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# Age at First Offense as a Predictor of Recidivism Among High-Risk Juvenile Delinquents Versus All Juvenile Delinquents

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AGE AT FIRST OFFENSE AS A PREDICTOR OF RECIDIVISM AMONG  
HIGH-RISK JUVENILE DELINQUENTS VERSUS  
ALL JUVENILE DELINQUENTS

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Charles H. Ambler, Ph.D.  
Dean of Graduate School

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by

Claudia Lopez

2018

## **Dedication**

To my mother, for all her sacrifices have blossomed into a successful life for her children.

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HIGH-RISK JUVENILE DELINQUENTS VERSUS  
ALL JUVENILE DELINQUENTS

by

CLAUDIA LOPEZ

THESIS

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## **Abstract**

Researchers have generally found a moderate negative correlation between juvenile delinquents' age at first offense and their risk of recidivism (Cottle, Lee, & Heilbrun, 2001). However, two studies at the El Paso Juvenile Probation Department (El Paso JPD) by Valenzuela (2011) and Ranadive (2014) found the correlation of age at first referral with recidivism to be non-significant and close to zero. A possible explanation for these findings at El Paso JPD is that age at first referral is predictive of recidivism among high-risk juvenile offenders but not in the general population of all juveniles referred to the justice system. The present study explored this possibility by comparing recidivism in two groups of juvenile delinquents: (a) 2,255 juveniles referred for the first time to El Paso JPD between January 2004 and December 2013 (All Juveniles sample), and (b) 49 participants in the El Paso JPD Challenge Academy with a history of serious and/or chronic offending (Serious and Chronic sample). As hypothesized, in the All Juveniles sample the correlation of age at first referral with recidivism during the 12-months following first offense was positive but close to zero ( $r=.073$ ,  $p<.001$ ). However, contrary to hypothesis, in the Serious and Chronic sample the correlation of age at first offense with re-offending during the 12-months following discharge from Challenge was positive and marginally significant ( $r=.272$ ,  $p=.061$ ). Survival curve analyses, Cox regressions and hierarchical logistic regression yielded similar results. These findings for both the general juvenile population and serious/chronic offenders are contrary to what would be expected based on most prior studies (Cottle et al. 2001): Juveniles at El Paso JPD who are younger at the time of their first referral are not at greater recidivism risk than juveniles who are older at the time of their first referral.

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## **Chapter 1: Introduction**

Juvenile offending is a significant problem in the United States. The media regularly inform the public of serious crimes committed by juveniles, including assault, robbery, and murder. Official statistics show that an estimated total of 921,600 arrests of juveniles occurred in the U.S. in 2015, accounting for approximately 9% of all arrests made in that year (Office of Juvenile Justice and Delinquency Prevention [OJJDP], 2017). Although there has been a 37% decrease in juvenile crime rates in the United States since 2011 (OJJDP, 2017), the problem has not been solved.

### **Juvenile Justice System**

The judicial system in the U.S. classifies individuals who violate the law into two separate systems: the juvenile justice system and the adult criminal justice system (del Carmen & Trulson, 2006). The adult criminal justice system is responsible for the processing of accused offenders who exceed the maximum age of juvenile court jurisdiction, which in most states is 17 years of age. In the adult criminal justice system, violations of the criminal law are called criminal offenses. On the other hand, the juvenile justice system handles juveniles ranging from the minimum age of responsibility by state to the upper age of juvenile court jurisdiction. When a minimum age of responsibility is not specified by the state, a juvenile can be held accountable of a criminal violation at any age. In the juvenile justice system, violations of the criminal law are called delinquency acts.

Years of integrated justice system highlighted the necessity of two separate criminal justice systems. The responsibility for criminal acts and delinquent behavior is founded on the concept *mens rea*, “a guilty mind,” which declares that an offense must be performed intentionally to meet the qualifications of a crime (del Carmen & Trulson, 2006). Nonetheless,

the justice system adjudges juveniles as being unable to have full *mens rea*. Juveniles are regarded as being unable to have full intention of committing a crime because they are not fully aware of their actions and the consequences they may bring. Juveniles are often seen as victims of circumstances, while adults are considered to be in control of their free will. In addition, juveniles are not prosecuted as adults due to the focus the justice system places on rehabilitation or correction. The juvenile justice system is based on the belief that juveniles should be rehabilitated and not punished. The rehabilitation process may include confinement to an institutional, counseling, and participation in programs that aim to reduce delinquency activities. The process of rehabilitation is important because it targets prevention of future delinquent acts by focusing on changing the juvenile's behavior, reducing risk factors and increasing protective factors.

Over the past century, legislators and the public have debated about the minimum age at which juvenile offenders should be considered capable of having *mens rea* or intention of committing a crime and therefore should be treated as adults (Hamilton, & Turner, 2015; Carroll, 2016). As a result, different U.S. states have established different benchmarks as the minimum age of responsibility to be accountable for a crime. In Texas, juveniles from ages 10 to 16 who have committed an offense are taken into detention and processed through the juvenile justice system (del Carmen & Trulson, 2006). Offenders who are seventeen years of age and older are considered adults and are processed through the adult criminal justice system (Edens & Cahill, 2007). In rare instances, juveniles younger than 17 who commit serious and violent offenses may be transferred to the adult criminal system for trial, a process called petitioning. Another rare occurrence is when the juvenile offender is younger than the minimum age of responsibility, or 6

to 10 years of age (depending on the state). In this case the minor is referred for counseling or mental health treatment (del Carmen & Trulson, 2006).

The juvenile justice system operates different from the adult justice system. Its differences include terminology and symbolic representations. For example, although both groups can be deprived of their liberty for their acts, adults are said to be arrested whereas juveniles are said to be taken into custody. Juveniles may be taken into custody for two types of offenses: delinquency or status offenses. Acts of delinquency are offenses committed by juveniles that would be categorized as crimes if committed by adults; these kinds of offenses can range from crimes against property to crimes against persons. Juveniles who have committed delinquent acts can in turn be divided into two categories: typical delinquents who have committed non-violent offenses, and non-typical delinquents who have engaged in frequent or serious offenses (del Carmen & Trulson, 2006). In distinction from delinquent acts, status offenses are violations of the law that are considered illegal only because the person committing the act is not an adult. Examples of status offenses include being a runaway, truancy and unruly behavior.

In the juvenile justice system, juvenile offenders are detained to keep both the juvenile offender and the community safe. Juveniles in detention may face an adjudication hearing, which resembles a trial and involves a hearing, but is not public and is considered non-criminal (del Carmen & Trulson, 2006). Disposition decisions are analogous to what the adult system calls sentences. Disposition decisions may be made by a judge at an adjudication hearing, or by a parole officer if the juvenile waives their right to an adjudication hearing, and are based on the offender's history, social factors and the severity of the offense. Disposition decisions typically

include rehabilitation components with aftercare, and combine surveillance and reintegration activities that meet the needs of the juvenile in the justice system and his/her family.

### **Juvenile Delinquency**

Statistics indicate that people younger than 18 years committed 8.5% of the national crimes in 2015 (Federal Bureau of Investigation [FBI], 2016). The information can be broken down into categories: juveniles under the age of 18 committed 7.1% of all murders, 15.7% of rape offenses, 19.4% of robberies, and 16.5% of burglaries (FBI, 2016). The most frequently committed violent offense committed by juveniles was assault (22.15% of the total offenses committed by juveniles) and the least common was homicide (0.18% of total offenses; Hein, Barbot, Square, Chapman, Geib, & Grigorenko, 2017). The most frequent non-violent offense committed by juveniles involved crimes against public order (55.35% of total offenses) and the least common was drug law violation (13.79% of total offenses; Hein et al., 2017).

Vries and Liem (2011) report that juveniles who recidivate commit an average of 7.64 offenses throughout a ten year follow up period. Research shows that a higher percentage of recidivism occurs within the first year after release and continues to occur during the first five to eight years after release (Mulder, Brand, Bullens, & van Marle, 2011).

Mulder et al. (2011) looked at 728 high-risk adjudicated juvenile delinquents who were placed in a juvenile justice institution for mandatory treatment. They found a recidivism rate of 79.9% and 70.1% after the exclusion of misdemeanors and vandalism in a 5-year follow up period, recording only those instances that led to an official record. A study by Valenzuela (2011) looked at 321 first-time juvenile offenders in diversion programs at the El Paso Juvenile Probation Department (El Paso JPD), including both low-risk and high-risk juveniles. The general recidivism rate for this group within one year of their initial intake was 15.6% and the



felony recidivism rate was 5.9% (Valenzuela, 2011). Ranadive (2014) reported a similar recidivism rate (15.8%) during a one-year follow up period in a group of 367 first-referral juveniles at El Paso JPD. As can be seen, researchers' estimates of recidivism rates have been highly variable, with much higher rates among high-risk offenders than among first-time offenders. It may be that such estimates, based as they are on official records, tend to be too low because only a small percentage of crimes committed by juveniles are actually caught and charged. For example, a study by Penner, Viljoen, Douglas, and Roesch (2014) outlined a self-reported reoffense rate of 70%, while only 24% of the same juveniles had a reoffense according to official juvenile agency records.

### **Factors that Contribute to Juvenile Recidivism**

**Mental disorders.** Several factors have been found to be associated with juvenile offending and recidivism (Feldmann, 2015; Mulder et al., 2011). For instance, a study by Feldmann (2015) reported that over 65% of juveniles in the juvenile justice system met the criteria for a mental disorder diagnosis. It has been found that externalizing problems, such as conduct disorder, oppositional defiant disorder and attention deficit disorder, and internalizing problems like major depression and anxiety as well as posttraumatic stress disorder are common among juvenile offenders (Hein et al., 2017; Kang, Wood, Eno Loudon, & Ricks, 2017). A study by Mulder et al. (2011) showed that conduct disorder is common among juvenile offenders, affecting approximately 60% of the juvenile offenders. Substance abuse has also been associated as a risk factor for recidivism (Feldmann, 2015; Benner, Stage, Nelson, Laederich, & Ralston, 2010). Mallett, Fukushima, Stoddard-Dare, and Quinn (2013) reported that over 35% of juveniles in a detention facility have a special education disability and 30% to 50% of the juveniles have a substance abuse disorder. A meta-analysis by Cottle, Lee, & Heilbrun (2001)

found that “substance abuse” is associated with recidivism ( $Z_r=.15, p<.001$ ) while “substance use” does not show an association ( $Z_r=.01, p=ns$ ). Specifically, the meta-analysis included six studies that examined the relationship of “substance abuse” (i.e., drug dependency) with recidivism, and two studies that examined the relationship of “substance use” (i.e., juveniles’ substance use at the time of their offense or lifetime use of any substance) with recidivism.

**Personality traits.** Personality factors have also been associated with a greater risk of recidivism among juvenile delinquents. Miner (2002) found that impulsivity, such as being reckless and aggressive, is associated with recidivism risk. Adolescents who score high on callous-unemotional traits also appear to have an elevated risk for criminal behavior. Specifically, Kimonis, Kennealy, and Goulter (2016) reported that juveniles who scored high on CU traits reoffended at a higher rate compared to other delinquents, committing both violent and non-violent crimes. In the study, the uncaring subscale of the Inventory of Callous-Unemotional Traits (Frick, 2004) predicted a higher rate of general recidivism while the Callousness subscale of this inventory predicted violent recidivism.

A study by Cauffman, Monahan and Thomas (2015) reported that low self-control is related to criminal behavior and other risk-taking behavior in juveniles, perhaps reflecting the effects of underdeveloped psychosocial maturity. Hein et al. (2017) found that self-reported anger and irritability correlate with violent recidivism, but self-reported depression and anxiety are associated with a decreased risk of violent recidivism. This study also outline that, higher levels of psychopathy, victimization, cynicism, high temperance and moral disengagement are factors that are present in persistent offenders. Benner et al. (2010) proposed a combination of environmental and personality factors as an explanation of juvenile delinquency. They found that

juveniles with conduct disorder and family problems are more likely to commit an offense than juveniles with the same disorder who are in a healthy family relationship.

**Gender.** Statistics show that males not only commit crimes more frequently than females but also are responsible for the majority of serious, violent crimes (Piquero, Jennings, Diamond, & Reingle, 2015; Hein et al., 2017; Vries & Liem, 2011). Hein et al. (2017) analyzed all juvenile convictions in the state of Connecticut from 2006 to 2012, and found that males committed 70.3% of the total violent offenses. Overall, males of all ages are more likely to commit a first offense (violent or non-violent) and are more likely to recidivate than females (Calley, 2012; Feldmann, 2015; Vries & Liem, 2011). A meta-analysis by Cottle et al. (2001) reported that being male is a predictor of recidivism ( $Z_r = -.34, p < .001$ ).

It has been reported that different factors may be related to recidivism, depending on the juvenile's gender. For example, Williams and LeCroy (2014) found that age at first offense, number of prior referrals, number of school suspensions, mother incarceration history, firearm use, gang involvement, destroying/stealing property and running away from home serve as predictors of recidivism for juvenile males. Their study used the Criminogenic and Protective Factors Assessment (CAPFA) 2 to classify low, medium and high-risk juveniles. High-risk males were found to be 5.6 times more likely to recidivate than low-risk males. In comparison, age at first expulsion from school, parent history of incarceration, gang involvement, type of felony and firearm use were better predictors for juvenile female reoffending. In the study, females who had a higher number of risk predictors were 8.8 times more likely to reoffend compared to low-risk females. A correlation between female out-of-home placement and decreased recidivism has been described but the same correlation is not present in male out-of-home placement (Minor, Wells, & Angel, 2008; Benner et al., 2010).

A study by Minor et al. (2008) found that childhood maltreatment, specifically, history of abandonment or neglect rather than physical or emotional abuse is associated with higher reoffending rates in male offenders. In addition, Cauffman, Fine, & Thomas (2017) found that female violent offenders were more likely to have experienced abuse, engage in self-harm and have a mental health problem than non-offender females. For both males and females, exposure to violence and abuse is associated with persistent criminal behavior (Cauffman, Cavanagh, Donley, & Thomas, 2016).

**Race.** Non-Whites, specifically African-Americans, are over-represented in official arrest statistics. In a sample collected by Hein et al. (2017), with a total of 58,678 court-referred youth in Connecticut between 2006 and 2012, African-Americans and Hispanic juveniles were overrepresented among violent offenders. African-Americans represented 28.6% of the total sample and accounted for 48.0% of the total violent offenders. Also, Hispanics represented 21.6% of the sample but accounted for 24.8% of the total violent offenders. On the other hand, a study by Edens and Cahill (2007) found that recidivism rates were relatively stable across ethnic groups, and that being Hispanic is not associated with a higher risk of violent recidivism whereas a meta-analysis by Cottle et al. (2001) found that being part of a minority race is correlated with general recidivism ( $Z_r=.07, p<.001$ ). Nonetheless, after conducting a hierarchical regression analysis and controlling for socioeconomic status, Cottle et al. (2001) found that race did not have a significant correlation with recidivism.

**Peer influence.** Stolzenberg and D'Alession (2008) have identified peer pressure as a factor that contributes to juvenile offending. They found that during adolescence, risk-taking increases and the need for social acceptance becomes stronger, and may contribute to juveniles' participation in group crimes, crimes committed in the company of their peers. However, the

researchers found that solo offending is a more dominant form of criminal behavior among juveniles than group offending. Furthermore, Stolzenberg and D'Alessio concluded that the causal connection between peer influence and group criminal activity is unclear, since delinquent behavior may lead to criminal peer association rather than criminal peer association leading to criminal activity. In a study by Cauffman et al. (2015), females that associated themselves with delinquent peers and antisocial romantic partners were more likely to belong to the persistent offending trajectory.

