THE DEVELOPMENTAL TRAJECTORY OF DELINQUENCY AMONG ADOLESCENT FEMALES

BY

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DISSERTATION

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ABSTRACT

Most trajectory research related to crime focuses on males and studies offending behaviors from childhood to adulthood (Farrington, 2010). Only very few studies focus on developmental trajectories of female delinquency during adolescence. Given that increasing numbers of girls appear in the juvenile justice system (e.g. Chesney-Lind & Shelden, 2004), given that the offending behaviors of females and males are not identical (e.g. Goodkind, Ng, & Sarri, 2006), and given that there are insufficient empirical studies to provide a good foundation to design effective interventions for delinquent girls (e.g. Le et al., 2003), it is crucial to understand girls’ offending trajectories. In order to address the needs of different types of girls in the juvenile justice system and provide suggestions to inform practice, the current study aims to address questions concerning how girls’ offending behaviors develop over time during adolescence and whether there exist subgroups who follow distinct developmental trajectories.

Developmental and life-course theorists in criminology generate different approaches to categorize trajectories of antisocial behaviors. Moffitt’s development taxonomy theory is the main theory applied in this study, and the theory presumes that maladaptive dispositions, antisocial personality, and family adversity are more likely to contribute to a life-persistent offending trajectory, which refers to a chronic offending trajectory in the current study; whereas school or peer related factors are more likely triggers of an adolescence-limited offending trajectory, which is represented as a desist offending trajectory in the current study. Based on Moffitt’s theory, this study addresses a number of hypotheses related to the development of delinquent trajectories in adolescent females. The sample consists of a cohort of 571 females who had their initial arrest at ages 13 to 14 in 2004 and completed pre-screen assessments using the Washington State Juvenile Court Assessment (WSJCA). This sample is a clinical population because Washington state only includes high-risk youth in their assessment process. In order to
test the hypotheses concerning the change of girls’ offending over time and to identify subgroups who follow distinctive developmental trajectories, the group-based trajectory model (GBTM) is executed to analyze the course of female offending over 4 years.

The current study reveals that there exist distinct delinquent trajectories among high-risk adolescent females in the state of Washington during adolescence. The findings show that different delinquent trajectory groups exist among high-risk females during adolescence. Two different but related measures, number of offenses and offending severity, were examined and result in dissimilar trajectory models. Among this clinical sample, 17% belong to the chronic offending group and 83% belong to the desist offending trajectory when modeling the number of offenses; however, 57% fall into the severe offending group and the 43% fall into the minor offending group when modeling offending severity. By measuring the estimation of two matrices of joint probabilities of membership between the trajectories modeling number of offenses and offending severity, three joint trajectory groups (minor 42.9%, severe-desist 40.5% and severe-chronic groups 16.6%) emerged. The findings reveal the girls who are not African American, who had not been associated with the child protection system, had been detained in 2004, were enrolled in school at least part-time, or had school conduct problems tended to develop along the minor offending trajectory. The girls who had alcohol use, believed in fighting and physical aggression to resolve disagreements or conflicts, were enrolled in school at least part-time, or had poorer school attendance were more likely to become severe-desist offenders. Girls who were more likely to develop a severe-chronic trajectory were African American, had been associated with the child protection system, had drug use, had mental health problems, had aggressive attitudes toward responsible, law abiding behaviors, believed in fighting and physical aggression to resolve disagreements or conflicts, dropped out, were suspended, or were expelled
from school, or had poor academic performance. Moreover, the girls in chronic, severe, severe-desist, or severe-chronic trajectory groups were at increased risk of being arrested again at ages 18 or 19 than their counterparts.

The current study reveals that race, child welfare contacts, mental health, substance use, aggressive attitudes, and school experiences are intersecting and contribute to different delinquent trajectories among these high-risk adolescent females. In discussing these factors further, this study posits that the loss of secure relationships might trigger girls to be involved in delinquent behaviors, which could imply that delinquent girls share common needs. However, the current study finds that there is still a spectrum of delinquent behaviors among girls. The backgrounds of girls in the desist trajectory groups are different from those in the chronic trajectory, which could result in different individual service needs. Therefore, it is vital for both the child welfare and juvenile justice systems to tailor individual needs into their policy and intervention programs.
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CHAPTER 1

INTRODUCTION

The first chapter of the current study presents three main arguments as to why it is important to examine the development of offending trajectory among adolescent females: (1) mainstream studies still focus on male offending while an increasing trend of female arrest rates is emerging; (2) offending behaviors of females and males are not identical; (3) the juvenile justice system houses a sizable number of females. The second chapter focuses on a theoretical framework and empirical studies related to developmental trajectories of delinquency. Moffitt’s development taxonomy theory is the main theory applied in this study since it is well developed and has been systematically examined. Moffitt (1993) defined adolescent-limited offenders as those who engage in anti-social behaviors during adolescence but who do not persist in these behaviors into adulthood. Contrarily, life-course-persistent offenders develop antisocial behaviors from a very young age, two or three years old. Based on Moffitt’s approach, other researchers expand on knowledge concerning the multiple trajectories of antisocial behavior or juvenile delinquency. The review of empirical studies provides comprehensive knowledge with which to frame the research design and interpret findings in this study.

In the chapter three, this study addresses three research questions related to development of delinquent trajectories in adolescent females: (1) Are there different clusters of delinquent trajectories in adolescent females? (2) Do contextual factors including demographics, child welfare contact, school history, peer relations, family history, and mental health history help to differentiate the various clusters of trajectories from one another? (3) Do the different clusters during adolescence help predict adult arrest? In addressing these questions, administrative data from the Washington State Department of Social and Health Services (DSHS) was analyzed. The
sample consists of a cohort of 571 females who had their initial arrest at ages 13 to 14 in 2004 and completed pre-screen assessments. In order to test the hypotheses concerning the change of girls’ offending over time and subgroups who follow distinctive developmental trajectories, the group-based trajectory model (GBTM) is utilized to analyze the course of female offending over 4 years (e.g. Nagin, 2005). The following outcome variables are examined to model the offense trajectories: number of offenses and offense severity. The contextual factors include demographics, history in the child protective system, and indicators from the pre-screen assessment.

The fourth elaborates the findings related to GBTM, the profiles of the girls in the different trajectory groups, and the prediction of early adulthood re-arrest by different trajectory models. Two different but related measures, number of offenses and offense severity, are examined and result in dissimilar trajectory models. The chapter five provides in-depth discussion based on the findings. The implication chapter emphasizes contributions of this study: (1) providing a basis for designing suitable interventions; (2) expanding the current understanding of girls’ offending trajectories, especially related to the factor of child maltreatment.

**Problem Statement**

Studies report that girls are less likely than boys to engage in delinquent activities (Chesney-Lind & Shelden, 2004; Goodkind et al., 2009; Zahn et al., 2008b). However, recent studies found that female youths are increasingly entering into the juvenile justice system (Goodkind, Ng, & Sarri, 2006; Goodkind et al., 2009; Scelfo, 2005; Zahn et al., 2008a). The Department of Health and Human Services (2001) indicated that 15-30% of girls in the US

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1 Note: The term “girl” is frequently used since this study focuses on the population of females whose ages are less than 18 years old.
nationwide have committed violent crimes by age 17. The FBI Uniform Crime Report (UCR) data indicates that while girls’ arrests for minor assaults increased by 24 percent from 1996 to 2006, boys’ arrests in the same category actually decreased by 4 percent. Although the rate of aggravated assaults committed by minors decreased for boys and girls combined, there is a major difference when gender is taken into account. Arrests of boys for aggravated assault decreased by 25 percent, while arrests of girls decreased by only 5 percent (OJJDP, 2008; OJJDP, 2009; Zahn et al., 2008a). Flores (2008, p.5) presents the “trends in juvenile female and male arrest rates (per 100,000) and juvenile female percentage arrests for violent offending: uniform crime reports, 1980-2003” (see figure 1.1). It is obvious that the arrest rates for aggravated assault, simple assault, and the violent crime index are ascended for females while the rates are declining for males after the mid-1990s (Flores, 2008). However, mainstream studies still focus on male offending while only a few researchers address this emerging concern of more and more adolescent females entering the juvenile justice system. It is vital to understand girls’ delinquency since delinquent girls tend to have poorer criminal, psychological and health outcomes during late adolescence and adulthood compared to non-delinquent girls (Chesney-Lind & Shelden, 2004; Zahn et al., 2010). Studies also show girls who develop long-term criminal careers are more likely to be involved in serious offenses, have alcohol or substance addiction, or experience physical and mental health problems in their later life (Bor et al., 2010; Huesmann, Dubow, and Boxer, 2009; Moffitt, & Caspi, 2001; Moffitt, 2006).
FIGURE 1.1 Trends in Juvenile Female and Male Rates (per 100,000) and Juvenile Female Percentage of Arrests for Violence Offending: Uniform Crime Reports, 1980-2003 (Flores, 2008, p. 5)

Furthermore, studies found that girls compared to boys are likely to be arrested for simple assaults, substance abuse and status offenses (Chesney-Lind, 1997; Goodkind, Ng, & Sarri, 2006; Le, Arifuhi & Nunez, 2003; Siegel & Williams, 2003; Zhan et al., 2010). Steffensmeier et al. (2005) also found that girls’ use of violence is typically perpetrated in homes or in schools, and the victims are mostly family members or peers. The Office of Juvenile Justice Delinquency Prevention (2008) reported that in 2007, 16% of female offenders and 10% of male offenders assaulted their parents. For domestic battery offenses, 60% of females assaulted their parents as compared to 46% of male juvenile offenders (OJJDP, 2008). Other studies reveal that girls are significantly more likely to experience sexual victimization in their homes, which increases their risk of delinquency as compared to boys (Zahn, et al., 2008). Ryan et. al. (2007) found that females from the child welfare system make up a higher proportion of first time delinquent offenders as compared with females who do not have contact with the child welfare system. Maltreatment is a particularly relevant factor that can contribute to girls’ delinquency. Girls as compared to boys tend to be arrested for status offenses. Most status offenses occur within the context of families or schools. Therefore, common offense types among girls are not necessarily the same as those among boys. The dearth of research on female delinquency raises a serious concern: how to develop good services for girls who have been in the juvenile justice system or have been dually involved in both the child welfare and juvenile justice systems without sufficient empirical knowledge of this population.

Most intervention programs for juvenile delinquency have been tailored for boys, since the majority of juvenile arrests are male youth (Chesney-Lind, Morash & Stevens , 2008; Le et al., 2003). Consequently, little has been known about how well girls respond to these interventions, although it is known that patterns of violence perpetrated by girls differ from those
of boys. The lack of interventions focused on delinquency among girls may also be attributed to the fact that gender differences have been overlooked in assessments of at-risk youths (Brumbaugh, Walters, & Winterfield, 2010; Hawkins et al., 2009; Hipwell & Loeber, 2006; Le, Arifuhi & Nunez, 2003; Zahn et. al., 2008a). According to Chesney-Lind, Morash and Stevens (2008), the majority of delinquency prevention programs are designed for both genders; however, programs that are exclusively for girls are relatively few in number, despite the fact that delinquency programs that are tailored to a particular gender tend to be more effective for both boys and girls (Chesney-Lind et al., 2008). Chesney-Lind and Shelden (1992) also point out the double standards of acceptable behaviors for females and males in the juvenile justice system.

Girls in juvenile justice face harsher situations than boys since the social expectations of females in general have been inconsistent and contradictory. For example, Baines and Alder (1996) point out that many juvenile justice service providers see girls as more difficult to work with since girls are viewed as abnormal or troublesome when they express their emotions. This common reaction in juvenile justice practice shows lack of understanding of how females develop their gender roles. The Office of Juvenile Justice and Delinquency Prevention (OJJDP) (2012) states “few studies have examined which girls become delinquent or why; and little is known about how well girls respond to interventions that have been traditionally designed with boys in mind.”

Despite this, there are an increasing number of girls in the juvenile justice system and the system seems to be failing to address their needs appropriately (Chesney-Lind, Morash, & Stevens, 2008; Le et al., 2003). Not only are programs designed exclusively for girls few in number, gender specific programs for teenage girls are tailored for a single issue such as teen pregnancy and mothering, substance abuse, or gang involvement, rather than addressing multiple factors affecting violent and delinquent behavior (Chesney-Lind et al., 2008). At-risk girls are likely to
have multiple service needs. For example, girls who are addicted to drugs may also have a history of abuse, suicidal behaviors, academic difficulties, and unemployment. Most programs tend to address individual level factors and outcomes of girls’ risky behaviors rather than the underlying, structural problems, such as gender inequality and poverty that can indirectly affect these girls (Chesney-Lind et al., 2008). Studies have also pointed out the lack of needed services, such as counseling for abuse, health education, sex education, career guidance, and anger management for at-risk girls (Chesney-Lind et al., 2008; Holsinger et al., 1999; Sherman, 2003). In order to design effective intervention programs for girls who have been in the juvenile justice system, we must understand how their offending behaviors develop and whether different groups of delinquent trajectories exist. With better understanding of girls’ offending trajectories during adolescence, the juvenile justice system could develop diverse and effective rehabilitation services tailored to girls’ needs and designed to prevent adulthood recidivism.

Delinquent behaviors are usually not isolated occurrences. Instead, delinquency as a trajectory is a dynamic process associated with an individual’s life history and the changes of their social environments (Elder, 1985; Farrington, 2010; Giele, 2009; Powell, Perreira, & Harris, 2010). Nevertheless, most trajectory research related to crime focuses on males and studies the offending behaviors from childhood to adulthood (Farrington, 2010). Only very few studies focus on developmental trajectories of female delinquency (Cote et al., 2001; Blokland, & Rianne, 2010; Fontaine, et al., 2009; Leve and Chamberlain’s study, 2004). Inconsistent findings related to types of developmental offending trajectories have emerged from those female-only studies. Moreover, none of these studies emphasize the period of adolescence and examine various offending outcomes. Given that increasing numbers of girls appear in the juvenile justice system; given that the offending behaviors of females and males are not identical;
and given insufficient empirical studies to provide a good foundation to design effective interventions for delinquent girls, it is important to understand girls’ offending trajectories. In order to address the needs of different types of girls in the juvenile justice system and provide suggestions to inform practice, the current study aims to address how girls’ offending behaviors develop over the span of adolescence and whether there exist subgroups which follow distinct developmental trajectories. By modeling the developmental trajectories of delinquency among adolescent females and profiling girls in the different trajectories by their social characteristics—at individual, family, and school levels—the findings of this study could inform policy and practice related to female offenders in both prevention and intervention stages. Therefore, the ultimate goals of this study are to understand (1) whether there exist different delinquent trajectory groups among adolescent females; (2) multidimensional profiles of delinquent girls in different delinquent trajectories; (3) how the findings related to female offending trajectories add to the current developmental and life-course theories. With the findings of this study, practitioners could design specific and effective intervention programs for delinquent girls. Given how different trajectory groups consist of girls who share similar backgrounds and delinquency history, and furthermore, given how the juvenile justice system typically offers unitary intervention such as detention or probation for all the youths, this research will recommend diverse services which consider multiple situational, contextual factors in serving delinquent girls.
CHAPTER 2
LITERATURE REVIEW

Farrington (2010) indicates that most theories and empirical findings related to developmental and life-course criminology apply to male offending. Most studies examine male samples or mixed gender samples to study youth developmental pathways to crime. Few studies focus on female-only samples to understand female offending trajectories (Blokland, & Rianne, 2010; Cote et al., 2001; Leve & Chamberlain, 2004). Therefore, the first section of literature review introduces three main developmental and life-course theories in criminology which help categorize antisocial trajectories. Those theories serve as a foundation to understand offending trajectories among girls, although they were first developed by studying male offending. The second section discusses how current empirical studies address offending trajectories among females and what risk factors might influence adolescent females to develop different types of offending trajectories.

Developmental and Life-Course Theories

The life course theory is widely applied when studying historical, social and cultural contexts of individuals’ lives over time (Elder, 1985; Giele, 2009). Elder (1985) indicates that life course “entails interacting processes (social, psychological, biological) from birth to death and that life course variation among individuals and cohorts is shaped in part by historical conditions” (p. 17). Thus, the life course theory emphasizes the connections between human development and contextual factors and dynamic processes that yield life trajectories (Elder, 1985; Giele, 2009). Developmental and life-course theories in criminology aim to understand an individual’s offending pattern and study the development of antisocial behavior or delinquency through childhood, adolescence, to adulthood (Farrington, 2010).
Developmental and life-course theorists in criminology generate different approaches to categorize trajectories of antisocial behaviors. The main theories related to the current studies are Moffitt’s adolescent-limited and life-course-persistent trajectories and Patterson’s early onset and late onset offending. In addition to these mainstream theories, Siverthorn and Frick have developed a different approach from Moffitt’s theory to study female-only samples. Yet, Siverthorn’s and Frick’s approach has insufficient empirical support. The following sections and table 2.1 elaborate the core concepts of these theories and defines the different trajectories of antisocial behaviors.
### TABLE 2.1 Developmental and Life-Course Theories

<table>
<thead>
<tr>
<th>Trajectory Groups</th>
<th>Moffitt</th>
<th>Patterson</th>
<th>Siverthorn and Frick</th>
</tr>
</thead>
<tbody>
<tr>
<td>adolescent-limited (AL) vs. life-course-persistent (LCP)</td>
<td>early onset vs. late onset</td>
<td>delayed-onset</td>
<td></td>
</tr>
</tbody>
</table>

**Key Concepts**

**1.** The onset of adolescent-limited offenders is in their early adolescent and their criminal careers usually end by young adulthood.

**2.** Life-course-persistent offenders develop antisocial behaviors from a very young age and these continue throughout their lives.

**1.** The dividing line is set at 14 years of age.

**2.** Early onset begins with childhood antisocial acts, moves to early arrest and then advances to chronic juvenile offending during adolescence.

**3.** Late onset individuals engage with deviant behaviors after 14 years of age and desist from adult crime by their 20’s.

**Hypothesis**

**1.** “Maturity gap” and “social mimicry” explain the triggering of delinquent behaviors for adolescent-limited offenders.

**2.** Young children with early genetic problems and family adversity are more likely to become a life-course-persistent offender.

**Children who exhibit antisocial behavior at young ages are more likely to have early onset of juvenile offending behaviors and become life-course-persistent offenders.**

**Girls only have one type of trajectory in criminology.**

**Limitations**

**Dualistic typologies cannot fully explain youth offending development.**

**Dualistic typologies cannot fully explain youth offending development.**

**The sample in their study was small and restricted to one clinical sample population.**
Moffitt’s Theory—Adolescent-Limited and Life-Course-Persistent Trajectories

Moffitt’s development taxonomy theory divides people with antisocial behaviors into two distinctive types: adolescent-limited and life-course-persistent (Farrington, 2010; Fontaine, et al., 2009; Moffitt, 1993; Moffitt, 2006; Nagin, Farrington, and Moffitt, 1995). Moffitt (1993) indicates that the peak offending time occurs during adolescence in the United States. The onset of anti-social behavior for most people who have engaged in a deviant life-style is early adolescence, and their criminal careers usually end by young adulthood. Moffitt (1993) defined adolescent-limited offenders as the group whose population is significant but without consistency in antisocial behaviors. The characteristics of this group are: (1) Their criminal careers are brief with “sporadic, crime-free periods in the midst” (p. 686); (2) Their antisocial behavior across situations is not consistent; (3) Their antisocial behavior usually occurs “in situations where it may serve an instrumental function” (p. 686) when used with self-control; (4) Their antisocial behaviors would be responsive to an intervention utilizing the principles of social learning theory which reinforce the pro-social life-style (Moffitt, 1993). Moffitt hypothesized that “maturity gap” and “social mimicry” explain the triggering of delinquent behaviors for adolescent-limited offenders (Farrington, 2010; Fontaine, et al., 2009; Moffitt, 1993, p.687; Moffitt, 2006, p. 571). Maturity gap refers to the period of adolescence where youth “experience psychological discomfort during the relatively role-less years between their biological maturation and their access to mature privileges and responsibilities” (Moffitt, 2006, p. 571). During this period of time, the youth who experience discomfort with their dependent status and are attracted to obtaining adult rewards may develop delinquent behaviors to fulfill their desires. Likewise, the life style of deviant peers (life-course-persistent offenders) is appealing to these youth as it represents adult-like social behavior which demonstrates autonomy from parents or attainment of teen-inaccessible assets. Therefore, adolescent-limited offenders
get involved in delinquent activities because of the effect of social mimicry (Fontaine, et al., 2009; Moffitt, 1993; Moffitt, 2006). However, their delinquent behaviors cease in adulthood and many display positive transition to adulthood, provided that they do not fall into “snares,” such as the impact of a criminal record, incarceration, substance abuse, etc. (Fontaine, et al., 2009; Moffitt, 1993; Moffitt, 2006; Odgers et al., 2008). Since their delinquent behavior is considered temporary and situational, adolescent-onset antisocial behavior is not predicted by childhood biological or family factors (Moffitt, 2006; p. 572).

Contrarily, life-course-persistent offenders develop antisocial behaviors from a very young age, two or three years old. Moffitt assumes that young children with neurodevelopmental impairment, maladaptive dispositions, antisocial personalities, and weak connections to other people are more likely to become life-course-persistent offenders (Farrington, 2010; Fontaine, et al., 2009; Moffitt, 1993; Odgers et al., 2008; Tibbetts, & Piquero, 1999). Beginning in childhood, the difficulties of adaptation within family and school resulting from neuropsychological deficits accumulate, thus increasing the risk of antisocial behaviors and decreasing opportunities to practice pro-social behaviors. As time passes, young children showing extreme antisocial behaviors engage in a high level of juvenile delinquency across circumstances and are channeled into antisocial adult life-styles as chronic offenders (Moffitt, 1993; Odgers et al., 2008). In sum, the risk factors of early biological problems (eg. cognitive or emotion deficits or ADHD) and family adversity (e.g. dysfunctional family or child abuse) are associated with the development of life-course-persistent delinquency trajectories (Farrington, 2010). The life-course-persistent offenders as compared to adolescent-limited offenders are more likely to specialize in serious offenses. Moreover, they encounter more physical and mental health problems as well as substance dependency during adulthood.
**Patterson’s Theory—Early Onset and Late Onset Offending**

Patterson (1998, 2002), who has studied offending trajectories extensively, also categorized two types of trajectories for juvenile offending: *early onset* and *late onset* (Chung et al. 2002a; Patterson et al., 1998; Patterson, and Yoerger, 2002). The dividing line of onset age is set at 14 years of age (Patterson, and Yoerger, 2002). Early onset of delinquency refers to children beginning to be involved with criminal behavior before age 14. Patterson, et al. (1998) indicate that the trajectory of early onset “begins with childhood antisocial acts, moves to early arrest and then advances to chronic juvenile offending during adolescence” (p542). The late onset individuals, who “possess marginal levels of social competency and marginal levels of deviancy” (p.171), engage in deviant behaviors after 14 years of age and desist from adult crime by their 20’s (Patterson, and Yoerger, 2002). Patterson’s theory shares many commonalities with Moffitt’s ideas. Both Moffitt’s taxonomy and Patterson’s development perspective on antisocial behavior indicate that children who exhibit antisocial behavior at young ages are more likely to have early onset of juvenile offending behaviors and become life-course-persistent offenders, while the late onset delinquency individuals are more likely to display adolescent-limited trajectories of criminal careers which cease by early adulthood (Chung et al. 2002a). The majority of adolescent-limited or late start delinquents would desist from offending by age 28 (Chung et al. 2002a). Patterson et al. (1998) also found that there is no difference in terms of risk of adult arrests between the late-onset boys and non-juvenile offenders, which suggests that the late onset individuals are more likely to rehabilitate. According to Moffitt’s and Patterson’s theories, on the other hand, the life-course-persistent or early onset offenders are a small subgroup of an age cohort (around 6%-7%); however, they account for the majority of all the offenses, especially violence-related crimes or victim-oriented offenses. The types of offenses that adolescent-limited offenders or late starters commit are usually less serious, such as theft,
vandalism, public disorders, and substance abuse (Chung et al. 2002a; Moffitt, 1993; Patterson et al., 1998; Nagin, Farrington, and Moffitt, 1995; Odgers et al., 2008).

**Siverthorn’s and Frick’s Approach on Female Trajectory**

Focusing on female delinquency, Siverthorn and Frick argue that Moffitt’s theory may not fit female samples (Siverthorn, & Frick, 1999; Siverthorn, Frick & Reynolds, 2001). Females usually begin their offenses at an older age (when they reach puberty), even though rates of antisocial traits are the same for boys and girls during childhood. Social norms related to gender may delay the onset of girls’ offenses since parents may have stricter control over girls than boys. Furthermore, Siverthorn and Frick hypothesized that girls only have one type of trajectory in criminology—delayed-onset pathway. Even though girls share similar childhood risk factors (concerning cognitive and neuropsychological deficits and dysfunctional family adversities) with life-course-persistent boys, girls’ overt antisocial or delinquent behaviors emerge later, during adolescence (Siverthorn, & Frick, 1999; Siverthorn, Frick & Reynolds, 2001). Siverthorn and Frick (2001) tested their hypothesis with 72 youth (32 boys and 40 girls) in a detention center. They find that girls in their sample rarely show severe antisocial behaviors prior to adolescence; however, girls’ conduct problems are different from those of adolescent-limited boys but consistent with those of life-course-persistent boys. Their sample was small and restricted to one clinical sample population (Moffitt, & Caspi, 2001). Therefore, generalizability to a larger sample size of girls or for a larger age range may be questionable. Furthermore, several studies found that Moffitt’s theory is well applied to female samples even though female offense rates are lower and the proportion of life-course-persistent females is much smaller as compared to males. A sex ratio of male to female for life-course-persistent offenders is 10:1 (Moffitt, & Caspi, 2001; Moffitt, 2006). In contrast to Siverthorn’s and Frick’s theory, Moffitt premises that a majority of girls are adolescent-limited offenders and shared the same causes of delinquency
with their adolescent-limited counterparts (Moffitt, & Caspi, 2001; Moffitt, 2006). Inconsistent theoretical conclusions combined with the dearth of research on female delinquency trajectories demands more attention in this area.

