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## **Early Contact with the Criminal Justice System and Intellectual Functioning as Risk Factors for Violent and Chronic Adult Offending**

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**Abstract:** *Prior research suggests early contact with the criminal justice system and neuropsychological deficits are associated with a life course persistent offending trajectory. Prior analyses of this important subject matter in life course criminology have primarily relied on analyses of age cohorts and samples drawn from urban areas. Moreover, prior studies have primarily examined samples comprised largely of majority group members who have committed only minor offenses. Data for the current study were collected from the institutional files of a cohort of 817 males exiting a Louisiana juvenile correctional facility in 1976. This information was then merged with data on the official adult records of participants up to 1988. Logistic and negative binomial regression models were used to examine the effects of age at first contact with the criminal justice system and neuropsychological/intellectual functioning on chronic and violent offending during early adulthood. Age at first contact with law enforcement and intellectual functioning emerged as robust predictors of both violent and chronic offending over the life course. Controlling for race, family criminal history, number of juvenile convictions, juvenile offense type, and diagnosed conduct disorders, early contact with the criminal justice system and intellectual functioning were inversely related to the likelihood of being charged with a violent offense as an adult. Further, early contact with the system and intellectual functioning exhibited strong inverse associations with the total number of adult criminal charges.*

**Keywords:** adolescent limited offending, age of onset, intellectual functioning, life course persistent offending

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### **INTRODUCTION**

Examinations of criminal trajectories over the life course have long been a staple within the criminological literature. Although many juveniles commit minor forms of delinquency, theoretical perspectives have attempted to develop indicators to identify which youth will become violent and chronic adult offenders. A number of risk and

protective factors, such as age at first contact with law enforcement, neuropsychological deficits, intellectual functioning, family make-up, attachment to mainstream institutions, peer relationships, previous offending patterns, and neighborhood conditions have been cited in the extant literature. However, because of the limited availability of longitudinal data on serious delinquents and

concerns over the generalizability of the extant research findings, it is critical that researchers continue to add to the foundation of this important subject matter in life course criminology.

Two consistent findings within prior research are that the early onset of antisocial or delinquent behavior and low levels of intellectual functioning increase the likelihood of violent and chronic offending over the life course. Such findings are consistent with Moffitt's (1993) developmental taxonomy in which she identifies two distinct offending trajectories. The majority of delinquent youth have a relatively short criminal career during which they commit primarily minor or status offenses. That is, most youth are Adolescence Limited (AL) offenders who do not progress to chronic or violent offending. A second group of offenders, Life Course Persistent (LCP) offenders, comprise approximately 6% of offenders who are responsible for a disproportionate amount of delinquency (Carroll et al. 2006). LCP offenders begin their criminal careers at an earlier age, have lower levels of intellectual functioning, often commit serious and personal crimes, and engage in antisocial and delinquent behavior throughout their lives.

Moffitt's taxonomic theory has received considerable attention and empirical support. The distinction between AL and LCP offending trajectories is critical to intervention and prevention efforts, which have limited resources and can be more effective when targeted toward those individuals most likely to become violent or chronic offenders. The current study adds to the foundation of this important subject matter in life course criminology by analyzing a unique data source for delinquent youth, many of whom have committed serious or violent offenses. Prior studies have primarily relied on age cohorts or relatively small samples of urban majority group members with low levels of delinquency. We address these limitations by examining a cohort of primarily black males who exited a secure juvenile correctional facility in Louisiana in 1976. In order to examine offending patterns from adolescence into early adulthood, data were collected at two time points, 1976 and 1988. We draw on these unique data on serious delinquents from diverse social settings to examine the associations between age at first contact with law enforcement, intellectual functioning, and patterns of chronic and violent offending in early adulthood.

## **THEORETICAL FRAMEWORK AND PRIOR FINDINGS**

There is a rich literature examining the persistence and desistance of antisocial and delinquent behavior from youth into adulthood. Much of this literature is grounded in developmental theoretical frameworks centered on identifying distinct offending trajectories over the life course. Such analyses have important implications for intervention and prevention programs, which have limited

resources and are most effective when targeted toward individuals likely to become violent or chronic offenders (Tremblay et al. 1992; Tremblay and Craig 1995; Wasserman and Miller 1998). Translating research findings into effective programming may allow policy makers the opportunity to develop and implement programs that reduce the antisocial behavior of individuals over the life course. As such, it is imperative that researchers continue to add to the foundation of this important subject matter in life-course criminology toward identifying youth at risk of becoming chronic and violent adult offenders. It is, after all, chronic offenders that are responsible for the majority of criminal offenses.