**Sexual Offenses.** Juvenile sexual offenders make up approximately 15% to 20% of all sexual arrests (Caldwell, 2016). Over the past decades, there has been a decline in juvenile sexual offending (Calley, 2012). The Center for Disease Control and Prevention monitors high-risk and precocious juvenile sexual behavior of 9<sup>th</sup> through 12<sup>th</sup> grade students in public and private schools through the use of the national Youth Risk Behavior Survey (Center for Disease Control and Prevention [CDC], 2013). A declining trend of high risk and precocious juvenile sexual behavior was found in the years 1991 through 2015, including a reduction in sexual partners and unsafe sexual activities (CDC, 2013). Declining trends in all forms of offending may be associated with the decline in juvenile sexual offenders.

Some studies have found that juveniles who commit a sexual offense are less likely to reoffend than juveniles who commit a general offense (Calley, 2012; Mulder et al., 2011; but see Fanniff, Schubert, Mulvey, Iselin, & Piquero, 2016). However, there is some evidence that juveniles who commit sexual crimes are more likely to commit another sexual crime than juveniles who have committed other types of crimes (Fanniff et al., 2016), and are more likely to commit another sexual crime if their preoccupation with children is high (Miner, 2002). The factors that predict juvenile general recidivism may differ from those that predict juvenile sexual

recidivism. For instance, Fanniff et al. (2016) found that the juveniles' history of antisocial behavior (a composite variable that included age at first offense) was predictive of general reoffending but did not predict specifically sexual reoffending.

### **Adolescence-Limited and Life-Course Persistent Antisocial Behavior**

**Moffitt's developmental taxonomy of antisocial behavior.** As will be discussed later in this introduction, meta-analytic findings (Cottle et al., 2001) indicate that the strongest predictor of recidivism among juvenile offenders is the age at which they first began offending: The younger a juvenile is at the time of his or her first referral to the juvenile justice system, the more likely the juvenile is to recidivate. The relationship between age at first referral and recidivism forms the central topic of the present thesis. However, before turning to this topic, it will be helpful to discuss the developmental taxonomy of antisocial behavior proposed by Moffitt (1993). As will be seen, Moffitt's theories predict a relationship between early offending and persistent offending.

Moffitt (1993) has proposed that juveniles who engage in antisocial juvenile behavior can be categorized into two groups: adolescent-limited offenders and life-course-persistent offenders. The two groups differ in the stability of antisocial behavior; for some juveniles antisocial behavior is temporal and situational, whereas for other juveniles it is stable and persistent (Moffitt, 1993).

According to Moffitt (1993), temporary and situational antisocial behavior are common, especially among juveniles. In contrast, stable and persistent antisocial behavior is limited to a small percentage of individuals in a society. Moffitt noted that criminal offenses peak at about age 17 and continuously decrease thereafter. The percentage of active offenders decreases by 50% by the early 20s, and by 85% by age 28 (Moffitt, 1993). Thus, although adult anti-social

behavior is usually preceded by childhood antisocial behavior, childhood antisocial behavior is not necessarily or even usually followed by adult antisocial behavior (Moffitt, 1993).

According to Moffitt (1993), adolescent-limited offending is a product of social influences and ceases by young adulthood. There is a behavioral discontinuity in this group; adolescence-limited offenders do not show antisocial behavior during childhood, but engage in it during adolescence and desist from it during adulthood (Moffitt, 1993).

Moffitt (2006) has proposed that such adolescents may be inclined to engage in delinquent acts as a result of the “maturity gap.” The maturity gap covers the years in which the adolescent experiences biological maturation but does not yet have the privileges and responsibilities of an adult (Moffitt, 2006). The length of the maturity gap has increased during recent centuries, so there is usually a 5- to 10-year period in which adolescents are biologically mature but have not reached social maturity. Moffitt (1993) cites studies (Goldstein, 1990; Kandel, 1980; Mausner & Platt, 1971) indicating that adolescent-limited offenders are more likely to engage in underage drinking and curfew violation. This suggests that adolescent-limited offenders are more likely to engage in crimes that represent adult privileges and show autonomy (Moffitt, 1993). Adolescence-limited offenders begin delinquency as a result of “social mimicry.” Borrowing from social learning theories (Sutherland & Cressey, 1978), Moffitt suggested that adolescents mimic the antisocial behavior of life-course persistent offenders, which provides access to desirable resources while reducing the effects of the maturity gap (Moffitt, 1993).

According to Moffitt (1993), adolescent-limited offending is a common pattern among males. For instance, she cites studies showing that four fifths of males have had some type of contact with the police for minor offenses, mainly during their adolescent years (Moffitt, 1993).

In a longitudinal study, Moffitt (1990) found that the frequency of antisocial behavior among boys with no prior history of such behavior rose from 5% at age 11 to 32% at age 15.

Nonetheless, the antisocial behavior is not uniformly present across social situations since many adolescents may display antisocial behavior around their friends but follow the rules in school.

Moffitt (2006) contrasts adolescent-limited offenders with life-course-persistent offenders. Moffitt posits that the antisocial behavior of life-course-persistent offenders is the result of two factors: (1) neurodevelopmental processes that become visible in childhood and continue through adulthood and (2) a high-risk social environment. As an example of a neurodevelopmental process affecting anti-social behavior, a child may be exposed to toxins in the womb or experience malnutrition while growing up that may affect his/her behavior negatively. As another example, negative patterns of behavior may also be the result of hereditary factors. As a result, the child may show signs of cognitive deficits, difficult temperament and hyperactivity like their parents (Moffitt, 1993). Examples of the influence of high-risk social or environmental factors include poverty, inadequate parenting and family bonds, which can increase the possibility of developing an antisocial personality (Moffitt, 2006).

According to Moffitt (1993), the antisocial personality of life-course-persistent individuals inclines them to engage in illegal activities, is present since a young age, and changes in its expression in different developmental stages. For example, the antisocial personality may be expressed as hitting at age 4, truancy at age 10, selling drugs at age 16, and robbery at age 22. In life-course-persistent individuals, the pattern of antisocial behavior does not occur simply during the maturity gap, but throughout development and in different situations such as home, school and social life.



Moffitt (1993) asserts that life-course persistent offenders are responsible for the majority of crimes committed by adults. In support of this assertion, she cites statistics (Farrington, Ohlin, & Wilson, 1986), showing that the most persistent 5% to 6% of offenders commit about half of the officially recorded crimes. According to Moffitt, juveniles who are life-course-persistent offenders engage in non-status crimes such as robbery and assault and continue with their criminal careers throughout their lives. This group shows an apparent decrease in criminal activity around age 40 but the antisocial personality traits remain present until the late sixties to early seventies.

Figure 1.1 shows the mean standardized scores for antisocial behavior in a sample of boys at 5, 7, 9, 11 and 13 years of age, as reported by Moffitt (1990). Moffitt found that among boys who are anti-social before adolescence, the level of delinquency in adolescence was a continuation or slight increase from levels of delinquency before adolescence. Also, boys who were diagnosed with ADD and categorized as delinquents acted antisocial since early childhood (Moffitt, 1990). This finding suggests that ADD may contribute to early antisocial behavior.

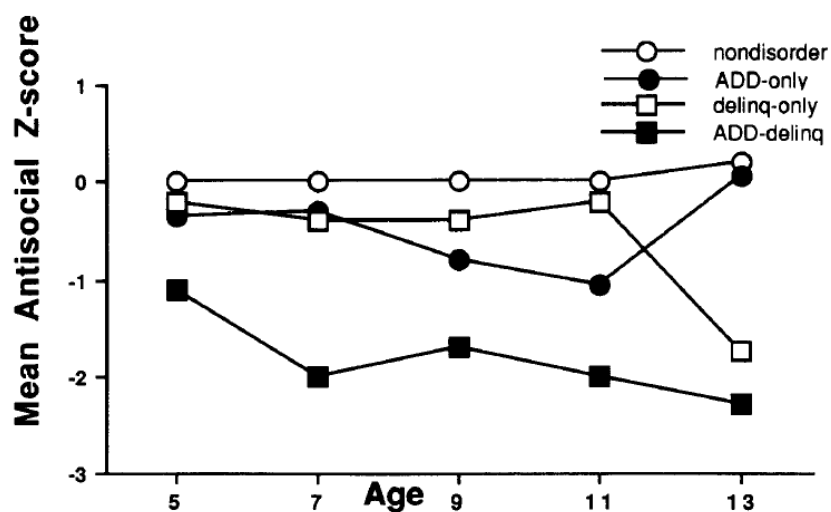


Figure 1.1: The mean of antisocial standardized scores taken at five different ages; Negative scores reflect higher levels of antisocial behavior. Source: Moffitt, T. E. (1990), pp. 899.

A study by Farrington, Ttofi, and Coid (2009) compared the life success of non-offenders, adolescence-limited offenders, late-onset offenders, and persistent offenders at ages 32 and 48. This study found that persistent offenders had the longest criminal careers, averaging 18.4 years and had the least successful lives. For instance, persistent offenders were less likely to own a home, have a stable relationship, have a stable employment and abstain from risky behaviors (physical altercations, substance use, criminal activity). On the other hand, late-onset and adolescence-limited offenders' criminal careers averaged 3.3 and 1.6 years, respectively. Specific factors that helped predict that a juvenile would continue with their criminal career through adulthood were heavy drinking at age 18, hyperactivity, low popularity and harsh discipline as a child. It was also found that one-third of the persistent offenders group had a criminal conviction in the five years before age 48. Approximately half of the persistent offenders (49%) were incarcerated at some point of their lives. The authors also found that most violent offenses (64%) by persistent offenders were committed at ages 21 to 50.

**Moffitt's theories and the Age-Crime Curve.** Moffitt (1993) has pointed out that one of the most undisputed facts about juvenile delinquency is the "empirical curve of criminal offenses over age," what she calls the "age-crime curve" (pp. 675). A schematic graph of the age-crime curve is shown in Figure 1.2. This curve shows the relationship between the prevalence of antisocial behavior (on the y-axis) as related to the age of the perpetrator (on the x-axis). As can be seen, this relationship follows an inverted U-shaped curve. Specifically, the prevalence of such antisocial behavior substantially increases during early adolescence, peaks in middle or late adolescence, and then declines during early adulthood.

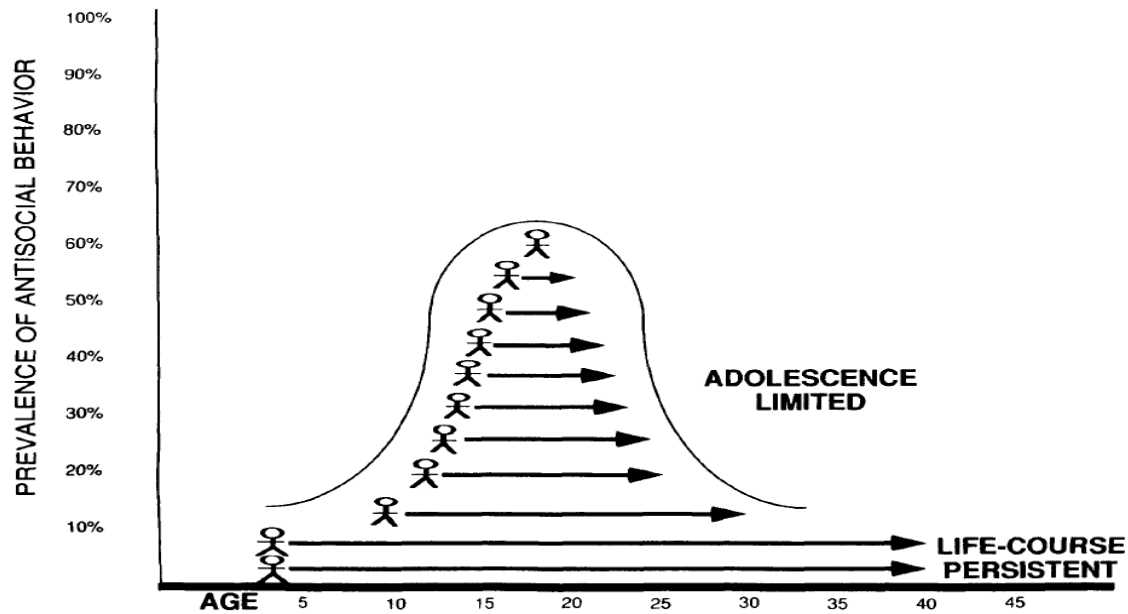


Figure 1.2: The trajectory path of adolescence-limited offending peaks during adolescence and decreases thereafter. The relationship between criminal activity and age in life-course-persistent offenders follows a flatter trajectory. Source: Moffitt, T. E. (1993), pp. 677.

It is unclear when the peak in the age-crime curve occurs. Some studies have reported that criminal behavior peaks during late adolescence (ages 17 to 19) and then decreases in adulthood (Stolzenberg & D'Alession, 2008; Cauffman et al., 2017). For instance, Stolzenberg and D'Alession found the peak age for criminal behavior to be at 18 years. On the other hand, Hein et al. (2017) found that violent crimes peaked somewhat earlier, around ages 14 and 15, with a drastic decline in criminal activity after adolescence.

Moffitt (1993) presents evidence that the upward bulge in the age-time curve during adolescence, with its peak between ages 17 and 19 (or possibly around ages 14 and 15), is due to an increase in the number of adolescence-limited individuals who engage in antisocial behavior, rather than to an increase in the amount of antisocial behavior engaged in by life-time persistent individuals. That is, Moffitt argues that the increase in anti-social behavior seen during adolescence occurs primarily because more adolescence-limited individuals are engaging in anti-

social behavior, and not because life-time-persistent individuals begin engaging in substantially more anti-social behavior during adolescence than they did during childhood.

Figure 1.2 illustrates Moffitt's (1993) position on this issue. Life-course-persistent anti-social individuals are shown at the bottom of the figure as two small stick-men. According to Moffitt, the number of these life-course persistent individuals stays constant during adolescence, and their participation in antisocial behavior stays at approximately the same level during adolescence as it did during childhood, although there is a change in the type of antisocial acts they commit.

According to Moffitt (1993), the "bulge" in the age-crime curve occurs because many individuals who did not engage in antisocial behavior during childhood begin doing so during adolescence. These individuals who engage in adolescence-limited antisocial activities are represented in Figure 1.2 as eight stick-men within the bulge of the age-crime curve.

For the purposes of the present thesis, an important implication of Figure 1.2 and Moffitt's (1993) theories is that the mix of individuals engaging in anti-social behavior changes during adolescence. At ages 10 and 11, life-course-persistent individuals represent a relatively high proportion of the population of juveniles who engage in antisocial acts. During ages 12 through 13, they account for a somewhat smaller proportion, and during ages 14 through 18 they account for a very small proportion. Put another way, Figure 1.2 implies that the population of juveniles who engage in antisocial behavior at ages 10 and 11 will consist mainly of lifetime-persistent individuals, the population of juveniles who engage in such behavior at ages 14 through 18 will consist mainly of adolescence-limited individuals, and the population of juveniles who engage in such behaviors during ages 12 through 13 will fall between the other two groups in respect to the mix of life-time-persistent and adolescence-limited individuals.

## Age at First Offense

Having discussed Moffitt's (1993) theories, the discussion will now turn to the central topic of this thesis, the relationship between juveniles' age at the time of their first referral and their risk of recidivating. Numerous studies have found an association between juveniles' age at first offense and juvenile recidivism (Moffitt, 1993; Mulder et al., 2011). A meta-analysis by Cottle et al. (2001) examined the relationship of age at first offense and other variables with recidivism. The meta-analysis included 8 studies with a total of 1,225 participants. It was found that recidivism was negatively correlated with age at first contact with the law ( $Z_r = -.34, p < .001$ ) and with age at first offense ( $Z_r = -.35, p < .001$ ). In fact, these two variables showed a stronger relationship with recidivism than did any other variables included in the meta-analysis. The meta-analysis also reported a significant but much smaller negative correlation between age at first offense and recidivism in the special subgroup of juvenile sexual offenders ( $Z_r = -.069, p < .05$ ; Heilbrun, Lee, & Cottle, 2005).