**Summary of Life-Course Criminology Theories**

Farrington (2010) summarizes a list of common consensuses regarding developmental and life-course criminology theories that explain the development of antisocial behavior or offending (p.250-251). The prevalence of crime rate peaks between ages 15 and 19. The peak age of initial offense is in the early adolescent years between age 8 and 14, and most desist from offending during early adulthood between 20 and 29. Children who display antisocial behavior from an early age or early onset offenders are more likely to have a long criminal career, commit many crimes, or have versatile offending. These chronic offenders occupy a small percentage of the population but are responsible for a large portion of all crimes. Usually, offenders commit various crimes accompanied by antisocial behaviors, such as drinking, bullying, etc. During adolescence, offenders tend to commit crimes with others. Upon aging, however, they become lone offenders. The reasons for offending during adolescence include “utilitarian ones,” “excitement or enjoyment,” or anger issues (p.251). Finally, the study finds that minor problems or offending, such as shoplifting, usually occur at a younger age and gradually lead to serious offending as the offender ages, such as burglary and eventually robbery (Farrington, 2010).

Moffitt’s development taxonomy theory is the main theory applied in this study since it is well developed and has been systematically examined. Moffitt’s theory contains clear key concepts of offending trajectories, a set of hypotheses about the causes of two offending trajectories, and valid inference in empirical research. The following section discusses how Moffitt’s theory applies to girls’ delinquency. Patterson’s theory is similar to Moffitt’s theory but
provides a definition of age onset, which gives a suggestion of sample selection for the current study. Siverthorn’s and Frick’s approach is the only approach in the field which was developed with a female-only sample concerning offending trajectories. Even though insufficient empirical studies support that approach, it is still valuable to be included since the current study also focuses on a female-only sample.

**Application of Moffitt’s Theory**

Moffitt divides people who develop antisocial behavior into two trajectory groups, adolescent-limited and life-course-persistent. Moffitt hypothesizes that a life-course-persistent offender usually develops neuropsychological deficits in very early childhood. Moreover, family adversity, such as poor parent-child relations or poor parenting, might increase the likelihood of being a life-course-persistent offender for youth (Moffitt, 1993; Moffitt, 2006). Compared to life-course-persistent trajectory which is defined as chronic, long-term offending, the adolescent-limited trajectory is considered to be sporadic, short-term offending. Moffitt assumes that “maturity gap” and “social mimicry” could be the triggers of delinquent behaviors for adolescent-limited offenders (Moffitt, 1993; Moffitt, 2006). The situational contexts within the family and school and how the contextual factors influence girls to develop the different offending trajectories are explored in this study.

**Contextual Factors Related to Life-Course-Persistent Trajectory**

The socialization process for males and females are dissimilar. The different processes of gender development contribute to the different pathways to delinquency for males and females even when both boys and girls end up with similar types or levels of offenses. From the perspective of female developmental theory, the notion of self as a process of separated individuation is not compatible with female experiences. Females tend to develop internal representations of themselves as being in relationships with others (Miller, 1998; Morton &
Leslie, 2005). Cultural influences on gender encourage females to maintain an interrelated self in order to provide nurturance to others, whereas males are expected to maintain an interrelated self in favor of autonomy and independence. Females are relationally focused, and their self-esteem, power, and effectiveness are dependent on their relationships with others. The disruption of connections with significant others is not perceived merely as a loss of relationships but a total loss of self, particularly for adolescent girls (Morton & Leslie, 2005). Therefore, girls who internalize their problems because of neuropsychological deficits, mental health problems, or family adversity might experience a higher risk of being life-course-persistent offenders (Moffitt, 1993; Moffitt, 2006).

The association between mental health problems and delinquency appears to be much stronger for girls than for boys (Zahn et al., 2010). Teppin et al.’s (2002) study in Illinois, for example, reported that three-fourths of the girls in juvenile detention met diagnostic criteria for one or more psychiatric disorders. Affective disorders were especially prevalent among girls; more than 20% of females met criteria for a major depressive episode. Girls who experience life stressors and victimization, such as depression, posttraumatic stress disorder, or child abuse, report higher levels of mental health problems (Bender, 2009; Zahn et al., 2010). Ruffolo et al. (2004) reported that the incidence of mental disorders among youths in the juvenile justice system is two to three times higher than in youths in the general population, among both males and females. With respect to protective factors, strong interpersonal competences (e.g., self-disclosure, conflict management) and rational coping strategies can prevent girls from engaging in risky behaviors, such as chorianic criminal behaviors (Hawkins et al., 2009; Ruffolo et al., 2004; Zahn et al., 2008b). Furthermore, studies also show that life-course-persistent offenders are more likely to develop mental health disorders during adulthood (Bor et al., 2010; Huesmann,
Dubow, & Boxer, 2009; Odgers et al., 2008). Therefore, mental health could be a cause and outcome for girls to develop life-course-persistent offending trajectories.

In terms of family context, a life-course-persistent trajectory is highly correlated to family adversity (Moffitt, 1993; Moffitt, 2006). Also, the family relationship has more impact on girls than on boys, since gender socialization theory explains that girls develop their identity based on their relationships with others (Morton & Leslie, 2005). Zahn (2008) indicates that “girls have stronger connections to family than boys do throughout life” (p.5). A number of studies found that weak family bonds due to instability, family dysfunctions, poor family structures, domestic violence, and child maltreatment increase the likelihood of delinquency among girls (Bright & Jonson-Reid, 2008; Brubaker & Fox, 2010; Chesney-Lind & Shelden, 2004; Colman et al., n.d.; Hawkins et al., 2009; Goodkind et al., 2006; Hipwell & Loeber, 2006; Kerpelman & Smith-Adcock, 2005; Le et al., 2003; Mcknight & Loper, 2002; Zahn et al., 2008b). For example, Kerpelman and Smith-Adcock (2005) employed a structural model depicting relationships among parent-child bonds, reputation enhancement, and delinquent activities. The findings indicated that strong mother-daughter bonds appear to moderate the relationship between reputation enhancement and delinquency, whereas weak mother-child bonds are the strongest predictor for delinquency (Kerpelman & Smith-Adcock, 2005). Also, Morton and Lesline’s (2005) qualitative study, which consisted of interviewing youth from a youth service agency, found that adolescent females involved in delinquent behaviors often derive their power and control via aggressive and manipulative means. Incarcerated females crave connections, love, nurturance, and support from anyone who would be willing to give it to them, and girls’ delinquent behaviors stem from dysfunctional relationships with family members, boyfriends or peers. Repeated failures to connect with others can also result in
negative identity development. Girls in the study were distrustful of people who had harmed them in the past, and they expressed having difficulties in connecting with others emotionally.

Ineffective parenting practices, including harsh or inconsistent discipline, can lead to parent-youth conflicts and domestic assault (Zahn et al., 2010). Several studies have examined the association between child maltreatment and youth delinquency and found that maltreatment is a precursor to delinquency for both boys and girls (Bright & Jonson-Reid, 2008; Dennison, Stewart, & Hurren, 2006; Katz, 2000; Kingree, Phan, & Thompson, 2003; Maxfield, & Widom, 1996; Widom, 1991; Zahn et al., 2010). Studies show that children who experience maltreatment are at increased risk of engaging in delinquent behavior (Ryan, & Testa, 2005; Ryan, 2006; Ryan et al., 2007; Ryan et al., 2008; Chiu, Ryan & Herze, 2011). Siegel and Williams (2003), for example, found that childhood victimization, such as sexual abuse or physical abuse at home or in foster placement, makes girls vulnerable to status offenses. Maxfield and Widom (1996) matched the cases of child maltreatment from juvenile court and adult criminal court records for 1967 through 1971 with a control group with similar characteristics of sex, race, date of birth, and school class within the same neighborhood. The findings show that maltreated children were 1.8 times more likely to be juvenile offenders and 1.9 times more likely to commit violent offenses than their counterparts. Moreover, both physical abuse and neglect are significant predictors for violent charges. Dennison, Stewart, and Hurren (2006) traced the official records of juvenile delinquency of a study group whose members were born in 1983 and 1984 and had not yet reached 17 years of the age in Queensland, Australia. They found that only 7% of cases had a history of maltreatment contact. Yet, the children with maltreatment histories were four times more likely to reoffend than those without maltreatment histories. Meanwhile, the group with maltreatment contacts is five times more likely to have received a more serious order
(supervised order) for an offending re-contact than the children with no maltreatment contacts. Additionally, the use of substitute care placement and placement instability are often, although not always, identified as predictors of involvement with juvenile corrections (English, Widom, & Branford, 2000; Jonson-Reid & Barth, 2000a, 2000b, 2003; Ryan, & Testa, 2005). Ryan and Testa (2005) found that children in substitute care are at an increased risk of delinquency (more than double the risk) as compared to children not in a substitute care setting. Their findings suggest that placement instability, not placement itself, is at least partly responsible for the increased risk of delinquency. Moreover, it is placement instability that increases the risk of delinquency for male children who were maltreated (Ryan & Testa, 2005). Ryan et. al. (2007) found that females make up the higher proportion of first time delinquent offenders that come into the justice system from the child welfare system. Maltreatment is a particularly relevant factor that can contribute to girls’ delinquency, and there is a major overrepresentation of African American girls involved in both the child welfare system and the juvenile justice system. Miller & Mullins (2009) emphasize the importance of victimization in childhood combined with the consideration of racial and economic marginality, school experiences, structural dislocation, as well as drug and alcohol use in explaining girls’ delinquency.

Researchers have also hypothesized that running away is a typical means of escaping from sexual abuse (Chesney-Lind, 1997; Siegel & Williams, 2003). Park, Morash and Stevens (2010) found that girls who ran away from home at an early age were likely to perpetrate violence. Interestingly, this was not the case with boys who run away from home. Running away may itself result in an arrest and incarceration but can also lead to other forms of offenses, such as prostitution or stealing, in order to survive on the streets (Goodkind, Ng, & Sarri, 2006; Chesney-Lind, 1997; Le, Arifuhi & Nunez, 2003; Siegel & Williams, 2003; Zahn et al., 2010).
Sexual abuse is a major risk factor for delinquency in girls, since girls who are victimized have a higher risk of being aggressive in order to survive. To better understand the relationship between sexual abuse and involvement in the justice system, Goodkind, Ng, and Sarri (2006) conducted a study to examine how this type of abuse can serve as a predictor for negative outcomes such as negative school experiences, mental health problems, substance use, delinquent behaviors, social service use, and risky sexual behaviors. The findings indicate that girls who were sexually abused are also likely to engage in theft and vandalism and exhibit delinquent behavior. In contrast, Bright and Jonson-Reid (2008) found that there is no significant relationship between sexual abuse and female status petitions and delinquency petitions. Nevertheless, a qualitative study by Baines and Alder (1996) found that employers in the juvenile justice system explained that risky sexual behaviors, poor hygiene, and drug abuse are symptoms of prior sexual abuse. However, without appropriate job training or resources, employers might hesitate to address the complex issues extant between sexual abuse and delinquency. Researchers have yet to establish a significant relationship between sexual abuse and girls’ delinquency.

Overall, it is undeniable that the contextual factors regarding mental health, family relations, and child maltreatment are significantly important to understanding how girls start their criminal careers and become life-course-persistent offenders.

**Contextual Factors Related to Adolescent-Limited Trajectory**

Based on Moffitt’s theory, adolescent-limited offenders refer to those whose criminal careers begin during adolescence and desist by early adulthood. Their antisocial behavior across situations is not consistent (Moffitt, 1993). The concepts of “maturity gap” and “social mimicry” in Moffitt’s theory explain causes of their sporadic deviant behaviors (Farrington, 2010; Fontaine, et al., 2009; Moffitt, 1993, p.687; Moffitt, 2006). During adolescence, the youth who experience discomfort with their dependent status and are attracted to obtaining adult rewards
may develop delinquent behaviors to fulfill their desires (maturity gap). At the same time, it is appealing to them that the life style of deviant peers (life-course-persistent offenders) represents adult-like social behavior which demonstrate autonomy from parents or attainment of teen-inaccessible assets (social mimicry) (Fontaine et al., 2009; Moffitt, 1993; Moffitt, 2006). The school becomes an important setting to study this type of trajectory because of the impact of peer influence and school performance.

The concept of maturity gap is highly associated with puberty. Early onset of puberty is another factor that may contribute to the likelihood of delinquency among girls. Leve and Chamberlain (2004) found that menstrual onset is not significant when predicting the age of first arrest after controlling for other child and family factors. Yet, Carter et al. (2009) reported that African American girls who perceived their developing bodies (e.g. breasts) as early relative to their peers were more likely to engage in delinquent behavior since they may be more likely to associate with older peers or adults, particularly delinquent males. The likelihood of associating with peers or adults who engage in crimes is higher for girls living in dangerous neighborhoods and dysfunctional families (Carter et al., 2009; Hawkins et al., 2009; Zahn et. al., 2008a).

Haynie (2003) also studied how the effects of parent and peer relationships mediate the association between pubertal development and adolescent girls’ delinquency, but his study included various race samples. He found that early pubertal girls were likely to engage in delinquent activities (minor delinquency or party deviance) since they had more opportunities to socialize with delinquent peers and become involved in romantic relationships. Further, poor parent-child relationships would cause serious delinquent behaviors for early pubertal girls.

Many studies focus on examining how peer relations, academic performance, school connectedness and success, and special education influence or inhibit girls’ delinquency
Weerman (2011) indicates that there are two prevalent theories in understanding peer influence on juvenile delinquency, the selection process and influence process. Traditionally, most scholars think that it is a selection process for adolescents to become involved in delinquent behaviors. Namely, the delinquent adolescents tend to seek the people who share similar values and behaviors that are deviant, or similar risky conditions. Therefore, behavioral similarity, attitudinal similarity, or risk similarity play roles in the selection process for youths. For example, Kaufmann et al. (2007)’s study showed that antisocial peer affiliation at ages 9-11 is significantly, positively related to both aggressive conduct and delinquent behaviors at later ages of 13-15. Pro-social involvement is not only significantly associated with delinquent behavior but also with aggressive conduct for the 167 urban boys and girls in this study. In general, males and African Americans are more likely to have both conduct problems and delinquent behaviors. Yet, there are no significant differences between pro-social involvement groups and antisocial affiliation groups when controlling for youth’s gender, race or family income. The study found that high prosocial involvement moderated the positive relationships between antisocial peer affiliations and delinquent behaviors.

In contrast, the influence perspective stresses the impact of social process, such as cultural transmission, social reinforcement, peer norms or school climate (Weerman, 2011; Farrell et. al., 2011). Unstructured and unsupervised socializing with peers, for example, spending a lot of time with deviant peers or hanging out on the street in groups, leads to more offending. Guardianship of adults, such as parents’ monitoring, mediates peer influence on problem behaviors (Weerman, 2011; Farrell et. al., 2011).
Weerman (2011) took into consideration both selection effects of peer affiliation and influence effects of social networks in his study. He found that there is no significant effect of peer similarity in delinquency for his sample of 1,156 students in a middle school in The Netherlands. However, he found that the structural effects (e.g. preferences for reciprocity, or similarity preferences for having the same gender) were significantly associated with delinquent behaviors. Furthermore, changes in the level of self-control, morality, and the bonds with their schools show negative associations with youth’s delinquent behaviors. The results confirm the theory of developmental psychology; maturity may ease impulsivity (Moffitt, 1993). Weerman (2011) concluded that the effect of behavioral similarities may play a role in friendship choices within classes, while he did not find the same impact within a broader connection of all school grades in his study.

Giordano (2010) mentions that the overall base rates of involvement in delinquency need to be considered. The average arrest rates are higher for boys than for girls under similar situations; therefore, some girls may learn about delinquent behavior from male rather than female companions. From the feminist perspective, males have dominating power within both macro- and micro-level contexts. Males may be important role models not only for delinquency in adolescent males but also for delinquency among adolescent girls (Giordano, 2010). Several studies have found that delinquency among females is either directly or indirectly related to males, especially romantic partners (Carter et al. 2009; Morton and Lesline, 2005; Richie, 1996). Instead of studying the male-dominating influence, McCarthy et al. (2004) examined the hypothesis of whether friendships with females provide more social control over adolescent criminal behaviors. They argued that females have greater impact as a control mechanism over deviant behaviors than males. For instance, mothers usually play a vital role in controlling
children as compared to fathers, whereas daughters tend to interiorize this control more often than sons. The findings indicate that female-dominated friendship networks are negatively associated with property crime for both female and male youths from ages 16 to 19. Yet, the association for school girls is twice as large as that for school boys. In terms of youths living on the street, the relationship between female-dominated friendship networks and property crime is significant for females but not for males (McCarthy et al., 2004). The study limited various offense types to only property crimes. However, Haynie’s (2003) study shows that early pubertal girls are more likely to have male school friends, older school friends, or be more popular with male students. The composition of school peer networks does not play a significant role when applying the theory of negative male influence to the delinquency of girls within the context of school in this study. According to the above studies, peer association with delinquents seems less influential on the delinquency of girls but positive peer relationships moderates the potential deviant behaviors for girls.

Aside from peer relationships, dropping out of school is also one of the indicators for the increase in juvenile arrest rates. Most adjudicated youth have encountered educational difficulties or academic failures (Archwamety & Katsiyannis, 1998). However, Archwamety & Katsiyannis, comparing delinquent recidivists and non-recidivists, found that only math performance surfaced as a differentiating factor for girls; reading, writing and math skills are significant factors for boys. Some studies report that positive peer relationships, strong school connectedness, and good academic performance are important protective factors (Zahn, 2008a, 2010). McKnight and Loper’s (2002) study on the predictors of delinquency in adolescent girls found that girls who express the desire to go to college and believe that teachers treat students fairly have a reduced likelihood of engaging in delinquent activities. In contrast, Hawkins (2009)
found that girls with strong connectedness with school are more likely to report engaging in aggravated assault, although girls who did well academically were less likely to be delinquent (Hawkins et al., 2009). Still, no consistent results have emerged across different studies.

The review of the above empirical studies related to peer relation and school performance help connect Moffitt’s theory about adolescent-limited trajectory with the risk factors of girls’ delinquency. It provides a valid base to build hypotheses in the current study.

**Trajectory Studies of Female Offending**

Increasingly, scholars argue that dualistic typology theories, such as Moffitt’s and Patterson’s approaches, cannot fully explain the development of youth offending (Ayers et al., 1999; Chung et al., 2002a; Farrington, 2010; Nagin’ and Land, 1993; Nagin, Farrington, and Moffitt, 1995; van Domburgh et al, 2009). Some scholars, like Lahey and Waldman, even suggest replacing the dualistic typologies with “a continuum of developmental trajectories” (Farrington, 2010, p. 255). Working from Moffitt’s or Patterson’s approach, researchers are expanding on knowledge concerning the multiple trajectories of antisocial behavior or juvenile delinquency. For example, van Domburgh et al (2009) distinguished three groups (serious persisters, moderately serious persisters, and desisters) who show offense characteristics from childhood by using risk and protective factors. Nagin’s studies revealed two chronic groups within life-course-persistent: high-rate chronic and low-rate chronic offenders, in addition to adolescence-limited offenders (Nagin’ and Land, 1993; Nagin, Farrington, and Moffitt, 1995).

Nagin, Farrington, and Moffitt (1995) indicate the typologies of “adolescence-limited” and “life-course-persistent” do not exhaustively identify all antisocial trajectories. Nagin, Farrington, and Moffitt (1995) indicate the typologies of “adolescence-limited” and “life-course-persistent” do not exhaustively identify all antisocial trajectories (Chung et al., 2002a; Nagin,
Farrington, and Moffitt, 1995). Some researchers also argue that two more possible categories may exist, namely early onset desist (childhood onset but not life persistent) and late onset persist (adolescence onset but persistent)(Ayers et al., 1999; Chung et al., 2002a). After reviewing studies related to her theory in the past ten years, Moffitt (2006) proclaimed the two original types, adolescent-limited and life-course-persistent, are valid and exhaustive if the length of criminal history is followed long enough. She did acknowledge that the additional groups, such as childhood-limited or adult-onset, could be seen as extending the categories of her theory (Farrington 2010; Moffitt, 2006).

Still, Moffitt’s and Patterson’s theories serve as foundational knowledge for researchers to study offending trajectories, although there are inconsistent conclusions about the number and types of trajectory groups. The following section discusses how current empirical studies categorize trajectories of antisocial behaviors. This work provides an important reference in defining possible trajectory groups of delinquency among adolescent females in the current study.

Most trajectory studies regarding girls entail the comparison of both genders and only very few research studies utilize girl-only samples. The first part of this section presents current empirical studies using mixed-genders samples, and the second part of the section exhibits the findings of studies with girl-only samples. The section emphasizes how the existing studies regarding offending trajectories sample populations, how offending trajectory groups are defined, and what risk factors are associated with different trajectory groups, especially female-related findings.

**Mixed-Genders Sample Studies**

The identified studies using mixed-gender samples compare male trajectories of antisocial behaviors with female trajectories. Some studies found that similar trajectory patterns exist among mixed-gender samples, and males and females in the same trajectory have shared
causes and outcomes. However, some of the studies reported that males and females develop dissimilar trajectory patterns.

**Similar trajectory patterns among mixed-gender samples**

Some studies found that life-persistent and adolescence-limited trajectories defined by Moffitt’s theory consistently applied to mixed-gender samples (Aguilar et al., 2000; Bor et al., 2010; Fergusson, Horwood and Nagin, 1999; Huesmann, Dubow, & Boxer, 2009; Moffitt, & Capis, 2001; Odgers et al., 2008). Moffitt and Capis (2001) examined a sample of 1037 children (48% female, from ages 3 to 18) in the Dunedin Multidisciplinary Health and Development Study. They found that the females and males in the same trajectories (life-course-persistent or adolescence-limited) shared similar childhood risk characteristics (family adversity and inadequate parenting, child neurocognitive health, child temperament and behavior, and peer delinquency). Although only 1% of the girls (n=6) developed life-course-persistent pathways, the authors reasoned that girls as a group as compared to boys have shown fewer neuropsychological problems (Moffitt, & Capis, 2001). In a follow-up study, Odgers et al. (2008) found four trajectories (life-course-persistent, adolescent-onset, childhood-limited, and low trajectory) from the same Dunedin Study’s sample by using growth mixture modeling to analyze antisocial conduct problems from ages 5 to 26. Both girls and boys in the life-course-persistent trajectory have more risk factors stemming from neurodevelopmental deficits, and social and familial problems during childhood. At age 32, these individuals are also more likely to engage in serious violent offenses, and to experience mental health, physical health, and financial difficulties. Adolescent-limited offenders experience the same adult outcomes, but with less severity (Odgers et al., 2008).
Bor et al. (2010) categorized antisocial behavior of a mixed-gender Australian sample of children from ages 5 to 14 into four groups (childhood limited, adolescence onset, life-course-persistent, and unclassified) and examined their antisocial behavior outcomes, substance addiction, mental health, and physical health at age 21. As compared to the childhood limited group, the authors found that both male and female individuals in the adolescent-limited and life-course-persistent groups exhibited increasing risks of experiencing negative outcomes during their young adulthood. However, life-course-persistent females as compared to their male counterparts are less likely to become involved in criminal activity, substance addiction, or to experience health problems (Bor et al., 2010). Aguilar et al. (2000) also suggested four types of comparable trajectories (childhood limited, adolescence onset, life-course-persistent, and never antisocial) for a sample of 120 children (58 female). Their findings show that the children’s social-emotional histories are significant predictors of the trajectory groups into which they fall. Life-course-persistent offenders exhibited lower neuropsychological functions from childhood to adolescence as compared to other groups. Conversely, adolescence-limited offenders showed more internalizing symptoms and life stress as compared to other groups (Aguilar et al., 2000).

Huesmann, Dubow, and Boxer (2009) examined 40-year longitudinal data. With three measurement times (ages 8 and 19 and 30), they categorized the aggressive and antisocial behaviors of a mixed-gender sample (N=230) into five types of trajectories: life-course-persistent low, life-course-persistent high, adolescent-limited, childhood-limited and late onset (adulthood onset). Overall, Moffitt’s typology theory helps explain the similarity of offending trajectories for both females and males from ages 8 to 30 in this study, although females tend to be classified as life-course-persistent low since their level of aggression appears less serious than that of males. Congruent with Moffitt’s theory, this study also found that both female and male individuals in
life-course-persistent high trajectory had poorer criminal and psychological outcomes at age 48. Furthermore, the trajectories of adolescent-limited and childhood-limited had fewer long-term negative outcomes and had recovered by adulthood. Interestingly, as compared to individuals in other types of trajectories, the authors found that the majority of adulthood-onset offenders who were female exhibited higher levels of aggression, more drinking problems, and poorer health at age 48, which points to how females use aggression to respond to environmental risk factors (Huesmann, Dubow, & Boxer, 2009).

Some studies define the types of trajectories somewhat differently. Fergusson, Horwood and Nagin (1999) analyzed data from New Zealand from a birth cohort of 936 children (mixed gender, from ages 0 to 16) by using latent class modeling. Four trajectories (non-offenders, moderate risk offenders, adolescent onset offenders, and chronic offenders) were identified with the Self Report Early Delinquency Scale (mainly related to property and violence offenses) from ages 12 to 16. The study’s findings suggest that chronic offenders are exposed to high risk factors like individual intellectual impairment, family hardship, and neighborhood disadvantages. Antisocial peer affiliations help explain the increasing risks of offending for adolescent onset offenders (Fergusson, Horwood, & Nagin, 1999). Fergusson and Horwood (2002) conducted a follow-up study comparing male and female offending trajectories of a sample with behavior problems. Five trajectories were defined by latent class analysis: low-risk offenders, the three groups of adolescence-limited offenders (early, intermediate, and late onset), and chronic offenders. The authors found that males and females develop offending trajectories in identical ways. Yet, females are more likely to become low-risk (71%) or early onset adolescent-limited offenders (21%) as compared to males, whereas males are more likely to become late onset adolescent-limited (25%) and chronic offenders (9%) as compared to females. Risk factors
stemming from sociodemographic backgrounds, family’s functional features, and individual characteristics associated with female offending trajectories did not differ from those associated with male offending trajectories (Fergusson, & Horwood, 2002).