Moffitt (1993) developed a theoretical explanation outlining two distinct trajectories of criminality from adolescence into adulthood, Adolescent Limited (AL) and Life Course Persistent (LCP). Each trajectory is grounded in a distinct developmental history. Moffitt's theory is anchored in concepts of normal development and behavior and recognizes that most juveniles will take part in antisocial behavior only during adolescence, a chaotic and challenging period of life. The majority of juveniles commit relatively minor forms of delinquency with such behavior declining during the transition into adulthood and many completely desisting by age 30 (Sampson and Laub 2003). Such youth primarily commit minor or status offense (e.g. drug use, vandalism, and theft) and often do not have a history of antisocial behavior. Moffitt attributes the antisocial behavior of AL offenders to the social mimicry or modeling of deviant peers as well as strain resulting from the gap between biological and social maturity. Many youth begin to commit delinquent acts during adolescence in an attempt to assert their independence and maturity and to attain social recognition from parents and peers (Caspi and Moffitt 1995). This behavior peaks around age 17 and quickly drops off as the adolescent matures, develops pro-social bonds, begins to understand the consequences of delinquency, and adopts a conventional and socially acceptable lifestyle (Aguilar et al. 2000; Laub, Nagin, and Sampson 1998; Laub and Sampson 1993).

A small group, approximately 4 to 6% of youth, exhibit a pattern of antisocial and criminal behavior throughout their life and are what Moffitt terms LCP offenders. Moffitt's identification of this group dovetails with research on chronic offenders, which suggests a small but hard-core group of offenders are responsible for a disproportionate amount of crime and delinquency (Carroll et al. 2006; Wolfgang, Figilo and Sellin 1972). Moffitt identified several risk factors that distinguish AL and LCP offenders, which have been empirically supported. Chronic or LCP offenders are aggressive, have a difficult temperament, are unable to regulate impulses, have low levels of intellectual functioning, and often begin committing antisocial and delinquent acts early in life (Moffitt 1993). Moffitt attributes the criminal behavior of

LCP offenders to the confluence of neuropsychological deficits and negative social environments. Moreover, prior research suggests that age at first contact with law enforcement and intellectual functioning are particularly robust predictors of chronic or LCP offending (Blumstein et al. 1986; DeLisi and Piquero 2011; DeLisi et al. 2013; Farrington and Hawkins 1991; McCluskey, McCluskey and Bynum 2006; Moffitt and Caspi 2001; Moffitt et al. 2008; Ribeiro da Silva, Rijo and Salekin 2012; Vaughn and Howard 2005).

There are a number of rationales as to why youth who initiate their delinquent careers at an earlier age have an increased probability of becoming chronic or LCP offenders. This association may be representative of stable individual differences in anti-social characteristics and the propensity to offend (Bacon, Paternoster, and Brame 2009; Nagin and Farrington 1992; Nagin and Paternoster 2000). That is, contact with law enforcement at an earlier age may not have a direct causal effect on future offending, but rather those who have a greater propensity to commit delinquent acts do so over their entire life course. A second argument proposes that the early onset of delinquency may set in motion labeling, social control and other processes and mechanisms that may have a causal impact on the propensity to commit criminal acts over the life course. Specifically, individuals who exhibit criminal behavior at an early age are more likely to be labeled delinquent, perceive themselves as delinquent, develop bonds with delinquent peers, and experience a weakening of pro-social bonds and attachments (Bernburg and Krohn 2003; Laub and Sampson 1993; Nagin and Paternoster 2000; Smith and Paternoster 1990; Thornberry 1987). A middle ground was offered by Piquero and Chung (2001) in which early onset offending serves as both a marker of criminal propensity and a meaningful and dynamic event. That is, “individuals with high criminal propensity are more likely to incur an early onset and are more likely than those with low criminal propensity to attribute saliency to the experience of an early onset” (Piquero and Chung 2001:200). Finally, the delinquent behavior of high-risk youth may be moderated by neighborhood factors. Moffitt and colleagues suggest that “life-course-persistent antisocial behavior originates early in life, when the difficult behavior of a high-risk young child is exacerbated by high-risk social environment” (Moffitt et al. 2002:180). Regardless of the underlying process, a number of prior studies report that the early onset of antisocial and officially recorded delinquent behavior increases the likelihood that an individual will follow a LCP trajectory and become a chronic adult offender (Farrington 1992, 1997, 2003).