However, contradicting results have been reported. In a study of 173 serious and chronic male juvenile offenders Calley (2012) found that age at first offense was unrelated to recidivism ( $\chi^2 = 0.579, p = 0.4467$ ). In addition, and of special relevance for the present thesis, two studies conducted at the El Paso JPD yielded results substantially different from the studies in the Cottle et al. (2001) meta-analysis. In the first of these two studies, Valenzuela (2011) examined a sample of 321 juvenile delinquents assigned to diversion programs. That is, these juveniles were predominantly first-time offenders who were assessed as low risk and allowed to enter diversion programs (i.e., rehabilitative programs in the community), without being placed on probation or adjudicated. Valenzuela (2011) found that in this sample of juveniles, age at first offense was not significantly related to 12-month recidivism ( $r = .044, p = .429$ ). In unpublished analyses from a

second study of 367 first-time offenders at the El Paso Juvenile Probation Department (El Paso JPD), Ranadive (2014) found that the correlation between age and 12-month recidivism was close to zero ( $r=.028$ ,  $p=.589$ ). As may be seen, the null findings of Calley (2012) Valenzuela (2011) and Ranadive (2014) are inconsistent with the findings of the meta-analysis of Cottle et al. (2001) that age at first offense is a strong predictor of recidivism.

As can be seen, most prior studies, as summarized in the meta-analysis by Cottle and her colleagues, have found a strong correlation between age at first offense and recidivism, whereas Calley (2012), Valenzuela (2011) and Ranadive (2014) found that the correlation between the two variables was near zero. This discrepancy in findings is potentially important because it suggests that predictiveness of age at first offense may greatly vary depending on some other factor.

Several features distinguish the studies of Valenzuela (2011) and Ranadive (2014) from most prior studies that have examined the relationship of age at first referral with recidivism. For instance, the studies by Valenzuela and Ranadive both investigated juvenile samples that were predominantly Hispanic (approximately 80%), a feature that sets these two studies apart from most prior studies on juvenile recidivism. However, the present study will focus on another feature that sets these two studies apart from most previous recidivism studies: the samples of both Valenzuela and Ranadive represented all juveniles entering El Paso JPD during a particular time period and thus were representative of all juvenile delinquents seen by the agency. In contrast, most previous recidivism studies used sub-samples of juveniles who were serious and chronic offenders.

Ranadive's (2014) sample consisted of all first-referral juveniles (juveniles who were being referred to the probation department for the first time) during a one-year period. Because

all juveniles seen by a juvenile probation agency will have a first referral, Ranadive's sampling approach ensured that she would include a typical sample of all juveniles coming into the agency. Valenzuela's (2011) sample was similar to Ranadive's, although slightly less representative because it excluded some juveniles who were high risk. Specifically, Valenzuela's sample included all juveniles who were assigned to receive deferred prosecution (DP) during a specified time period. Because the large majority of first-time offenders are assigned to DP, except for a few deemed high-risk, Valenzuela's sample was roughly representative of the juveniles coming into the agency, but with a few high-risk cases removed.

In contrast, most prior studies on recidivism risk in juveniles have focused on serious and chronic juveniles only, rather than the population of all juveniles seen by a particular juvenile justice agency. For example, in the meta-analysis by Cottle et al. (2001, pp. 386), 8 studies reported on the relationship between age at first offense and recidivism. Of these 8 studies, 5 were clearly serious and chronic samples (e.g., juveniles incarcerated in a state training program), 1 contained a high proportion of serious and chronic juveniles (a mental health evaluation clinic), 1 provided an ambiguous description of its sample, and only 1 was composed of a representative sample of all juveniles seen by the juvenile probation agency in a specified time period (Minor, Hartmann & Terry, 1997). The difference between these samples and the samples in the Ranadive (2014) and Valenzuela (2011) studies can be seen in the reported recidivism rates. The mean recidivism rate of studies in the Cottle meta-analysis was 48.0% (range = 22% to 75%). In contrast, the recidivism rate was 15.8% in the Ranadive study and only 15.6% in the Valenzuela study.

The Ranadive (2014) and Valenzuela (2011) studies also differed from prior studies in regards to the index referral that marked the beginning of the follow-up period in which

recidivism was measured. In both of these studies, the index referral was always the juvenile's first referral. In prior studies, however, the index referral has often been the juvenile's most recent referral or adjudication, which may have taken place several years after the juvenile's first referral.

In sum, the findings of Valenzuela (2011) and Ranadive (2014) regarding the relationship of age at onset and recidivism may differ from the findings of the Cottle et al. (2001) meta-analysis because Valenzuela and Ranadive examined the relationship among all or most juveniles entering a juvenile probation agency, beginning at the time they entered, whereas most studies in the Cottle et al. meta-analysis, like most juvenile recidivism studies, have examined the relationship among the sub-group of serious and chronic juveniles. The findings of Valenzuela and Ranadive suggest that if all juveniles are tracked from the time of their first referral, age of onset will not be found to predict recidivism. However, the findings of the Cottle et al. meta-analysis suggest that in subsamples of juveniles consisting entirely or largely of serious offenders, age at first referral is likely to be predictive of recidivism.

### **Current Study**

The current study explored the possibility that age at first referral is predictive of recidivism among high-risk juvenile offenders but not in the general population of all juveniles referred to the juvenile justice system. The study included two samples. First, a sample of all juvenile delinquents referred to El Paso JPD (All Juveniles sample) was tracked prospectively from the time of their first referral to the agency. It was predicted that the correlation between age at first referral and recidivism would be close to zero and positive in this sample as in the studies by Valenzuela (2011) and Ranadive (2014). Second, a sample of high-risk serious and/or chronic juvenile delinquents (Serious and Chronic sample) from the same agency was tracked



from a later point in their delinquent involvement (i.e., following discharge from a treatment program). It was predicted that these juveniles' age at the time of their first referral to the agency would be negatively correlated with recidivism following their discharge from the treatment program, as in the Cottle et al. (2001) meta-analysis.

Data was collected on site at the El Paso JPD. Although Texas law regulates the El Paso JPD, juvenile probation is administered at a local level (El Paso County, 2017). Juveniles are referred to El Paso JDP after committing a violation to protect the juvenile and/or the community and to prevent future offenses. The court decisions may range from the dismissal of the case to order a long-term confinement for the juvenile. A subdivision of the El Paso JPD is the Challenge Academy, a long-term residential program for 14 to 17 year old adolescents in need behavioral modification or substance abuse treatment that have failed to benefit from other departmental services. The juveniles referred to the academy must complete a short- or a full-term stay. A short-term stay consists of a 60-day stay at the academy. A full-term requires participation in the academy for 210 days.

## **Chapter 2: Method**

### **Participants**

Data for the present study was collected on site at the El Paso JPD. El Paso County is a large sized county in west Texas with 82.2% of the population self-identified as Hispanic or Latino (United States Census Bureau, 2016).

The following samples (including several that were subsamples of each other) were selected and included in the present study:

(1) The first sample was the “All Juveniles” sample. This sample included all juvenile offenders ( $N=2,982$ ) whose first referral to El Paso JPD occurred from January 2004 through December 2013. The mean age at first referral for juveniles in this sample was 14.22 years ( $SD=1.503$ ). At the time of their first offense, 36 juveniles were 10 years old, 115 were 11 years old, 288 were 12 years old, 473 were 13 years old, 606 were 14 years old, 737 were 15 years old, and 727 were 16 years old. Seventy-six point two percent of the juveniles in the All Juveniles sample were males. Hispanics made up 76.3% ( $2,288/2,982$ ) of the All Juveniles sample, 0.7% ( $22/2,982$ ) identified as Non-Hispanic White, 4.9% ( $148/2,982$ ) were African America, 0.4% ( $11/2,982$ ) were Asian, and 0.3% ( $10/2,982$ ) were American Indian. Ethnicity was unspecified for 17.4% ( $519/2,982$ ) of the sample.

(2) The second sample was the “All Juveniles 10-15” sample ( $N=2,255$ ). This sample was a subset of the All Juveniles sample. Specifically, it included all juveniles in the All Juveniles sample who were younger than 16 at the time of their first referral to El Paso JPD. Juveniles who were 16 years of age or older at the time of their first referral were excluded from this sample because they reached 17 years of age within a year of their first referral and therefore had incomplete 12-month recidivism data, as required for some of the study’s analyses.

Thirty-six juveniles in the All Juveniles 10-15 sample were 10 years old, 115 were 11 years old, 288 were 12 years old, 473 were 13 years old, 606 were 14 years old, and 737 were 15 years old at the time of first offense. The mean age at first referral for juveniles in this sample was 13.64 years ( $SD=1.279$ ). Males comprised the majority of the first time offenders in this sample (75.8%). Seventy-six point eight percent (1731/2255) of the juveniles in the sample were Hispanic. African Americans accounted for 5% (112/2255) of the sample, 1% (22/2255) were Non-Hispanic Whites, 0.4% (9/2255) were Asian, and 0.4 % (8/2255) were American Indian. Ethnicity was unspecified for 16.4% of the sample.

(3) The third sample was the “All Juveniles Equal-Sized” sample ( $N=575$ ). This sample was a subsample of the All Juveniles 10-15 sample. The Equal-Sized sample was constructed by stratifying the All Juveniles 10-15 sample by age at time of first offense and then randomly selecting juveniles, as described in the next section, so that equal numbers of juveniles from all potential age groups were included (i.e., 115 11-year olds, 115 12-year-olds, and so on up to 115 15-year-olds). The purpose of including this Equal-Sized subsample was to ensure adequate representation of younger juveniles for some analyses. The mean age at first referral for juveniles in the All Juveniles Equal-Sized sample was 13 years ( $SD=1.415$ ). Their ages ranged from 11 to 15 years old, with 115 juveniles in each age group (115 juveniles who were 11 years old at time of first offense, 115 who were 12 years old at time of first offense, and so on). Males comprised the majority of the first-time offenders in this sample (78.1%). Seventy-seven percent (443/575) of the juveniles in the sample were Hispanic. African Americans accounted for 4.5% (26/575) of the sample, 0.9% (5/575) were Non-Hispanic Whites, 0.3% (2/575) were American Indian, and 0.2% (1/575) identified as Asian. Ethnicity was unspecified for 17% of the sample.

(4) The fourth sample was the “Serious and Chronic” sample ( $N=128$ ). This sample included all juvenile offenders who (a) participated in the El Paso JPD Challenge Academy, from January 2004 through December 2013, and (b) were 16 years of age or younger at the time of discharge from program. The mean age of the juveniles in this sample at the time of discharge from the Challenge program in this sample was 15.51 years ( $SD=0.687$ ). Their ages at discharge ranged from 14 to 16 years old, with 14 14-year-olds, 35 15-year-olds, and 79 16-year-olds. The mean age at first referral in this sample was 13.3 years ( $SD=1.33$ ). Their ages at first referral ranged from 10 to 16 years old with 4 10-year-olds, 7 11-year-olds, 23 12-year-olds, 33 13-year-olds, 40 14-year-olds, 16 15-year-olds, and 5 16 year-olds. Males composed 80.5% of the Serious and Chronic sample. The majority of the sample members were Hispanic (82.8%; 106/128). African Americans made up 5.5% (7/128) of the sample and 11.7% (15/128) did not report their ethnicity. Among the juveniles in the Serious and Chronic sample, 7.8% (10/128) were discharged due to failure to adjust, 1.6% (2/128) were discharged because of ineligibility, 89.1% (114/128) were discharged due to graduation, and 1.6% (2/128) were discharged as a runaway.

(5) The fifth sample was the “Serious and Chronic 10-15” sample ( $N=49$ ). This sample was a subset of the Serious and Chronic sample. Specifically, it included all juveniles in the Serious and Chronic sample who were younger than 16 at the time of their discharge from the Challenge program. The 79 juveniles who were 16 years of age or older at the time of their discharge were excluded from this sample because they reached 17 years of age within a year of their discharge and therefore had incomplete 12-month recidivism data, as required for some of the study’s analyses. The mean discharge age of the juveniles in this sample was 14.71 years ( $SD=0.456$ ), their ages at time of discharge from the program ranged from 14 to 15 years old,

with 14 14-year-olds and 35 15-year-olds. The mean age at first referral was 12.65 ( $SD=1.071$ ). Ages at first referral ranged from 10 to 14 years of age old, including 2 10-year-olds, 5 11-year-olds, 12 12-year-olds, 19 13-year-olds, and 11 14-year-olds. Males composed 77.6% of this sample. The majority of the juveniles in the sample were Hispanic (79.6%; 39/49). African Americans made up 14.3% (3/49) of the sample and 6.1% (7/49) were Non-Hispanic Whites. Among the juveniles in the Serious and Chronic 10-15 sample, 12.2% (6/49) were discharged due to failure to adjust, 2% (1/49) were discharged because of ineligibility, 83.7% (41/49) were discharged due to graduation, and 2% (1/49) were discharged as a runaway.

### **Sampling Approach for the All Juveniles Equal-Sized Sample**

To ensure adequate representation of younger juveniles in some analyses, it was necessary to select the All Juveniles Equal-Sized sample for the present study using stratification by age. Specifically, the All Juveniles Equal-Sized sample was selected from the All Juveniles 10-15 sample using the following three-step approach:

- (1) All first-time referral juveniles in the All Juveniles 10-15 sample who were 11 years of age at the time of first referral were added to the Equal-Sized sample.
- (2) Let  $n-2004$  be the number of juveniles now included in the Equal-Sized sample who were 11 years of age at the time of their first referral and whose first referral occurred in 2004. A sample with a size of  $n-2004$  juveniles was randomly selected from among all 12-year-old first referrals for the same year in the All Juveniles 10-15 sample. Similarly, samples of size  $n-2004$  were randomly selected from among all first-time referrals in the All Juveniles 10-15 sample in each of the following age groups for that year: 13 years of age, 14 years of age, and 15 years of age. These samples were added to the Equal-Sized sample.

(3) The procedure described in step (2) was repeated for each year in the sampling period. For instance, let  $n_{2005}$  be the number of juveniles included in the Equal-Sized sample who were 11 years of age at the time of first referral and whose first referral occurred in 2005. Samples of size  $n_{2005}$  were also randomly selected from among the 12-year-olds, the 13-year-olds and so on in the All Juveniles 10-15 sample for that same year.

This three-step sampling strategy resulted in (a) an All Juveniles Equal-Sized sample that included an approximate average of 57.5 juveniles from each year (5 age groups x 5.75 juveniles in each age group), and (b) an overall sample size of 575 (approximately 57.5 juveniles from each year x 10 years). This sampling strategy (a) ensured that adequate numbers of juveniles from each age group were included (115 per age group) in the All Juveniles Equal-Sized sample and (b) avoided confounding juveniles' age at first referral with any changes in JPD policy, referral patterns, or other factors during the target period.

## **Variables**

Data for the study was collected from the electronic databases of El Paso JPD by the author of the present thesis. Identifying information was not collected. Data for each juvenile was recorded with the juvenile's personal identification number (JID) assigned by JPD. This number is designed to (a) allow identification of the juvenile within JPD files but (b) preserve the confidentiality of the juvenile's data, since individuals outside of El Paso JPD do not have access to JIDs. Approval of the study, including the method used to preserve confidentiality, was obtained from the Institutional Review Board (IRB) at the University of Texas at El Paso and by the review board at the El Paso JPD.