Chung et al. (2002a, 2002b) examined longitudinal data of 423 low-income children (52% females, from ages 13 to 18) with an offense seriousness scale by using semiparametric group-based modeling (SGM). Five developmental trajectories were identified: nonoffenders, desisters, later onsets, escalators, and chronic offenders. Around 6% of females and 17% of males are chronic offenders. Escalators start with minor offending at age 13 and build towards harsher crimes through age 21. The study found that 34% of females are escalators, while the comparative figure is 43% for males. The later onsets (10% of the females; 6% of the males) and the desisters (27% of the females; 20% of the males) started their criminal careers during adolescence (Chung et al., 2002a; Chung et al., 2002b). However, the later onsets persistently committed a crime after the age of 21, while the desisters had ceased offending by the age of 21. Furthermore, the authors found that the risk factors stemming from individual, family, and neighborhood characteristics help predict early onset and initial levels of offending. Aggressive children and those from dangerous neighborhoods are more likely to become chronic offenders than escalators. Escalators are more likely to come from dysfunctional families, to associate with high-risk peers, and to have easy access to drugs as compared to desisters. In contrast, individual factors (aggression, anxiety and depression) help distinguish late onset offenders from non-offenders, which opposes Moffitt’s theory that aggression helps predict early onset or life-course-persistent trajectories (Chung et al., 2002a). On the other hand, the authors suggest that females may develop different patterns from males although the five trajectories applied to both genders in the study (Chung et al., 2002a).
Some studies indicated consistency in terms of the types of trajectories for both genders but identified contradictions with Moffitt’s theory. The study of MaCabe et al. (2004) produced mixed findings. The authors examined a high-risk sample (N=303; 30% were girls) who met DSM-IV criteria for conduct disorder and had received various services (e.g. psychological, financial, or placement) from public sectors in San Diego County, California. Around 13% had been in the child welfare system and 35% had been in the juvenile justice system. Children who had at least one symptom of conduct disorder prior to the age of 10 were defined as childhood onsets as compared to adolescence onsets. Around 48% of the girls in the sample belonged to the childhood onset group. Both girls and boys in the childhood onset group had poorer profiles than other groups (parental antisocial behaviors, lack of parental monitoring, below median education and ADHD), although the girls in this group were associated with more risk factors (family mental illnesses, low income families, and child maltreatment) than the boys. Girls in the childhood onset and adolescence-onset groups were significantly different from one another in terms of antisocial behavior, ADHD, family mental illness, and low income status. These findings are consistent with Moffitt’s theory, because the individuals in the childhood onset group had more negative backgrounds and were distinct from those in the adolescence-onset group. Interestingly, MaCabe et al. (2004) found that girls in the adolescence-onset group share similar risky backgrounds with boys in the childhood onset group, which aligns with the theory of Sivertorn and Frick. The authors also indicate that girls with conduct disordered behaviors were more likely to have been involved in the child welfare system than boys, while boys with conduct disordered behaviors were more likely to have been involved in the juvenile justice system than girls. However, the patterns of the results stayed the same after controlling for these two effects.
White and Piquero (2004) conducted a similar study by examining police contact with an African-American sample (N=220). They also found that an early onset group (police contact prior to the age of 13) existed in both male (n=48, 32%) and female (n=16, 23%) subgroups, and those in this group had worse criminal outcomes than those in the late onset group. However, late onset females and early onset males were exposed to the most risk factors (such as adult offenses, family SES, or school adaptation and performance), while late onset females also shared some risk factors with late onset males. The authors concluded that Siverthorn and Frick overlooked both the complexity of female offending and the similarity of criminal trajectories for males and females (White and Piquero, 2004). In sum, from this literature review, Moffitt’s taxonomy theory applies to both male and female samples overall. Consequently, the life-course-persistent trajectory seems to exist among female samples even though their percentiles are much lower than those of males. In addition, both genders in this trajectory share similar risk factors in childhood and long-term outcomes in later stages of life (Fontaiane, et al., 2009).

**Dissimilar trajectory patterns among mixed-gender samples**

Piquero and Chung (2001) examined secondary data from the 1950s to 1970s from a sample of middle/low class African Americans in Philadelphia. They found that early onset (initial arrest before aged 14) males and females were more likely to have subsequent serious offending than late onseters. However, there was no significant difference in recidivism between early onset and late onset females after controlling for SES, family structure, intellectual functioning, mother’s age at birth, and disciplinary codes; whereas, the effect of early onset remains significant in predicting recidivism in male subsamples. Social contexts and policies concerning crime have been changing since 1950, and the authors reminded readers to use their findings with caution. However, such findings still provide insight into understanding s girls’
offending patterns. Many studies show that females are less likely to commit serious offenses than males (e.g. Huesmann, Dubow, and Boxer, 2009). The authors’ findings in this study, specifically, that there are no distinct delinquent trajectories among the female subsamples, may correspond to the concept that Siverthorn, and Frick (1999; 2001) promoted—the early onset and late onset girls merge into one group sharing the same characteristics with life-course-persistent males (Siverthorn, & Frick, 1999; Siverthorn, Frick & Reynolds, 2001).

Kratzer and Hodgins’ study (1999), conducted in Sweden, also supports Siverthorn and Frick’s idea and shows that Moffitt’s typology theory does not quite fit female samples. The sample in this study is composed of 13,852 youth (48% female, from ages 0 to 30 years) and divided into five groups based on convictions: the stable early-starter (6% of males and 0.4% of females), adolescence-limited (10% of males and 2% females), adult-starter (4% of males and 4% of females), and discontinuous offender (13% males and 1% of females). The authors found that adult starters (45%) rather than early-starters (33%) commit the largest proportion of all crimes among females, which differs from the results for males, where early-starter males are responsible for 77% of all crimes. Furthermore, Kratzer and Hodgins found that global intelligence test scores are significantly lower for early-starters than for those in other groups. However, they concluded that global intelligence test scores are important to predict the memberships of early-start and adolescence-limited trajectories for females. The authors did not provide sufficient explanation of how they came to this conclusion, which was inconsistent with their reports of global intelligence test scores. Ayers et al. (1999) assessed self-reported criminal behavior of 566 youth (48% female) at two time points of age 12-13 and 14-15. Eight trajectory categories were defined based on degrees of seriousness of the offenses: (1) stable non-delinquents; (2) stable lows; (3) stable moderates; (4) stable highs; (5) starters/initiators; (6)
escalators; (7) de-escalators; (8) desisters. Their findings suggest that boys and girls show different patterns of offending. Girls as compared to boys tend to offend later and are involved in less serious offending. However, the pattern of change from time 1 (age 12-13) to time 2 (age 14-15) are similar for both genders. In terms of prevention strategies, they found that enhancing family relationships for females, especially for the desisters and de-escalators, is more effective since the variables of family involvement and communication are significant for females. The authors concluded that these social development constructs are more powerful to understanding trajectory developments during adolescence for female offenders than for male offenders, since the majority of females begin their criminal careers during this period (Ayers et al., 1999). The studies in this section suggest that girls may only develop their offending trajectories from adolescence; however, it remains questionable whether all girls only share one type of trajectory. The difference between adolescence-limited and adolescence-delay-onset trajectories needs further examination (Fontaine, et al., 2009).

**Female-Only Sample Studies**

Few studies include female-only samples to understand female offending trajectories. Cote et al. (2001) examined the disruptive behaviors (Social Behavior Questionnaire) of 820 girls (from ages 6 to 12) from Quebec. Four trajectory groups were identified by using a semi-parametric mixture model: low (57%), medium (32%), medium-high (10%), and high (1%). They found that only girls in the low trajectory group were not associated with high risks of developing conduct disorder symptoms during their adolescence. Also, the odds ratio of conduct disorder at high clinical levels for girls in the medium-high and high trajectory cluster is four times greater than those in the low trajectory cluster (Cote et al., 2001). Leve and Chamberlain’s study (2004) on defining an early-onset pathway for delinquency was limited to only 62 girls. Their findings show that the early-onset girls were more likely to have familial (i.e. parental
transitions and biological parent criminality) and individual risk factors (i.e. IQ) as compared to late-onset girls. Furthermore, the ages of first arrests were significantly related to having health-risking sexual behaviors and criminal behaviors. Yet, the other predicted variables related to childhood experience, severe punishments and sexual abuse, were not significantly associated with the onset pathway for delinquency. Finally, there was no significant relationship between the onset ages of delinquency and substance use and depression (Leve & Chamberlain, 2004).

A Netherlands study focused on a sample of 432 criminal females aged 12 to 62 in 1977 (Blokland, & Rianne, 2010). By using the number of convictions, a group based model was applied to obtain four distinct groups: sporadic offenders (88.8%), emerging adulthood desisters (3.9%), emerging adulthood onsetters (6.6%), and high-frequency chronics (0.7%). Sporadic offenders only had very few convictions during their life time, while the high-frequency chronics had an average of over 40 convictions in their life time. The emerging adulthood desisters showed a peak in convictions during their early 20s and desisted by the age of 40, whereas emerging adulthood onsetters exhibited a peak in convictions during their early 20s and 30s but desisted later, around the age of 60. Only convictions regarding property, traffic offending, and drug use are significantly associated with the four trajectory groups. The high-frequency chronic and emerging adulthood desisters were more likely to have drug convictions. The findings also revealed that violent offenses are not prevalent among female offenders, even among chronic offenders (Blokland, & Rianne, 2010). Further research on females may need to take into consideration the specific female offense types. Moreover, sizable female samples could overcome the concern about generalization of the results since most studies related to female trajectories are fairly thoy small (Fontaiane, et al., 2009).
Fontaiane, et al. (2009) listed suggestions to help future researchers enhance understanding of offending trajectories among females: (1) use longitudinal data on large female samples; (2) collect multiple sources of offending; (3) address the specific and various forms of offending among females; (4) examine differences and inter-relationships in developmental patterns by offense subtypes; (5) perform advanced statistical methods, such as a group-based model, to minimize the effects of subjectivity in the grouping procedures; (6) include a wide range of risk or protective factors to help create a reliable model (Fontaiane, et al., 2009, p.378; Moffit, 2006; Chung et al., 2002a). This review of empirical studies provides comprehensive knowledge with which to frame the research design and interpret findings in this study. Moffitt’s or Patterson’s theory only divides trajectories of antisocial behaviors into two groups; yet, most empirical studies find more than two groups. The various groups generated from the above studies suggest definitions of possible groups based on the related trajectory theories which will be applied in this study.

**Research Gaps**

Even though ample empirical work concerns juvenile delinquency, insufficient studies focus on girls’ delinquency and the development of their offending trajectories. Most trajectory research related to crime focuses on males offending behaviors until adulthood. Few studies focus on female offending trajectories, and inconsistent findings related to types of developmental offending trajectories emerged from those female only studies. Moreover, those female studies emphasize either the period of childhood or the entire period until late adulthood. No studies focus on only the period of adolescence which could help the juvenile justice system understand their target population. Given that the offending behaviors of females and males are not identical, and given that the developmental needs during adolescence and adulthood are
dissimilar, it is essential to understand girls’ offending trajectories during adolescence. With better understanding of girls’ offending trajectories during adolescence, the juvenile justice system could develop diverse and effective rehabilitation services tailored to girls’ needs and designed to prevent adulthood recidivism.

Another limitation of the extant research lies in the fact that most trajectory studies examine only single antisocial outcomes, such as conduct problems or convictions (Fontaiane et al., 2009). Including various official offending outcomes in the current study will help unfold the phenomena of girl delinquency more comprehensively. Furthermore, the scholarly work around trajectories in criminology rarely takes the effects of child maltreatment into consideration (Fontaiane, et al., 2009; Moffit, 2006). It is evident that family dysfunction increases the risk of both boys and girls engaging in criminal behaviors. Yet, many empirical studies have shown that girls experience more strain than boys when they encounter family relationship disruptions and the disruptions become triggers for girls to engage in anti-social behaviors (Bright & Jonson-Reid, 2008; Brubaker & Fox, 2010; Chesney-Lind & Shelden, 2004; Colman et al., n.d.; Hawkins et al., 2009; Garcia & Lane, 2012; Goodkind et al., 2006; Hipwell & Loeber, 2006; Kerpelman & Smith-Adcock, 2005; Le et al., 2003; Mcknight & Loper, 2002; Zahn et al., 2008b). Child maltreatment as an important indicator of family relationship disruptions could be a significant effect contributing to development of girls’ offending. Additionally, increasing numbers of girls are involved in the juvenile justice system, especially those dually involved in both the child welfare and juvenile justice systems (Bright & Jonson-Reid, 2008; Dennison, Stewart, & Hurren, 2006; Katz, 2000; Kingree, Phan, & Thompson, 2003; Maxfield, & Widom, 1996; Widom, 1991; Zahn et al., 2010). The factors related to child welfare contacts, such as
maltreatment types or out-of-home placement experiences, are worth paying attention to, particularly when studying girls’ delinquency.
CHAPTER 3

METHODS

Research Questions

This study aims to model the development trajectories of delinquency among adolescent females and examine the association of contextual factors—individual, family, peer, and school factors—with the development of different trajectories. Using longitudinal data, the change in girls’ offending behaviors during adolescence is analyzed. Using the group-based trajectory model (GBTM) statistical method, the groups of girls who have followed a similar development trajectory in offending are identified. This approach allows researchers to examine the change of individuals’ behaviors over time, group together those who follow similar developmental trajectories, and identify the differences between the subgroups in distinct trajectories (Jones, Nagin, & Roeder, 2001; Muthén and Muthén, 2000; Nagin, 2005). Based on the body of literature, this study adopts trajectory terms based on Moffitt’s theory (adolescent-limited and life-course-persistent trajectories). However, due to the sample and observation period which focuses on adolescence, the current study cannot adopt the terms of adolescent-limited and life-course-persistent. With consideration of other categories from empirical studies examining samples at the adolescent age, the terms desist trajectory and chronic trajectory are more appropriate in the current study (Ayers et al., 1999; Bor et al., 2010; Chung et al., 2002a; Chung et al., 2002b; Cote et al.; Fergusson, Horwood, & Nagin, 1999; Fergusson, & Horwood 2002; Moffitt, & Capis, 2001). Further, this study examines the contextual factors associated with individuals in different trajectory groups. With these analyses, the girls at different risk levels of offending are profiled and adulthood arrest is predicted.
Moffitt’s theory presumes that maladaptive dispositions, antisocial personality, and family adversity are more likely to contribute to a life-persistent offending trajectory, which refers to a chronic offending trajectory in the current study; whereas, school or peer related factors are more likely triggers of an adolescence-limited offending trajectory, which is represented as a desist offending trajectory in the current study. Based on Moffitt’s theory, this study addresses a number of hypotheses related to the development of delinquent trajectories in adolescent females.

1. Are there different delinquent trajectory groups among adolescent females?

   Hypothesis: Multiple delinquent trajectory groups exist among adolescent females. In addition to two groups of desist and chronic trajectories, other groups, such as escalate groups, are expected to be generated.

2. Do contextual factors including demographics, child welfare contact, school history, peer relations, family history, and mental health history help to differentiate the various trajectories from one another?

   Hypotheses:
   a. Adolescent females from the child welfare system are more likely to become chronic offenders as compared with those who are not from the child welfare system.
   b. Adolescent females from supportive families are less likely to become chronic offenders as compared with those from non-supportive families.
   c. Adolescent females who had histories of mental health problems are more likely to become chronic offenders as compared with those who did not have histories of mental health problems.
d. Adolescent females who had anti-social or aggression histories are more likely to become chronic offenders as compared with those who did not have anti-social or aggression histories.

e. Adolescent females who had poor school performance more likely to become desist offenders as compared with those who had good school performance.

f. Adolescent females associated with anti-social peers are more likely to become desist offenders as compared with those who did not associate with anti-social peers.

3. Do the different trajectories during adolescence help predict adult arrest?

Hypothesis: Adolescent females in the cluster of chronic offenders are more likely to have early adult offending.

Data

I analyzed administrative data from the Washington State Department of Social and Health Services (DSHS). DSHS is in charge of both child protective services (CPS) and juvenile rehabilitation. The data includes longitudinal records concerning: referral of maltreatment investigations, foster care placements, legal action/status/custody, juvenile offense charges, detention history of juvenile offenders, and Washington State Juvenile Court Assessment (WSJCA) results. The data from Washington State Juvenile Court contains the charge records from 1883 until 2009. Table 3.1 shows the details of the databases. However, this study only examined the charge records from 2004 to 2009 since the state of Washington started to implement WSJCA in November, 2003. This study is a longitudinal analysis conducted by examining multiple databases.

The juvenile offense records include important charge information, such as offense type, offense severity, number of offenses, and detention. This rich data allows for analysis of the
change of girls’ delinquent behaviors over time by modeling offending trajectories. The WSJCA is unique in its potential contribution to this line of inquiry, as it contains standardized measures that can be used to construct valid indicators of the community in which youth live (Barnoski, 2004). Moreover, Barnoski (2004) mentioned that WSJCA “is not a single event, but a process for managing the juvenile probation counselor’s rehabilitative efforts with youth” (p.3). The pre-screen assessment of WSJCA (see appendix A for the pre-screen risk scoring manual) contains offender’s social characteristics at the individual, family, and school levels, including school/academic performance, peer association, court-order/DSHS, runaway experience, family adversity, current parental control, alcohol/drug use, child maltreatment history, mental health status, and antisocial or aggressive attitudes (Barnoski, 2004). The rich information regarding social characteristics from the pre-screen assessment helps this study to profile girls in different trajectory groups. In order to promptly evaluate the risk level of juvenile offenders at the beginning of their adjudication process, the state of Washington has been implementing the pre-screen assessment to high-risk youth since November, 2003 (Barnoski, 2004).

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2 Note: The term “high-risk” is frequently used to describe the study sample. It refers to high-risk of involvement in the juvenile justice system.
<table>
<thead>
<tr>
<th>Data</th>
<th>Number of records</th>
<th>Date</th>
<th>Key Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Child Protective System</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Referral of maltreatment investigations</td>
<td>n=479,014</td>
<td>2000-2008</td>
<td>receive date, decision, abuse types, finding</td>
</tr>
<tr>
<td>• Foster care placements</td>
<td>n=1,744,534</td>
<td>1984-2008</td>
<td>dates, placement types, placement address</td>
</tr>
<tr>
<td>• Legal action</td>
<td>n=5,524,030</td>
<td>2000-2008</td>
<td>action date, action code, custody date, code, status date, legal status</td>
</tr>
<tr>
<td><strong>Juvenile Justice System</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Charge</td>
<td>n=10,320,724</td>
<td>1984-2009</td>
<td>offense date, law description, type of offense, adjudication date, court level</td>
</tr>
<tr>
<td>• Detention</td>
<td>n=99,014</td>
<td>1988-2009</td>
<td>Intake date, admit date, release date, detention reasons, furlough, temporary leave</td>
</tr>
<tr>
<td>• WSJCA (risk assessment)</td>
<td>n=34,276</td>
<td>2004-2009</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(pre-screen assessment)</td>
<td></td>
<td>1. Criminal history: age at initial offense; misdemeanor, felony, or weapon referrals; against person misdemeanor or felony referrals; confinement orders to detention or to state institution; escapes; failure to appear warrants.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2. Social history: gender; school; friends; court-order/DSHS; runaways; family; current parental control; alcohol/ drug abuse; child maltreatment; mental health.</td>
</tr>
</tbody>
</table>
Sample

With consideration of the research questions, the availability of data, and the administrative process of the Washington State Juvenile Court, the sample selection process of the current study was as follows (see figure 3.1). First, the charge data was only available through the year 2009. Secondly, the state of Washington began implementing the pre-screen assessments from the end of 2003. The first research question entailed modelling the development of offending trajectories for an age cohort of girls. The second research question aimed to examine contextual factors in relation to trajectory subgroups. Finally, the third research question concerned the prediction of early adulthood arrest by the trajectory subgroups. In light of the constraints described above, the sample had to be a selected cohort of females who had their initial arrest at ages 13 to 14 in 2004 and completed their pre-screen assessments. Moreover, I had to limit my observation period for modeling delinquent trajectories from 2004 to the end of 2007, thereby allowing the period of 2008 to 2009 to serve as the observation period of early adulthood recidivism.

The available data from the Washington State Juvenile Court, through 2009, contains 10,320,724 charge records (see table 3.1). Of 10,320,724 records, 74,489 cases had their first arrest between ages of 13 or 14. The 74,489 cases consist of 47,390 males, 26,962 females, and 137 missing gender cases. Among the 26,962 females who had their initial arrest at 13 or 14 years old, 2,375 girls had their initial arrest occurring in 2004. Only 571 cases of the 2,375 cases had pre-screen assessment records.

The sample consists of a cohort of 571 females who had their initial arrest at ages 13 to 14 in 2004 and completed pre-screen assessments. This sample is a clinical population because Washington state only includes high-risk youth in their assessment process. Around 67% are
Caucasian, 14% are African American, 9% are Hispanic and 10% are other races. Around 48% have also been involved in the child welfare service. Nearly 88% of these girls had at least one re-arrest record. All girls had an initial arrest in 2004, 47% had at least one additional arrest record in 2005, 37% had been re-arrested in 2006 and 35% had arrest records in 2007.
The state of Washington started to implement the pre-screen assessment in November, 2003.

The sample in this study is a cohort of females who had their initial arrest at ages 13 to 14 in 2004.

The last year of data that our research team currently has is 2009.

The observation period for modeling delinquent trajectories is from 2004 to 2007.

The end of 2007 is the cut off point for modeling the female delinquent trajectories. The arrest records in 2008 and 2009 are computed into the variable of “adulthood recidivism.”
Measures

The following section provides an overview of how trajectories of offense, multi-dimensional profiles, and adulthood arrest are measured in this study. Table 3.2 shows a summary of the measures in this study.

Groups of Delinquent Trajectories

The following outcome variables are examined to model the offense trajectories: offense severity, number of offenses, and detention experience. Severity of offense data is measured on a scale (0-9) from less serious to more serious. The number of offenses remains numeric. A dichotomous variable of detention indicates whether youth has been detained. The above offense indicators are measured at one-year intervals from 2004 to 2007. Based on Moffitt’s theory and other related empirical studies (Chung et al., 2002a; Chung et al., 2002b; Moffitt, 1993; Moffitt, 2006; Nagin’ and Land, 1993; Nagin, Farrington, and Moffitt, 1995), I expect that at least three groups will emerge: life-course persistent, adolescence-limited, and desister.

Contextual Factors

The contextual factors assessed in this study include demographics, history in the child protective system, and indicators from the WSJCA pre-screen assessment. Race/ethnicity is categorized into White, African American, Hispanic, and other, since Asians/Pacific Islanders or Indian Americans are fairly small groups in the sample. In terms of history in the child protective system, several variables are included. A dichotomous variable of child welfare contact indicates whether youth have ever had an open record of child protection before their initial offense. A dichotomous variable of out-of-home placement indicates whether youth has ever been in an out-of-home placement before their initial offense. A dichotomous variable of detention experience indicates whether youth has ever been detained in 2004, the same year as their initial arrest.
The major domains related to youth’s lives which the pre-screen assessment examines include school/academic performance, peer association, runaway experience, family adversity, parental control, alcohol/drug use, mental health status, and antisocial or aggressive attitudes, from self-reports of youth and parents. Each domain consists of several items. School/academic performance contains three variables: current enrollment (graduated, at least enrolled part-time, and not enrolled), school conduct (no problematic behavior and problematic behavior), school attendance (good attendance and poor attendance), and academic performance (no Fs and with Fs). Peer association includes history of past peer association and current association, and three types of association are categorized. Youth who replied as “never had/no consistent friends or companions” are coded as “isolated.” Youth associated with pro-social and anti-social peers or gang members are coded as “mixed peer association.” Youth only associated with pro-social peers are coded as “pro-social association.” Youth only associated with anti-social peers or gang members are coded as “anti-social association.” Runaway experience is dichotomized as “no history of running away/being kicked out” and “had history of running away/being kicked out.” Family adversity refers to imprisonment experience of family members and problem history of parents. The measures of imprisonment experience of family members include none, parents involved, and other members involved. The measures of parents’ problem history include no problems, one problem and multiple problems. Parental control is dichotomized as obedience and disobedience. Alcohol/drug use encompasses history and current usage. As long as youth have used alcohol or drugs, whether or not it is past use or current experience, the measure of alcohol use and drug use is coded as yes. Mental health status includes none, diagnosed with mental health problems, and medication or/and treatment prescribed. A 3 point-scale of antisocial or aggressive attitudes consists of the following indictors: attitude toward responsible
law abiding behavior, accepts responsibility for antisocial behavior, belief in yelling and verbal aggression to resolve a disagreement or conflict, and belief in fighting and physical aggression to resolve a disagreement or conflicts. A sum-up score of the four indicators for each youth is computed. A low score refers to less aggressive and a higher score refers to more aggressive. Another indicator related to aggression is reports of violence or sexual aggression not included in criminal history, which is determined with a dichotomous measure: none and any violence or sexual aggression reports.