In addition to chronic offending, prior literature suggests individuals who begin their delinquent careers at an early age tend to be more physically aggressive and have an increased likelihood of committing violent offenses during adulthood (Loeber and Farrington 2000;

McCluskey, McCluskey, and Bynum 2006). Prior studies have found youth who begin offending before age 13 are two to three times more likely to become serious, violent, and chronic offenders (Loeber and Farrington 2000) and that juveniles convicted of a violent crime between ages 10-16 are more likely to commit violent crimes as adults compared to their non-violent counterparts (Hawkins et al. 2000). Findings from the Cambridge Study in Delinquent Development, a longitudinal survey of the development of offending and antisocial behavior in 411 boys followed from ages 8-46, showed that males first convicted at an early age tended to become the most persistent adult offenders. Those convicted between ages 10-13 averaged 8.8 convictions before the age of 40 and had an average career duration of 11.6 years (Farrington 1998). The sample also exhibited considerable continuity in their offending careers with 73% of those convicted between ages 10-16 recidivating during early adulthood (Farrington 1992). Moreover, 85% of recidivists were convicted of a violent crime and the probability of committing a violent offense was positively associated with the number of prior offenses (Farrington 1992, 1997).

Beyond early contact with the criminal justice system, prior research suggests chronic or LCP offenders exhibit deficits in neuropsychological abilities (DeLisi and Vaughn 2011; Eme 2009; Loeber 1990; Moffitt 1990; Moffitt and Silva 1988). Neuropsychological deficits can be identified in infancy and tend to manifest in areas such as reading, memory, attention, and impulsivity (Aguilar et al. 2000). In the absence of direct measures, such deficiencies are often gauged with proxy measures of intellectual functioning. Prior studies indicate that the verbal and non-verbal IQ scores of chronic or LCP offenders are about half a standard deviation lower, approximately 8 points, than AL offenders (Lynam, Moffitt and Stouthamer-Loeber 1993; Moffitt, Lynam and Silva 1994). While the causes, interpretation, and implications of the association between intellectual functioning and chronic and violent offending have been debated, it is clear that low scores on various intelligence exams are correlated with antisocial behavior, delinquency, and violence during adulthood (Piquero and White 2003).

In an analysis of longitudinal cohort data from the Dunedin Multidisciplinary Health and Development study, Moffitt et al. (1994) found that youth who began their delinquent careers before the age of 13 scored worse on neuropsychological tests than their non-delinquent counterparts. Moreover, juveniles with the lowest scores were also the most delinquent in a 5 year follow-up study when the young men had reached adulthood. The 12% of respondents with the poorest scores were also responsible for more than half of the officially recorded crimes committed by the entire sample. Analyses of longitudinal data on a cohort of 12 and 13 year old males from the Pittsburgh Youth Study offered similar findings.

Controlling for race, class, and test motivation, there was a strong inverse association between IQ score and delinquency and those with lower levels of intellectual functioning exhibited higher rates of overall delinquency (Lynam, et al. 1993). However, this relation did not hold among White youth. Although there was a relationship between IQ and school achievement for both White and Black youth, education proved to have differing effects on delinquency patterns. Most delinquents performed poorly in school, yet Black youth were found to be at the greatest risk for delinquency.

In sum, the extant literature suggests several developmental risk factors are associated with chronic and violent offending over the life course. Prior studies have found contact with the criminal justice system at an early age and intellectual functioning to be inversely associated with both the severity and frequency of adult offending. However, the effects of these factors on both violent and persistent offending remain important subject matters in life-course criminology and continue to be debated. There are certain limitations to prior research, in part due to the limited availability of data on serious delinquents, and thus researchers continue to explore the robustness and generalizability of prior findings. A number of prior studies have relied on convenience or age cohort samples comprised of predominantly White respondents that have committed no or relatively minor delinquent offenses. In such contexts, it is difficult to ascertain if predictors of distinct life course trajectories are applicable to serious or chronic offenders. In addition, prior research has primarily focused on samples drawn from a single community, often in urbanized areas. While such studies have highlighted the role of bonds and attachment to mainstream social institutions (Laub and Sampson 1993) the potentially differential impact of urban and rural environments is often overlooked. In the current study, we explore the robustness of age at first contact with law enforcement and intellectual functioning as predictors of both chronic and violent offending in early adulthood while addressing certain limitations in prior research. Specifically, we draw on unique data from a sample of serious delinquents previously detained in a secure juvenile correctional facility in Louisiana. We expect to uncover inverse associations between age at first contact with law enforcement, intellectual functioning, and both the total number and severity of offenses committed in early adulthood.

