issues not only in schools, but also at home and in the community.

For those students who unfortunately are already involved in the justice system, incarceration may not be the best answer for them either. Locking them up is unlikely to help rehabilitate their behaviors. Although public security is on the other end of the priority in the justice system, the society could pay a higher price in the long run if young offenders are given punishment only without offering them any proper treatment. As shown in this study, secure care and parole increased the likelihood of adult recidivism.

**Research Agenda**

Moving forward, my next attempt to continue this study is aimed at obtaining and studying other risk factors at home and in the community. Such a study could make stronger conclusions regarding the comparison of profiles among the four different offending patterns. When family and community background are included in the study, high-risk youths would be better identified and possibly offered more appropriate services outside the school than currently.

This study uses aggregate data for the school-related risk factors across the years in DOE. Instead of examining a single year that a student was in the DOE, which could be unrepresentative of other times, this study looks at students’ overall performance in school. This approach could be improved by examining the risk factors at low grades (child predictors) and high grades (juvenile predictors) independently. After all, the predictors at different ages may be
differentially linked to the future criminality, accounting for the sensitive age difference among young population.

The next step after identifying the list of risk factors for criminality is developing a risk level scale based on the significant factors and weighted if necessary. Or going one step further, a standardized risk level instrument could be developed, as noted in the OJJDP’s comprehensive strategy (Howell, 1995). This instrument could be used in the school system to identify high-risk students and to provide early intervention to interrupt the pipeline to prison flow. It also could be used in the juvenile justice system during the decision-making process on the judicial placement and rehabilitation plans to prevent future recidivism.

As identified in past studies (Carr & Vandiver, 2001; Christle, Jolivette, & Nelson, 2005), protective factors build resiliency to desist from crime among at-risk youths. Studies on protective factors are needed as well, as reinforcement of protective factors is a strategy of aimed at decreasing the risk factors in many promising programs for at-risk youth and youth offenders (Lipsey & Cullen, 2007).
REFERENCES


APPENDIX: DATA RESOURCES AND VARIABLES

DOE

One student /one or multiple entries/year--one student/one entry

Enrollment (E, with SIS codebook)


12,143,715 entries; 39 variables

Population: 1,869,028 (704,415 in this study)

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New variables:
TotDOEYear  Total entries in DOE
NTransitions  Number of unexpected transitions in DOE
PropFRLunchDOE  Proportion of f/r lunch in DOE
DummyFRLunch  Dummy coded f/r lunch based on
the prop
AverageAbsDOE  Average yearly missing days in DOE
AverageTruancyFlagDOE  Average number of truancy flags in DOE
FallGradeOnce  Fail grade once (last entry)
FailGradeTwice  Fail grade twice
FailGradeMany  Fail grade more than twice

Discipline (D)—1996-2008---3,159,551 entries; 22 variables

Population: 563,591

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ReturnDt  long  %tdD_m_Y
DiscReason  str2  %2s  Discipline reason
WeaponType  str2  %2s

New variables:
AverTotDiscFlag  Average number of charges in DOE
AverTotDiscFlag2  Average number of charge2 in DOE
AverTotDiscFlag3  Average number of charge3 in DOE
AverTotDiscFlag4  Average number of charge4 in DOE
AverTotDiscFlag5  Average number of charge5 in DOE

Assessment (A)—1999 (March)-2008---5,753,096 entries; 50 variables

Population: 1,104,548

storage  display  value
variable name  type  format  label  variable label
---------------------------------------------------------------------------------------------------------------------
ID       str8  %9s  SSN
district  str3  %9s  Parish
school   str3  %9s
last_name str12 %12s  Last name
first_name str8 %9s  First name
middle_name str1 %9s
State_ID  str9  %9s
month    str2  %9s  Birth month
day      str2  %9s  Birth date
year     str4  %9s  Birth year
sum_grade str2  %9s  Grade
sum_gender str1 %9s  Gender
sum_ethnic str3 %9s  Race
sum_edu_class str1 %9s  Special education Status
sum_special_edu str2 %9s
sum_tech_edu str1 %9s
sum_LEP_status str1 %9s
sum_section_504 str1 %9s
sum_lunch_stas str1 %9s
LAP_lunch_stas str1 %9s  Free, reduced, or paid lunch
sum_migrant_sts str1 %9s  Types of tests
program_name str10 %10s
administrative str3 %9s
administrative str6 %9s  Exam date
district_code str3 %9s
school_code str3 %9s
ELA_scaled_scores str3 %9s
ELA_achieve_l-1 str3 %9s  ELA level
reading_subscore float %9.0g
New variables:

**PropFailELA**  Proportion of “fail” on ELA in DOE

**PropFailMATH**  Proportion of “fail” on MATH in DOE

DOE Merge (merged students from the three data sets using SSN, DOB, & last name)

7-12 graders born during 1980-1989

OJJ

Client & Petition (1996 July-2011 May)---102,683 entries; 65 variables

Population: 61,724 (44,669 in this study)
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adj_modifier3 str26 %26s
adj_modifier4 str26 %26s
adj_modifier5 str26 %26s
adj_modifier6 str17 %17s
adj_modifier7 str17 %17s
adj_modifier8 str17 %17s
adj_modifier9 byte %8.0g
adj_modifier10 byte %8.0g

New variables:
LStatus                  Legal status in OJJ
TopChargeOJJ             The most serious OJJ charge
Parole
SecuCustody
Probation
NonSecuCustody
TotCharegOJJ             Total number of OJJ charges
OJJAge                   Age at first OJJ entry

OJJ & DOE Merge (merged by SSN, DOB, & sex)


MasterforLSU contains "A" - Incarcerate, "P" - Parole(actually paroled by parole board), "G" - Good -time Parole Supervision(on parole by mandatory release) and "B" - Probation.

291, 382 entries; 24 variables

Population: 291,358 (283,087)
jurd_loc    str4  %9s
phys_loc    str4  %9s
max_prol_date str8  %9s
max_ftd_date str8  %9s
gng_cde     str3  %9s
bt_pl       str2  %9s
max_prob_date str8  %9s
sup_lvl     str3  %9s
max_good_time~e str8  %9s
dbl_good_time~e str8  %9s
max_sen_length str7  %9s
el           str1  %9s  Education level
work_rel_elig~e str8  %9s
dc           str1  %9s

DescripForLsu_new.dta--- 291, 360 entries; 24 variables

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DOE Merge (Descriptive & Master): merged by DOC number.
Merge DOE Merge with the other two (DOE Merge & OJJ) by SSN, or DOB, last name
VITA

Xian Guan was born in Changshu, a beautiful historic town in Jiangsu, China. She majored in electrical engineering for her bachelor’s degree. In 2006, she graduated from the Law School in Sichuan University (China) with a focus on the criminal law. In the following year, Xian started Ph.D. program in Social Work at LSU. Her interests are in the school-aged population, their development and the risk and protective factors for their social outcomes. Xian will continue her work on the general wellbeing among the vulnerable youth.