**Adulthood Recidivism**

The arrest record at age 19 is used, based on the data set, which only provides data through the year 2009. The sample in this study was a cohort of girls ages 13 or 14 in 2004; therefore, the cohort would be ages 18 or 19 in 2009. A dichotomous variable of early adult offending indicates whether the individual has any arrest record at 19 years old.
### TABLE 3.2 Measures

<table>
<thead>
<tr>
<th>Variable</th>
<th>Original data/items</th>
<th>Transformation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Delinquent trajectory</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of offenses</td>
<td>Non-criminal, criminal traffic, criminal non-traffic, criminal miscellaneous; misdemeanor; felony</td>
<td>Ordinal variable: No offense (0); miscellaneous only (1); alcohol misdemeanor (2); other misc (3); drug misc (4); property misc (5); misc related to weapon, sex and assault (6); felony related to other and drug (7); felony related to property (8); severe felony (9).</td>
</tr>
<tr>
<td>Severity</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Personal Characteristics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Race/ethnicity</td>
<td>Race: White, African American, American Indian, Asian</td>
<td>Categorical variable: White, African American, Hispanic, other (American Indian and Asian)</td>
</tr>
<tr>
<td></td>
<td>Ethnicity: Hispanic; non-Hispanic</td>
<td></td>
</tr>
<tr>
<td>Child welfare contact</td>
<td>Had a record in the data file of referral of maltreatment investigations</td>
<td>Dichotomous variable: yes(1) and no (0)</td>
</tr>
<tr>
<td>Out-of-home placement</td>
<td>Had a record in the data file of foster care placement</td>
<td>Dichotomous variable: yes(1) and no (0)</td>
</tr>
<tr>
<td><strong>Pre-Screen Assessment</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>School/academic performance</td>
<td>Current enrollment: graduated/ GED; enrolled full-time; enrolled part-time; suspended; drop out; expelled.</td>
<td>At least enrolled part-time (1): graduated/ GED; enrolled full-time, enrolled part-time; Not enrolled (0): suspended, drop out, expelled.</td>
</tr>
<tr>
<td></td>
<td>School conduct: recognition for good behavior; no problems with school conduct; problems reported by teachers; problem calls to parents; calls to police.</td>
<td>No problem behavior (1): recognition for good behavior, no problems with school conduct; Problem behavior (0): problems reported by teachers, problem calls to parents, calls to police</td>
</tr>
<tr>
<td></td>
<td>School attendance: good attendance with few absences; no unexcused absences; some partial-day unexcused absences; some full-day unexcused absences; truancy petition/equivalent or withdrawn.</td>
<td>Good attendance (1): good attendance with few absences, no unexcused absences; Poor attendance (0): some partial-day unexcused absences, some full-day unexcused absences, truancy petition/equivalent or withdrawn.</td>
</tr>
</tbody>
</table>
TABLE 3.2 (cont.)

<table>
<thead>
<tr>
<th>Academic performance: honor student (mostly As); above 3.0 (mostly As and Bs); 2.0 to 3.0 (mostly Bs, and Cs., no Fs); 1.0 to 2.0 (mostly Cs and Ds, some Fs); below 1.0 (some Ds and mostly Fs).</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Fs (1): honor student (mostly As), above 3.0 (mostly As and Bs), 2.0 to 3.0 (mostly Bs, and Cs., no Fs); With Fs (0): 1.0 to 2.0 (mostly Cs and Ds, some Fs), below 1.0 (some Ds and mostly Fs).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>History of peer association (check all that apply): never had consistent friend or companions; had pro-social friends; had anti-social friends; been a gang member/associate.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Some pro-social, or mixed association (0): a. checked only “had pro-social friends;” b. checked both “had pro-social friends” and either “had anti-social friends,” or “been a gang member/associate,” or all.</td>
</tr>
<tr>
<td>No pro-social association (1): a. checked only “never had consistent friend or companions;” b. checked either “had anti-social friends,” or “been a gang member/associate,” or both.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Peer association</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current peer association (check all that apply): never had consistent friend or companions; had pro-social friends; had anti-social friends; been a gang member/associate.</td>
</tr>
<tr>
<td>Same as the above column</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Runaway experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>No history of running away/being kicked out; 1 instance; 2 to 3 instances; 4-5 instances; over 5 instances.</td>
</tr>
<tr>
<td>No history of running away/being kicked out (1); Had history of running away/being kicked out (0).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Family adversity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Imprisonment experience of family members (check all that apply): no jail/imprisonment history in family; mother/female caretaker; father/male caretaker; older sibling; younger sibling; other member.</td>
</tr>
<tr>
<td>Any members involved (0); None (1): no jail/imprisonment history in family;</td>
</tr>
<tr>
<td>TABLE 3.2 (cont.)</td>
</tr>
<tr>
<td>-------------------</td>
</tr>
<tr>
<td>Parental control</td>
</tr>
<tr>
<td></td>
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<td></td>
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<tr>
<td></td>
</tr>
<tr>
<td>Alcohol use</td>
</tr>
<tr>
<td>(history and current)</td>
</tr>
<tr>
<td>Drug use</td>
</tr>
<tr>
<td>(history and current)</td>
</tr>
<tr>
<td>Mental health status</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
| Antisocial/аггрессив attitude | Low aggression (0): abides by conventions/values  
Medium aggression (1): believes conventions/values sometimes apply to him/her; does not believe conventions/values apply to him/her  
High aggression (2): resents or is hostile toward responsible behavior. |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Attitude toward responsible law abiding behavior</td>
<td></td>
</tr>
</tbody>
</table>
• Accepts responsibility for anti-social behavior  
• Belief in yelling and verbal aggression to resolve a disagreement or conflict  
• Belief in fighting and physical aggression to resolve a disagreement or conflict |
| Antisocial/аггрессион attitude | Low aggression (0): accepts responsibility for anti-social behavior.  
Medium aggression (1): minimized, denies, justifies, excuses, or blames others; accepts anti-social behavior as okay  
High aggression (2): proud of anti-social behavior. |
| • Accepts responsibility for anti-social behavior |  
• Low aggression (0): believes verbal aggression is rarely appropriate.  
Medium aggression (1): believes verbal aggression is sometimes appropriate.  
High aggression (2): believes verbal aggression is often appropriate. |
| • Belief in yelling and verbal aggression to resolve a disagreement or conflict |  
• Low aggression (0): believes physical aggression is never or rarely appropriate.  
Medium aggression (1): believes physical aggression is sometimes appropriate.  
High aggression (2): believes physical aggression is often appropriate. |
| • Belief in fighting and physical aggression to resolve a disagreement or conflict | Had at least one charge during 2008 to 2009  
Dichotomous variable: yes(1) and no (0) |

TABLE 3.2 (cont.)
Analysis Protocol

In order to test the hypotheses concerning the change of girls’ offending over time and to cluster subgroups who follow distinctive developmental trajectories, the group-based trajectory model (GBTM) is utilized to analyze the course of the sample’s offending over 4 years (Nagin, 2005; Nagin, 2010; Nagin & Odgers, 2010). The GBTM is widely used for identifying “meaningful subgroups within a population that follow distinct trajectories” (Nagin, 2005, p.1) and profiling the shared characteristics of individuals within the distinct trajectory groups (Nagin, 1999;; Nagin, 2010). The use of GBTM is the current trend among the existing body work of delinquency trajectory studies. It provides a statistical method to generate trajectory groups instead of using a predetermined method to group samples based on pre-and-post antisocial behaviors (Fontaine, et al., 2009, p.378; Moffit, 2006; Nagin, 2005; Nagin, 2010; Nagin & Odgers, 2010).

This approach combines the important components of hierarchical modeling and latent growth curve modeling, since the observed outcome variable is related to time and the time points are nested within individuals (Jones, Nagin, & Roeder, 2001; Muthén and Muthén, 2000; Nagin, 2005; Vermunt, J., K., 2007). The use of GBTN not only allows for examination of the individual’s behavior at multiple time points but also enables the grouping of individuals following the same trajectory at the same time. These important traits compensate for the disadvantages of some traditional statistic methods. For example, event history analysis could only examine related events/behavior at two time points. Latent class analysis could cluster individuals who share similar behaviors but not include the nested effect of time. The GBTM is therefore a better tool to study the change of antisocial behaviors over time. It uses multinominal modeling instead of continuous multivariate density functions, which are applied to hierarchical
modeling and latent growth curve modeling, given the assumption of distinct groups existing in a population (Jones, Nagin, & Roeder, 2001; Nagin & Odgers, 2010).

This approach holds two important functions in the current study: (1) this application uses an advanced statistical method instead of a priori assumption of group assignment to model the heterogeneous groups of developmental trajectories across individuals from the data itself; (2) the model helps examine whether the trajectories proposed by theory fit the studied population and whether any unobserved trajectories exist (Nagin, 2005; Nagin, 2010; Nagin & Odgers, 2010). Since the population naturally comprises a continuous distribution rather than a discrete distribution, the group-based trajectory model applies finite mixture models, “a class of statistical models designed to analyze data composed of a mixture of two or more groups whose outcome are generated by distinct statistical processes” (Nagin & Odgers, 2010, p.115). The GBTM, performing finite mixture modeling, views “trajectory groups as a statistical device for approximating unknown distribution of trajectories across population members” (p.116) instead of assuming that a predetermined number of trajectories exist in the population (Nagin & Odgers, 2010). Using this approach, the within-group variability of individual-level trajectories declines, whereas, the between-group variability of distinct trajectories increases. Moreover, it remains uncertain that Moffitt’s dual typology theory exhaustively explains all possible types of offending trajectory among girls. The GBTM provides a systematic methodology to indicate unobserved individual differences in development presenting in a population (Nagin, 2005; Nagin, 2010; Nagin & Odgers, 2010).

The GBTM contains two basic features: (1) the predicted trajectory of each group and its shape and pattern, and (2) the probability of membership in the predicted trajectory of each group (Nagin, 2005, p.25; Nagin & Odgers, 2010). An SAS-based procedure, Proc Traj, based
on a semi-parametric multinomial strategy is employed (Jones, Nagin, & Roeder, 2001; Nagin, 2005). The longitudinal series of an individual’s offending over the four years is predicted. Figure 3.2 demonstrates the analysis structure. Time-stable covariates (Z) refer to ex ante risk factors which affect the group membership assignment belonging to a particular cluster (C) in the model. Time-dependent covariates (W), offense related variables, directly affect the female’s trajectory (Y) (Jones, Nagin, & Roeder, 2001). The basic models are elaborated next.

FIGURE 3.2 Analysis Structure of Group-Based Trajectory Model

Reference: Jones, Nagin, & Roeder (2001), p.376
**Basic Models**

An SAS procedure, Proc Traj, provides the option of modeling three different distributions. The zero-inflated Poisson (ZIP) is used to analyze count data, the censored normal (CNORM) model is employed to model the distribution of scale data, and maximum likelihood is performed to examine dichotomous data (Jones, Nagin, & Roeder, 2001; Nagin, 2005). The number of re-offenses in the current study is count data; however, over half of the sample did not have a re-offense in the given subsequent years. The ZIP serves the function of modeling the conditional distribution of count data when more zeros present in the outcome measure of the sample (Jones, Nagin, & Roeder, 2001; Nagin, 2005). The outcome variables related to offense severity are treated as a type of scale variable. The CNORM is used to model the link between time and the censored variable on a scale of minimum and maximum. The offense severity is rated from 0 (less serious) to 9 (most serious) (Chung et. al., 2002; Jones, Nagin, & Roeder, 2001; Nagin, 2005). This analysis produces the trajectories of two outcomes (number of re-offenses and offense severity). Figure 3.3 exhibits the analysis procedure.

The number of trajectory groups is determined by the process of model selection. The Bayesian Information Criterion (BIC) is the most prevalent criterion used for model selection for both nested and unnested models. A group-based trajectory model is a finite mixture unnested model, and the BIC provides a comparison for selecting the optimal model to compose the mixture (Chung et. al., 2002; Jones, Nagin, & Roeder, 2001; Nagin, 1999; Nagin, 2005). BIC consists of several features: (1) it is always negative; (2) the smaller the absolute value of BIC, the better quality of model fit; (3) it favors the model with fewer groups (Chung et. al., 2002; Jones, Nagin, & Roeder, 2001; Nagin, 1999; Nagin, 2005). In addition to the input provided by BIC, Nagin (2005) pointed out that researchers need to exercise their subjective judgment with
objective statistical information to specify the best model to the data, since statistical models are just approximations.

After the above step of approximating the number of trajectory groups, the proportion of individuals in each group is estimated (Nagin, 1999; Nagin, 2005). In order to examine the hypotheses related to whether social characteristics help to differentiate the various groups of trajectories from one another, the posterior probability of group membership analysis, which “measures the probability that an individual with a specific behavior profile belongs to a specific trajectory,” is calculated (p.78) (Nagin, 2005). A cross tabulation of trajectory groups with individual level characteristic coefficients (race, child welfare contact, and pre-screen variables) shows profiles of each trajectory cluster. To compare the profiles of each trajectory group, the coefficients (race, child welfare contact, and pre-screen variables) and the parameter estimates of the trajectories themselves are jointly assessed by multinomial logistic regression analysis. Each coefficient estimate measures how the risk factor influences the probability of membership in the particular trajectory cluster, relative to membership in a specified reference cluster (Jones, Nagin, & Roeder, 2001; Nagin, 2005; Nagin & Odgers, 2010). Moreover, seven scenarios are created to “predict the probability of trajectory group membership for different configurations of risk factors” (Nagin & Odgers, 2010, p. 123) by a multinomial logistic regression analysis. The scenarios include child welfare contact only, dysfunctional family only, mental health history only, anti-social or aggression history only, poor school performance only, anti-social peer association only, and multiple risks. The analysis helps demonstrate how specific risk factors relate to predicted posterior probabilities of group membership in each trajectory cluster (Nagin, 2005; Nagin & Odgers, 2010).
Dual Trajectory Modeling

Dual trajectory analysis was “designed to measure the linkages between the trajectories of two distinct but related outcomes” (Nagin & Odgers, 2010, p. 131). A dual trajectory analysis is conducted to examine the relationship among the trajectories of two outcomes (number of re-offenses and offense severity) in the current study. A chi-squared test is performed to measure the estimation of two matrices of joint probabilities of membership (Nagin, 2005; Nagin & Odgers, 2010). The dual-trajectory modeling provides richer information of the pattern of interconnection between distinct but related outcomes (Nagin, 2005). By doing linkage analysis, comprehensive-scale findings of multiple offending trajectory groups will be generated based on the above two models and could provide a good basis from which to develop diverse services for girls.
Prediction of Adulthood Recidivism

To measure the estimate of the adulthood recidivism rate in each trajectory cluster, multinomial logistic regression analysis is performed. Each coefficient of recidivism in the particular trajectory cluster relative to a specified reference cluster is reported (Jones, Nagin, & Roeder, 2001; Nagin, 2005; Nagin, 2010).
CHAPTER 4

RESULTS

The results of this study are divided into four sections. The first section describes the findings of the model concerning delinquent trajectories examined by number of offenses. The results of the group based trajectory model (GBTM), descriptive statistics, and binary logistic regression are presented. The second section reports the delinquent trajectory model’s findings regarding offending severity and includes the same types of analysis as the first section. The results of the analyses conducted with respect to a joint trajectory, including descriptive statistics and multinomial logistic regression, are given in the third section. The last section addresses the findings related to early adulthood recidivism. A binary logistic regression was conducted and is presented in that section.

Table 4.1 provides descriptive statistics of the sample. Among the 571 adolescent females, 66.5% are White, followed by 14.4% African American, 8.8% Hispanic, 6.3% American Indian, and 4.0% of Asian American. Around half (48.3%) of the girls in the sample had or have child welfare contacts, 10.3% had been placed out of home before their initial arrest, and around 18% had been detained in the same year as their initial arrest. Over half of the girls in the current study had history of running away or being kicked out of their homes (53.1%), have used alcohol (73.2%), have used drugs (68.3%), have aggressive attitudes toward responsible law abiding behavior (69.5%), do not accept responsibility for anti-social behavior (55.0%), or have a belief in yelling and verbal aggression to resolve a disagreement or conflict (64.1%). Only one fourth of the sample has been diagnosed with mental health problems or has medication or treatment prescribed. About 40% of the girls hold a belief in fighting and physical aggression to resolve a disagreement or conflict. In terms of family related variables, 44% of the sample do not have any
family members who have been imprisoned. In other words, over half of the sample has at least a family member, such as parents or siblings, who has been in jail. The majority of the girls (64.4%) do not have any history of parental problems in household, such as substance abuse problems or health problems. Yet, only 37% of the girls reported that they usually obey and follow rules. With regards to school variables, 21% of the sample was suspended, dropped out, or expelled when they completed the court prescreen assessment after their initial arrest. Around 47% of the sample do not have problem behaviors reported by teachers, calls to parents or calls to police. Moreover, 40% of them have good school attendance and good academic performance. Only about 17% of these girls never had consistent friends, or had anti-social friends, or had been involved with gang members.

The descriptive statistics regarding the trajectory models of offending implied overrepresentation of minority and crossover youth\(^3\) in chronic or severe offending trajectory groups. In the model of number of offenses, about 22% of African American girls and 9% of American Indian girls were in the subgroup of chronic offending trajectory; while only 13% of African American girls and 6% of American Indian girls were in the desist offending trajectory group. Similar results also appeared in the offending trajectory and dual trajectory models. Around 5% more African American girls were in the severe offending trajectory group (16.6%) than in the minor offending trajectory group (11.4%). The number of American Indian girls in the severe offending trajectory group (8.0%) is double that of American Indian girls in the minor trajectory group (4.1%). In terms of child welfare contacts, almost half of the sample is crossover youth. Moreover, the percentages of crossover girls appear higher in the chronic, severe, and severe-chronic trajectory groups than their counterpart groups (desist, minor, or severe-desist).

\(^3\) Crossover youth refers to youth involved with both the child welfare and juvenile justice systems.
With regard to the individual level variables, higher percentages of girls in the chronic, severe, or severe-chronic trajectory groups than those in the counterpart trajectory groups had history of runaway, alcohol use, drug use, or mental health problems. Furthermore, the chronic, severe, and severe-chronic trajectory groups consist of more girls who hold aggressive attitudes and beliefs. The distributions in relation to family variables showed that higher percentages of girls in the desist or minor trajectory groups had no family members imprisoned, had no parental problem history, and were obedient to parents than the percentages of those in the chronic, severe, severe-desist or severe-chronic trajectory groups. The school level variables include current school enrollment, school conduct problems, school attendance, academic performance, and peer association. The percentage of dropping out of school for girls in the chronic, severe, severe-desist or severe-chronic offending trajectory is higher than the average of the entire sample. Furthermore, the majority of girls in the chronic and severe-chronic trajectory groups had school problems, poor school attendance, or poor academic performance. Most of the girls in the sample do not have antisocial peer association; yet, the percentages of anti-social association are still higher for the chronic, severe, severe-desist or severe-chronic groups as compared to the desist and minor groups. The following sections provide further details concerning the trajectory models and relevant statistical findings.
<table>
<thead>
<tr>
<th>Trajectory model/Variables</th>
<th>All Girls (n=517)</th>
<th>Number of offenses</th>
<th>Offending trajectory</th>
<th>Dual Trajectory</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Desist offenders (n=474)</td>
<td>Chronic offenders (n=97)</td>
<td>Minor Offenders (n=245)</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>380 (66.5%)</td>
<td>325 (68.6%)</td>
<td>55 (56.7%)</td>
<td>173 (70.6%)</td>
</tr>
<tr>
<td>African American</td>
<td>82 (14.4%)</td>
<td>61 (12.9%)</td>
<td>21 (21.6%)</td>
<td>28 (11.4%)</td>
</tr>
<tr>
<td>Hispanic</td>
<td>50 (8.8%)</td>
<td>42 (8.9%)</td>
<td>8 (8.2%)</td>
<td>26 (10.6%)</td>
</tr>
<tr>
<td>American Indian</td>
<td>36 (6.3%)</td>
<td>27 (5.7%)</td>
<td>9 (9.3%)</td>
<td>10 (4.1%)</td>
</tr>
<tr>
<td>Asian American</td>
<td>23 (4.0%)</td>
<td>19 (4.0%)</td>
<td>4 (4.1%)</td>
<td>8 (3.3%)</td>
</tr>
<tr>
<td>Child welfare contacts</td>
<td>276 (48.3%)</td>
<td>217 (45.8%)</td>
<td>59 (60.8%)</td>
<td>103 (42.0%)</td>
</tr>
<tr>
<td>Out of home placement</td>
<td>59 (10.3%)</td>
<td>48 (10.1%)</td>
<td>11 (11.3%)</td>
<td>23 (9.4%)</td>
</tr>
<tr>
<td>Detention in 2004</td>
<td>101 (17.7%)</td>
<td>83 (17.5%)</td>
<td>18 (18.6%)</td>
<td>46 (18.8%)</td>
</tr>
<tr>
<td>Individual</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Runaway history</td>
<td>303 (53.1%)</td>
<td>241 (50.8%)</td>
<td>62 (63.9%)</td>
<td>116 (47.3%)</td>
</tr>
<tr>
<td>Alcohol use</td>
<td>418 (73.2%)</td>
<td>345 (72.8%)</td>
<td>73 (75.3%)</td>
<td>172 (70.2%)</td>
</tr>
<tr>
<td>Drug use</td>
<td>390 (68.3%)</td>
<td>312 (65.8%)</td>
<td>78 (80.4%)</td>
<td>156 (63.7%)</td>
</tr>
<tr>
<td>Mental health problems</td>
<td>143 (25.0%)</td>
<td>107 (22.6%)</td>
<td>36 (37.1%)</td>
<td>52 (21.2%)</td>
</tr>
<tr>
<td>Aggressive attitude toward responsible law abiding behavior</td>
<td>397 (69.5%)</td>
<td>311 (65.6%)</td>
<td>86 (88.7%)</td>
<td>151 (61.6%)</td>
</tr>
<tr>
<td>Don’t accept responsibility for anti-social behavior</td>
<td>314 (55.0%)</td>
<td>250 (52.7%)</td>
<td>64 (66.0%)</td>
<td>123 (50.2%)</td>
</tr>
<tr>
<td>Belief in yelling and verbal aggression to resolve a disagreement or conflict</td>
<td>366 (64.1%)</td>
<td>288 (60.8%)</td>
<td>78 (80.4%)</td>
<td>145 (59.2%)</td>
</tr>
<tr>
<td>Belief in fighting and physical aggression to resolve a disagreement or conflict</td>
<td>227 (39.8%)</td>
<td>171 (36.1%)</td>
<td>56 (57.7%)</td>
<td>74 (30.2%)</td>
</tr>
<tr>
<td>Trajectory model/Variables</td>
<td>All Girls (n=517)</td>
<td>Number of offenses</td>
<td>Offending trajectory</td>
<td>Dual Trajectory</td>
</tr>
<tr>
<td>----------------------------</td>
<td>-------------------</td>
<td>--------------------</td>
<td>----------------------</td>
<td>-----------------</td>
</tr>
<tr>
<td></td>
<td>Desist offenders (n=474)</td>
<td>Chronic offenders (n=97)</td>
<td>Minor Offenders (n=245)</td>
<td>Severe Offenders (n=326)</td>
</tr>
<tr>
<td><strong>Family</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No family members have been imprisoned</td>
<td>249(43.6%)</td>
<td>211(44.5%)</td>
<td>38(39.2%)</td>
<td>110(44.9%)</td>
</tr>
<tr>
<td>No history of parental problems</td>
<td>368(64.4%)</td>
<td>318(67.1%)</td>
<td>50(51.5%)</td>
<td>170(69.4%)</td>
</tr>
<tr>
<td>Obedient to parents</td>
<td>211(37.0%)</td>
<td>191(40.3%)</td>
<td>20(20.6%)</td>
<td>101(41.2%)</td>
</tr>
<tr>
<td><strong>School</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Currently not enrolled</td>
<td>121(21.2%)</td>
<td>84(17.7%)</td>
<td>37(38.1%)</td>
<td>37(15.1%)</td>
</tr>
<tr>
<td>No school conduct problems</td>
<td>266(46.6%)</td>
<td>237(50.0%)</td>
<td>29(29.9%)</td>
<td>120(49.0%)</td>
</tr>
<tr>
<td>Good school attendance</td>
<td>229(40.1%)</td>
<td>199(42.0%)</td>
<td>30(30.9%)</td>
<td>113(46.1%)</td>
</tr>
<tr>
<td>Good academic performance</td>
<td>232(40.6%)</td>
<td>207(43.7%)</td>
<td>25(25.8%)</td>
<td>104(42.4%)</td>
</tr>
<tr>
<td>Antisocial peer association</td>
<td>94(16.5%)</td>
<td>74(15.6%)</td>
<td>20(20.6%)</td>
<td>35(14.3%)</td>
</tr>
</tbody>
</table>
Developmental Trajectories of Number of Offenses

The GBTM was used to identify developmental trajectories of offending. In the first modeling, the dependent variable was the number of offenses from 2004 to 2007. The number of re-offenses in the current study is count data; however, over half of the sample did not have re-offenses in the given subsequent years. The ZIP serves the function of modeling the conditional distribution of count data when more zeroes are present in the outcome measure of the sample (Jones, Nagin, & Roeder, 2001; Nagin, 2005). Therefore, the ZIP distribution was employed in the first modeling due to the nature of the variable. This study tested one-, two- and three-group models of offense trajectories. The Bayesian Information Criterion (BIC) is the mostly prevalent criterion of model selection for both nested and unnested models. With a group-based trajectory model as a finite mixture unnested model, the BIC provides a comparison for selecting the optimal model to compose the mixture (Chung et. al., 2002; Jones, Nagin, & Roeder, 2001; Nagin, 1999; Nagin, 2005). The BIC consists of several features: (1) it is always negative; (2) the smaller the absolute value of the BIC, the better quality of the model fit; and (3) it favors models with fewer clusters (Chung et. al., 2002; Jones, Nagin, & Roeder, 2001; Nagin, 1999; Nagin, 2005). The BIC results are summarized in Table 4.2 The two-group solution proved to be the most efficient because the BIC was minimized for this model according the above criteria. The following findings related to the trajectories of the number of offenses are based on the two-group model.
TABLE 4.2 Model selection results of developmental trajectories of number of offense (BIC)

<table>
<thead>
<tr>
<th>Model</th>
<th>BIC</th>
<th>Offense Trajectory Group Prevalence (in percentages)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>-2798.19</td>
<td>100.0</td>
</tr>
<tr>
<td>2</td>
<td>-2716.15</td>
<td>83.0</td>
</tr>
<tr>
<td>3</td>
<td>-2719.66</td>
<td>69.0</td>
</tr>
</tbody>
</table>

According to Moffitt’s development taxonomy, the offending trajectories are usually divided into two distinctive types: adolescent-limited and life-course-persistent (Farrington, 2010; Fontaine, et al., 2009; Moffitt, 1993; Moffitt, 2006; Nagin, Farrington, and Moffitt, 1995). Some researchers interchange the terms “life-course-persistent” and “chronic” or “adolescent-limited” and “desist” especially when their samples exclude adults (Ayers et al., 1999; Bor et al., 2010; Blokland, & Rianne, 2010; Fergusson, Horwood, & Nagin, 1999; Fergusson, & Horwood, 2002; Chung et al., 2002a; Chung et al., 2002b; Nagin’ and Land, 1993; Moffitt, & Capis, 2001; Nagin, Farrington, and Moffitt, 1995). Since the observation period in the current study includes only adolescents, this study adopts the terms chronic and desist offending for this model. Figure 4.1 shows the observed trajectories for the two groups, chronic offending and desist offending. The high-risk female sample consists of 17% chronic offenders and 83% desist offenders over the four-year observation period. The adolescent females who fall in the chronic offending trajectory (17%) relapse into criminal behaviors throughout the adolescent period. The number of offenses for these chronic offenders remains high over the four years. The majority of the adolescent females displayed a low frequency of offending initially and by 2007 had desisted. Since these girls mostly did not commit offenses by the end of adolescence, they (83%) are categorized as in the desist offending trajectory. The number of offenses for these desist offenders dropped from 2 in 2004 to 0 by 2007. The GBTM applies the maximum posterior probability rule to assign individuals to the trajectory groups. Although the classification is not
perfect, this will not produce significant errors in parameter estimates or the standard deviation of the sampling distribution (Chung, et al., 2002a).