## DATA, MEASURES AND METHODS

Whereas a number of prior studies have focused on large urban area, the current sample is comprised of individuals from both urban and rural locales. The current study examines data from Louisiana, which has and continues to be largely comprised of rural areas and small towns. Louisiana ranks 25<sup>th</sup> in the nation for population

size having only two large metropolitan areas, New Orleans and Baton Rouge. From 1979 to 1989, the time period during which the data for this study were collected, the state poverty rate increased from 18% to 23%, ranking Louisiana as one of the five poorest states during both decades (US Department of Commerce 1993). Louisiana schools, especially those in New Orleans, were among the worst in the country with more than 85% of 4<sup>th</sup> graders reading below their grade level (Currie 1998). In 1980, approximately 30% of state residents were Black and minorities comprised more than half of the population in six parishes (counties) (Louisiana Division of Administration 1990). Louisiana has also been plagued by high levels of violence and incarceration. Between 1970 and 1995 the New Orleans homicide rate increased by 325% while the state experienced a five-fold increase in incarceration rates, one of the fastest growing rates in the country (Currie 1998). By 1995, Louisiana reported an incarceration rate second only to Texas. Louisiana has and continues to be a state in which residents face persistent environmental and structural disadvantages and inequalities, have few educational and economic resources, and where many residents are isolated from mainstream socializing institutions.

The data examined in this study were originally collected under a legislative directive focused on prison overcrowding. Data were collected retrospectively from institutional files on a cohort of 817 male delinquents exiting the Louisiana Technical Institute (LTI) during 1976. Data on adult offending were collected during a follow-up period in 1988 on 508 of the individuals in the initial sample (Guin 1991)<sup>1</sup>. The institution had 11 sites across the state and housed youth from nearly every parish, representing a mix of urban and rural communities. All youth exiting this juvenile detention system, which was the only set of facilities that housed juveniles who had been adjudicated and sentenced for their crimes in Louisiana, were included in this sample. The sample does not include youth who were detained in parish detention centers. In 1988, approximately 90% of the cohort was located utilizing state and federal databases containing official criminal records with the remaining individual being unidentifiable in official records or deceased<sup>2</sup>. Examinations of adult records indicated that more than 80% of the cohort had been charged with criminal offenses during their relatively early adult lives.

The youth in the original cohort ranged in age from 11 to 22 with a mean of 16. Racial minorities, particularly Blacks, comprised the bulk of the sample (71%). About three-quarters (73%) of the youth were either erratically or not attending school. Over 70% of the youth came from disrupted family structures and 60% had family members with an official criminal history. The youth had been housed in detention centers for a multitude of offenses, both property (59%) and violent (17%) and more than a quarter of the youth had previous convictions. The follow-

up study in 1988 showed that, as adults, 17 cohort members were charged with homicide, 154 were charged with burglary, 53 were charged with armed robbery, 158 were charged with robbery or theft. Among the cohort members who were charged with murder it is known that 3 individuals were eventually convicted of capital crimes and executed by the state. Overall, it appears that individuals who went on to violent and chronic adult criminal careers were over-represented in the cohort analyzed in the current study. Considering crimes, especially violent crimes, are relatively rare events, it is critical that analyses of the impact of predictors of criminal trajectories study actual criminal offenders rather than individuals who commit minor delinquent acts (e.g. smoking, curfew violations, etc.). As such, these data are uniquely situated to contribute to the extant literature on criminal trajectories over the life course.

These data also offer a unique blend of advantages often garnered from either self-report or official data. In addition to official offending records, the data provide indicators often available only in large scale and costly self-report data collection efforts such as the Cambridge and Dunedin Studies. These include indicators of intellectual functioning, mental disorder diagnoses, and parent and sibling criminal history collected by the institution from other official records. It is however important to recognize that official data suffer from certain inherent weaknesses. For example, it is impossible to definitively measure the true number of offenses committed by an individual using only official data. The police do not become aware of every offense and do not make an arrest for every crime that comes to their attention. Prior studies suggest only 13% of police contacts with youth lead to an arrest (Worden and Myers 1999). The quality of official data has also been questioned. Names, birthdates, social security numbers, aliases, and

misspellings undermine data accuracy and quality (Geerken 1994). That said, an important strength of official data is the availability and comparability of relatively accurate and consistent data over time. Once individuals have entered into the system, it is relatively easy to follow their criminal careers. Despite inconsistencies across self-report and official data sources, prior research on criminal careers suggests the social correlates of offending are relatively concordant across data sources (Brame et al. 2005; Kazemian and Farrington 2005; Kirk 2006; Thornberry and Krohn 2003).