Tables 2.1 and 2.2 show the variables that were collected. As can be seen, for the three All Juveniles samples (All Juveniles, All Juveniles 10-15, All Juveniles Equal-Sized) the

variables were divided into four categories, 1) demographics, 2) characteristics of first referral, 3) recidivism during 12-month follow-up after first offense and 4) recidivism during 36-month follow-up after index offense. For the two Serious and Chronic samples (Serious and Chronic, Serious and Chronic 10-15) the variables were into six somewhat different categories, 1) demographics, 2) characteristics of first referral, 3) recidivism during 12-month follow-up after first offense, 4) delinquency before entering Challenge, 5) recidivism during 12-month follow-up after discharge from Challenge and 6) recidivism during 36-month follow-up after first offense. For the All Juveniles samples the variables were divided into five categories, 1) demographics, 2) characteristics of first referral, 3) recidivism during 12-month follow-up after first offense, 4) recidivism during 36-month follow-up after index offense and 5) length between first offense and first re-offense. For the Serious and Chronic samples the variables were into eight different categories, 1) demographics, 2) characteristics of first referral, 3) recidivism during 12-month follow-up after first offense, 4) delinquency before entering Challenge, 5) recidivism during 12-month follow-up after discharge from Challenge, 6) recidivism during 36-month follow-up after first offense, 7) length between first offense and first re-offense and 8) length between discharge from Challenge and first re-offense after discharge from program.

The variables collected for juveniles in the All Juveniles samples allowed the present study to determine whether these juveniles recidivated (a) within 12 months of their first referral and whether recidivism in the All Juveniles samples was related to the juveniles' age at first referral. The variables collected for juveniles in the Serious and Chronic samples allowed the study to determine whether these juveniles recidivated (a) within 12 months of their first referral, (b) within 12 months of their discharge from program and whether the recidivism risk in the Serious and Chronic samples was related to the juveniles' age at first referral. The variables

collected for the juveniles in the All Juveniles samples and Serious and Chronic samples allowed the study to determine if the recidivism rate for juveniles that first offended at an early age was greater than the rate for juveniles that first offended at a later age.

In the electronic files provided by El Paso JPD, for both the All Juveniles samples and the Serious and Chronic samples, the author of this thesis discovered some minor discrepancies for age at first referral and age at time of Challenge discharge. A small error in the JPD computer programs seemed to have been responsible for these discrepancies. The author therefore used birth date information from the files to re-calculate these ages for 258 juveniles. In the large majority of cases, the re-calculated ages were within one year of the ages as recorded in JPD files. However, in 11 cases the re-calculated age varied more than a year from the age recorded in JPD files. These 11 cases were deleted and are not included in any of the analyses or descriptive statistics reported in the thesis.



**Table 2.1****Variables for All Juveniles Samples**

<b>Name of Variable</b>	<b>Scoring Format</b>
Demographics	
<i>Age at time of first referral</i>	Age in years at last birthday before first referral
<i>Gender</i>	Male, Female, Unknown
<i>Ethnicity</i>	Ex.: Hispanic, Non-Hispanic White
Characteristics of first referral	
<i>Year of referral</i>	Year
<i>Description of most serious offense</i>	Ex.: Possession of < 2 oz. marijuana in drug free zone
<i>Any felony offense</i>	Yes/No
<i>Any status offense</i>	Yes/No
<i>Any marijuana offense</i>	Yes/No
<i>Any alcohol offense</i>	Yes/No
<i>Any offense for other substance</i>	Yes/No
<i>Any violent offense</i>	Yes/No
<i>Severity of most serious: Qualitative</i>	Ex.: Class 1 Felony, Class B Misdemeanor
<i>Severity of most serious: Quantitative</i>	Ex.: Class 1 Felony = 7; Class B Misdemeanor = 2
<i>Disposition following first referral</i>	Ex.: Deferred prosecution; Court ordered probation
<i>Duration of probation, if applicable</i>	Ex. length of time
Recidivism during 12-month follow-up after first offense	
<i>Any referral during 12-month follow-up</i>	Yes/No
<i>Any referral for felony during 12-month follow-up</i>	Yes/No
<i>Any referral for misdemeanor during 12-month follow-up</i>	Yes/No
<i>Any referral for status offense during 12-month follow-up</i>	Yes/No
<i>Any referral for marijuana offense during 12-month follow-up</i>	Yes/No
<i>Any referral for alcohol during 12-month follow-up</i>	Yes/No
<i>Any referral for other substance during 12-month follow-up</i>	Yes/No
<i>Any referral for violent offense during 12-month follow-up</i>	Yes/No
<i>Petitioned during 12-month follow-up</i>	Yes/No

## Variables for All Juveniles Samples (continued)

### Recidivism during 36-month follow-up after index offense

<i>Any referral during 36-month follow-up</i>	Yes/No
<i>Any referral for felony during 36-month follow-up</i>	Yes/No
<i>Any referral for misdemeanor during 36-month follow-up</i>	Yes/No
<i>Any referral for status offense during 36-month follow-up</i>	Yes/No
<i>Any referral for marijuana offense during 36-month follow-up</i>	Yes/No
<i>Any referral for alcohol during 36-month follow-up</i>	Yes/No
<i>Any referral for other substance during 36-month follow-up</i>	Yes/No
<i>Any referral for violent offense during 36-month follow-up</i>	Yes/No
<i>Petitioned during 36-month follow-up</i>	Yes/No

### Recidivism follow-up after index offense

<i>Date of First Offense</i>	Date, m/d/y format
<i>Date of First Re-offense</i>	Date, m/d/y format
<i>Date of First Misdemeanor Re-offense</i>	Date, m/d/y format
<i>Date of First Felony Re-offense</i>	Date, m/d/y format
<i>Date of First Drug-Related Re-offense</i>	Date, m/d/y format
<i>Date of First Violent Re-offense</i>	Date, m/d/y format
<i>Length of First Re-offense</i>	Date, m/d/y format
<i>Length of First Misdemeanor Re-offense</i>	Date, m/d/y format
<i>Length of First Felony Re-offense</i>	Date, m/d/y format
<i>Length of First Drug-Related Re-offense</i>	Date, m/d/y format
<i>Length of First Violent Re-offense</i>	Date, m/d/y format
<i>Date of Age Out from El Paso JPD</i>	Date, m/d/y format
<i>Re-offense After First Offense</i>	Yes/No
<i>Survival Time from First Offense</i>	Time, Number in Years

Table 2.2

## Variables for Serious and Chronic Samples

Name of Variable	Scoring Format
Demographics	
<i>Age at time of discharge from from Challenge</i>	Age in years at last birthday before discharge from program
<i>Year of <b>discharge from</b> Challenge</i>	Year
<i>Gender</i>	Male, Female, Unknown
<i>Ethnicity</i>	Ex.: Hispanic, Non-Hispanic White
Characteristics of first referral	
<i>Year of first referral</i>	Year
<i>Age at time of first referral</i>	Age in years at last birthday before first referral
<i>Description of most serious offense</i>	Ex.: Possession of < 2 oz. marijuana in drug free zone
<i>Any felony offense</i>	Yes/No
<i>Any status offense</i>	Yes/No
<i>Any marijuana offense</i>	Yes/No
<i>Any alcohol offense</i>	Yes/No
<i>Any offense for other substance</i>	Yes/No
<i>Any violent offense</i>	Yes/No
<i>Severity of most serious: Qualitative</i>	Ex.: Class 1 Felony, Class B Misdemeanor
<i>Severity of most serious: Quantitative</i>	Ex.: Class 1 Felony = 7; Class B Misdemeanor = 2
<i>Disposition following first referral</i>	Ex.: Deferred prosecution; Court ordered probation
Recidivism during 12-month follow-up after first offense	
<i>Any referral during 12-month follow-up</i>	Yes/No
<i>Any referral for felony during 12-month follow-up</i>	Yes/No
<i>Any referral for violent offense during 12-month follow-up</i>	Yes/No
<i>Petitioned during 12-month follow-up</i>	Yes/No
Recidivism during 36-month follow-up after first offense	
<i>Any referral during 36-month follow-up</i>	Yes/No
<i>Any referral for felony during 36-month follow-up</i>	Yes/No
<i>Any referral for violent offense during 36-month follow-up</i>	Yes/No
<i>Petitioned during 36-month follow-up</i>	Yes/No

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**Variables for Serious and Chronic Samples (continued)****Delinquency before entering Challenge***Number of prior referrals before Challenge**Adjudicated before Challenge**Any felony offense before Challenge**Any status offense before Challenge**Any marijuana offense before Challenge**Any alcohol offense before Challenge**Any offense for other substance before Challenge**Any violent offense before Challenge**Severity of most serious offense before Challenge: Qualitative**Severity of most serious offense before Challenge: Quantitative*

Number of referrals before entering Challenge

Yes/No

Yes/No

Yes/No

Yes/No

Yes/No

Yes/No

Yes/No

Ex.: Class 1 Felony, Class B Misdemeanor

Ex.: Class 1 Felony = 7; Class B Misdemeanor = 2

**Recidivism during 12-month follow-up after discharge from Challenge***Any referral during 12-month follow-up**Any referral for felony during 12-month follow-up**Any referral for misdemeanor during 12-month follow-up**Any referral for status offense during 12-month follow-up**Any referral for marijuana offense during 12-month follow-up**Any referral for alcohol during 12-month follow-up**Any referral for other substance during 12-month follow-up**Any referral for violent offense during 12-month follow-up**Petitioned during 12-month follow-up*

Yes/No

Yes/No

Yes/No

Yes/No

Yes/No

Yes/No

Yes/No

Yes/No

Yes/No

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**Variables for Serious and Chronic Sample (continued)**

## Recidivism follow-up after index offense

<i>Date of First Offense</i>	Date, m/d/y format
<i>Date of First Re-offense</i>	Date, m/d/y format
<i>Date of First Misdemeanor Re-offense</i>	Date, m/d/y format
<i>Date of First Felony Re-offense</i>	Date, m/d/y format
<i>Date of First Drug-Related Re-offense</i>	Date, m/d/y format
<i>Date of First Violent Re-offense</i>	Date, m/d/y format
<i>Length of First Re-offense</i>	Date, m/d/y format
<i>Length of First Misdemeanor Re-offense</i>	Date, m/d/y format
<i>Length of First Felony Re-offense</i>	Date, m/d/y format
<i>Length of First Drug-Related Re-offense</i>	Date, m/d/y format
<i>Length of First Violent Re-offense</i>	Date, m/d/y format

## Recidivism follow-up after discharge from Challenge

<i>Date of First Offense</i>	Date, m/d/y format
<i>Date of First Re-offense</i>	Date, m/d/y format
<i>Date of First Misdemeanor Re-offense</i>	Date, m/d/y format
<i>Date of First Felony Re-offense</i>	Date, m/d/y format
<i>Date of First Drug-Related Re-offense</i>	Date, m/d/y format
<i>Date of First Violent Re-offense</i>	Date, m/d/y format
<i>Length of First Re-offense</i>	Date, m/d/y format
<i>Length of First Misdemeanor Re-offense</i>	Date, m/d/y format
<i>Length of First Felony Re-offense</i>	Date, m/d/y format
<i>Length of First Drug-Related Re-offense</i>	Date, m/d/y format
<i>Length of First Violent Re-offense</i>	Date, m/d/y format
<i>Date of Age Out from El Paso JPD</i>	Date, m/d/y format
<i>Re-offense After First Offense</i>	Yes/No
<i>Survival Time from First Offense</i>	Time, Number in Years
<i>Date of First Re-offense After Challenge Discharge</i>	Date, m/d/y format
<i>Re-offense After Challenge Discharge</i>	Yes/No
<i>Survival Time from Challenge Discharge</i>	Time, Number in Years

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## Chapter 3: Results

### Characteristics of the First Referral

Characteristics of the first referrals for the All Juveniles ( $N=2,982$ ) and Serious and Chronic ( $N=128$ ) samples were examined. T-tests indicated that there was a significant difference between the two samples in the duration of probation following first referral, with the Serious and Chronic sample being assigned substantially longer probation periods (Mean=409.125 days,  $SD=243.89$ ) than the All Juveniles sample (Mean=131.66 days,  $SD=190.957$ ,  $t=-14.210$ ,  $p<.001$ ). Chi-square tests also showed that there was a significant difference between the two samples in respect to felony offenses at first referral: The juveniles in the All Juvenile sample were more likely to have a felony offense at first referral (55.1%) than the juveniles in the Serious and Chronic sample (39.8%;  $\chi^2=7.544$ ,  $p=.006$ ).

**All Juveniles sample.** JPD files for juveniles sometimes listed multiple offenses on the date of their first offense. The following descriptive statistics for the All Juveniles sample ( $N=2,982$ ) were based on all the offenses listed for juveniles on the date of their first offense. The proportion of the juveniles in this sample whose first offense involved a felony was 55.1% (1643/2982). For 12% (357/2982) of the juveniles, the first referral included a marijuana offense (possession/distribution) and 5.3% (159/2982) included another substance offense (excludes alcohol). For 43% (1283/2982) of these juveniles, the first referral involved a violent offense. Based on the Texas Juvenile Justice Department (TJJD) offense categories, the proportion of the juveniles whose first offense included assaults was 36.5%, 15.5% committed drug offenses, 8.8% committed burglary offenses, 5.3% committed theft, 4.4% committed sexual assault offenses, 3% committed weapon offenses, 1.8% committed robbery offenses, 1% of the referrals involved attempted homicides and less than 0.01% involved homicide offenses.

**Serious and Chronic sample.** The following descriptive statistics, like those in the preceding section, were based on all the offenses listed for juveniles on the date of their first offense. The proportion of the juveniles in the Serious and Chronic sample ( $N=128$ ) whose first offense involved a felony was 39.8% (51/128). In this group, 13.3% (17/128) of the first referrals involved a marijuana offense and 3.1% (4/128) involved another substance offense (excludes alcohol). For 40.6% (52/128) of these juveniles, the first referral involved a violent offense. Based on the TJJD offense categories, the proportion of the juveniles whose first offense included assaults was 32.6%, 21.7% committed drug offenses, 13.2% committed thefts, 6.3% committed burglary offenses, 4.7% committed robbery offenses, and 2.3% committed weapon offenses. Due to the rehabilitation approach of Challenge Academy, juveniles who have committed major felony offenses such as murder do not qualify for the program.

#### **Delinquency Before Entering Challenge Academy- Serious and Chronic sample**

The offense histories of juveniles in the Serious and Chronic sample ( $N=128$ ) were examined. The number of prior referrals before entering Challenge ranged from zero to six ( $M=1.82$ ,  $SD=1.539$ ) in this sample. Twenty-one point nine percent of Challenge participants did not have prior referrals, 28.1% had 1 prior referral before entering the Challenge program, 20.3%, had two referrals, 14.1% had three referrals, 8.6% had four referrals, 5.5% had five referrals, and 1.6% had six referrals. The proportion of the juveniles whose past referrals included a felony was 31.3%. In this sample, 12.4% (16/128) had at least one prior Marijuana offenses (possession/distribution), 2.3% (3/128) had a prior offense involving another illegal substance, and 36.4% (47/128) had a prior violent offense.