FIGURE 4.1 Trajectories of number of offenses from 2004 to 2007

The chi-square tests of independence that were performed to examine the relationships between the contextual factors and the offending trajectories concerning the number of offenses are presented in table 4.3. The percentage of African Americans who developed a chronic offending trajectory was 26%, whereas the percentage of non-African Americans who developed a chronic offending trajectory was only 16%. The difference in percentages is significant, \( \chi^2 = (1, N=517) = 5.05, p < .05 \). The relation between child welfare contacts and offending trajectories was statistically significant, \( \chi^2 = (1, N=517) = 7.30, p < .01 \). Among the adolescent females who
have had child welfare contacts, 21% fell into the chronic offending trajectory while only 13% of those who did not have child welfare contacts belonged to the chronic offending trajectory. As can be seen by the cross tabulated frequencies, there is a significant relationship between detention experience and offending trajectories, $\chi^2=(1, \ N=517)=12.32, p < .01$. Almost 25% of the adolescent females who have been detained developed a chronic offending trajectory compared to 13% of those who did not have detention experiences. The percentages of adolescent females in the two groups did not differ significantly by out-of-home placement.

### TABLE 4.3 Number of offenses: Characteristics of offense trajectory groups

<table>
<thead>
<tr>
<th>Variables</th>
<th>Desist offending trajectory</th>
<th>Chronic offending trajectory</th>
<th>$\chi^2$</th>
<th>df</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>61(74.4%)</td>
<td>21(25.6%)</td>
<td>5.048*</td>
<td>1</td>
</tr>
<tr>
<td>Non-African American</td>
<td>413(84.5%)</td>
<td>76(15.5%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Child welfare contact</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Have had any contact</td>
<td>217(78.6%)</td>
<td>59(21.4%)</td>
<td>7.298**</td>
<td>1</td>
</tr>
<tr>
<td>No contact</td>
<td>257(87.1%)</td>
<td>38(12.9%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Out-of-home placement</strong></td>
<td></td>
<td></td>
<td>0.128</td>
<td>1</td>
</tr>
<tr>
<td>Have been placed before initial arrest</td>
<td>48(81.4%)</td>
<td>11(18.6%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No placement before initial arrest</td>
<td>426(83.2%)</td>
<td>86(16.8%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Detention experience</strong></td>
<td></td>
<td></td>
<td>12.318**</td>
<td>1</td>
</tr>
<tr>
<td>Have been detained</td>
<td>151(75.5%)</td>
<td>49(24.5%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never been detained</td>
<td>323(87.1%)</td>
<td>48(12.9%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p < .05;  **p < .01

A binary logistic regression was performed to examine the effects of historical contextual factors including race, child welfare contacts, detention experiences, mental health history, anti-social attitudes, family history, school history, and peer relations on the offense trajectory group...
membership from 2004 to 2007. The factors were examined stepwise to understand the effects from individual, family, and school levels. Five models were examined in all contrasts and are shown in table 4.4.

The contextual factors at the individual level concerning runaway history, substance abuse, and mental health status were tested in the first model. The results show that girls who had used drugs and those who had a history of mental health problems were more likely to become chronic offenders. The odds of falling into the chronic offending trajectory group for girls who never used drugs was 0.4 times (OR=0.38, p<.01) less than those who had a drug-use history. Similarly, the girls who did not have mental health problems were less likely to become chronic offenders (OR=0.46, p<.01) compared to those who had history of mental health problems. The variables of runaway history and alcohol abuse were not statistically significant in this model.

The second model also looks at the individual level, as with the first model, but focuses on attitudes towards violence. The findings show that girls who hold aggressive attitudes are more likely to develop a chronic offending trajectory. Controlling for race, child welfare contacts, out-of-home placement, and detention experience, the odds of fell into the chronic offending trajectory group for girls who demonstrated a higher degree of aggressive attitude toward responsible law abiding behavior was 2.4 times (OR=2.42, p<.01) more than for those who showed a less aggressive attitude. The adolescent females who had more aggressive beliefs in support of fighting and physical aggression to resolve conflict, are more likely to become chronic offenders (OR=1.6, p<.01) compared to those who had less aggressive beliefs. The variables of accepts responsibility for anti-social behavior and belief in yelling and verbal aggression to resolve a disagreement or conflict were not statistically significant in this model.
Three variables related to family, namely imprisonment experience of family members, problem history of parents, and parental control, were included in model 3; however, only parental control shows statistical significance. The relative risk ratio of developing a chronic offending trajectory is 0.4 times less for the adolescent females who obeyed and followed their parents’ rules (OR=0.41, \(p<.01\)) as compared with those who did not obey their parents’ rules. Model 4 examines school related factors, including enrollment, conduct, attendance, academic performance, and peer association. Besides enrollment, the other factors are not statistically significant in this model. The adolescent females not currently enrolled were more likely to become chronic offenders (OR=2.2, \(p<.01\)) than those who are enrolled part-time or full-time or who had graduated.

In the last model, all the factors were tested. Only race, drug use, mental health problems, and school enrollment remain statistically significant. The adolescents who are African American (OR=2.0, \(p<.05\)), have used drugs (OR=2.3, \(p<.05\)), had history of mental health problems (OR=2.1, \(p<.01\)), and are not enrolled currently in school (OR=2.0, \(p<.05\)) are more likely to become chronic offenders. After controlling for other variables, the statistically significant variables related to child welfare contacts, aggressive attitude (aggressive toward responsible law abiding behavior and belief in fighting and physical aggression to resolve disagreements or conflicts), and family (obedient to parents) in the above models became insignificant.

Four confounding variables, race, child welfare contact, out-of-home placement and detention experience, were controlled across the five models when testing the variables at the individual, family, and school levels. The odds for an African American girl to develop a chronic offending trajectory across the five models are all significant and are around two times greater.
than the odds for a non-African American girl. In terms of child welfare contacts, the relative risk ratio of developing chronic offending trajectories is almost two times greater for the adolescent females who have had any child welfare contact as compared with those who did not have any child welfare contact in the first four models. The out-of-home placement and detention experience variables are insignificant in the binary logistic regression models.

To address the concern related to multicollinearity among the independent variables, the collinearity diagnostics were performed as a posttest. Multicollinearity can be detected by checking the statistics of tolerance value and variance inflation factors (VIF) for each independent variable (Jeeshim and KUCC625, 2003). The rule of thumb for making a determination generally assumes a tolerance value less than .1 or VIF greater than 10 designates significant multicollinearity (Jeeshim and KUCC625, 2003). The tolerance values of the demographic, individual-level, family-level, and school-level variables of this model are all greater than 0.1, and the statistics of VIF are all less than 2. Thus, these results suggest that multicollinearity is not a concern in the current study.
## TABLE 4.4 Desist offenders versus chronic offenders: Coefficients of predictors of variables measured at pre-screen assessment for logistic regression predicting offense trajectory group membership at age 13 to 17

<table>
<thead>
<tr>
<th>Variables</th>
<th>Model 1 Exp(B)</th>
<th>Model 2 Exp(B)</th>
<th>Model 3 Exp(B)</th>
<th>Model 4 Exp(B)</th>
<th>Model 5 Exp(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>African American</td>
<td>1.993*</td>
<td>1.802*</td>
<td>1.904*</td>
<td>2.048*</td>
<td>2.035*</td>
</tr>
<tr>
<td>Child welfare contact</td>
<td>1.887**</td>
<td>1.856*</td>
<td>1.878*</td>
<td>1.816*</td>
<td>1.725</td>
</tr>
<tr>
<td>Out-of-home placement</td>
<td>0.649</td>
<td>0.816</td>
<td>0.746</td>
<td>0.768</td>
<td>0.737</td>
</tr>
<tr>
<td>Detention experience in 2004</td>
<td>0.708</td>
<td>0.632</td>
<td>0.714</td>
<td>0.685</td>
<td>0.576</td>
</tr>
</tbody>
</table>

**Individual**

- No runaway history                           | 0.760          |                |                |                |                |
- Never Alcohol use                             | 1.677          |                |                |                |                |
- Never Drug use                                 | 0.379**        |                |                |                |                |
- No mental health problem history              | 0.461**        |                |                |                |                |
- Aggressive Attitude toward responsible law abiding behavior | 2.422** |                |                |                |                |
- Accepts responsibility for anti-social behavior | 0.886          |                |                |                |                |
- Belief in yelling and verbal aggression to resolve a disagreement or conflict | 0.941       |                |                |                |                |
- Belief in fighting and physical aggression to resolve a disagreement or conflict | 1.624*       |                |                |                |                |

**Family**

- No family members have been imprisoned       |                |                | 1.023          | 1.105          |                |
- No history of parental problems              |                |                | 1.106          | 1.039          |                |
- Obedient to parents                          |                |                | 0.412**        |                | 0.587          |

**School**

- Current not enrolled                         |                |                | 2.168**        | 2.033*         |                |
- No school conduct problems                   |                |                | 0.598          | 0.828          |                |
- Good school attendance                       |                |                | 1.227          | 1.464          |                |
- Good academic performance                    |                |                | 0.565          | 0.560          |                |
- Antisocial peer association                  |                |                | 1.034          | 0.807          |                |

Reference group: Desist trajectory

*p < .05;  **p < .01
Developmental Trajectories of Offending by Offense Severity

The second modeling of GBTM identifies developmental trajectories of offense severity. Since this dependent variable is scale data (0-9), the censored normal (CNORM) was employed (Jones, Nagin, & Roeder, 2001; Nagin, 2005). The CNORM is used to model the link between time and the censored variable at the scale of minimum and maximum. The study tested one-, two-, three-, and four-group models of offense trajectories. The BIC results are summarized in table 4.5. The two-group and the three-group solutions both appear efficient even though the three-group solution proved to be most efficient based on the BIC and AIC results. The trajectory plots for the two-group and the three-group demonstrate a very close pattern (figure 4.2).

According to Moffitt’s theory, the trajectories of antisocial behaviors are mainly divided into two clusters, adolescent-limited (desist) and life-course-persistent (chronic) (Moffitt, 1993; Moffitt, 2006; Nagin, Farrington, and Moffitt, 1995). Based on Moffitt’s approach, researchers have expanded the body of knowledge concerning the multipletypes of offending trajectories. Some empirical studies found distinctions between serious persisters and moderately serious persisters, or high-rate chronic and low-rate chronic offenders within a chronic trajectory (Domburgh et al., 2009; Nagin’ and Land, 1993; Nagin, Farrington, and Moffitt, 1995). Chung et al. (2002a, 2002b), on the other hand, added another type of trajectory cluster-escalators besides chronic and desist offenders. Nevertheless, this study did not identify a distinguishing trajectory when comparing the first output with the second output since both trajectory group 1 and trajectory group 2 in the output 2 of the three-group solution depict a descending trend. Substantively, the two-group solution is better supported by Moffitt’s theory than the three-group solution. Therefore, the following findings related to the trajectories of offending trajectory are based on the two-group model.
TABLE 4.5 Model selection results of developmental trajectories of offense severity (BIC)

<table>
<thead>
<tr>
<th>Model</th>
<th>BIC</th>
<th>Offense Trajectory Group Prevalence (in percentages)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>-4310.08</td>
<td>100.0</td>
</tr>
<tr>
<td>2</td>
<td>-4228.45</td>
<td>43.0</td>
</tr>
<tr>
<td>3</td>
<td>-4218.17</td>
<td>60.2</td>
</tr>
<tr>
<td>4</td>
<td>-4232.51</td>
<td>45.6</td>
</tr>
</tbody>
</table>

FIGURE 4.2 Comparison of trajectories of severity for two groups and three groups

Output1: Severity vs. Time

Output2: Severity vs. Time

Caorn Model
In order to differentiate from the two trajectory groups of the first modeling regarding number of offenses, the trajectory groups in this modeling concerning offending severity were named as severe and minor offending trajectories (figure 4.3). In this modeling, 57% of adolescent females were categorized into the severe offending trajectory group and 43% were classified into the minor offending trajectory group over the four-year observation period. The girls developing along the minor trajectory (43%) tended to commit severe crimes at first, such as felonies, but gradually moved to minor offenses, and finally desisted their antisocial behaviors. On the contrary, the majority of girls (57%) consistently committed misdemeanor related crimes throughout their adolescence. The GBTM applies the maximum posterior probability rule to assign individuals to the trajectory groups. Due to the nature of the variables, the zero-inflated Poisson (ZIP) was used to model the conditional distributions of the number of offenses, while the censored normal (CNORM) was conducted to model the conditional distributions of offending severity. Hence, the classifications for the first modeling (number of offenses) and this modeling (offending severity) appear different (Jones, Nagin, & Roeder, 2001; Nagin, 2005).
Table 4.6 exhibits the results of chi-square tests concerning the relationships between the contextual factors and the two developmental trajectories of offense severity. The percentages of adolescent females in the two groups did not differ significantly by race or out-of-home placement. The relationship between child welfare contacts and offending trajectories was statistically significant, $\chi^2 = (1, N=517) = 6.81, p < .01$. Among the adolescent females who had child welfare contacts, 63% fell into the severe offending trajectory, while only 52% of the adolescent females who did not have child welfare contacts belonged to the severe offending trajectory. As can be seen by the cross tabulated frequencies, there is a significant relationship between detention experience and offending trajectories, $\chi^2 = (1, N=517) = 9.97, p < .01$. Around two-thirds of the adolescent females (66%) who had been detained developed a severe offending
trajectory compared to 52% of those who did not have detention experiences. Overall, the girls who had been associated with the child welfare system and had been detained tended to develop more severe criminal behaviors throughout adolescence.

**TABLE 4.6 Offense severity: Characteristics of offense trajectory groups**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Minor offending trajectory</th>
<th>Severe offending trajectory</th>
<th>Pearson chi-Square Test</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>28(34.1%)</td>
<td>54(65.9%)</td>
<td>3.000</td>
</tr>
<tr>
<td>Non- African American</td>
<td>217(44.4%)</td>
<td>272(55.6%)</td>
<td></td>
</tr>
<tr>
<td><strong>Child welfare contact</strong></td>
<td></td>
<td></td>
<td>6.810**</td>
</tr>
<tr>
<td>Have had any contact</td>
<td>103(37.3%)</td>
<td>173(62.7%)</td>
<td></td>
</tr>
<tr>
<td>No contact</td>
<td>142(48.1%)</td>
<td>153(51.9%)</td>
<td></td>
</tr>
<tr>
<td><strong>Out-of-home placement</strong></td>
<td></td>
<td></td>
<td>0.414</td>
</tr>
<tr>
<td>Have been placed before initial arrest</td>
<td>23(39.0%)</td>
<td>36(61.0%)</td>
<td></td>
</tr>
<tr>
<td>No placement before initial arrest</td>
<td>222(43.4%)</td>
<td>290(56.6%)</td>
<td></td>
</tr>
<tr>
<td><strong>Detention experience</strong></td>
<td></td>
<td></td>
<td>9.969**</td>
</tr>
<tr>
<td>Have been detained</td>
<td>68(34.0%)</td>
<td>132(66.0%)</td>
<td></td>
</tr>
<tr>
<td>Never been detained</td>
<td>177(47.7%)</td>
<td>194(52.3%)</td>
<td></td>
</tr>
</tbody>
</table>

*p < .05; **p < .01

The results of the binary logistic regression analyses for the effects of the sample’s historical contexts in relation to severity of offense trajectory group membership between 2004 and 2007 are presented in Table 4.7. As with the trajectory modeling related to number of offenses, five models were examined in all contrasts (race, child welfare contacts, detention experiences, mental health history, anti-social attitudes, family history, school history, and peer association) for offense severity. The factors were also examined stepwise to understand the effects at the individual, family, and school levels.
Other than the variables of child welfare contact and detention experience in 2004, the contextual factors at the individual level concerning runaway history, substance abuse, and mental health all show insignificance in the first model. The second model in relation to attitudes towards violence indicates that girls with aggressive attitudes are more likely to develop a severe offending trajectory. Controlling for race, child welfare contacts, out-of-home placement, and detention experience, the odds of falling into the severe offending trajectory group for girls with higher degrees of aggressive attitudes toward responsible law abiding behavior (OR=1.6, \( p<.05 \)) were 1.6 times more than those without less aggressive attitudes. The adolescent females who had more aggressive beliefs about using fighting and physical aggression to resolve a conflict were more likely to become severe offenders (OR=1.9, \( p<.01 \)) compared to those who had less negative beliefs. In the first trajectory modeling regarding the number of offenses, these two attitude factors appear statistically significant as well and specify a worse offending trajectory. Thus, aggressive girls tended to become chronic offenders or commit more serious crimes. Note that the variables of accepts responsibility for anti-social behavior and belief in yelling and verbal aggression to resolve a disagreement or conflict were not statistically significant in this model.

Three variables related to family, namely, imprisonment experience of family members, problem history of parents, and parental control, were included in the third model; however, none shows statistical significance. The fourth model examines school related factors, including enrollment, conduct, attendance, academic performance, and peer association. Like the first trajectory modeling, regarding number of offenses, only enrollment appears to be significant in this modeling concerning offense severity. The adolescent females currently not enrolled were more likely to become severe offenders (OR=1.8, \( p<.05 \)) than those who were enrolled part-time.
or full-time or who had graduated. In the final model, all of the factors were tested. In addition to child welfare contact (OR=1.7, \( p<.05 \)) and detention experience (OR=0.5, \( p<.01 \)), only two variables, belief in fighting and physical aggression to resolve a disagreement or conflict (OR=2.0, \( p<.01 \)) and school enrollment (OR=1.7, \( p<.05 \)), remain statistical significance.

Four confounding variables, race, child welfare contact, out-of-home placement and detention experience, were controlled across the five models. The odds for a girl who has been associated with the child welfare system to develop a severe offending trajectory across the five models are all significant and are nearly two times greater than odds for those without child welfare contacts. On the other hand, the relative risk ratio of developing a severe offending trajectory is around 0.5 or 0.6 times less for the adolescent females who have been detained in 2004 as compared with those without the detention experiences in 2004 after controlling other variables across the five models. The variables of race and out-of-home placement appear insignificant in the binary logistic regression models related to offense severity.

To address the concern related to multicollinearity among the independent variables of this model, the collinearity diagnostics were performed as a posttest. The tolerance values of the demographic and the individual, family, and schoollevel variables of this model are all greater than 0.1, and the statistics of VIF are all smaller than 2. Note that a tolerance value less than .1 or VIF greater than 10 indicates significant multicollinearity (Jeeshim and KUCC625, 2003). The results suggested that multicollinearity is not a concern in the current study.
TABLE 4.7 Minor offenders versus severe offenders: Coefficients of predictors of variables measured at pre-screen assessment for logistic regression predicting offense trajectory group membership at age 13 to 17

<table>
<thead>
<tr>
<th>Variables</th>
<th>Model 1 Exp(B)</th>
<th>Model 2 Exp(B)</th>
<th>Model 3 Exp(B)</th>
<th>Model 4 Exp(B)</th>
<th>Model 5 Exp(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>African American</td>
<td>1.606</td>
<td>1.417</td>
<td>1.487</td>
<td>1.510</td>
<td>1.510</td>
</tr>
<tr>
<td>Child welfare contact</td>
<td>1.789**</td>
<td>1.808**</td>
<td>1.817**</td>
<td>1.765**</td>
<td>1.726*</td>
</tr>
<tr>
<td>Out-of-home placement</td>
<td>0.843</td>
<td>0.967</td>
<td>0.908</td>
<td>0.971</td>
<td>0.978</td>
</tr>
<tr>
<td>Detention experience in 2004</td>
<td>0.568*</td>
<td>0.516*</td>
<td>0.577*</td>
<td>0.562*</td>
<td>0.480**</td>
</tr>
</tbody>
</table>

**Individual**

| No runaway history                     | 0.779          |                |                |                | 0.916          |
| Never Alcohol use                      | 0.911          |                |                |                | 1.012          |
| Never Drug use                         | 0.800          |                |                |                | 0.843          |
| No mental health history               | 0.699          |                |                |                | 0.709          |
| Aggressive Attitude toward responsible law abiding behavior |                | 1.597*         |                |                | 1.483          |
| Accepts responsibility for anti-social behavior | 0.877          |                |                |                | 0.828          |
| Belief in yelling and verbal aggression to resolve a disagreement or conflict | 0.808          |                |                |                | 0.792          |
| Belief in fighting and physical aggression to resolve a disagreement or conflict | 1.878**        |                |                |                | 1.978**        |

**Family**

| No family members have been imprisoned |                | 1.047          |                | 1.154          |
| Problem history of parents             |                | 1.126          |                | 1.071          |
| Obedient to parents                    |                | 1.126          |                | 1.112          |

**School**

| Currently not enrolled                 |                | 1.794*         |                | 1.698*         |
| No school conduct problems             |                | 1.109          |                | 1.382          |
| Good school attendance                 | 0.666          | 0.721          |                |                |
| Good academic performance              | 1.174          | 1.148          |                |                |
| Antisocial peer association            | 1.184          | 1.057          |                |                |

Reference group: minor offending trajectory
*p < .05;  **p < .01
**Dual Trajectory Modeling**

The current study investigates girls’ delinquent trajectories by analyzing two different but related measures, number of offenses and offending severity, which result in dissimilar trajectory models. The first modeling, which relates to number of offenses, shows that in the sample, 17% belong to the chronic offending trajectory and 83% belong to the desist offending trajectory. On the other hand, the second modeling indicates that 57% of the sample fall into the severe offending group and 43% fall into the minor offending group when examining offending severity.

Thus, there is some variation between trajectory outcomes. In order to provide more specific classification, the joint trajectory model was implemented in the current study. The combination of the probabilities of the trajectories related to these two outcomes gives more detailed understandings of the development of offending among this female sample (Nagin, & Odgers, 2010). With this thorough classification, the current study is able to test whether and how the joint probabilities vary in terms of girls’ profiles (Nagin, & Odgers, 2010). The dual-trajectory modeling provides richer information about the pattern of interconnection between distinct but related outcomes (Nagin, 2005). Conducting linkage analysis generates comprehensive-scale findings of multiple offending trajectory groups based on the above two models and can thereby provide a good basis to develop diverse services for girls, which is essential as gender-specific programs are relatively few in number and are typically tailored for a single issue rather than the multiple factors which girls face.

To measure the estimation of two matrices of joint probabilities of membership between the trajectories modeling number of offenses and offense severity, a chi-square test analysis was performed. The relationship between these two trajectory modelings was significantly different, \( \chi^2 = 1, N=517 = 79.6, p < .001 \) (see table 4.8). In panel A, less than 1% of the girls in the minor
offending trajectory group developed a chronic offending trajectory; while almost 30% of the girls in the severe offending trajectory group become chronic offenders. In panel B, almost all the chronic offenders (98%) belong to the severe offending trajectory group, whereas only around half of desisters (48.7%) fell into the severe offending trajectory group. In panel C, the study sample consists of 47% minor-desist offenders, 41% severe-desist offenders, 17% severe-chronic offenders, and less than 1% minor-chronic offenders.