### **Dependent Variables**

Among the 508 youth found in the follow-up of the original cohort 87.6% were charged with crimes during their early adult lives. However, there was considerable variation in both chronic and violent offending during early adulthood. The focus of the current study is twofold. We begin by examining the role of factors measured during the respondent’s youth in predicting whether he was charged with a violent crime during early adulthood. Specifically, we analyze a binary indicator of adult violence in which those charged with a murder, rape, robbery, or aggravated assault as an adult were coded 1. In addition, we examine predictors of the total number of offenses respondents were charged with during their early adult years. Table 1 presents descriptive statistics for all measures included in the analyses. Of the 508 respondents included in the analyses, 27% (136) were charged with a violent crime as an adult. Although 12.4% of respondents were not charged with a crime during early adulthood, there is significant variation in the number of charges across the sample ranging from 0 to 55 with a mean of about 3.

**Table 1: Descriptive Statistics for Study Variables, 1976 & 1988 (N=508)**

	<b>Minimum</b>	<b>Maximum</b>	<b>Mean</b>	<b>Standard Deviation</b>
Adult Violent Crime	0	1	.27	.44
Number of Adult Crimes	0	55	3.08	4.36
Age at First Contact	5	17	13.17	2.27
WISC	-9.30	8.52	.01	2.83
JV Convictions	1	10	3.65	1.92
Property Off.	0	1	.57	.50
Urban	0	1	.61	.49
Black	0	1	.69	.46
Axis Category	0	2	.56	.73
Fam. Crim. Hist.	0	1	.55	.50
Adult Years	7	16	11.85	1.17

## Primary Explanatory Measures

Our primary explanatory variables are measures highlighted in Moffitt's (1993) developmental taxonomy of offending trajectories. Moffitt (1993) proposed that, compared to AL offenders, LCP offenders begin their criminal careers at an earlier age and this has received empirical support (Blumstein et al. 1986; Farrington et al. 1990; Piquero and Chung 2001). Our analyses include a measure of the age at which a youth first came into contact with the criminal justice system, which is a proxy for the onset of antisocial behavior (Moffitt et al. 2008). An initial contact with legal authorities does not necessarily equate to an arrest. Such contact indicates law enforcement interceded in a juvenile's life as a result of a confirmed or suspected status or delinquent offense. In our sample, age at first contact varies between 5 and 17 with an average of approximately 13. More than 50% of respondents had their first contact with law enforcement prior to age 14, the traditional cutoff for early onset delinquency (Moffitt et al. 1994; Patterson, Crosby and Vuchinich 1992; Simmons et al. 1994; Tibbetts and Piquero 1999). In addition, intellectual functioning is expected to be inversely associated with both violent and chronic offending during early adulthood (Eme 2009; Moffitt 1997; Piquero and Chung 2001). We assess intellectual functioning with the Wechsler Intelligence Scale for Children (WISC), which has been described as one of the most psychometrically trustworthy measures of intellectual functioning in children (Caspi et al. 1996; Lynam et al. 1993). Our analyses include a standardized composite scale comprised of three WISC scales: summary measures of verbal and spatial ability and a full scale IQ as a general measure of intelligence. An Alpha value of .929 indicates the scale is internally consistent.

## Control Measures

Beyond our primary explanatory measures, a number of control measures were explored. We include a binary indicator of the type of juvenile offenses committed in which property offenses are coded 1. Approximately 57% of respondents committed only property crimes during their youth as opposed to violent or both property and violent crimes. We expect youth who specialized in property offense to have a lower likelihood of committing a violent crime in early adulthood. We also control for the total number of crimes for which youth were adjudicated, a continuous measure that varies between 1 and 10 with a mean of 3.65<sup>3</sup>. Delinquency levels are quite high in this sample, as evidenced by an average of nearly 4 offenses and 28% of respondents committing more than 4. Prior literature suggests individuals with a greater number of juvenile convictions are likely to become chronic and violent adult offenders (Farrington 1992). Official files included an indicator of the criminal history of family members (i.e. father, mother, and siblings), which is likely

to exacerbate an individual's criminality (Warr 1998; Laub and Sampson 1993; Akers et al. 1979). Individuals with close family members immersed in a life of crime may have a greater likelihood of becoming chronic and violent adult offenders. We control for such processes with a binary indicator coded 1 if a family member had been officially processed through the criminal justice systems. Approximately 55% of respondents had at least one family member processed into the system.