## 12-Month Recidivism Following First Offense or Discharge From Challenge

**All Juveniles 10-15 Sample. 12-month recidivism following first offense.** The All Juveniles 10-15 sample ( $N=2,255$ ) included all 10 to 15 year olds with data from 2004 to 2013. It excluded juveniles who were 16 years old because they aged out of the juvenile system on their seventeenth birthday and therefore did not have recidivism data available for the full 12 months following their first offense. Among the juveniles who recidivated, 15.6% ( $352/2,255$ ) of the juveniles recidivated during the 12-month follow up period after their first offense. Among the juveniles who recidivated, 38.92% ( $137/352$ ) committed felony offenses, 41.19% ( $145/352$ ) committed violent offenses, 20.17% ( $71/352$ ) committed marijuana offenses (possession/distribution), and 5.68% ( $20/352$ ) committed other substance offenses. Among the 352 juveniles who reoffended, 90.34% ( $318/352$ ) were petitioned. The description of the re-offenses account for any re-offense following their first offense and it is not limited to the juvenile's first re-offense during the follow-up period.

There was a weak, positive and statistically significant correlation ( $r=.073$ ,  $p=.001$ ) between Age at time of first offense and Any referral during 12-month follow-up after first offense in the All Juveniles 10-15 sample. A weak, positive and significant correlation ( $r=.058$ ,  $p=.006$ ) was also found between Age at time of first offense and Any felony referral during 12-month follow-up. In addition, Age at first offense was positively, weakly and significantly correlated with Any misdemeanor referral ( $r=.067$ ,  $p=.002$ ), Any marijuana referral ( $r=.063$ ,  $p=.003$ ), Any other substance referral ( $r=.053$ ,  $p=.013$ ), and being petitioned during follow-up ( $r=.087$ ,  $p<.001$ ). Figure 3.1 portrays the recidivism rates for any referral during follow-up, grouped by age at first offense (juveniles who were less than 11 years of age at time of first offense are not included in the graph).



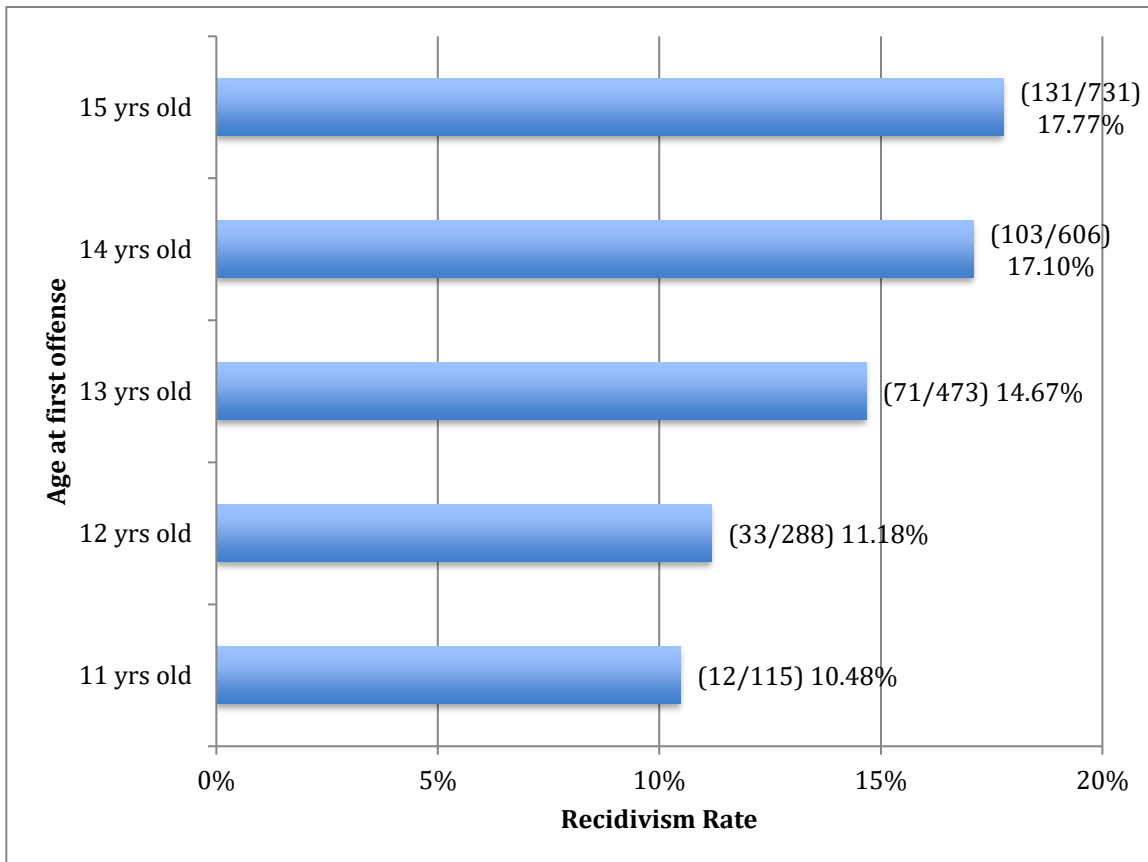


Figure 3.1: Twelve-month recidivism rates for any referral during follow-up. All Juveniles sample 10-15 (2004-2013,  $N=2,219$ ). By age at first offense.

**All Juveniles Equal-Sized sample. 12-month recidivism following first offense.** The All Juveniles Equal-Sized sample included 575 juveniles with data from 2004 to 2013, who were between 11 years old and 15 years old at their time of first offense. As discussed in the Method section, this sample was constructed to ensure that all ages were equally represented. Analyses on this sample were included in the thesis as a “double check” on the findings in the All Juveniles 10-15 sample, which contained substantially more older juveniles than younger juveniles. As it turned out, however, the findings for the All Juveniles Equal-Sized sample were highly similar to those for the All Juveniles 10-15 sample, with only minor differences. In the All Juveniles Equal-Sized sample, 13.6% (78/575) of the juveniles recidivated during the 12-month

follow up period after their first offense. Among the juveniles who recidivated, 41.03% (3/78) committed felony offenses, 46.15% (36/78) committed violent offenses, 21.79% (17/78) committed marijuana offenses (possession/distribution), and 0.08% (6/78) committed other substance offenses. Among the 78 juveniles who reoffended, 91.03% (78/78) were petitioned.

No significant correlation ( $r=.080$ ,  $p=.055$ ) was found between Age at first offense and Any referral during 12-month follow-up in the All Juveniles Equal-Sized sample. Age at first offense was not significantly correlated ( $r=.027$ ,  $p=.511$ ) with Any felony referral during 12-month follow-up. Weak, positive, and significant correlations were between Age at first offense and Any misdemeanor referral ( $r=.107$ ,  $p=.010$ ) and Petitioned during follow-up ( $r=.117$ ,  $p=.005$ ). Figure 3.2 shows the recidivism rates grouped by age at first offense.

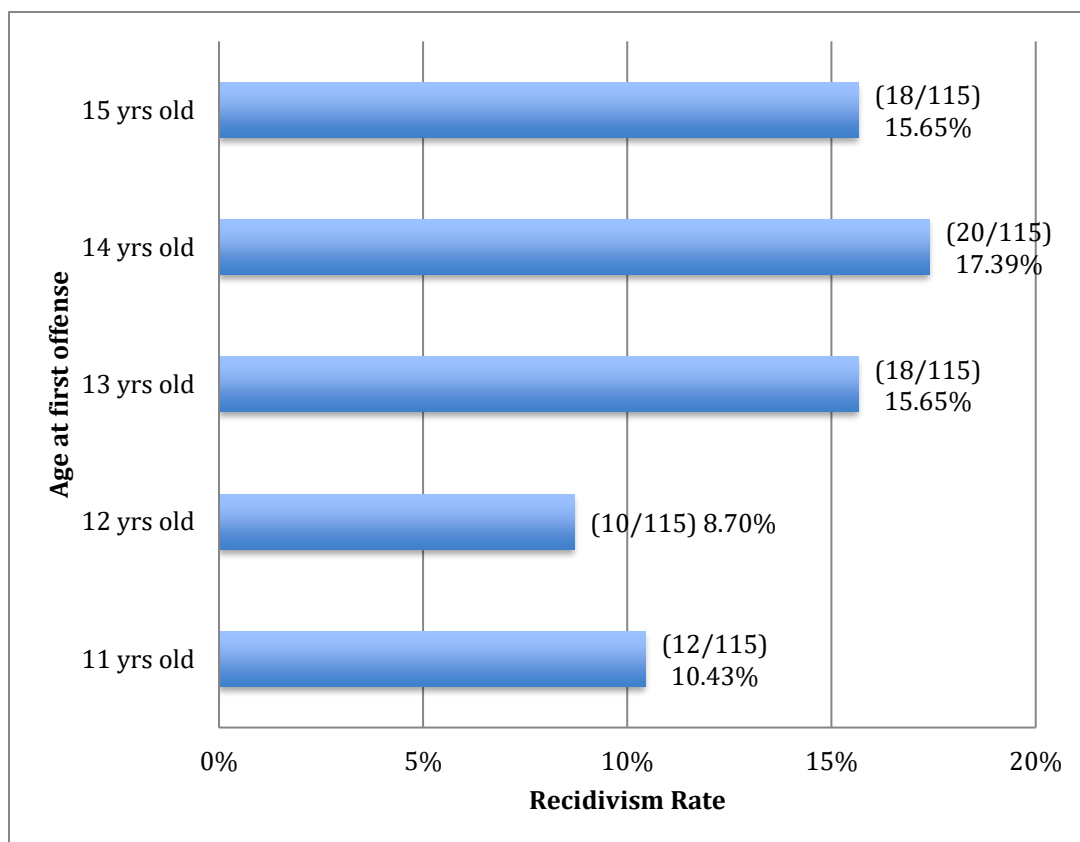


Figure 3.2: Twelve-month recidivism rates following first offense for All Juveniles Equal-Sized sample (2004-2013,  $N=575$ ). By age at first offense.

**Serious and Chronic 10-15 Sample. 12-Month Recidivism Following Discharge from Challenge.** In the Serious and Chronic 10-15 sample, 28.6% (14/49) of the juveniles recidivated during the 12-month follow up period after their discharge from the Challenge Academy. Among the juveniles who recidivated after discharge, 50% (7/14) committed felony offenses, 7.14% (1/14) committed Marijuana offenses (possession/distribution), 35.71% (5/14) committed violent offenses and 64.29% (9/14) were petitioned after a re-offense following Challenge. Figure 3.4 shows the recidivism rates during the 12 months after Challenge discharge, by juveniles' age at time of graduation. Because all Challenge graduates were 14-16 years old at time of discharge, and 16-year-olds were excluded from these analyses due to lack of 12-month follow-up data, Figure 3.4 shows results for only 14-year-olds and 15-year-olds.

The present study hypothesized that in the Serious and Chronic sample a negative correlation would be found between age at first offense and recidivism following discharge from Challenge. Instead, a positive but only marginally significant correlation ( $r=.272$ ,  $p=.061$ ) was found between Age at first offense and Any referral during 12-month follow-up after Challenge. No significant correlation ( $r=-.021$ ,  $p=.887$ ) was found between Age at first offense and Any felony referral during 12-month follow-up after Challenge. Figure 3.4 shows the 12-month recidivism rates after Challenge for Serious and Chronic 10-15 sample.

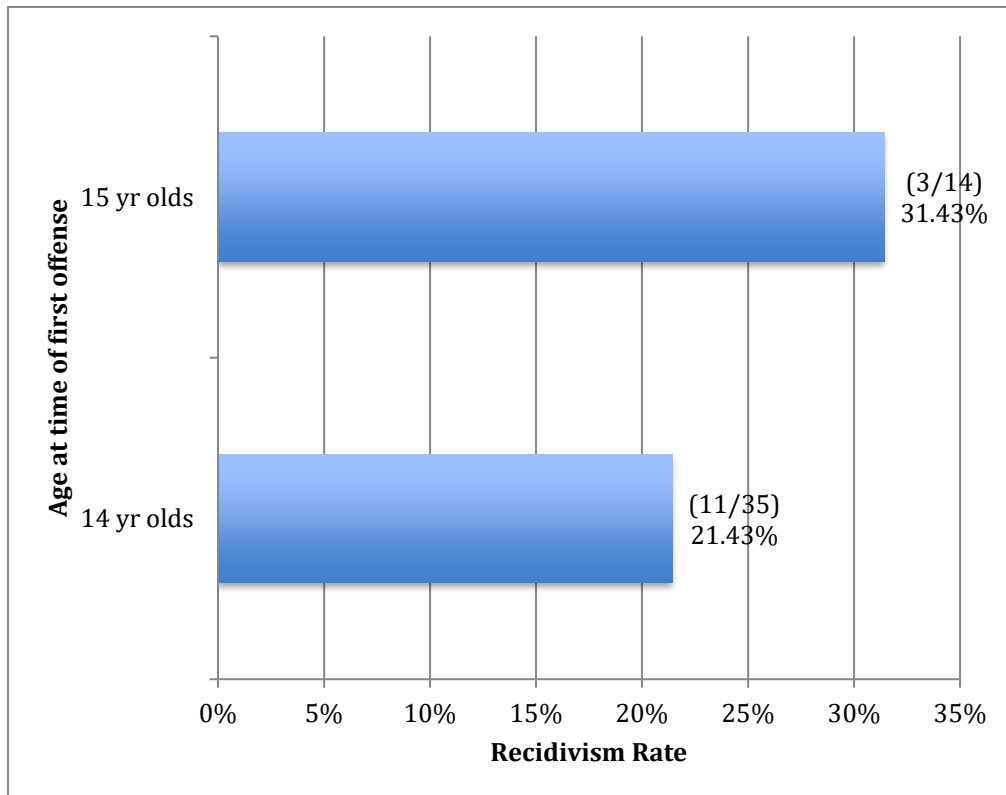


Figure 3.4: Twelve-month recidivism rates after Challenge for Serious and Chronic 10-15 sample (2004-2013,  $N = 49$ ).

**Serious and Chronic 10-15 sample. 12-month recidivism following first offense.** As an exploratory analysis, recidivism following first offense was examined in the Serious and Chronic 10-15 sample. In the Serious and Chronic 10-15 sample ( $N = 49$ ), 51% (25/49) of the juveniles recidivated during the 12-month follow-up period after their first offense. Among the juveniles who recidivated, 72% (18/25) committed felony offenses and 44% (11/25) committed violent offenses. Among the juveniles who reoffended, 56% (14/25) were petitioned.

A moderate, positive and significant correlation ( $r=.423$ ,  $p=.003$ ) between Age at first offense during the 12 months following the first offense was present in the Serious and Chronic 10-15 sample. Age at first offense and Any felony referral during 12-month follow-up after first offense showed a weak, positive, and significant correlation ( $r=.297$ ,  $p=.041$ ). A similar

correlation was found between Age at first offense and Petitioned during 12-month follow-up ( $r=.298, p=.040$ ). Figure 3.3 displays the recidivism rates in this sample based on the 12-month follow-up after first offense grouped by age.