The current study used chi-square analysis instead of GBTM for modeling the joint trajectory. Since only two cases (0.4%) are in the joint group of minor-chronic, they were combined with the minor-desist joint group. A multinomial logistic regression was conducted to test the effects of historical context in relation to the three joint trajectory groups’ (minor 42.9%, severe-desist 40.5% and severe-chronic 16.6%) membership between 2004 and 2007. Table 4.9 shows two models. The first model used the severe-chronic trajectory as the reference group in order to see whether the profiles of the girls in the minor offending trajectory group or severe-desist offending trajectory was different from those in the severe-chronic offending trajectory group. The second model primarily aims to compare the profiles of severe-desisters with the profiles of minor offenders since a difference between the minor trajectory membership and severe-desist trajectory memberships could exist.
TABLE 4.8 Number of offenses vs. severity of offense

<table>
<thead>
<tr>
<th>Variables</th>
<th>Offense Severity</th>
<th>Pearson chi-Square Test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Minor offending trajectory</td>
<td>Severe offending trajectory</td>
</tr>
<tr>
<td>Panel A: Probability of number of offenses conditional on offense severity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of Offenses</td>
<td>Desist offending trajectory</td>
<td>243 (99.2%)</td>
</tr>
<tr>
<td></td>
<td>Chronic offending trajectory</td>
<td>2 (0.8%)</td>
</tr>
<tr>
<td>Panel B: Probability of offense severity conditional on number of offenses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of Offenses</td>
<td>Desist offending trajectory</td>
<td>243 (51.3%)</td>
</tr>
<tr>
<td></td>
<td>Chronic offending trajectory</td>
<td>2 (2.1%)</td>
</tr>
<tr>
<td>Panel C: Probability of number of offenses and offense severity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of Offenses</td>
<td>Desist offending trajectory</td>
<td>243 (42.6%)</td>
</tr>
<tr>
<td></td>
<td>Chronic offending trajectory</td>
<td>2 (0.4%)</td>
</tr>
</tbody>
</table>

*p < .05; **p < .01; *** p < .001

The results for model 1 indicate that several individual-related and school-related variables, and no family related variables, were significantly associated with different offense trajectory group membership. For the minor offending trajectory relative to the severe-chronic offending trajectory, non-African American girls (OR=2.3, \( p < .05 \)) and girls without child welfare contacts (OR=2.1, \( p < .05 \)) are more likely to become minor offenders. In other words, African American girls or girls who have been associated with child welfare system are at higher risk of becoming severe-chronic offenders. Further, girls without detention experiences at the same year of their initial arrest were less likely to develop a minor offending trajectory (OR=0.4, \( p < .05 \)). This finding is consistent with the result of the modeling related to offense severity. More specifically, the girls who had been detained in 2004 tend to develop the minor offending...
trajectory rather than the severe-chronic offending trajectory. For the minor offending trajectory relative to the severe-chronic offending, the relative risk ratio of developing a minor offending trajectory is 0.4 times less for adolescent females who have used drugs (OR=0.4, \( p < .05 \)), 0.5 times less for those who have had mental health problems (OR=0.5, \( p < .01 \)), 0.3 times less for those who showed an aggressive attitude toward responsible law abiding behavior (OR=0.3, \( p < .01 \)), 0.4 times less for those who believed in fighting and physical aggression to resolve disagreements or conflicts (OR=0.4, \( p < .05 \)) as compared with their counterparts. At the school level, the odds ratio of being minor offenders for the girls who enrolled in school at least part-time is 2.7 times (OR=2.7, \( p < .01 \)) greater than those who dropped out, were suspended, or expelled from school, when comparing the minor offending trajectory with the severe-chronic offending.

The comparison in model 1 of the severe-desist offending trajectory relative to the severe-chronic offending trajectory indicates different profiles for the girls in these two trajectory groups. Yet, the characteristics of girls in the severe-desist offending trajectory is not significantly distinguished from that in severe-chronic offending trajectory in terms of race, child welfare contacts, out-of-home placement experiences, or detention experiences. The relative risk ratio of belonging to the severe-desist trajectory group as compared to the severe-chronic trajectory group for girls who have had alcohol use (OR=2.5, \( p < .05 \)) is 2.5 time greater than for those who never used alcohol. On the contrary, girls who had drug use history (OR=0.4, \( p < .05 \)) and had mental health problem histories (OR=0.5, \( p < .05 \)) are less likely to develop a severe-desist offending trajectory than their counterparts, again considering the severe-desist offending trajectory relative to the severe-chronic offending. At the school level, the odds ratio of developing a severe-desist trajectory for the girls who enrolled in school at least part-time
(OR=1.9, p<.05) is 1.9 times greater than those who dropped out, were suspended, or expelled from school when comparing the severe-desist offending trajectory with the severe-chronic offending. Current school enrollment serves as a protective factor for girls against developing a more severe offending trajectory, as model 1 illustrates. The relative risk ratio of belonging to the severe-desist trajectory group as compared to the severe-chronic offending group for girls who had poorer school attendance (OR=2.0, p<.05) is twice as great as for those who attended school more regularly. The girls who had poor academic performance (OR=0.5, p<.05) were less likely to be in the severe-desist trajectory group than those who did not have any fails when compared to the severe-chronic offending trajectory.

The discussion of model 2 only focuses on the comparison of the severe-desist trajectory versus the minor trajectory since the analysis related to the severe-chronic trajectory versus the minor trajectory has been illustrated above. Only four variables show statistical significance when predicting group membership between the severe-desist trajectory and minor trajectory. In this model, the girls without any detention experience in 2004 (OR=2.0, p<.05) were more likely to develop a severe-desist trajectory as compared to those who has been detained in 2004. The relative risk ratio of belonging to the severe-desist trajectory group as compared to the minor offending group for girls who believed in fighting and physical aggression to resolve disagreements or conflicts were 2.3 times greater than those without this aggressive belief. Compared to the girls who had a preference for good behaviors or had no problems with school conduct, those who had problematic conduct in school were 0.6 times less likely to be in the severe-desist trajectory group. Specifically, school conduct problems were significantly associated with less severe criminal behaviors. These conduct problems may include problems reported by teachers, problem calls to parents, or calls to police. Nevertheless, poor school
attendance increased the risk of developing a more severe delinquent trajectory. The odds for girls who had poorer school attendance belonging to the severe-desist trajectory group verse the minor offending trajectory were 1.7 times greater than those who attended school more regularly.

To address the concern related to multicollinearity among the independent variables of this model, the collinearity diagnostics were performed as a posttest. The tolerance values of the demographic and the individual, family, and school level variables of this model are all greater than 0.1, and the statistics of VIF are all smaller than 2. Note that a tolerance value less than .1 or VIF greater than 10 indicates significant multicollinearity (Jeeshim and KUCC625, 2003). The results suggested that multicollinearity is not a concern in the current study.
TABLE 4.9 Dual trajectory modeling: Coefficients of predictors of variables measured at pre-screen assessment for multinomial logistic regression predicting offense trajectory group membership at age 13 to 17

<table>
<thead>
<tr>
<th>Variables</th>
<th>Model 1 Reference group: Severe-chronic trajectory</th>
<th></th>
<th>Model 2 Reference group: Minor trajectory</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Minor trajectory Exp(B)</td>
<td>Severe-desist trajectory Exp(B)</td>
<td>Severe desist trajectory Exp(B)</td>
<td>Severe-chronic trajectory Exp(B)</td>
</tr>
<tr>
<td>Non-African American</td>
<td>2.323*</td>
<td>1.826</td>
<td>0.789</td>
<td>0.430*</td>
</tr>
<tr>
<td>No child welfare contact</td>
<td>2.067*</td>
<td>1.309</td>
<td>0.633</td>
<td>0.484*</td>
</tr>
<tr>
<td>No out-of-home placement</td>
<td>0.785</td>
<td>0.746</td>
<td>0.950</td>
<td>1.274</td>
</tr>
<tr>
<td>No Detention experience in 2004</td>
<td>0.438*</td>
<td>0.855</td>
<td>1.952*</td>
<td>2.283*</td>
</tr>
<tr>
<td><strong>Individual</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Runaway history</td>
<td>0.967</td>
<td>1.075</td>
<td>1.111</td>
<td>1.034</td>
</tr>
<tr>
<td>Alcohol use</td>
<td>2.007</td>
<td>2.466*</td>
<td>1.187</td>
<td>0.481</td>
</tr>
<tr>
<td>Drug use</td>
<td>0.394*</td>
<td>0.387*</td>
<td>0.982</td>
<td>2.536*</td>
</tr>
<tr>
<td>Mental health history</td>
<td>0.456**</td>
<td>0.528*</td>
<td>1.158</td>
<td>2.195**</td>
</tr>
<tr>
<td>Aggressive attitude toward responsible law abiding behavior</td>
<td>0.326**</td>
<td>0.448</td>
<td>1.375</td>
<td>3.070**</td>
</tr>
<tr>
<td>Accepts responsibility for anti-social behavior</td>
<td>1.534</td>
<td>1.424</td>
<td>0.929</td>
<td>0.652</td>
</tr>
<tr>
<td>Belief in yelling and verbal aggression to resolve a disagreement or conflict</td>
<td>1.078</td>
<td>0.759</td>
<td>0.704</td>
<td>0.928</td>
</tr>
<tr>
<td>Belief in fighting and physical aggression to resolve a disagreement or conflict</td>
<td>0.432*</td>
<td>0.978</td>
<td>2.265**</td>
<td>2.316*</td>
</tr>
<tr>
<td><strong>Family</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family members have been imprisoned</td>
<td>1.286</td>
<td>1.122</td>
<td>0.872</td>
<td>0.777</td>
</tr>
<tr>
<td>Problem history of parents (at least one problem)</td>
<td>0.677</td>
<td>0.800</td>
<td>1.182</td>
<td>1.477</td>
</tr>
<tr>
<td>Disobedient to parents</td>
<td>0.829</td>
<td>0.622</td>
<td>0.751</td>
<td>1.206</td>
</tr>
<tr>
<td><strong>School</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Currently enrolled part- or full-time</td>
<td>2.672**</td>
<td>1.885*</td>
<td>0.705</td>
<td>0.374**</td>
</tr>
<tr>
<td>School conduct problems</td>
<td>1.069</td>
<td>0.675</td>
<td>0.631*</td>
<td>0.935</td>
</tr>
<tr>
<td>Poor school attendance</td>
<td>1.214</td>
<td>2.015*</td>
<td>1.659*</td>
<td>0.824</td>
</tr>
<tr>
<td>Poor academic performance</td>
<td>0.676</td>
<td>0.496*</td>
<td>0.773</td>
<td>1.480</td>
</tr>
<tr>
<td>Prosocial peer association</td>
<td>0.869</td>
<td>0.683</td>
<td>0.786</td>
<td>1.150</td>
</tr>
</tbody>
</table>

* p < .05;  ** p < .01

Note: all the pre-screen variables in this table were binaries.
Early Adulthood Arrest

The final results section applies a binary logistic regression analysis to answer the third research question regarding early adulthood recidivism (see table 4.10). Three models examined the association of different trajectory memberships with early adulthood arrest rates: (1) trajectory groups related to number of offenses; (2) trajectory groups concerning offense severity; (3) a joint trajectory.

The first model shows that the girls in the chronic offending trajectory group are more likely to be arrested at the ages of 18 or 19 (OR=2.2, \(p<.01\)) than those in the desist offending trajectory group after controlling for other variables. Further, the girls who had beliefs in yelling and verbal aggression to resolve disagreements or conflicts (OR=1.5, \(p<.05\)) are also 1.5 times more likely to be rearrested in early adulthood than those without the same aggressive attitudes. Interestingly, child welfare contact is a significant predictor related to early adulthood arrest across the three models. After controlling for other variables within the offending trajectory groups, the odds of early adulthood recidivism for girls who have had child welfare contact (OR=0.5, \(p<.01\)) are 0.5 times less than those without child welfare contact. Association with child welfare services turns out to be a protective factor when predicting the likelihood of adulthood arrest.

The second model related to offense severity indicates that the relative risk ratio of being arrested at the ages of 18 or 19 for the girls in the severe trajectory group is 2.5 time (OR=2.5, \(p<.001\)) greater than for those in the minor trajectory group, when controlling for other variables. As with model 1, the girls who had aggressive attitudes about using verbal violence (OR=1.6, \(p<.05\)) were also 1.6 times more likely to be rearrested in early adulthood than those without the same aggressive attitudes. However, higher degrees of aggressive attitude toward responsible
law abiding behavior (OR=0.6, \(p<.05\)) and belief in fighting and physical aggression to resolve disagreements or conflicts (OR=0.6, \(p<.05\)) decrease the relative risk ratio of recidivism at early adulthood for girls. Finally, child welfare contact (OR=0.6, \(p<.01\)) reduces the likelihood of being rearrested at 18 or 19 years old.

The findings of model 3 specify that the relative risk of early adulthood recidivism for girls in the severe-desist trajectory group (OR=2.2, \(p<.001\)) and in the severe-chronic trajectory group (OR=3.4, \(p<.001\)) were higher than for those in the minor trajectory group after controlling for other variables. The girls who tended to view verbal violence as useful in solving conflicts (OR=1.6, \(p<.05\)) were 1.6 times more likely to have an early-adulthood arrests than those with less verbal aggression. On the contrary, a higher degree of physical aggression results in a lower risk of early adulthood recidivism (OR=0.6, \(p<.05\)).

In sum, the girls who developed a more severe offending trajectory were more likely to be arrested again at the ages of 18 or 19. Interestingly, the variables of child welfare contact, aggressive attitude toward responsible law abiding behavior, and belief in fighting and physical aggression to resolve disagreements or conflicts serve as protective factors in this series of analyses. However, verbal aggression was a significant predictor for early adulthood arrest among the girls. The socialization of gender roles and females’ developmental needs might contribute to the results (Garcia, & Lane, 2012). A further discussion will be elaborated in the next chapter. Finally, race, detention experience, and family-related and school-related factors appear to be statistically insignificantly associated with early adulthood recidivism after controlling for trajectory group membership. The next chapter will provide relevant discussions.
TABLE 4.10 Coefficients of predictors of trajectory subgroups for logistic regression predicting early adulthood arrest at age 17 to 19

<table>
<thead>
<tr>
<th>Variables</th>
<th>Model 1 Number of Offenses Exp(B)</th>
<th>Model 2 Offense Severity Exp(B)</th>
<th>Model 3 Dual Trajectory Exp(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>African American</td>
<td>0.785</td>
<td>0.780</td>
<td>0.808</td>
</tr>
<tr>
<td>Child welfare contact</td>
<td>0.547**</td>
<td>0.567**</td>
<td>0.574*</td>
</tr>
<tr>
<td>Out-of-home placement</td>
<td>1.199</td>
<td>1.252</td>
<td>1.225</td>
</tr>
<tr>
<td>Detention experience</td>
<td>1.282</td>
<td>1.191</td>
<td>1.177</td>
</tr>
</tbody>
</table>

**Individual**
- No runaway history | 0.855 | 0.885 | 0.877 |
- Never Alcohol use | 1.095 | 1.141 | 1.097 |
- Never Drug use | 0.665 | 0.636 | 0.666 |
- No mental health history | 1.298 | 1.264 | 1.323 |
- Aggressive Attitude toward responsible law abiding behavior | 0.618 | 0.593* | 0.577 |
  - Accepts responsibility for anti-social behavior | 1.379 | 1.385 | 1.406 |
  - Belief in yelling and verbal aggression to resolve disagreements or conflicts | 1.517* | 1.554* | 1.568* |
    - Belief in fighting and physical aggression to resolve disagreements or conflicts | 0.667 | 0.615* | 0.608* |

**Family**
- No family members have been imprisoned | 1.017 | 1.008 | 1.002 |
- Problem history of parents | 0.962 | 0.949 | 0.948 |
- Obedient to parents | 0.901 | 0.826 | 0.849 |

**School**
- Currently not enrolled | 0.867 | 0.864 | 0.902 |
- No school conduct problems | 1.000 | 1.102 | 1.073 |
- Good school attendance | 1.282 | 1.139 | 1.181 |
- Good academic performance | 0.702 | 0.762 | 0.734 |
- Antisocial peer association | 0.914 | 0.864 | 0.914 |

**Number of offense**
- Desist trajectory - |
- Chronic trajectory | 2.182** |

**Offense severity**
- Minor trajectory - |
- Severe trajectory | 2.489*** |

**Joint Trajectory**
- Minor trajectory - |
- Severe-desist trajectory | 2.231*** |
- Severe-chronic trajectory | 3.368*** |

*p < .05; **p < .01; *** p < .001
CHAPTER 5

DISCUSSION

Few studies focus on delinquent trajectories among adolescent females (Fontaiane, et al., 2009) and look at how child welfare related factors contribute to the development of delinquent trajectories. The studies including or exclusively concerning female subjects usually examine anti-social behaviors from childhood to adulthood and most support the existence of more than one type of trajectory exists among female samples (Aguilar et al. 2000; Ayers et al., 1999; Blokland, & Rianne, 2010; Bor et al., 2010; Cote et al., 2001; Fergusson, & Horwood, 2002; Huesmann, Dubow, & Boxer, 2009; MaCabe et al., 2004; Odgers et al., 2008; White, & Piquero, 200).

The current study extends the understanding of the development of anti-social behaviors and investigates how females’ offending behaviors develop over time during adolescence and whether there exist subgroups which follow distinct developmental trajectories. However, the sample of the present study is a clinical population, because the state of Washington only includes high-risk youth in their assessment process, and thus the findings cannot be generalized to all females in the juvenile justice system. Next, this chapter discusses the main findings of GBTM and logistic regression analyses as presented in the previous chapter.

Main Findings

Different delinquent trajectory groups exist among females during adolescence

The current study investigates girls’ delinquent trajectories within a four year period. Two different but related measures, number of offenses and offending severity, were examined and result in dissimilar trajectory models. Both the models of number of offenses and of offending severity generate two distinct trajectory models: (1) chronic offending group and desist offending group, established by modeling the number of offenses; (2) severe offending group
and minor offending group, established by modeling offending severity. The outcomes of these models are different in terms of the composition of the trajectory groups. The sample was composed of 17% chronic offenders and 83% desist offenders when modeling the number of offenses. However, the same sample was made up of 57% severe offenders and 43% minor offenders when modeling offending severity. Different measures of the offending behaviors result in different trajectory patterns even within a sample. The above findings indicate that there is some variation between trajectory outcomes. In order to provide more specific classification, the joint trajectory model was utilized in the current study. Linking together the probabilities of the trajectories of these two outcomes provides more detailed understanding of the development of offending among this female sample (Nagin, & Odgers, 2010). This is an important reminder that using multiple measures to identify youth delinquent development over time can help expand understanding of this complex phenomenon. With such thorough classification, it is possible to test whether and how the joint probabilities vary in terms of girls’ profiles (Nagin, & Odgers, 2010).

In the current study, less than 1% of the girls in the minor offending trajectory group developed a chronic offending trajectory; while almost 30% of the girls in the severe offending trajectory group become chronic offenders. However, almost all (98%) of the chronic offenders belong to the severe offending trajectory group. Since the minor-chronic and the minor-desist groups were combined into one, due to the small number of minor-chronic sample members, three joint trajectory groups instead of four are presented in the current study: minor (42.9%), severe-desist (40.5%) and severe-chronic groups (16.6%). This classification helps to identify girls at different risk levels and provides a good base to develop better intervention strategies tailored for the needs of the girls who fall into different offending trajectories.
Profiles of girls in different trajectory groups are dissimilar

To answer the second research questions, this study used logistic regression analysis to predict membership in different offense trajectory groups based on the GBTM results (see Table 5.1 for highlights of the main findings). Dissimilar profiles emerged by analyzing the different offending outcome variables. Including various offending measures provides wider-ranging understanding of girls’ offending trajectory types. The adolescent females who are non-African Americans, do not have drug use, do not have mental health problem histories, or are currently enrolled in school are more likely to develop a desist offending trajectory, which implies their offending behaviors would stop soon after their initial arrest. Contrarily, the adolescent females who are African American, had used drugs, had history of mental health problems, or are not currently enrolled in school are more likely to develop a prolonged criminal trajectory. The girls belonging to the chronic offending trajectory group also had a higher risk of being re-arrested in early adulthood. These findings imply these girls have high chances of developing life-long criminal careers. The findings concerning offending severity were distinct from the above results regarding the number of offenses. The girls who did not have child welfare contacts, were detained during the same year of their initial arrest, did not believe that physical aggression is appropriate, or were enrolled in school are more likely to develop along the minor offending trajectory. However, girls connected to the child welfare system, those who hold aggressive beliefs, or those not enrolled in school develop more severe offending behaviors over time. Moreover, the girls in the severe trajectory group are at high risk of recidivism during early adulthood.

In the third model of dual trajectory modeling, a multinomial regression analysis was conducted to predict membership in minor trajectory, severe-desist trajectory, and severe-chronic
trajectory groups. The dual trajectory model shows girls’ profiles which are similar but still distinct from those of the above two models. Several variables did not appear significant in the first two models but become significant in this joint trajectory model, including those of abide by conventions or values, school conduct problems, school attendance, and academic performance. The dual trajectory model established, in sum, that girls who were not African American, had not been associated with the child welfare system, had been detained in 2004, did not have aggressive attitudes toward responsible law abiding behavior, were enrolled in school at least part-time, or had school conduct problems (e.g. problems reported by teachers, problem calls to parents, or calls to police) tended to develop minor offending trajectories. The girls who had alcohol use, believed in fighting and physical aggression to resolve disagreements or conflicts, were enrolled in school at least part-time, or had poorer school attendance were more likely to become severe-desist offenders. Girls who were more likely to develop a severe-chronic trajectory were African American, had been associated with the child welfare system, had drug use, had mental health problems, had aggressive attitudes toward responsible law abiding behaviors, believed in fighting and physical aggression to resolve disagreements or conflicts, dropped out, were suspended, or were expelled from school, or who had poor academic performance.
### TABLE 5.1 Highlights of main findings of the current study

<table>
<thead>
<tr>
<th>Hypotheses</th>
<th>Main Findings</th>
</tr>
</thead>
</table>
| **Research Question 1: Are there different delinquent trajectory groups among adolescent females?** | - Number of Offense: chronic (17%) vs. desist offenders (83%)  
- Offending Severity: minor (57%) vs. severe offending trajectory groups (43%)  
- Dual Trajectory: minor (42.9%) vs. severe-desist (40.5%) vs. severe-chronic offending trajectory groups (16.6%) |
| - Multiple delinquent trajectory groups exist among adolescent females | |
| **Research Question 2: Do contextual factors help to differentiate the various trajectory groups from one another?** | - Severe trajectory (OR=1.7, \(p<.05\)) > Minor trajectory  
- Minor trajectory (OR=2.1, \(p<.05\)) > Severe-chronic trajectory  
- Severe trajectory (OR=2.3, \(p<.05\)) > Desist offenders  
- Severe-chronic trajectory > Minor trajectory (OR=0.4, \(p<.05\))  
- Severe-chronic trajectory > Severe-desist trajectory (OR=0.4, \(p<.05\))  
- Drug use:  
  - Chronic offenders (OR=2.1, \(p<.05\)) > Desist offenders  
  - Severe-chronic trajectory > Minor trajectory (OR=0.5, \(p<.05\))  
  - Severe-chronic trajectory > Severe-desist trajectory (OR=0.5, \(p<.05\))  
- Mental health problems:  
  - Chronic offenders (OR=2.1, \(p<.05\)) > Desist offenders  
  - Severe-chronic trajectory > Minor trajectory (OR=0.5, \(p<.05\))  
  - Severe-chronic trajectory > Severe-desist trajectory (OR=0.5, \(p<.05\))  
- Alcohol use:  
  - Severe-desist trajectory (OR=2.5, \(p<.05\)) > Severe-chronic trajectory |
| - Adolescent females from the child welfare system are more likely to become chronic offenders as compared with those who are not from the child welfare system. | No variables significant.  
- Adolescent females from supportive families are less likely to become chronic offenders as compared with those from non-supportive families. |
TABLE 5.1 (cont.)

- Adolescent females who had anti-social or aggression histories are more likely to become chronic offenders as compared with those who did not have anti-social or aggression histories.

<table>
<thead>
<tr>
<th>Have beliefs in fighting and physical aggression to resolve a disagreement or conflict:</th>
</tr>
</thead>
<tbody>
<tr>
<td>▪ Severe trajectory (OR=2.0, ( p&lt;.01 )) &gt; Minor trajectory</td>
</tr>
<tr>
<td>▪ Severe-chronic trajectory &gt; Minor trajectory (OR=0.4, ( p&lt;.05 ))</td>
</tr>
<tr>
<td>▪ Severe-desist trajectory (OR=2.3, ( p&lt;.01 )) &gt; Minor trajectory</td>
</tr>
</tbody>
</table>

- Adolescent females associated with anti-social peers are more likely to become desist offenders as compared with those who did not associate with anti-social peers.

<table>
<thead>
<tr>
<th>Showed an aggressive attitude toward responsible law abiding behavior:</th>
</tr>
</thead>
<tbody>
<tr>
<td>▪ Severe-chronic trajectory &gt; Minor trajectory (OR=0.3, ( p&lt;.01 ))</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Current school enrollment: not enrolled</th>
</tr>
</thead>
<tbody>
<tr>
<td>▪ Chronic offenders (OR=2.0, ( p&lt;.05 )) &gt; Desist offenders</td>
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<tr>
<td>▪ Severe trajectory (OR=1.7, ( p&lt;.05 )) &gt; Minor trajectory</td>
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<tr>
<td>▪ Severe-chronic trajectory &gt; Minor trajectory (OR=2.7, ( p&lt;.01 ))</td>
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<td>▪ Severe-chronic trajectory &gt; Severe-desist trajectory (OR=1.9, ( p&lt;.05 ))</td>
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<th>Poor school attendance:</th>
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<td>▪ Severe-desist trajectory (OR=2.0, ( p&lt;.05 )) &gt; Severe-chronic trajectory</td>
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<td>▪ Severe-desist trajectory (OR=1.7, ( p&lt;.05 )) &gt; Minor trajectory</td>
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<th>Poor academic performance:</th>
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<td>▪ Severe-chronic trajectory &gt; Severe-desist trajectory (OR=0.5, ( p&lt;.05 ))</td>
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<th>School conduct problems:</th>
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<td>▪ Minor trajectory &gt; Severe-desist trajectory (OR=0.6, ( p&lt;.05 ))</td>
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No variables significant.

- Adolescent females who had poor school performance more likely to become desist offenders as compared with those who had good school performance.