Our analyses also include indicators of respondent's race<sup>4</sup> (0=white / 1=black) and community type (0=rural / 1=urban). Consistent with prior research on disproportionate minority contact in the South (Thomas, Moak and Walker 2013), approximately 69% of respondents were black and 31% were white. In addition, 61% of respondents resided in urban centers with populations greater than 100,000 with the remaining 39% living in rural locales. A measure of mental health stability was also available. Mental health disorders, particularly personality disorders, have emerged as robust correlates of conduct problems, delinquency, and adult criminal offending (Harris, Rice and Cormier 1991; Ribeiro da Silva et al. 2012; Salekin, Rogers and Sewell 1996; Vaughn and Howard 2005). These disorders are categorized as Axis I or II based on the DSM III (American Psychiatric Association 1980). Axis I disorders include clinical disorders, such as oppositional defiant disorder, anxiety disorders, and depression. Axis I disorders often affect individuals over the short term, such as adjustment disorders, can be managed with counseling and medication, and do not permeate all factions of a person's life. Many of the youth in the cohort were diagnosed with disorders such as "adjustment reaction to adolescence" or "situational depression" both of which are considered to be appropriate developmental and situational responses based on their age and confinement (Guin 1991). Axis II disorders include personality disorders, such as antisocial and narcissistic personality. Axis II disorders are categorized as enduring patterns of maladaptiveness that endure across time and all social situations (APA 1980). Adaptation difficulties tend to permeate the individuals cognition and behavior, becoming apparent in almost every aspect of individual functioning (APA 1980). Personality disorders are often recognized in late adolescence, persist over time, are not considered developmentally appropriate for youth, and are considered more severe than situational disorders. Mental retardation is sometimes considered an Axis II disorder; however such diagnoses are excluded from the measure used in the current study. The measure used in the current study is a mental health diagnosis scale in which youth whom were never diagnosed with a disorder were coded zero, youth diagnosed with an Axis I disorder were coded 1, and individuals diagnosed with an Axis II disorder are coded 2<sup>5</sup>.

## **Analytical Strategy**

We begin our analyses with a logistic regression predicting variation in the relative likelihood that a formerly detained delinquent will commit a violent crime during early adulthood. In our analysis of chronic adult offending, we use a Poisson-based estimator to predict the number of crimes respondents were charged with as an adult (Osgood and Chambers 2000). The standard Poisson model assumes the mean and variance of the outcome are equal. When the variance exceeds the mean, as it often does with crime data, the distribution is said to be over dispersed, and an alternative Poisson-based estimator that allows for the introduction of an error term is appropriate (Long and Freese 2006). Tests for over dispersion indicated this was the case with these data, and so we use a negative binomial estimator to predict the adult crime count. Because age varies across the sample, the time each individual was at risk of being charged with an offense as an adult varies. It is plausible that time at risk impacts the number of offenses an individual is charged with; therefore we incorporate adult years, age at wave 2 minus 18, as an exposure variable. Respondents were between 25 and 34 in 1988 (wave 2) corresponding to exposure times ranging from 7 to 16 years with an average of approximately 12 years.

## **RESULTS**

Model 1 of Table 2 presents the results of a logistic regression using indicators measured when the individuals were youth to predict the likelihood of being charged with at least one violent crime during early adulthood. Each of the primary explanatory measures but few of the control measures are significantly associated with the probability that an individual was charged with a violent crime as an adult. Combined, the predictors explain approximately 12% of the variation in the likelihood that an individual will be charged with a violent crime during early adulthood. Consistent with Moffitt's expectations regarding LCP offenders, the results indicate that the age at which a juvenile first came into contact with law enforcement is significantly and negatively associated with the likelihood of being charged with a violent crime as an adult. In terms of effect size, controlling for the other measures in the model, each additional year that a juvenile avoids contact with law enforcement reduces the odds of being charged with a violent offense as an adult by 16.3%. This effect is illustrated in Figure 1, in which the x-axis corresponds to the range of observed ages in which youth were first processed into the juvenile justice system and the y-axis represents the predicted probability that an offender will commit a violent crime during early adulthood. When all other measures are held constant at their respective means, the probability that an individual will be charged with a violent crime is approximately .6

for youth who first come into contact with the system at age 5 and the probability drops to approximately .15 when age at first contact occurs at 17.