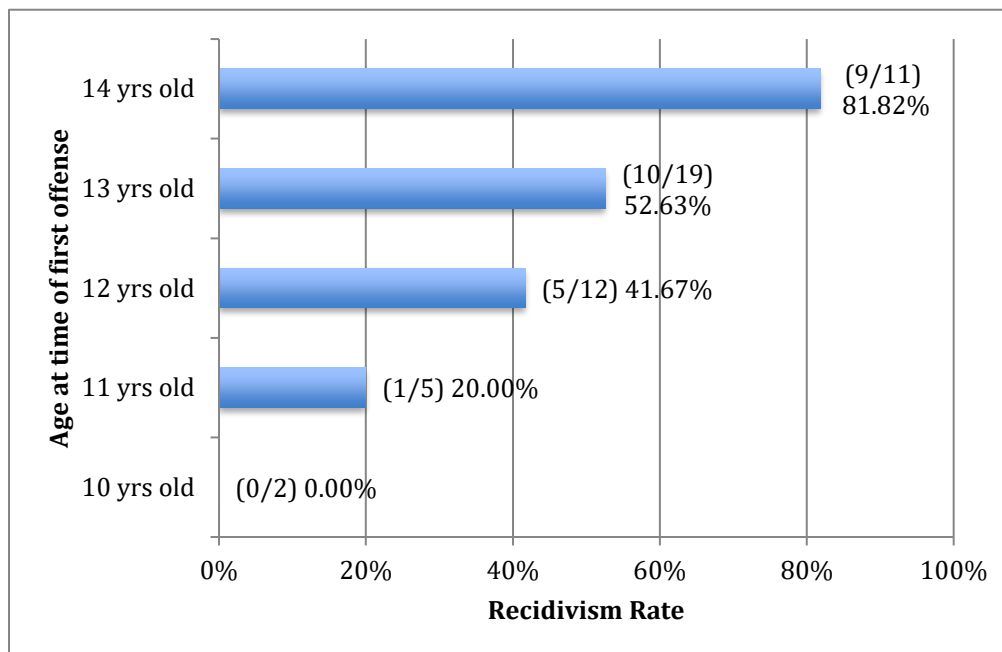


Figure 3.3: Twelve-month recidivism rates for Serious and Chronic 10-15 sample (2004-2013,  $N=49$ ). By age at first offense.

### Survival Analyses

Survival analyses were conducted for the All Juveniles sample ( $N=2,942$ ) and the Serious and Chronic sample ( $N=128$ ). In these analyses, the juvenile “failed” if he or she recidivated, and “survived” if he or she did not recidivate. The follow-up period of each juvenile for the survival analyses was not limited to 12 months, but instead lasted until (a) the juvenile recidivated (“failed”) or (b) the juvenile reached adulthood (17 years of age) and was no longer tracked by El Paso JPD (“right censored”).

Figures 3.5, 3.6 and 3.7, which show the survival curve results are grouped together on the following pages. Figure 3.5 displays the survival times for the All Juveniles sample ( $N=2,982$ ), grouped by age at first offense. As can be seen, the survival curves fell into three groups: (1) The highest recidivism rates (i.e., lowest survival curves) were observed among juveniles who were 13, 14, 15 or 16 years old at the time of their first offense; (2) Intermediate recidivism rates were observed among juveniles who were 11 or 12 years old at the time of their first offense; (3) The lowest recidivism rates were observed among juveniles who were 10 years old at the time of their first offense.

Figure 3.6 displays survival times for the Serious and Chronic sample ( $N=128$ ). As can be seen, the survival curves fell into three groups that were somewhat different than the groups in Figure 3.5: (1) The highest recidivism rates (i.e., lowest survival curves) were observed among juveniles who were 14 or 16 years old at the time of their first offense; (2) Intermediate recidivism rates were observed among juveniles who were 12, 13 or 15 years old at the time of their first offense; (3) The lowest recidivism rates were observed among juveniles who were 10 or 11 years old at the time of their first offense.

Figure 3.7 compares survival curves for (a) the 128 juveniles in the Serious and Chronic sample and (b) the subsample of 2,926 juveniles in the All-Juveniles sample who were *not* in the Serious and Chronic Sample. This subsample was designated as the All Juveniles Minus S&C subsample. Appendix A contains the actuarial life tables (survival data) for the Serious and Chronic sample and the All Juveniles Minus S&C subsample. These tables were used to create the survival curves in Figure 3.7. As shown in Figure 3.7 and Appendix A, at 1 year after their first offense, the juveniles in the Serious and Chronic sample were 85.14% more likely to recidivate than the juveniles in the All Juveniles Minus S&C subsample. Two years after the first

offense, the juveniles in the Serious and Chronic sample were 91.49% more likely to recidivate than the juveniles in the All Juveniles Minus S&C subsample. The median survival time for the Serious and Chronic sample was 1.267 years. Median survival time could not be calculated for the All Juveniles Minus S&C subsample because fewer than 50% of the juveniles in this subsample recidivated.

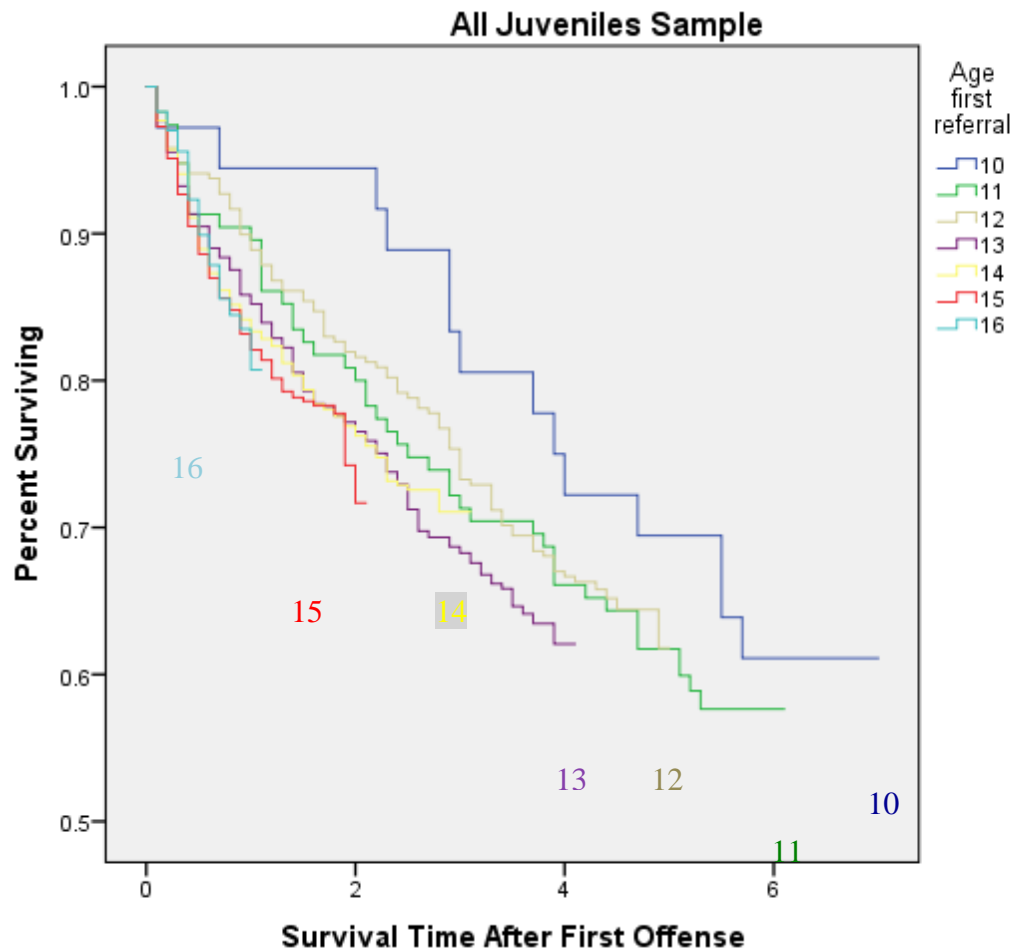


Figure 3.5: Survival curves, showing proportion of juveniles who have not recidivated. All Juveniles sample ( $N=2982$ ). By age at first offense.

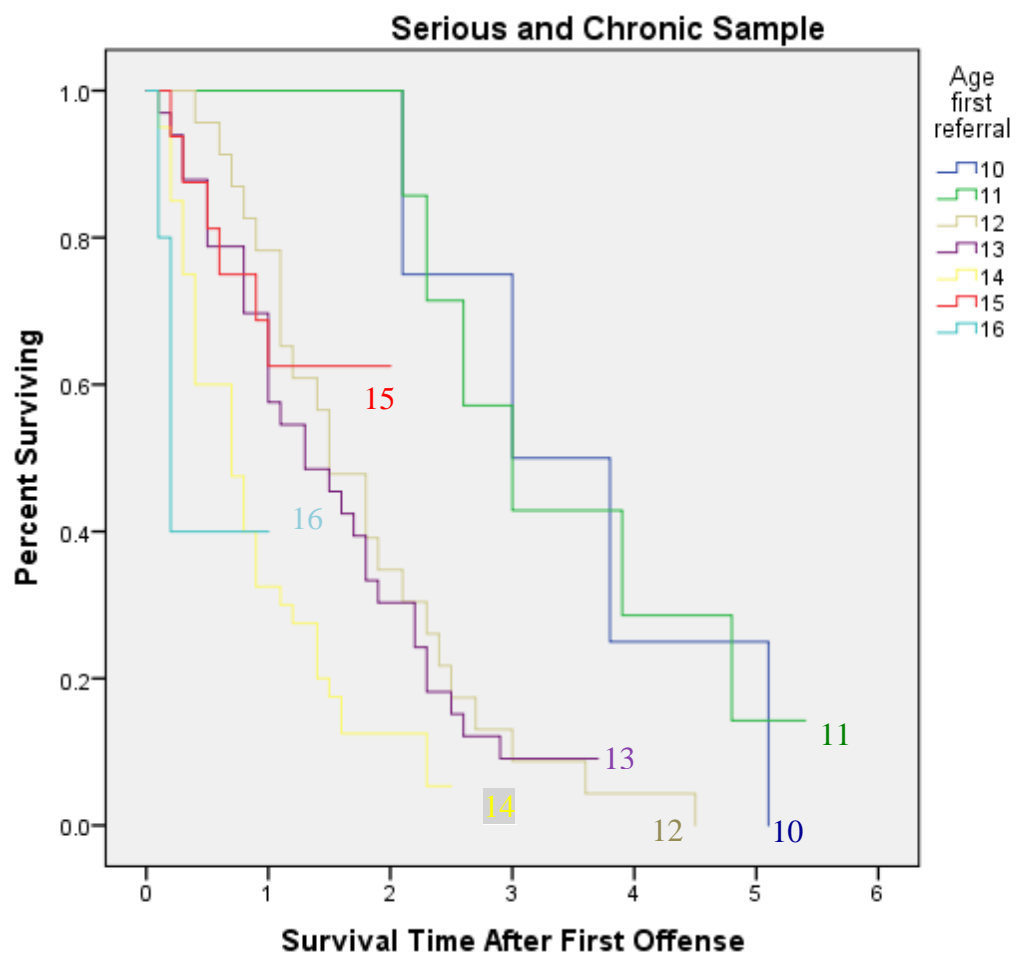


Figure 3.6: Survival curves, showing proportion of juveniles who have not recidivated. Serious and Chronic sample ( $N=128$ ). By age at first offense.



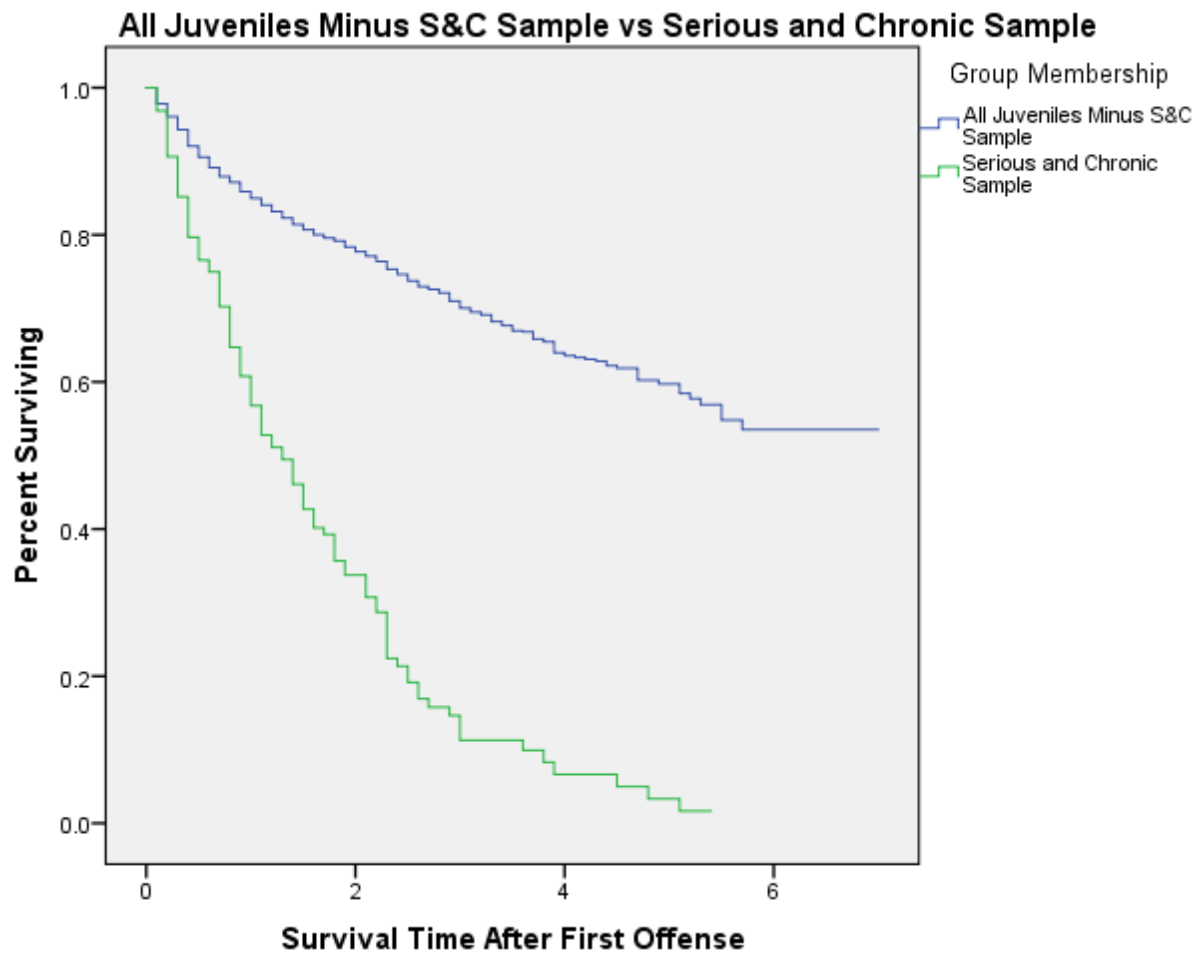


Figure 3.7: Survival curves, showing proportion of juveniles who have not recidivated. All Juveniles sample compared to Serious and Chronic sample ( $N=3054$ ). By age at first offense.

## Cox Regressions

**All Juveniles Sample.** A Cox regression that accounted for the effect of time-dependent covariates was conducted on the survival curve data from the All Juvenile sample. The relationship of Age at first offense with recidivism was not time-dependent ( $\text{Exp}(B)=.964$ ,  $p=0.267$ ). Therefore a Cox regression was performed with age at first offense as a non-time dependent covariate. This regression showed that for every year increase in age at first offense, the recidivism hazard rate significantly increased by 1.077 ( $p=.011$ ).

**All Juveniles Equal-Sized Sample.** A Cox regression that accounted for the effect of time-dependent covariates was conducted on the survival data from the All Juveniles Equal-Sized Sample. The relationship of Age at first offense with recidivism was not time-dependent ( $\text{Exp}(B)=1.031$ ,  $p=.483$ ). Therefore a Cox regression was performed with age at first offense as a non-time dependent covariate. This regression showed that age at first offense did not significantly predict recidivism hazard ( $\text{Exp}(B)=1.009$ ,  $p=.121$ ).

**Serious and Chronic Sample.** A Cox regression that accounted for the effect of time-dependent covariates was conducted on the survival data from the Serious and Chronic sample. The relationship of Age at first offense with recidivism after Challenge was not time-dependent ( $\text{Exp}(B)=.874$ ,  $p=.156$ ). Therefore, a Cox regression was performed with age at first offense as a non-time dependent covariate. The Cox regression showed that for every year increase in age, the hazard rate for recidivism after first offense significantly increased by 1.346 ( $p<.001$ ).