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<th>Research Question 3: Do the different groups during adolescence help predict adult arrests?</th>
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<td>▪ Adolescent females in the cluster of chronic offenders are more likely to have early adult offending</td>
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<th>Early adulthood recidivism:</th>
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<tr>
<td>▪ Chronic offenders (OR=2.2, ( p&lt;.01 )) &gt; Desist offenders</td>
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<tr>
<td>▪ Severe trajectory (OR=2.5, ( p&lt;.001 )) &gt; Minor trajectory</td>
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<tr>
<td>▪ Severe-chronic trajectory (OR=2.2, ( p&lt;.001 )) &gt; Minor trajectory</td>
</tr>
<tr>
<td>▪ Severe-desist trajectory (OR=3.4, ( p&lt;.001 )) &gt; Minor trajectory</td>
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Responding to Current Literature Pertaining to Girls’ Delinquency Trajectories

Expanding the application of Moffitt’s theory to girls’ samples

According to Moffitt’s development taxonomy theory, offending trajectories are usually divided into two distinctive types: adolescent-limited and life-course-persistent (Farrington, 2010; Fontaine, et al., 2009; Moffitt, 1993; Moffitt, 2006; Nagin, Farrington, and Moffitt, 1995). In the current study, two distinctive trajectory groups are generated for both models regarding number of offense (chronic vs. desist offending groups) and offending severity (minor vs. severe offending groups). The findings are consistent with Moffitt’s theory and contradictory to Silverthorn’s and Frick’s approach (Silverthorn, & Frick, 1999; Silverthorn, Frick & Reynolds, 2001). Silverthorn and Frick believe that females usually begin their offenses after puberty; therefore, they hypothesized that girls only have one type of offending trajectory – a delayed-onset pathway – and tested it with a clinical and mixed gender sample from a detention center. On the other hand, other empirical studies examining samples from childhood to adolescence found multiple types of trajectories of antisocial behaviors, such as desister, escalator, low chronic offenders, or low, median and high offending (Ayers et al., 1999; Bor et al., 2010; Chung et al., 2002a; Chung et al., 2002b; Cote et al.; Fergusson, Horwood, & Nagin, 1999; Fergusson, & Horwood 2002; Moffitt, & Capis, 2001). These studies mostly examined non-clinical and mixed gender samples, which are different from the sample of the current study. The findings of the current study support Moffitt’s dualistic typology theory related to criminal trajectory instead of single type or multi-types of trajectory.

Even though the identification of dualistic trajectory groups in the current study coheres with Moffitt’s theory, the distribution of each trajectory group is different from that which Moffitt proposed. Moffitt assumed that the prevalence rate of life-course-persistent or chronic
offenders is between 6% and 10% among the general population (Moffitt, 1993; Moffitt, 2006). Most empirical studies expanding Moffitt’s theory support the contention that membership in the chronic offending trajectory lies in the range of Moffitt’s proposed prevalence rate as well (Chung et al., 2002a; Farrington, 2010; Nagin’ and Land, 1993; Nagin, Farrington, and Moffitt, 1995; van Domburgh et al, 2009). However, among the clinical sample of the present study, 17% were considered chronic offenders when examining the number of offenses, while 57% develop severe trajectories when examining the offending severity. The current study only included girls who had finished the Washington State Juvenile Court Assessment (WSJCA). The WSJCA mainly targets high-risk youths who need more intensive efforts, not low-risk youths, due to scarce resources (Barnoski, 2004). This high-risk, adolescent, female-only sample from the state of Washington limits the generalizability of the current study. Other factors might also contribute to the different results of the current study from previous literature, such as an adolescence-only observation period or different measures of antisocial-behaviors.

**Reflection on girls’ profiles in the current study**

Race is an important predictor in the current study. Only rarely do offending trajectory studies include race as a membership predictor. The current study found that African American girls are particularly vulnerable to association with severe offending behaviors compared to girls of other racial and ethnic backgrounds. Among all youth under age 18 in the state of Washington, only 4% are non-Hispanic black youth (Annie E. Casey Foundation, n.d.). However, African American girls make up 14% of the youth in the current study’s sample. Furthermore, these girls have an increased risk of developing chronic or severe-chronic offending trajectories. According to the 2008 annual report of the Washington State Partnership Council on Juvenile Justice (WA-PCJJ) (2008), disproportionate minority contact is one of the top two concerns for the
Governor’s Juvenile Justice Advisory Committee. The council’s Relative Rate Indexes (RRI) report (2008) showed that African American youth are at higher risk for juvenile arrests than youth from any other ethnicity groups (WA-PCJJ, 2008). A number of researchers report that African American girls are overrepresented in the juvenile justice system, as over-representation of racial/ethnic minority youth has been a major issue for both child welfare and juvenile justice systems (Brubaker & Fox, 2010; Le, Arifuhi, & Nunez, 2003; Chiu, Ryan & Herze, 2011; Ryan & Testa, 2005; Ryan et al., 2007; Ryan et al., 2008). Chauhan and Reppucci’s (2009) study examined the existence of differential risk factors for African American and white delinquent girls. The researchers found that parental physical abuse was a stronger predictor of antisocial behavior for white girls, while witnessing domestic violence was primarily associated with antisocial behavior among African American girls. They also found that girls who lived in disadvantaged neighborhoods, particularly African American girls, were more likely to witness or be exposed to violence, which can lead to the development of antisocial behavior (Chauhan & Reppucci, 2009). A qualitative study (Brubaker & Fox, 2010) on urban African American girls at risk is consistent with this finding. The researchers found that many African American girls face unique problems that are different from those of white peers. African American girls living in impoverished neighborhoods encounter structural problems, such as poverty and racism, which are often difficult to overcome (Brubaker & Fox, 2010). However, taking neighborhood effects into account still cannot fully explain why African American girls in the current study are at higher risk of engaging in more severe offending behavior over time. Some researchers believe that minority youth tend to receive more severe charges or dispositions from the justice system than do white youth (Leiber, 2006; Wordes, Bynum, & Corley, 1994). The current study used a court decision related to the offense severity. The court decision might impact the variables
related to offense severity. The assumption regarding the correlation between race and severity of court sentences needs further examination. Despite the possible impact of such findings, the current findings still add meaningfully to the existing literature and bring attention to the importance of providing suitable intervention programs for this vulnerable subpopulation in the juvenile justice system.

Contact with child welfare is another significant predictor in the current study. The current study finds that adolescent females who have had child welfare contact have increased risk of developing more chronic or severe offending trajectories during adolescence. Even though very few trajectory scholars working in criminology include the effect of child maltreatment (Fontaiane, et al., 2009; Moffit, 2006), many studies indicate that maltreatment is a precursor to delinquency for both boys and girls (Bright & Jonson-Reid, 2008; Dennison, Stewart, & Hurren, 2006; Katz, 2000; Kingree, Phan, & Thompson, 2003; Maxfield, & Widom, 1996; Widom, 1991; Zahn et al., 2010). It is evident that children who experience maltreatment are at increased risk of engaging in delinquent behavior (Ryan, & Testa, 2005; Ryan, 2006; Ryan et al., 2007; Ryan et al., 2008). Siegel and Williams (2003), for example, found that childhood victimization, such as sexual abuse or physical abuse at home or in foster placement, makes girls vulnerable to adopting offender status. Maxfield and Widom (1996) indicated that maltreated children are 1.8 times more likely to be juvenile offenders and 1.9 times more likely to commit violent offenses than their counterparts. Dennison, Stewart, and Hurren (2006) found that children with maltreatment histories are four times more likely to reoffend than those without maltreatment histories. In the current study, 68% of girls who had child welfare contacts had maltreatment allegations and only 12% had indicated allegation results. Although the majority of these cases were without indicated maltreatment, the girls came to the attention of the child
welfare system and were at increased risk of developing chronic or severe offending trajectories during adolescence. There is limited information in the current study data indicating why some children had no maltreatment allegation but still had child welfare contact. It is important to identity these children in future studies since they might be a high-risk population for juvenile delinquency.

On the other hand, the effect of out-of-home placement prior to initial arrest remains insignificant in every testing model of the current study. The use of substitute care placement, and placement instability are often, although not always, identified as predictors of involvement with juvenile corrections (English, Widom, & Branford, 2000; Jonson-Reid & Barth, 2000a, 2000b, 2003; Ryan, & Testa, 2005). Ryan and Testa (2005) suggest that placement instability, not placement itself, is at least partly responsible for the increased risk of delinquency. Moreover, it is placement instability that increases the risk of delinquency for male children who were maltreated (Ryan & Testa, 2005). The current study indicates that there is no significant difference between girls with or without out-of-home placement in the development of a chronic, severe, or severe-chronic offending trajectory. Strain theory implies that girls who have strong and steady support systems are able to deal with the loss of love, relationships, or traumatic experiences (Garcia, & Lane, 2012). More information is needed to test whether stable out-of-home placement might provide such a support system and could be a protective factor for girls from acting out.

The effect of detention experience occurring in the same year as girls’ initial arrest is significant in the current study. Girls detained in 2004 right after their initial arrests were more likely to develop less severe offending trajectories. This finding indicates that detention can be an effective intervention for reducing future criminal behaviors. However, this is contradictory to
the mainstream literature. Studies have shown that detained youths usually have poor life outcomes, such as recidivism, using alcohol or drugs, or dropping out of school (Richard, 2009). Bontrager, Ryon et. al. (2013) found that the recidivism rate is lower for youth under probation than for those in residential placements. The Annie E. Casey Foundation initiated a Juvenile Detention Alternatives Initiative (JDAI) project over five states and found that juvenile arrests for serious violent offenses and total commitments to state juvenile correctional facilities declined dramatically (Richard, 2009). It seems undeniable that this reform is promising. It promotes the success of court-involved youth and improves the effectiveness of the juvenile justice system. The measure related to detention in the current study is limited. Therefore, further research is needed to assess the effectiveness of detention services.

*Individual level factors*

Based on Moffitt’s theory, the current study hypothesized that girls who had alcohol or drug use histories, who had mental health problems, who had anti-social or aggression histories, and whose families were dysfunctional were more likely to become chronic offenders. These factors are considered within the context of the distinct socialization processes which contribute to the different pathways to delinquency for males and females. Females are relationally focused, and their self-esteem, power, and effectiveness are dependent on their relationships with others. Studies have shown that poor family relationships, mental health issues, and substance abuse are significant triggers for girls to act out (Garcia, & Lane, 2012; Morton & Leslie, 2005; Moffitt, 1993; Moffitt, 2006). In the current study, the effect of alcohol use is only significant when testing the difference between severe-desist and severe-chronic offenders. The girls with alcohol use history were more likely to develop severe-desist trajectories than severe- chronic trajectories. In terms of drug use, girls with drug use histories were more likely to develop severe or chronic
offending trajectories. Previous studies have shown that delinquent girls tend to be involved with alcohol and drug use (Goodkind, Ng, & Sarri, 2006; Goodkind et al., 2009; Miller & Mullins, 2009; Scelfo, 2005; Zahn et al., 2008). It remains unclear whether substance use is a trigger for violent behaviors or if it is coincidental when youth are arrested for this type of offense. Some researchers found that substance use can be a means of coping associated with sexual abuse among girls, which may lead to criminal activities (Banines and Alder, 1996; Bright and Jonson-Reid, 2008; Goodkind, Ng, and Sarri, 2006; Garcia and Lane, 2012).

On the other hand, the association between mental health problems and delinquency appears to be much stronger for girls as opposed to boys (Zahn et al., 2010). In the current study, the risk of developing severe-chronic trajectory is increased for girls diagnosed with mental health problems or having prescribed medication or treatment. Researchers have found that youth in the juvenile justice system, especially girls, are more likely to report mental health disorders than youths in the general population (Hawkins et al., 2009; Ruffolo et al., 2004; Teppin et al., 2002; Zahn et al., 2008b). In addition, mental health problems are also highly associated with life stressors or victimization, such as posttraumatic stress from child abuse (Bender, 2009; Zahn et al., 2010). Garcia and Lane (2012) point out that girls without healthy coping strategies to deal with those negative situations, such as those who have mental health problems, might turn to behaving badly as a response. Therefore, mental health problems may be both causes and outcomes of youth delinquency.

Gender socialization theory explains that girls develop their identities based on their relationships with others (Morton & Leslie, 2005). Anger could lead males to show anti-social behaviors directly, while females tend to internalize their anger. A stronger sense of guilt and disapproval would accompany deviant behavior among females, since they worry about the
effect of anger in relationships with others. Therefore, girls usually translate anger into action when they cannot find any legal or social outlets (Chesney-Lind & Shelden, 2004; Garcia, & Lane, 2012; Miller, 1998; Haight et al., n.d.; Hawkins et al., 2009; Morton & Leslie, 2005). On the other hand, some gender role socialization theorists suggest that boys and girls are becoming more similar in their social roles, life experiences, and pressures and cultural traditions. Adler (1975) indicates that “the departure from the safety of traditional female roles and the testing of uncertain alternative roles coincide with the turmoil of adolescence creating criminogenic risk factors which are bound to increase” (as cited by Chesney-Lind & Shelden, 2004, p. 126). The changing gender role socialization, which emphasizes greater female freedom and assertiveness, “ha[s] masculinized female behavior and engendered in them imitative male machismo competitiveness” (Steffensmeier et al., 2005, p.359). Moreover, boys and girls are also becoming more similar in the types and levels of crimes they commit (Goodkind et al., 2009; Steffensmeier et al., 2005).

Steffensmeier et al. (2005) argued that girls today face greater struggles in maintaining a sense of self as they confront a much more complex, multidimensional, and often contradictory set of behavioral expectations that specify what is appropriate, acceptable, or possible for girls. The changing gender-role expectations toward greater freedom for females, assertiveness, and male-like machismo and competitiveness as a copying strategy for solving interpersonal conflicts may cause girls to be more violent (Steffensmeier & Schwartz, 2009). Baines and Alder (1996) pointed out that all of the images of the “idealized adolescent” are masculine, which results in many conflicts in regards to the coexistence of adolescence and femininity. Gender is constructed as a relational set of binary opposites in which femininity is the deficit, devalued component in relation to masculinity. Even when girls’ behaviors are consistent with
traditionally constructed ideals of femininity (e.g., being sensitive to others or being emotional), their behavior is socially and culturally devalued in comparison to masculine traits, such as independence and ambition (Baines & Alder, 1996). In the current study, two factors related to aggressive attitudes appear significant in predicting membership in severe offending trajectories. Chung et al. (2002a, 2002b) also found that aggressive children and those from dangerous neighborhoods are more likely to become chronic offenders. That result might support the argument that some girls in this higher-risk sample have become masculinized, and these girls tend to develop more aggressive offending behaviors, mirroring those of boys. Still, some feminists believe that girls’ masculinizing behavior is just an aggressive response to seek power or control over their victimized life experiences (Garcia, & Lane, 2012).

The effect of runaway history appears insignificant among all the testing models. Some researchers have hypothesized that running away is a usual means of escaping from sexual abuse (Chesney-Lind, 1997; Siegel & Williams, 2003). Park, Morash and Stevens (2010) found that girls who ran away from home at an early age were likely to perpetrate violence. Running away may itself result in an arrest and incarceration but can also lead to other forms of offenses, such as prostitution or stealing, in order to survive on the streets (Goodkind, Ng, & Sarri, 2006; Chesney-Lind, 1997; Le, Arifuhi & Nunez, 2003; Siegel & Williams, 2003; Zahn et al., 2010). However, the findings of the current study do not support the contention that runaway history can help predict memberships in different offending trajectories. The current study sample only includes high-risk adolescent females who were involved in the juvenile justice system. Therefore, the current findings related to runaway history might be limited to similar clinical populations and may not apply to general female populations.
Family level factors

According to Moffitt’s theory, children from dysfunctional families are at higher risk of falling into chronic offending trajectories (Garcia, & Lane, 2012; Morton & Leslie, 2005; Moffitt, 1993; Moffitt, 2006). A number of studies found that weak family bonds due to instability, family dysfunctions, poor family structures, domestic violence, and child maltreatment increase the likelihood of delinquency among girls (Bright & Jonson-Reid, 2008; Brubaker & Fox, 2010; Chesney-Lind & Shelden, 2004; Colman et al., n.d.; Hawkins et al., 2009; Goodkind et al., 2006; Hipwell & Loeber, 2006; Kerpelman & Smith-Adcock, 2005; Le et al., 2003; McKnight & Loper, 2002; Zahn et al., 2008b). Parents’ imprisonment experiences, mental health problems, drug abuse, and low socioeconomic status contribute to family problems, which are highly associated with youth delinquency. Also, trajectory studies have shown that life-course-persistent offenders or chronic offenders are exposed to high risk of family adversity, such as poor family management, negative parental attachment, or biological parent criminality (Ayers et al., 1999; Chung et al., 2002a, 2002b; Fergusson, & Horwood, 2002; Fergusson, Horwood, & Nagin, 1999; Leve & Chamberlain, 2004; Piquero, & Chung, 2001; Odgers et al., 2008).

The current study examined three family-adversity-related variables: imprisonment experience of family members, problem history of parents, and parental control. Surprisingly, none of these show significance in relation to predicting membership in offending trajectories. Several confounding factors might lead to these unexpected findings. First, the current study includes the variable of child welfare contact, which could mediate the relationships between family adversity and trajectory groups. In the current study, around 66% of girls who have had child welfare contact had at least one family member imprisoned compared to 48% of girls without child welfare contact. Almost half (45%) of the parents of girls who have had child
welfare contact had at least one problem, whereas only 27% of parents of girls without child welfare contact had problems. In terms of parental control, 71% of girls who have had child welfare contact disobeyed their parents, while 56% of their counterparts showed disobedience. After controlling for the effect of child welfare contact in the predicting models, the relationship between the family related variables and trajectory groups might disappear. However, this assumption needs further investigation. This sample’s make-up – namely, that the current study’s sample only includes high risk adolescent females – presents another possible reason for the findings related to family level factors. The family related variables could be a significant predictor for differentiating male and female offending, or comparing the general girl population with delinquent girls, as the literature suggests. However, family function appears insignificant to distinguish different offending trajectory memberships among a clinical sample in the current study. Further examination in this area is needed in the future.

_School level factors_

Based on Moffitt’s theory, this study hypothesized that adolescent females who had poor school performance or had anti-social peer relations were more likely to develop desist or minor offense trajectories. The findings concerning academic performance and school conduct are consistent with the hypotheses and theory. The girls who had poor academic performance or school conduct problems are more likely to develop a severe-desist offending trajectory than a severe-chronic trajectory. Moffitt believed that the criminal careers of desisters are sporadic (Moffitt, 1993). School maladaptation resulting from a maturity gap could be a trigger for these desisters to get involved in criminal behaviors temporarily (Farrington, 2010; Fontaine, et al., 2009; Moffitt, 1993; Moffitt, 2006). Nonetheless, the hypotheses related to school attendance and enrollment did not prove to be accurate. Being suspended, expelled, dropping out of school, and
poor school attendance increase the risk of developing a severe or chronic delinquent trajectory. Most adjudicated youth have encountered educational difficulties or academic failures (Archwamety & Katsiyannis, 1998). Although the results of these two variables contradict the theory, this indicates that absences from school could be one of the outcome behaviors of chronic offenders. Moffitt has assumed that chronic offender youths tend to act like adults earlier than their peers, especially engaging in anti-social behaviors (Moffitt, 1993; Moffitt, 2006). Absences from school could be indicators of insufficient parental supervision or disobedience to parents, which are associated with the development of chronic offending trajectories.

The effect of anti-social peer relations appears insignificant in the current study. Most scholars believe that delinquent adolescents tend to seek people who share similar deviant values and behaviors or similar risky conditions. Additionally, it is appealing to some youth that the lifestyle of deviant peers represents adult-like social behavior which demonstrates autonomy from parents or attainment of teen-inaccessible assets. This suggests that desist offenders get involved in delinquent activities because of the effect of social mimicry (Fontaiane, et al., 2009; Kaufmann et. al., 2007; Moffitt, 1993; Moffitt, 2006). Several studies have found that delinquency among females is either directly or indirectly related to males, especially romantic partners (Carter et al. 2009; Morton and Lesline, 2005; Richie, 1996). On the other hand, other researchers state that association with anti-social, delinquent peers seems less influential on the delinquency of girls, and positive peer relationships moderate the potential deviant behaviors of girls (McCarthy et al., 2004; Haynie’s (2003; Carter et al. 2009; Morton and Lesline, 2005; Richie, 1996). The current study did not find any empirical evidence to support the effect of peer relations among a clinical sample of delinquent girls.
Predicting Early Adulthood Re-arrests

To answer the third research question related to the prediction of early adulthood recidivism, binary logistic regression analyses were conducted. The girls in chronic, severe, severe-desist, or severe-chronic trajectory groups were at increased risk of being arrested again at ages 18 or 19 compared to their counterparts. Some trajectory studies have found that chronic offenders have more negative outcomes during adulthood than those who develop other types of offense trajectories. Huesmann, Dubow, and Boxer (2009) revealed that both females and males in the chronic offense trajectory groups had poor criminal and psychological outcomes at age 48. On the other hand, Bor et al. (2010) found that females in the chronic trajectory groups were less likely to be involved in criminal actions, substance addiction or health problems than male chronic offenders. Due to the limited available administrative data, the current study was only able to test the association between the different trajectory groups and early adulthood re-arrests. The findings reveal the immediate hazard of recidivism for female chronic offenders. Long term outcomes related to their criminal actions, education, mental health, physical health, or relationships in the later adulthood need further examination.
CHAPTER 6

IMPLICATIONS

Theory, Policy and Practice Implications

Every delinquent girl has a unique life experience, which has led her to delinquency. Individuals may construct different meanings out of similar delinquent behaviors and experiences depending on the context (Miller, 2010). Delinquent girls may use past experiences to weave meanings that they ascribe to their current situations (Cole, 1996; Miller, 2010; Miller & Goodnow, 1995). The current study aims to describe unique life profiles of delinquent girls associated with different trajectory groups by using a Washington sample. The 2011 annual report of the WA-PCJJ (2011) revealed that the state of Washington has initiated an action concerning pathways for girls into the juvenile justice system and evidence based practice for gender specific services since 2008. Therefore, the current study responds to multiple demands to address policy and practice issues related to delinquent girls. The purpose of profiling girls in different offense trajectories is not to label or stigmatize delinquent girls; instead, the goal of this study is to address their unique intersectionalities and provide a basis for designing suitable policies and interventions to meet their needs. The following section, provides theory, policy, and practice suggestions based on the main findings of the current study.

Implications on Theory

The current study contributes to the understanding of offending trajectories among girls during adolescence. Insufficient studies focus on girls’ delinquency and the development of their offending trajectories. Most trajectory research related to crime focuses on males’ offending behaviors through adulthood. The current study examines a clinical, adolescent, female sample who were defined as having intensive service needs by the state of Washington. The focus on a
female sample who have been served by the juvenile justice system, and the examination of their offending trajectories during adolescence, is unique among the current body of literature. Unlike Silverthorn and Frick’s suggestion that there is only one type of offending trajectory for female samples (Silverthorn, & Frick, 1999; Silverthorn, Frick & Reynolds, 2001), the findings of this study support Moffitt’s theory that there exist different offending trajectories for at-risk delinquent girls. Most empirical research applying Moffitt’s theory concerns male or mixed gender samples through adulthood. With unique focuses, therefore, this current study not only adds to the existing literature in understanding multidimensional profiles of delinquent girls in different delinquent trajectories but also provides the juvenile justice system with a good basis for developing effective intervention projects.

The scholarly work in criminology around trajectories rarely takes into consideration the effect of child maltreatment. Nevertheless, more and more girls are entering the juvenile justice system as individuals dually involved in both the child welfare and juvenile justice systems (Bright & Jonson-Reid, 2008; Dennison, Stewart, & Hurren, 2006; Katz, 2000; Kingree, Phan, & Thompson, 2003; Maxfield, & Widom, 1996; Widom, 1991; Zahn et al., 2010). The current study particularly reveals the significance of child welfare contacts among those girls who developed more severe or chronic delinquency trajectories. This study helps policy makers, practitioners, and researchers to rethink how the child welfare and juvenile justice systems construct services with attention to gender differences and how the two systems address the developmental needs of girls in different delinquency trajectories.

**Policy Implications**

Most policies for juvenile delinquency have been tailored for boys since the majority of juvenile arrests involve male youth (Chesney-Lind, Morash & Stevens, 2008; Le et al., 2003).
Consequently, little is known about how well girls respond to these policies and the interventions they lead to, although patterns of violence perpetrated by girls differ from those of boys. The lack of policies designed to address delinquency among girls may also be attributed to the fact that gender differences have been overlooked in the assessments of at-risk youths (Brumbaugh, Walters, & Winterfield, 2010; Hawkins et al., 2009; Hipwell & Loeber, 2006; Le, Arifuhi & Nunez, 2003; Zahn et. al., 2008a). In 1992, the Juvenile Justice and Delinquency Presentation Act (JJDPA) began to address the following issues in the juvenile justice system: 1) gender bias and 2) a lack of gender-specific programs or intervention (Brubaker & Fox, 2010). This law requires states to complete an analysis of gender-specific services and develop a plan for providing needed, gender-specific services (OJJDP, 1998). However, only a few randomized intervention trial research projects have been conducted for girl offenders. It is important for states to review current gender-specific policies and intervention programs. The findings of the current study reveal different trajectory groups emerge when different offense outcomes are examined. Moreover, multiple offending trajectories exist even among a high-risk sample, and the profiles of girls in the different trajectory groups are dissimilar. These findings suggest that if states only include basic gender differences in formulating policies related to serving juvenile females, they may produce overly simplified programming. Trajectory-specific programs based on different girls’ profiles can address their needs more thoughtfully and effectively.

In the current study, the girls with child welfare contacts are at a high risk for developing a severe-chronic trajectory. The Child Abuse Prevention and Treatment Act (CAPTA) urges interagency collaboration between the child welfare and the juvenile justice system. However, detailed requirements of the collaboration mechanism between the two systems should be emphasized. For example, integrated case systems and joint court orders could strengthen the
relationships between the two systems and provide youth with more holistic and effective services.