Beyond age at first contact, it was expected that neuropsychological deficits and specializing in property offenses as a youth would significantly influence the likelihood of committing a violent crime during early adulthood. As expected, the results indicate that the index of WISC scores is significantly and negatively associated with the likelihood of being charged with a violent crime in early adulthood. In terms of effect size, controlling for the other measures in the model, a standard deviation increase (2.83) in the WISC scale score reduces the odds that an individual will be charged as an adult violent offender by 20.4%. That is, higher levels of intellectual functioning reduce the likelihood of being charged with a violent crime as an adult. In addition, the results confirm our expectation regarding the effect of the nature of the offense committed by a youth on the likelihood that they will become a violent adult offender. Youth who committed only property offenses are significantly less likely to be charged with a violent offense as an adult. Compared to general and violent offenders, the odds that an individual will be charged with a violent offense during early adulthood are approximately 40% lower for youth who specialize in property crimes.

The results have thus far confirmed our expectations; however, the impact of juvenile convictions and the criminality of family members on violent offending in early adulthood are not as expected. We expected individuals with a greater number of juvenile convictions to have an increased probability of violent criminality during adulthood. The results, however, indicate that, controlling for the other measures in the analysis, the number of juvenile convictions does not significantly influence the likelihood of being charged with a violent offense as an adult. In addition, we expected individuals whose family members have a history of criminal convictions to have an elevated likelihood of being charged as a violent adult offender. The results fail to support this expectation, instead indicating that the officially recorded criminality of close family members does not significantly influence the odds that an individual will be charged with a violent adult offense. The results also suggest that neither race nor mental health disorder diagnoses are significantly associated with the likelihood of being charged with a violent offense in early adulthood. However, location emerged as a strong predictor of adult violence with the odds of being charged with a violent crime being 121% greater for individuals residing in large urban centers as compared to rural areas.

The above results indicate age at first contact and neuropsychological deficits or intellectual functioning are strong and robust predictors of violent offending during

**Table 2: Regression Models Predicting Violent Crime and Total Charges as Adult, 1988 (N=508) <sup>a</sup>**

	<b>Model 1 – Violent <sup>b</sup></b>	<b>Model 2 - Adult Charges<sup>c</sup></b>
Age at First Contact	-.178** (.046) [.837]	-.055* (.025) [.946]
WISC	-.081* (.041) [.923]	-.058** (.019) [.943]
JV Convictions	-.038 (.054) [.963]	.012 (.028) [1.012]
Property Off.	-.509* (.214) [.601]	.043 (.110) [1.044]
Urban	.793** (.241) [2.210]	.203+ (.109) [1.225]
Black	.233 (.281) [1.262]	-.031 (.114) [.986]
Axis Category	.202 (.143) [1.223]	.134+ (.082) [1.103]
Fam. Crim. Hist.	-.116 (.217) [.891]	-.322** (.114) [.852]
Constant	.959 (.750)	-.729+ (.405)
Nagelkerke Pseudo R <sup>2</sup>	.12	.08

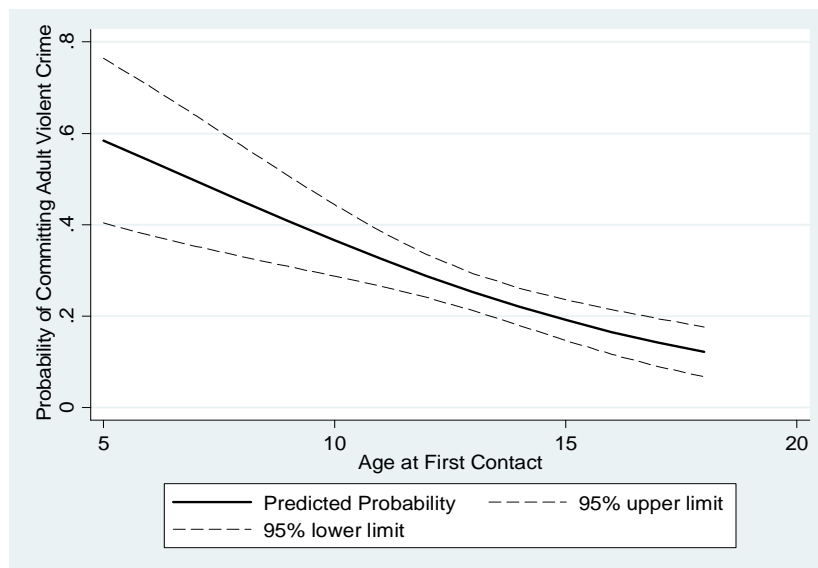
\*\*p≤.01; \*p≤.05; +p≤.10, 2-tail tests