## Logistic Regressions

A hierarchical logistic regression was conducted using data from all juveniles who were members of either the All Juveniles sample or the Serious and Chronic and were less than 16 years old at time of first referral ( $N=2,325$ ). The criterion variable was 12-month recidivism

following first offense. The three predictor variables were (1) juvenile's age at first offense, (2) severity of the first offense (felony=1; misdemeanor=0), and (3) Participation in Challenge Program (Challenge participant 1; not a Challenge participant=0) as predictors of any referral during the 12-months following first offense. Participation in Challenge Program was coded 1 if the juvenile participated in the Challenge program at any time after their first offense. Juveniles who were sixteen year old at time of first offense were excluded from the analyses since the majority could not be followed for 12 months after the first offense.

Prior to conducting the hierarchical logistic regression, the assumptions of the statistical analysis were tested, as recommended by Wilson and Lorenz (2015). The criterion variable (12-month recidivism) was binary (referral=yes/no). Second, multicollinearity among the predictor variables was low, as shown in Appendix B. Third, the Box-Tidwell test was used to evaluate the assumption the linearity of independent variables and log odds. No significant interactions were found; the log odds were linearly related to the independent variables. Fourth, the sample size ( $N=2,325$ ) was large relative to the number of predictor variables (3).

A three-step hierarchical logistic regression was conducted. Age at first offense was entered as a predictor in the first step of the regression. Group membership was entered in the second step. Severity of offense was entered in the third step. Table 3.1 summarizes the results of the hierarchical logistic regression. At step 1, Age at first offense significantly accounted for 9% (Nagelkerke  $R^2$ ) of the variance in Any referral during 12-month follow-up ( $\chi^2=11.841, p=.001$ ). At step 2, severity of offense was added as a predictor and was statistically significant ( $\chi^2=123.802, p<.001$ ). The amount of variance in Any referral during 12-month follow-up explained by the predictors in step 2 increased to 9.6% Nagelkerke  $R^2$ ). At step 3, group membership was added as a predictor and was statistically significant ( $\chi^2=52.703, p<.001$ ). The

model explained 13.2% (Nagelkerke  $R^2$ ) of the variance in the 12-month recidivism. A higher age at first offense was weakly but significantly associated with an increased likelihood of 12-month recidivism ( $\text{Exp}(B)=1.212$ ,  $p<.001$ ). Belonging to the Serious and Chronic sample was significantly and strongly associated with a higher likelihood of 12-month recidivism ( $\text{Exp}(B)=4.702$ ,  $p<.001$ ). Unexpectedly, having a first referral that involved a felony (severity of offense), was associated with a *lower* likelihood of 12-month recidivism ( $\text{Exp}(B)=.274$ ,  $p<.001$ ).

**Table 3.1**

**Hierarchical Regression Analysis for Variables Predicting the Likelihood of Any Referral During 12-Months Following First Offense**

Variable	Wald $\chi^2$	B	SE(B)	Odds Ratio
<b>Step 1</b>				
Age at first offense	11.361***	.155	.046	1.168
<b>Step 2</b>				
Age at first offense	10.605**	.153	.047	1.166
Severity of first offense	110.877***	-1.310	.124	.270
<b>Step 3</b>				
Age at first offense	15.508****	.192	.049	1.212
Severity of first offense	105.241***	-1.293	.126	.274
Challenge participation	56.969***	1.548	.205	4.402
<i>Note. N=2378; *<math>p&lt;.05</math>, **<math>p&lt;.01</math>, ***<math>p&lt;.001</math></i>				

## **Chapter 4: Discussion**

The present study set out to better understand the relationship of juvenile delinquents' age at first offense with their subsequent risk for recidivism. Three sets of findings from the study shed light on this issue. First, as predicted, age at first offense was found to have a near-zero (but significant) positive correlation with recidivism in a general population of juveniles. However, contrary to prediction, age at first referral was found to have a moderate positive (but only marginally significant) correlation with recidivism in a small sample of serious, chronic juvenile offenders. Second, survival curve analyses and cox regression confirmed that, contrary to findings reported in many previous studies, age at first offense was positively related to risk of recidivism in both the general population of juveniles and among serious, chronic offenders. Third, hierarchical regression indicated that three variables (age at time of first offense, severity of first offense, and participation in a program for serious/chronic juvenile offenders) were all predictive of subsequent recidivism. These findings will be discussed in detail in the following sections.

### **Relationship of Age at first Offense and Recidivism**

The primary goal of the present study was to determine the association between age at time of first offense and recidivism during 12-month follow-up. First, it was hypothesized that the correlation between age at time of first offense and recidivism would be non-significant or close to zero in the general population of juveniles at El Paso JPD, as in two prior studies conducted at this agency (Valenzuela, 2011; Ranadive, 2014). Two correlational findings from the present study supported this hypothesis. First, in a general sample of 2,255 juvenile offenders (All Juveniles 10-15 sample) who committed their first offense between 2004 and 2013, age at time of first offense was significantly and positively correlated ( $r=.073$ ,  $p=.001$ ) with any new

referral during the 12-months following the initial offense. Although the correlation was positive and statistically significant, it was close to zero, as hypothesized, and indicated a very weak association between age at first offense and 12-month recidivism.

Results supporting this first hypothesis were also found in a subsample of the All Juveniles sample, the All Juveniles Equal-Sized sample, which was constructed to ensure that equal number of juveniles were included to represent each possible age at first offense (i.e., 115 juveniles who were eleven years old at the time of their first offense, 115 who were twelve years old at the time of their first offense, and so on up through juveniles who were fifteen years old at the time of their first offense). In this subsample of 575 juvenile offenders, age at first offense was not significantly associated with new referrals during 12-month follow-up ( $r=.080$ ,  $p=.055$ ).

Second, it was hypothesized that the correlation between age at first offense and recidivism would be *negative* among serious and chronic offenders, as reported in a meta-analysis by Cottle et al (2001). The findings of the present study failed to support this hypothesis. In a sample of 49 participants of the El Paso JPD Challenge program, an intensive program aimed at serious and chronic juvenile offenders, age at time of first offense showed a *positive* correlation of .272 ( $p=.061$ ) with any new referral during the 12 months following their discharge from the program. As may be seen, the correlation was in the opposite direction from what was predicted, although only marginally significant.

The present results can be compared with those from other studies. As noted in the Introduction of this thesis, prior studies by Valenzuela (2011) and Ranadive (2014) conducted at El Paso JPD with general samples of juveniles found only low, non-significant correlations ( $r<.05$ ) between age at first offense and 12-month recidivism. The findings regarding the All Juveniles samples replicate these earlier results.

More surprising was the finding of a positive and marginally significant correlation between age at first offense and recidivism in the Serious and Chronic 10-15 sample of Challenge participants. This finding is inconsistent with what the literature shows about the age at first offense and recidivism. For example, a meta-analysis by Cottle et al (2001) found that recidivism was negatively correlated with age at first contact with the law ( $Z_r = -.34, p < .001$ ) and age at first offense ( $Z_r = -.35, p < .001$ ).

Based on the literature, the present study hypothesized that recidivism would be negatively associated with age at first offense among the serious and chronic juvenile offenders at El Paso JPD, even though these two variables have little or no correlation in the general juvenile population at that agency. This hypothesis was proposed to explain why prior findings of Valenzuela (2011) and Ranadive (2014) at JPD differed from the findings of most researchers. Specifically, the hypothesis tested the explanation that the samples of Valenzuela and Ranadive represented the general population of juvenile offenders, whereas the samples of most prior studies represented chronic and serious juvenile offenders. It was hypothesized that this difference in sample composition might explain Valenzuela and Randive's findings. However, this hypothesis was not confirmed in the present study and the proposed explanation was not supported.

Because the proposed explanation was not supported by the present findings, other explanations must be considered. One possible explanation as to why the correlation between age at first offense and recidivism was found to be close to zero in the current study of the general population of juvenile delinquents at El Paso JPD is that El Paso County is predominantly Hispanic. Among the selected samples, around 80% of the juveniles identified as Hispanic. Samples with similar characteristics were used in Valenzuela's (2011) and Ranadive's (2014)

studies. In contrast, the juveniles in the Cottle et al. (2001) meta-analysis were 47.9% Non-Hispanic White, 38.18% African American and the remaining participants were classified as “other.”

A second possible explanation as to why a moderate and positive relationship was found between these two variables among the Chronic/Serious offenders in the present study, whereas previous studies have found the opposite is that every juvenile in the Serious and Chronic sample was once part of the juveniles who were referred for the first time to the juvenile justice system. Based on the previously mentioned results from the All Juveniles samples, it can be expected that the correlation would also be positive in the Serious and Chronic 10-15 sample. Another explanation is that the Serious and Chronic 10-15 sample was small ( $N=49$ ) and therefore did not yield reliable findings.

Two other findings provide additional information about recidivism in the Serious and Chronic 10-15 sample of the present study. First, in a sample of 49 participants in the El Paso JPD Challenge program, age at first offense showed a moderate, positive and significant correlation ( $r=.423, p=.003$ ) with any new referral during the 12 months following their first offense. Second, age at first offense showed a correlation of .297 ( $p=.041$ ) with Any felony referral during 12-month follow-up after first offense. The findings suggest that greater the age at first offense is associated with general recidivism and felony re-offenses.

### **Survival Analyses and Cox Regressions**

The present study supplemented the correlational analyses discussed in the prior section with survival analyses, which allowed the examination of juveniles’ recidivism patterns for several years and not just in 12-month periods. Survival curves for the All Juveniles sample, by age at first offense, are displayed in Figure 3.5. Visual inspection suggests that the survival



curves fell into three groups: (1) The highest recidivism rates (i.e., lowest survival curves) were observed among juveniles who were 13, 14, 15 or 16 years old at the time of their first offense; (2) Intermediate recidivism rates were observed among juveniles who were 11 or 12 years old at the time of their first offense; (3) The lowest recidivism rates were observed among juveniles who were 10 years old at the time of their first offense. As can be seen in Figure 3.5, the survival curves *within* each of these groups showed considerable overlap and were not clearly different from each other. For instance, the survival curves for 13, 14, 15 and 16 year olds overlapped substantially and crossed each other over time.

A Cox regression was performed on the survival data from the All Juveniles sample, to examine the relationship of age at first offense with recidivism. Consistent with what was indicated by the visual inspection of the survival curves, the Cox regression showed a small but significant positive relationship between age at first offense and risk of recidivism (hazard rate), with the odds of recidivism increasing by a factor of 1.077 ( $p=.011$ ) for each additional year in juveniles' age at first offense. The results of a similar Cox regression of survival data for the All Juveniles Equal-Sized sample yielded similar results, although the results were not statistically significant. The results of these Cox regressions are generally consistent with the results from the correlational results reported in the prior section: There appears to be a weak, not entirely reliable positive relationship between age at first offense and recidivism risk in the general juvenile population at El Paso JPD.

### **Logistic Regressions**

A hierarchical logistic regression was conducted to identify predictors of 12-month recidivism in the All Juveniles sample. Three significant predictors of recidivism were included: (1) juvenile's age at first offense, (2) seriousness of first offense (felony versus misdemeanor),

and (3) Challenge participation. When all three variables were entered into the regression equation, the statistically significant model explained 12.8% (Nagelkerke  $R^2$ ) of the variance in 12-month recidivism.

Regarding the three individual predictors in the logistic regression: (1) An older Age at first offense was significantly associated with an increased likelihood of 12-month recidivism. This finding confirmed the results of the correlational and Cox regression analyses previously reported here. (2) Being a Challenge participant was significantly associated with an increased risk of recidivism. This finding was unsurprising: Juveniles are selected for Challenge participants because they have a history of serious or chronic offending and therefore have elevated risk of recidivism. (3) Juveniles who committed a felony offense as their first referral had a significantly lower recidivism rate than juveniles whose first offense or offenses included only misdemeanors. This third finding was unanticipated, since felony offenders might be expected to have a higher, rather than a lower, recidivism risk than misdemeanor offenders. One explanation for this finding might be that juveniles who committed a felony as their first offense were more likely to be incarcerated in state facilities: Certain felony offenses make juveniles eligible for placement in a secure facility under the supervision of the Texas Juvenile Justice Department (TJJD). Another explanation for this finding might be that those who committed a felony offense, such as a sexual offense, were placed in high-risk probation for a longer period of time, and therefore were supervised more intensively than juveniles who only committed misdemeanors.

### **Limitations of the Present Study**

The present study has several limitations. Most importantly, despite strenuous efforts by the author of this thesis and administrative and IT personnel at El Paso JPD, recidivism data

could not be obtained for juveniles after they turned 17 and entered the adult justice system. By necessity, all recidivism data in the present study came from El Paso JPD files and reflected only offenses committed before the juveniles reached the age of 17. As a result, the length of the follow-up period in which recidivism data were available varied according to juveniles' ages at the time of their first offense. For example, nearly six years of follow-up data were available for juveniles who were 11 years old at the time of their first offense, whereas less than 12 months of data were available for juveniles who were 16 years old at time of first offense.

These restrictions on the availability of long-term recidivism data had a particularly negative effect for the Serious and Chronic Sample. Many juveniles in this sample were 16 years of age or older when they were discharged from Challenge. These juveniles had to be eliminated from all analyses involving 12-month recidivism data, so that the size of the Serious and Chronic 10-15 sample used in these analyses was smaller than wished.

In addition, it would have been desirable to have adult recidivism data to look at the trajectory of recidivism of older juveniles over a longer period of time – for instance, for three years after their initial offense, as planned in the original proposal for the present thesis. Several findings from the current study indicated that juveniles who were older at the time of their first offense had a higher risk of recidivism (hazard rate) than did juveniles who were younger at the time of their first offense. It is possible that a different pattern of findings would be found if follow-up periods were longer. However, it should be noted that the survival curves shown in Figure 3.5 do not provide any reason to expect that the relationship of age at first offense with recidivism changes over time. The survival curves for the different age groups in Figure 3.5 are roughly parallel, and there is no indication that the curves for the younger juveniles will eventually overtake or cross the curves for the older ones. Furthermore, as reported in the

Results, a statistical test indicated that the relationship of age at first offense with recidivism was not time dependent. That is, the tendency for older juveniles to recidivate at a slightly higher rate than younger juveniles did not change significantly over time. Thus, the survival curves generated in the present study suggest that the same pattern seen in the present study for 12-month recidivism would also be observed for longer follow-up periods.

A second limitation of the present study was that the sample was composed of predominantly Hispanic juveniles living in one geographic area. It is possible that the results may not generalize to other geographic areas, or to predominantly non-Hispanic juvenile samples.

A third limitation of the present study was its reliance on official legal records to provide a measure of juveniles' delinquent activities. Other sources of information (i.e., self-reports of juveniles) may provide a fuller and more accurate picture of delinquent behavior (see Penner et al., 2014). However, it should be noted that nearly all studies that have found a positive relationship of age at first offense with recidivism have also relied on legal records, and many of these studies have also used 12-month follow-up periods. Thus, the differences between the present findings and the findings of these prior studies is unlikely to be due to the present study's reliance on legal records or the length of follow-up data. In fact, the survival analyses in the present study were based on follow-up periods longer than those in most prior studies.

### **Practical Implications**

Predicting recidivism is an important task for juvenile probation departments. Currently, some risk assessment tools that are used to predict recidivism include age at first offense as a predictor, with lower age at first offense being assumed to predict higher recidivism risk. The current study did not find that age at first offense is a valid negative predictor of recidivism.

Similar results (Valenzuela, 2011; Ranadive, 2014) have also shown that this variable does not predict recidivism at the El Paso JPD. Therefore, age at time of first offense should not be used to predict recidivism at this agency. The inclusion of this variable in risk assessment tools at El Paso JPD can lower their accuracy.