At the school level, current school enrollment is an important factor impacting the development of chronic or severe trajectories. Specifically, keeping girls, especially those with high risk profiles, in the school system can prevent development along a trajectory indicative of long-term criminal behavior. This presents a challenge as most schools have applied zero-tolerance policies since the 1990s. The philosophy of zero-tolerance policies suggests that removing deviant students will deter other students from disruption and create a better climate in school. However, zero-tolerance policies have not been shown to improve school safety; conversely, the schools, as a relatively low-cost service setting, pass over the responsibility of discipline to the juvenile justice systems, which introduces very high-cost processes (APA, 2008). The ineffective application of the zero-tolerance policies produces more arrests and incarcerations of less serious offenders. The criminalization of less serious forms of violence may increase female arrests, since most girls’ offenses are less serious and less chronic than those of boys (Steffensmeier & Schwartz, 2009). Therefore, this policy needs significant modification to support girls with behavior problems in the school system since keeping them away from schools increases opportunities of being exposed to criminal events, especially in high-crime rate neighborhoods.

**Practice Implications**

According to Chesney-Lind, Morash and Stevens (2008), the majority of delinquency prevention programs are designed for both genders. Programs that are exclusively for girls are relatively few in number, despite the fact that delinquency programs that are tailored to a particular gender tend to be more effective for both boys and girls (Chesney-Lind et al., 2008).
Those gender-specific programs which do exist for teenage girls are typically tailored for a single issue such as teen pregnancy and mothering, substance abuse, or gang involvement, rather than addressing multiple factors affecting violent and delinquent behavior. The lack of gender-specific intervention programs for delinquent girls is largely a result of issue-specific funding initiatives. The current study has revealed that at-risk girls are likely to have multiple service needs. For example, girls who develop severe-chronic offending trajectories may have histories of abuse, substance abuse, mental health problems, and academic difficulties. Most programs tend to address individual-level factors and outcomes of girls’ at-risk behaviors rather than the underlying, structural problems, such as gender inequality and poverty that can indirectly affect these girls (Chesney-Lind et al., 2008). Studies have also pointed out the lack of needed services, such as counseling for abuse, health education, sex education, career guidance, and anger management for at-risk girls (Chesney-Lind et al., 2008; Holsinger et al., 1999; Sherman, 2003). Gender-specific programs need to take into consideration ongoing structural problems that affect girls in the juvenile justice system, such as gender inequality and racism (Chesney-Lind et al., 2008).

Gender responsive policy and practice are not addressed well at the state level, either. The 2008 annual report of WA-PCJJ (2008) shows that multiple reforms regarding juvenile justice legislation and intervention programs have been implemented in Washington state. Even though some of these reforms indirectly address girls’ related offenses, such as the runaways/status offenders programs (WA-PCJJ, 2008), specific work tailored to meet girls’ needs is rare. Again, there are insufficient evidence based interventions for adolescent females. The backgrounds and needs of girls in the minor or desist trajectory groups are not identical with those in the severe or chronic trajectories. Furthermore, there is a significant difference between
severe-desist and severe-chronic offenders. A single intervention for all youth in the juvenile justice system, such as detention or probation, cannot address the individual needs of girls who develop different offending trajectories. Diverse and innovative interventions are needed to serve girls who develop along each different offense trajectory, even though they were all defined by the state of Washington as at-risk youth who need intensive interventions. The current study suggests not only gender-specific interventions but also trajectory-specific programs as necessary to this end. Since the current study indicated that the profiles of girls in the different trajectory groups are dissimilar, it would be helpful to provide practitioners a list of risk factors for different trajectory groups in initial assessments. With a basic understanding of the development of each possible offending trajectory for different girls, practitioners can tailor interventions to better meet girls’ needs.

The current study found that African American girls are particularly vulnerable to involvement in the juvenile justice system. Therefore, it is important to conduct further research to investigate and understand what causes this disproportionate representation. Developing culturally competent interventions may be an effective strategy to address this. One of the Office of Juvenile Justice and Delinquency Prevention (OJJDP) model programs was developed specifically to provide services for African American girls who were disproportionately represented in the Alameda County juvenile justice system. The Reaffirming Young Sisters’ Excellence (RYSE) program aims to reduce the likelihood of recidivism (Le et al., 2003; OJJDP, 2010). The random assignment group for the RYSE and comparison groups were based on a ratio of four to one so that more girls could get the RYSE services. Le et al. (2003) found that there was no single significant effect on the reduction of recidivism when RYSE girls were compared with the control group, after controlling for their ages. However, African American
girls in the RYSE group were less likely to be re-arrested than African American girls in the comparison group. The same pattern applied to Hispanic girls in the sample, but not to white or Asian American girls. In fact, white and Asian American girls in the RSYE group did worse than their counterparts receiving traditional probation service. On the other hand, in the qualitative data, including interviews with probation officers, the focus group with the girls and community service providers gave positive feedback about RYSE. The probation officers felt that the RYSE program had a positive impact in girls’ lives, since officers had more time to work with girls individually. In general, African American girls benefited most from the RYSE program compared to white or Asian American, girls since the intervention was culturally appropriate and sensitive to African American girls’ experiences (Le et al., 2003). The current study points out that effective intervention programs, especially those targeting chronic or severe juvenile female offenders, must take race into consideration.

Another vulnerable population is dually involved girls. More efforts should be invested in determining how to prevent girls from moving from the child welfare system to the juvenile justice system, since the results of this study show these dually involved girls are more likely to develop a severe offending trajectory. Additionally, more research must take place in order to help both the child welfare system and juvenile justices to develop or evaluate programs which address the needs of dually involved girls. Currently, no interventions are specifically offered to girls who are moving from the child welfare system to the juvenile justice system. However, an evaluation project does exist which aims to collaborate around cross-system resources. The Multidimensional Treatment Foster Care (MTFC) project provides delinquent girls after care in the child welfare system. The Oregon Social Learning Center (OSLC) conducted a randomized intervention trial to examine the effectiveness of a MTFC intervention compared to group care.
(GC) for 13- to 17-year-old females with histories of chronic criminal behavior and mental health problems (Chamberlain, Leve & DeGarmo, 2007; Leve & Chamberlain, 2004; Leve, Chamberlain & Reid, 2005; Leve & Chamberlain, 2007). Three related studies suggest that the MTFC intervention was more effective than group home settings for the delinquent girls referred for out-of-home care (Chamberlain, Leve & DeGarmo, 2007; Leve, Chamberlain & Reid, 2005; Leve & Chamberlain, 2007). The girls receiving the MTFC intervention had lower recidivism rates and spent fewer days in locked settings in a 12-month follow-up compared with the group care girls. The criminal referral rate dropped 85% for MTFC girls but only a 43% reduction occurred for GC girls (Leve, Chamberlain & Reid, 2005). A follow-up study related to the effects on school attendance and homework completion in those 81 juvenile justice involved girls also indicated increases in girls’ educational engagement for the MTFC intervention group (Leve & Chamberlain, 2007). The latent variable of the covariance model, controlling for initial status, demonstrated maintenance of effects for MTFC in preventing delinquency at the 2-year assessment (Chamberlain, Leve & DeGarmo, 2007). The series of studies takes four vital characteristics of MTFC into account: (1) relationships with mentoring adults, (2) close supervision, (3) clear limit setting, and (4) low association with delinquent peers (Chamberlain, Leve & DeGarmo, 2007). Although the sample size in the studies was small, the random-trial design indicates the effectiveness of well-trained and supervised community foster care for girls with histories of delinquency in the juvenile justice system. It is important to provide delinquent girls with diverse choices for after-care, such as MTFC.

In terms of drug use and mental health problems, girls with these backgrounds are more likely to develop long-term offending behavior. Ruffolo et al. (2004) also reported that the incidence of mental disorders among youths in the juvenile justice system is two to three times
higher than in youths in the general population. It is undeniable that the juvenile justice system must provide treatment for those who have been involved in the system. Furthermore, it takes efforts from the school system and child welfare system to assess the causes of drug use and mental health problems and provide suitable interventions at crucial times in order to prevent at-risk girls from move into the juvenile justice system and eventually becoming chronic offenders.

The current study found that girls who have beliefs in physical aggression are more likely to become chronic or severe offenders. These higher-risk girls within the study’s clinical sample could become masculinized, which suggests their aggressive antisocial attitudes reflect those of boys. Despite this similarity in behavior, we cannot assume that these girls have similar needs to their male counterparts who might also develop chronic or severe offending trajectories. A better understanding of possible triggers of girls’ aggression as well as development of different intervention strategies is important.

At the school level, two factors, school enrollment and attendance, indicate the importance of keeping misbehaving girls in the school system. Girls who are not currently enrolled or attending school irregularly have an increased risk of developing chronic or severe delinquency trajectories. With the intention of prevention, the juvenile justice system can develop a strategic partnership with the school system. Therefore, it is useful to develop innovative school programs that not only keep girls with behavioral problems in schools but also develop different intervention strategies for these girls. Including local agencies and community resources in the development of strategies can offer great assistance to school systems as well. The OJJDP (n.d.) provides a list of effective programs incorporating community resources which support schools that promote interventions to keep students in school and improve the climate for learning. All of these programs are non-gender-specific; however, some programs more than
others might be more effective for girls. For example, the Big Brothers Big Sisters community-based mentoring program is a one-to-one mentoring program based in communities. Incarcerated females were found to crave connections, love, nurturance, and support from anyone who would be willing to give it to them, and girls’ delinquent behaviors can stem from dysfunctional relationships with family members, boyfriends or peers (Morton and Lesline, 2005). Repeated failures to connect with others can also result in negative identity development. Girls who had insecure relationships in the past might have difficulties in connecting with others emotionally. Therefore, a one-to-one mentoring program in the school system focusing on building secure relationships might be especially useful for girls.

In sum, high-risk girls in the juvenile justice system do not follow a shared delinquent trajectory. By examining different offense outcomes, such as the number of offenses and offending severity, various trajectories were identified. Moreover, the profiles of the girls in the different offending trajectory groups are dissimilar. The juvenile justice system has to pay more attention to several factors which are associated with the development of chronic or severe offending trajectories among females during adolescence, specifically, race, prior child welfare contacts, drug use history, mental health history, anti-social belief in fighting and physical aggression, and dropping out of school. On the other hand, a large portion of girls in this clinic sample do not share the same risk factors as those girls who develop chronic or severe offending trajectory. The current research identifies several causes which trigger different offending patterns, but further research is needed to better understand why and how these factors lead to poor outcomes. For example, understanding why child welfare service, utilized as a protective intervention, turns into a risk factor for girls’ delinquency could lead to important policy and practice changes. Juvenile justice and child welfare practitioners all look for solutions to prevent
problems in the first place and then effective interventions which support girls at different risk levels. The combination of supportive administration, rigorous research, and innovation interventions could help the juvenile justice system reach its goals.

**Limitations**

Several limitations exist in the current study. Even though the findings cannot be generalized to all females in the juvenile justice system, this Washington sample still provides a good understanding of the overall phenomenon of girls’ delinquency. From 2003 to 2007, the overall arrest rates of girls in Washington state have increased as compared to the data in 1998, according to the 2008 annual report of the Washington State Partnership Council on Juvenile Justice (WA-PCJJ) (2008). This finding is similar to the national trend of girls’ delinquency (OJJDP, 2008). The arrest rates for violent crimes, property offenses, and drug and alcohol offenses increased for females nationally and in Washington state from late 1990’s to 2007 (Flores, 2008; WA-PCJJ, 2008). Therefore, used with caution, the findings of the current study can be used to understand common phenomena of girls’ delinquency.

Many researchers have investigated how girls’ early life experiences can increase the likelihood of delinquent behaviors and recidivism by examining girls’ official records of subsequent delinquent behaviors (e.g., Hawkins et al., 2009). Yet, in using secondary data such as administrative records, researchers encounter challenges. Hofferth (2005) indicated that studies based on such records are typically data driven, which might not directly address questions that researchers pose.

Also, the limited number of available variables in secondary administrative data might restrict the examination of possible effects in research (Kruttschnitt, & Giordano, 2009). This study tried to overcome these potential problems by including multiple contextual variables to
illustrate the different profiles of girls in distinct offending trajectories. This study uses multiple contextual variables from a pre-screen assessment, which limits the sample size of this study. The state of Washington has been performing the pre-screen assessments on those who need intensive services since 2003. Because of this screening process, this study’s findings cannot be generalized to non-clinical populations.

Another concern is related to the validity of arrest report measurement. Offenders, police officers, and other officials may have discrete points of views on offense types. The scope of offense types is usually widespread (Steffesmeier and Schwartz, 2009). Therefore, this study used a multivariate statistical model to gauge the offending trajectories. Other issues related to measures include lack of neighborhood factors and only one outcome measure during adulthood. Some studies have shown that neighborhood characteristics can help predict development along a chronic offending trajectory (Carter et al., 2009; Chung et. al., 2002a, 2002b; Fergusson, Horwood, & Nagin, 1999; Hawkins et al., 2009; Zahn et. al., 2008a). Measurements concerning the individual, family, and school were examined in the current study. Due to the limitations inherent in the administrative data, none of neighborhood variables are available. Similarly, the current study was only able to include one outcome variable, the arrest records at ages 18 or 19, during adulthood. A short observation period during early adulthood can be seen as an extension of late adolescence. Including a longer observation time and more measurements, such as educational attainment, physical health, mental health, or employment during adulthood, could provide better predictions and more complete understanding of the well-being of girls developing different trajectories after adolescence.
Conclusions

The current study reveals that there exist distinct delinquent trajectories among higher-risk adolescent females in the state of Washington during adolescence. This high-risk sample of females still has distinct trajectories, which affirms Moffitt’s theory. Further, the profiles of girls in desist vs. chronic, minor vs. severe, and minor vs. severe-desist vs. severe-chronic trajectory groups are dissimilar. The goal of the current study is not to compare the offending types of males and females; hence, further examination is still needed as to whether high-risk females share similar profiles with high-risk males, as Moffitt hypothesized. Also, some variables could be bidirectional when studying their association with girls’ offending behavior, such as mental health or substance abuse. Nevertheless, the findings concerning the association between child welfare contacts and different offense trajectories add to the existing trajectory literature and urge the collaboration of the child welfare and juvenile justice systems. The current study also confirms that girls who developed severe or chronic trajectories have increased risks of recidivism during early adulthood. Although this finding would be stronger with a longer observation period or more outcome measurements in adulthood, the results are still valuable, especially in considering how to deliver effective services in the juvenile justice system.

The loss of secure relationships might serve as a trigger for girls to be involved in delinquent behaviors (Garica, & Lane, 2012), which could imply that delinquent girls share common needs. However, the current study finds that there is still a spectrum of delinquent behaviors among girls. The backgrounds of girls in the desist trajectory groups are different from those in the chronic trajectory, which could result in different individual service needs. Therefore, it is vital for both the child welfare and juvenile justice systems to consider individual needs in tailoring their policy and intervention programs.
REFERENCES


Miller, P. J. (2010, Fall). Developmental Cultural Psychology. In class lecture at Department of Psychology. Urbana-Champaign, IL.


APPENDIX A

JUVENILE COURT PRE-SCREEN ASSESSMENT

Manual
Washington State Juvenile Court Pre-Screen Assessment

<table>
<thead>
<tr>
<th>Domain 1: Record of Referrals Resulting in Conviction, Diversion, or Deferred Adjudication/Disposition</th>
</tr>
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<tbody>
<tr>
<td><strong>Referrals, rather than offenses, are used to assess the persistence of re-offending by the youth. Include only referrals that resulted in a conviction, diversion, deferred adjudication, or deferred disposition (regardless of whether successfully completed).</strong></td>
</tr>
</tbody>
</table>

| **1. Age at first offense:** The age at the time of the offense for which the youth was referred to juvenile court for the first time on a non-traffic misdemeanor or felony that resulted in a conviction, diversion, deferred adjudication, or deferred disposition. | O Over 16  
O 16  
O 15  
O 13 to 14  
O Under 13 |

| **Felony and misdemeanor referrals:** Items 2 and 3 are mutually exclusive and should add to the total number of referrals that resulted in a conviction, diversion, deferred adjudication, or deferred disposition. |

| **2. Misdemeanor referrals:** Total number of referrals for which the most serious offense was a non-traffic misdemeanor that resulted in a conviction, diversion, deferred adjudication, or deferred disposition (regardless of whether successfully completed). | O None or one  
O Two  
O Three or four  
O Five or more |

| **3. Felony referrals:** Total number of referrals for a felony offense that resulted in a conviction, diversion, deferred adjudication, or deferred disposition (regardless of whether successfully completed). | O None  
O One  
O Two  
O Three or more |

| **Against-person or weapon referrals:** Items 4, 5, and 6 are mutually exclusive and should add to the total number of referrals that involve an against-person or weapon offense, including sex offenses, that resulted in a conviction, diversion, deferred adjudication, or deferred disposition (regardless of whether successfully completed). |

| **4. Weapon referrals:** Total referrals for which the most serious offense was a firearm/weapon charge or a weapon enhancement finding. | O None  
O One or more |

| **5. Against-person misdemeanor referrals:** Total number of referrals for which the most serious offense was an against-person misdemeanor — a misdemeanor involving threats, force, or physical harm to another person or sexual misconduct (assault, coercion, harassment, intimidation, etc.). | O None  
O One  
O Two or more |

| **6. Against-person felony referrals:** Number of referrals involving force or physical harm to another person including sexual misconduct (homicide, manslaughter, assault, robbery, kidnapping, rape, domestic violence, harassment, criminal mistreatment, intimidation, coercion, etc.) | O None  
O One or two  
O Three or more |

| **Sex offense referrals:** Items 7 and 8 are mutually exclusive and should add to the total number of referrals that involve a sex offense or sexual misconduct that resulted in a conviction, diversion, deferred adjudication, or deferred disposition. |

| **7. Sexual misconduct misdemeanor referrals:** Number of referrals for which the most serious offense was a sexual misconduct misdemeanor including obscene phone calls, indecent exposure, obscenity, pornography, or public indecency, or misdemeanors with sexual motivation. | O None  
O One  
O Two or more |

| **8. Felony sex offense referrals:** Referrals for a felony sex offense or involving sexual motivation including carnal knowledge, child molestation, communication with minor for immoral purpose, incest, indecent exposure, indecent liberties, promoting pornography, rape, sexual misconduct, or voyeurism. | O None  
O One  
O Two or more |

| **9. Disposition orders where youth served at least one day confined in detention:** Total disposition and modification orders for which the youth served at least one day physically confined in a county detention facility. A day served includes credit for time served. | O None  
O One  
O Two  
O Three or more |

| **10. Disposition orders where youth served at least one day confined under JRA:** Total number of disposition orders and modification orders for which the youth served at least one day confined under JRA authority. A day served includes credit for time served. | O None  
O One  
O Two or more |
### 11. Escapes: Total number of attempted or actual escapes that resulted in a conviction.

- O None
- O One
- O Two or more


- O None
- O One
- O Two or more

### Social History (Current is defined as behaviors occurring within the last six months)

#### 1. Youth's Gender
- O Male
- O Female

#### 2a. Youth's current school enrollment status, regardless of attendance:
If the youth is in home school as a result of being expelled or dropping out, check the expelled or dropped out box, otherwise check enrolled.

- O Graduated, GED
- O Enrolled full-time
- O Enrolled part-time
- O Suspended
- O Dropped out
- O Expelled

#### 2b. Youth's conduct in the most recent term:
Fighting or threatening students; threatening teachers/staff; overly disruptive behavior; drug/alcohol use; crimes, e.g., theft, vandalism; lying, cheating, dishonesty.

- O Recognition for good behavior
- O No problems with school conduct
- O Problems reported by teachers
- O Problem calls to parents
- O Calls to police

#### 2c. Youth's attendance in the most recent term:
Full-day absence means missing majority of classes. Partial-day absence means attending the majority of classes and missing the minority. A truancy petition is equal to 7 unexcused absences in a month or 10 in a year.

- O Good attendance with few absences
- O No unexcused absences
- O Some partial-day unexcused absences
- O Some full-day unexcused absences
- O Truancy petition/equivalent or withdrawn

#### 2d. Youth’s academic performance in the most recent school term:

- O Honor student (mostly As)
- O Above 3.0 (mostly As and Bs)
- O 2.0 to 3.0 (mostly Bs and Cs, no Fs)
- O 1.0 to 2.0 (mostly Cs and Ds, some Fs)
- O Below 1.0 (some Ds and mostly Fs)

#### 3a. History of anti-social friends/companions:
Anti-social peers are youths hostile to or disruptive of the legal social order; youths who violate the law and the rights of others. *(Check all that apply.)*

- □ Never had consistent friends or companions
- □ Had pro-social friends
- □ Had anti-social friends
- □ Been a gang member/associate

#### 3b. Current friends/companions youth actually spends time with:
*(Check all that apply.)*

- □ No consistent friends or companions
- □ Pro-social friends
- □ Anti-social friends
- □ Gang member/associate

#### 4. History of court-ordered or DSHS voluntary out-of-home and shelter care placements exceeding 30 days:
Exclude JRA commitments.

- O No out-of-home placements exceeding 30 days
- O 1 out-of-home placement
- O 2 out-of-home placements
- O 3 or more out-of-home placements

#### 5. History of runaways or times kicked out of home:
Include times the youth did not voluntarily return within 24 hours, and include incidents not reported by or to law enforcement.

- O No history of running away being kicked out
- O 1 instance of running away/kicked out
- O 2 to 3 instances of running away/kicked out
- O 4 to 5 instances of running away/kicked out
- O Over 5 instances of running away/kicked out

#### 6a. History of jail/imprisonment of persons who were ever involved in the household for at least 3 months:
*(Check all that apply.)*

- □ No jail/imprisonment history in family
- □ Mother/female caretaker
- □ Father/male caretaker
- □ Older sibling
- □ Younger sibling
- □ Other member

#### 6b. History of jail/imprisonment history of persons who are currently involved with the household:
*(Check all that apply.)*

- □ No jail/imprisonment history of persons currently in household
## 6c. Problem history of parents who are currently involved with the household: (Check all that apply.)

- No problem history of parents in household
- Parental alcohol problem history
- Parental drug problem history
- Parental physical health problem history
- Parental mental health problem history
- Parental employment problem history

## 7. Current parental authority and control:

- O Youth usually obeys and follows rules
- O Sometimes obeys or obeys some rules
- O Consistently disobeys, and/or is hostile

## 8a. History of alcohol use: (Check all that apply.)

- □ No past alcohol use
- □ Past alcohol use
- □ Alcohol caused family conflict
- □ Alcohol disrupted education
- □ Alcohol caused health problems
- □ Alcohol interfered with keeping pro-social friends
- □ Past alcohol contributed to criminal behavior

## 8b. History of drug use: (Check all that apply.)

- □ No past drug use
- □ Past drug use
- □ Drugs caused family conflict
- □ Drugs disrupted education
- □ Drugs caused health problems
- □ Drugs interfered with keeping pro-social friends
- □ Drugs contributed to criminal behavior

## 8c. Current alcohol use: (Check all that apply.)

- □ No current alcohol use
- □ Current alcohol use
- □ Alcohol caused family conflict
- □ Alcohol disrupted education
- □ Alcohol caused health problems
- □ Alcohol interfered with keeping pro-social friends
- □ Past alcohol contributed to criminal behavior

## 8d. Current drug use: (Check all that apply.)

- □ No current drug use
- □ Current drug use
- □ Drugs caused family conflict
- □ Drugs disrupted education
- □ Drugs caused health problems
- □ Drugs interfered with keeping pro-social friends
- □ Drugs contributed to criminal behavior

For abuse and neglect, include any history that is suspected, whether or not substantiated; exclude reports of abuse or neglect proven to be false.

## 9a. History of physical abuse: Include suspected incidents of abuse, whether or not substantiated, but exclude reports proven to be false. (Check all that apply.)

- □ Not a victim of physical abuse
- □ Physically abused by family member
- □ Physically abused by someone outside the family

## 9b. History of sexual abuse: Include suspected incidents of abuse, whether or not substantiated, but exclude reports proven to be false. (Check all that apply.)

- □ Not a victim of sexual abuse
- □ Sexually abused by family member
- □ Sexually abused by someone outside the family

## 10. History of being a victim of neglect: Include suspected incidents of neglect, whether or not substantiated, but exclude reports proven to be false.

- O Not victim of neglect
- O Victim of neglect

## 11. History of mental health problems: Such as schizophrenia, bi-polar, mood, thought, personality, and adjustment disorders. Exclude substance abuse and special education since those issues are considered elsewhere.

- O No history of mental health problem(s)
- O Diagnosed with mental health problem(s)
- O Only mental health medication prescribed
Confirm by a professional in the social service/healthcare field.

<table>
<thead>
<tr>
<th>Attitude/Behavior Indicators</th>
<th>O Only mental health treatment prescribed</th>
<th>O Mental health medication and treatment prescribed</th>
</tr>
</thead>
</table>

1. **Attitude toward responsible law abiding behavior:**
   - Abides by conventions/values
   - Believes conventions/values sometime apply to him or her
   - Does not believe conventions/values apply to him or her
   - Resents or is hostile toward responsible behavior

2. **Accepts responsibility for anti-social behavior:**
   - Accepts responsibility for anti-social behavior
   - Minimizes, denies, justifies, excuses, or blames others
   - Accepts anti-social behavior as okay
   - Proud of anti-social behavior

3. **Belief in yelling and verbal aggression to resolve a disagreement or conflict:**
   - Believes verbal aggression is rarely appropriate
   - Believes verbal aggression is sometimes appropriate
   - Believes verbal aggression is often appropriate

4. **Belief in fighting and physical aggression to resolve a disagreement or conflict:**
   - Believes physical aggression is never appropriate
   - Believes physical aggression is rarely appropriate
   - Believes physical aggression is sometimes appropriate
   - Believes physical aggression is often appropriate

5. **Reports/evidence of violence not included in criminal history: (Check all that apply.)**
   - No reports/evidence of violence
   - Violent outbursts, displays of temper, uncontrolled anger indicating potential for harm
   - Deliberately inflicting physical pain
   - Using/threatening with a weapon
   - Fire starting
   - Violent destruction of property
   - Animal cruelty

6. **Reports of problem with sexual aggression not included in criminal history: (Check all that apply.)**
   - No reports/evidence of sexual aggression
   - Aggressive sex
   - Sex for power
   - Young sex partners
   - Child sex
   - Voyeurism
   - Exposure