There are likely to be other agencies, similar to El Paso JPD, that serve Hispanic populations or operate under the laws and procedures of the state of Texas, in which age at first offense is unproductive of recidivism and inappropriate for inclusion in risk assessment tools. In these agencies, this variable should probably not be used to evaluate recidivism risk, although this recommendation depends on the outcome of future research.

Age at first offense was not a strong predictor of future re-offenses in El Paso, TX, which has a highly predominantly Hispanic population. Therefore, it may be that this variable is unproductive among Hispanics. Thus, it would be worthwhile for additional studies to expand the research on this issue to improve services for the affected juvenile populations.

### **Future Directions**

The findings of the present study suggest several avenues for future research. (1) Studies that assess the predictors of juvenile recidivism have commonly measured recidivism by using a 12-month follow-up period after an index offense, as the present study did. Future studies should attempt to study recidivism over longer follow-up periods, to see whether the patterns observed here and in other studies are maintained over time. Such studies would benefit from incorporating recidivism data for juveniles not only from the juvenile system, but from the adult criminal system as well. (2) The present study, like most prior studies of juvenile recidivism, relied on data from legal records and archival sources. It would be worthwhile to conduct studies that gather recidivism data from other sources, for instance from juvenile self-reports. (3) Studies

of recidivism in Hispanic juveniles have been rare. Future recidivism studies should examine this group in other cities in the U.S. with substantial Hispanic populations. (4) Studies similar to the present one should be made in geographical areas besides El Paso, and in non-Hispanic populations, to help determine the factors that affect the predictive power of age at first offense as a predictor of recidivism. (5) Most research on the relationship of age at first offense with recidivism has focused on samples of chronic or serious juveniles. More studies are needed, like the present one, that include general samples of juvenile offenders, who can be tracked from the time of their first offense through their subsequent involvement in the juvenile justice system and, if possible, in the adult criminal system.

In conclusion, the current findings raise important questions about the relationship of age at the time of first offense with recidivism among both first time juvenile offenders and high-risk offenders. Future research is needed to better understand the association between these variables.

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## Appendix A

### Actuarial Life Tables for the Serious and Chronic Sample and the All Juveniles Minus S&C Subsample

Life Table

First-order Controls	Interval Start Time	Number Entering Interval	Number Withdrawing during Interval	Number Exposed to Risk	Number of Terminal Events	Proportion Terminating	Proportion Surviving	Cumulative Proportion Surviving at End of Interval	Std. Error of Cumulative Proportion Surviving at End of Interval	Probability Density	Std. Error of Probability Density	Hazard Rate	Std. Error of Hazard Rate
All	.0	2926	62	2895.000	63	.02	.98	.98	.00	.218	.027	.22	.03
Juvenile	.1	2801	67	2767.500	50	.02	.98	.96	.00	.177	.025	.18	.03
s Minus	.2	2684	68	2650.000	49	.02	.98	.94	.00	.178	.025	.19	.03
S&C	.3	2567	67	2533.500	60	.02	.98	.92	.01	.223	.029	.24	.03
Subsam	.4	2440	69	2405.500	39	.02	.98	.91	.01	.149	.024	.16	.03
ple	.5	2332	67	2298.500	36	.02	.98	.89	.01	.142	.023	.16	.03
	.6	2229	71	2193.500	30	.01	.99	.88	.01	.122	.022	.14	.03
	.7	2128	65	2095.500	19	.01	.99	.87	.01	.080	.018	.09	.02
	.8	2044	62	2013.000	29	.01	.99	.86	.01	.126	.023	.15	.03

.9	1953	55	1925.500	20	.01	.99	.85	.01	.089	.020	.10	.02
1.0	1878	50	1853.000	20	.01	.99	.84	.01	.092	.020	.11	.02
1.1	1808	52	1782.000	19	.01	.99	.83	.01	.090	.020	.11	.02
1.2	1737	67	1703.500	18	.01	.99	.82	.01	.088	.021	.11	.03
1.3	1652	61	1621.500	17	.01	.99	.81	.01	.086	.021	.11	.03
1.4	1574	61	1543.500	14	.01	.99	.81	.01	.074	.020	.09	.02
1.5	1499	56	1471.000	12	.01	.99	.80	.01	.066	.019	.08	.02
1.6	1431	65	1398.500	8	.01	.99	.80	.01	.046	.016	.06	.02
1.7	1358	44	1336.000	7	.01	.99	.79	.01	.042	.016	.05	.02
1.8	1307	60	1277.000	13	.01	.99	.78	.01	.081	.022	.10	.03
1.9	1234	51	1208.500	10	.01	.99	.78	.01	.065	.020	.08	.03
2.0	1173	50	1148.000	9	.01	.99	.77	.01	.061	.020	.08	.03
2.1	1114	51	1088.500	10	.01	.99	.76	.01	.071	.022	.09	.03
2.2	1053	50	1028.000	14	.01	.99	.75	.01	.104	.028	.14	.04
2.3	989	50	964.000	9	.01	.99	.75	.01	.070	.023	.09	.03
2.4	930	45	907.500	11	.01	.99	.74	.01	.090	.027	.12	.04
2.5	874	40	854.000	9	.01	.99	.73	.01	.078	.026	.11	.04
2.6	825	42	804.000	4	.00	1.00	.73	.01	.036	.018	.05	.02
2.7	779	39	759.500	5	.01	.99	.72	.01	.048	.021	.07	.03
2.8	735	36	717.000	11	.02	.98	.71	.01	.111	.033	.15	.05
2.9	688	37	669.500	9	.01	.99	.70	.01	.095	.032	.14	.05
3.0	642	45	619.500	5	.01	.99	.69	.01	.057	.025	.08	.04
3.1	592	38	573.000	3	.01	.99	.69	.01	.036	.021	.05	.03
3.2	551	31	535.500	7	.01	.99	.68	.01	.090	.034	.13	.05
3.3	513	24	501.000	4	.01	.99	.68	.01	.054	.027	.08	.04
3.4	485	24	473.000	5	.01	.99	.67	.01	.072	.032	.11	.05
3.5	456	37	437.500	1	.00	1.00	.67	.01	.015	.015	.02	.02

3.6	418	24	406.000	6	.01	.99	.66	.01	.099	.040	.15	.06
3.7	388	25	375.500	2	.01	.99	.65	.01	.035	.025	.05	.04
3.8	361	27	347.500	8	.02	.98	.64	.01	.151	.053	.23	.08
3.9	326	28	312.000	2	.01	.99	.64	.01	.041	.029	.06	.05
4.0	296	30	281.000	1	.00	1.00	.63	.01	.023	.023	.04	.04
4.1	265	21	254.500	1	.00	1.00	.63	.01	.025	.025	.04	.04
4.2	243	23	231.500	1	.00	1.00	.63	.01	.027	.027	.04	.04
4.3	219	21	208.500	2	.01	.99	.62	.01	.060	.042	.10	.07
4.4	196	26	183.000	1	.01	.99	.62	.02	.034	.034	.05	.05
4.5	169	13	162.500	0	.00	1.00	.62	.02	.000	.000	.00	.00
4.6	156	8	152.000	4	.03	.97	.60	.02	.163	.080	.27	.13
4.7	144	14	137.000	0	.00	1.00	.60	.02	.000	.000	.00	.00
4.8	130	21	119.500	1	.01	.99	.60	.02	.050	.050	.08	.08
4.9	108	13	101.500	0	.00	1.00	.60	.02	.000	.000	.00	.00
5.0	95	6	92.000	2	.02	.98	.58	.02	.130	.091	.22	.16
5.1	87	11	81.500	1	.01	.99	.58	.02	.072	.071	.12	.12
5.2	75	7	71.500	1	.01	.99	.57	.02	.081	.080	.14	.14
5.3	67	8	63.000	0	.00	1.00	.57	.02	.000	.000	.00	.00
5.4	59	9	54.500	2	.04	.96	.55	.03	.209	.145	.37	.26
5.5	48	3	46.500	0	.00	1.00	.55	.03	.000	.000	.00	.00
5.6	45	6	42.000	1	.02	.98	.54	.03	.131	.129	.24	.24
5.7	38	3	36.500	0	.00	1.00	.54	.03	.000	.000	.00	.00
5.8	35	6	32.000	0	.00	1.00	.54	.03	.000	.000	.00	.00
5.9	29	6	26.000	0	.00	1.00	.54	.03	.000	.000	.00	.00
6.0	23	3	21.500	0	.00	1.00	.54	.03	.000	.000	.00	.00
6.1	20	1	19.500	0	.00	1.00	.54	.03	.000	.000	.00	.00
6.2	19	4	17.000	0	.00	1.00	.54	.03	.000	.000	.00	.00

	6.3	15	4	13.000	0	.00	1.00	.54	.03	.000	.000	.00	.00
	6.4	11	2	10.000	0	.00	1.00	.54	.03	.000	.000	.00	.00
	6.5	9	1	8.500	0	.00	1.00	.54	.03	.000	.000	.00	.00
	6.6	8	4	6.000	0	.00	1.00	.54	.03	.000	.000	.00	.00
	6.7	4	0	4.000	0	.00	1.00	.54	.03	.000	.000	.00	.00
	6.8	4	3	2.500	0	.00	1.00	.54	.03	.000	.000	.00	.00
	6.9	1	1	.500	0	.00	1.00	.54	.03	.000	.000	.00	.00
Serious and Chronic Sample	.0	128	0	128.000	4	.03	.97	.97	.02	.313	.154	.32	.16
	.1	124	0	124.000	8	.06	.94	.91	.03	.625	.214	.67	.24
	.2	116	0	116.000	7	.06	.94	.85	.03	.547	.201	.62	.24
	.3	109	0	109.000	7	.06	.94	.80	.04	.547	.201	.66	.25
	.4	102	1	101.500	4	.04	.96	.77	.04	.314	.155	.40	.20
	.5	97	0	97.000	2	.02	.98	.75	.04	.158	.111	.21	.15
	.6	95	0	95.000	6	.06	.94	.70	.04	.473	.189	.65	.27
	.7	89	0	89.000	7	.08	.92	.65	.04	.552	.203	.82	.31
	.8	82	0	82.000	5	.06	.94	.61	.04	.395	.173	.63	.28
	.9	77	1	76.500	5	.07	.93	.57	.04	.397	.174	.68	.30
	1.0	71	1	70.500	5	.07	.93	.53	.04	.403	.176	.74	.33
	1.1	65	2	64.000	2	.03	.97	.51	.04	.165	.116	.32	.22
	1.2	61	0	61.000	2	.03	.97	.49	.04	.168	.117	.33	.24
	1.3	59	0	59.000	4	.07	.93	.46	.04	.335	.165	.70	.35
	1.4	55	1	54.500	4	.07	.93	.43	.04	.338	.166	.76	.38
	1.5	50	0	50.000	3	.06	.94	.40	.04	.256	.146	.62	.36
	1.6	47	0	47.000	1	.02	.98	.39	.04	.085	.085	.22	.22
	1.7	46	5	43.500	4	.09	.91	.36	.04	.361	.177	.96	.48
	1.8	37	0	37.000	2	.05	.95	.34	.04	.193	.135	.56	.39
	1.9	35	1	34.500	0	.00	1.00	.34	.04	.000	.000	.00	.00



2.0	34	1	33.500	3	.09	.91	.31	.04	.302	.171	.94	.54
2.1	30	0	30.000	2	.07	.93	.29	.04	.205	.143	.69	.49
2.2	28	1	27.500	6	.22	.78	.22	.04	.626	.244	2.45	.99
2.3	21	0	21.000	1	.05	.95	.21	.04	.107	.106	.49	.49
2.4	20	1	19.500	2	.10	.90	.19	.04	.219	.152	1.08	.76
2.5	17	0	17.000	2	.12	.88	.17	.04	.225	.156	1.25	.88
2.6	15	0	15.000	1	.07	.93	.16	.04	.113	.112	.69	.69
2.7	14	0	14.000	0	.00	1.00	.16	.04	.000	.000	.00	.00
2.8	14	0	14.000	1	.07	.93	.15	.04	.113	.112	.74	.74
2.9	13	0	13.000	3	.23	.77	.11	.03	.338	.190	2.61	1.49
3.0	10	0	10.000	0	.00	1.00	.11	.03	.000	.000	.00	.00
3.1	10	1	9.500	0	.00	1.00	.11	.03	.000	.000	.00	.00
3.2	9	0	9.000	0	.00	1.00	.11	.03	.000	.000	.00	.00
3.3	9	0	9.000	0	.00	1.00	.11	.03	.000	.000	.00	.00
3.4	9	0	9.000	0	.00	1.00	.11	.03	.000	.000	.00	.00
3.5	9	1	8.500	1	.12	.88	.10	.03	.133	.130	1.25	1.25
3.6	7	1	6.500	0	.00	1.00	.10	.03	.000	.000	.00	.00
3.7	6	0	6.000	1	.17	.83	.08	.03	.166	.160	1.82	1.81
3.8	5	0	5.000	1	.20	.80	.07	.03	.166	.160	2.22	2.21
3.9	4	0	4.000	0	.00	1.00	.07	.03	.000	.000	.00	.00
4.0	4	0	4.000	0	.00	1.00	.07	.03	.000	.000	.00	.00
4.1	4	0	4.000	0	.00	1.00	.07	.03	.000	.000	.00	.00
4.2	4	0	4.000	0	.00	1.00	.07	.03	.000	.000	.00	.00
4.3	4	0	4.000	0	.00	1.00	.07	.03	.000	.000	.00	.00
4.4	4	0	4.000	1	.25	.75	.05	.03	.166	.160	2.86	2.83
4.5	3	0	3.000	0	.00	1.00	.05	.03	.000	.000	.00	.00
4.6	3	0	3.000	0	.00	1.00	.05	.03	.000	.000	.00	.00

4.7	3	0	3.000	1	.33	.67	.03	.02	.166	.160	4.00	3.92
4.8	2	0	2.000	0	.00	1.00	.03	.02	.000	.000	.00	.00
4.9	2	0	2.000	0	.00	1.00	.03	.02	.000	.000	.00	.00
5.0	2	0	2.000	1	.50	.50	.02	.02	.166	.160	6.67	6.29
5.1	1	0	1.000	0	.00	1.00	.02	.02	.000	.000	.00	.00
5.2	1	0	1.000	0	.00	1.00	.02	.02	.000	.000	.00	.00
5.3	1	1	.500	0	.00	1.00	.02	.02	.000	.000	.00	.00

## Appendix B

### Correlations between predictors: juvenile's age at first offense, severity of the first offense, and Participation in Challenge Program

Correlations				
		Age at first offense	Group Membership	Severity
<b>Age at first offense</b>	Pearson	1	-.079**	.058**
	Correlation			
	Sig. (2-tailed)		.000	.005
	N	2325	2325	2325
<b>Challenge participation</b>	Pearson	-.079**	1	-.017
	Correlation			
	Sig. (2-tailed)	.000		.411
	N	2325	2325	2325
<b>Severity</b>	Pearson	.058**	-.017	1
	Correlation			
	Sig. (2-tailed)	.005	.411	
	N	2325	2325	2325
<i>Note: **Correlation is significant at the 0.01 level (2-tailed)</i>				

### **Vita**

Claudia Lopez was born in El Paso, Texas. She graduated from Bel Air High School in El Paso, Texas in May 2011. She attended the University at Texas at El Paso where she received a Bachelor of Arts in Psychology in May 2015. She continued her education and pursued a Master of Arts in Clinical Psychology at the University of Texas at El Paso. She completed 300 hours of clinical internship in the El Paso Juvenile Probation Department.

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