<sup>a</sup> Coefficients with standard errors in parentheses. Values in brackets are odds ratios (Model 1) and factor change in expected count (Model 2).

<sup>b</sup> Binary logistic regression.

<sup>c</sup> Negative binomial regression (Exposure: Number of adult years).

**Figure 1: Predicted Probability of Adult Violence by Age at First Contact**





early adulthood. Moffitt (1993), however, proposed that such factors would be characteristic of chronic or persistent offenders. We test these propositions with a negative binomial regression analysis predicting the total number of offenses individuals were charged with during early adulthood. The results of this analysis are presented in Model 2 of Table 2. Time at risk (number of years as an adult) is incorporated into this analysis as an exposure effect (Long and Freese 2006). Combined, the predictors explain approximately 8% of the variation in the number of adult criminal charges<sup>6</sup>. As expected, individuals who first contact law enforcement at an earlier age are charged with significantly more criminal offenses as an adult. This finding is consistent with our analysis of violent offending and supports Moffitt's (1993) proposition that LCP or chronic offenders begin their criminal careers at an earlier age and are charged with significantly more offenses as adults. In terms of effect size, each additional year that a juvenile avoids official contact with the criminal justice system reduces the expected number of crimes he will be charged with as an adult by 5.4%.

Moffitt (1993) also proposed that LCP or chronic offenders would suffer from neuropsychological deficits. As such, we expected our indicator of intellectual functioning, a standardized composite index of verbal and non-verbal intelligence, to be negatively associated with the adult offense count. As expected, youth with higher scores on the WISC index indicating greater levels of neuropsychological or intellectual functioning were charged with significantly fewer offenses as an adult. In terms of effect size, controlling for the other measures in the model, a standard deviation increase (2.83) in the standardized WISC scale score reduces the expected number of crimes an individual will be charged with during early adulthood by 15.3%. Beyond age at first contact and neuropsychological functioning, we expected the number and type of juvenile convictions to be significantly associated with the number of adult criminal charges. The results however indicate that, controlling for the other measures in the analysis, the number of juvenile convictions and the nature of these offenses did not significantly influence the total number of adult criminal charges.

A number of control measures were significantly associated with chronic adult offending. Although race was not a significant factor, both urban location and diagnosed mental health disorders exhibited a marginally significant influence on total adult charges. Individuals residing in urban as opposed to rural areas and those with personality disorders were charged with a greater number of crimes during their early adult years. In contrast, the impact of the officially recorded criminality of family members, once again, did not conform to expectations. The criminality of family members did not exacerbate the likelihood that an individual would be a chronic adult offender. Instead, the results indicate that officially

documented criminal activity by family members is negatively associated with chronic adult offending. It is possible that such findings are the result of undetected offending due to the reliance on official data. That is, individuals may learn techniques from family members regarding how to successfully evade law enforcement. Alternatively, negative and costly interactions between family members and the criminal justice system may have attenuated the criminality of the individuals in this study. Similar findings from the Rochester Inter-generational Study have been attributed to differential levels of parenting style and contact (Laub and Sampson 1988; Thornberry 2009; Thornberry et al. 2003). That is, "when contact is ongoing, antisocial behavior in the earlier generation increases involvement in antisocial behavior by the later generation; when contact is low; however, there is no transfer of risk" (Thornberry 2009:320).

### **Supplemental and Sensitivity Analyses**

We conducted a number of supplemental analyses to ensure the reliability and robustness of our results. Prior literature generally identifies ages 13 or 14 as a "cut-off" point to distinguish early and late onset delinquency (Moffitt et al. 1994; Piquero and Chung 2001). In addition, prior analyses often exclude or have no data on very young youth. As such, we explored potential "cut-off" points for the early onset of delinquency by creating binary indicators of whether a youth committed his first offense before age 13, before age 14, and we then recreated these measures after removing the small number of youth (n=14) who first contacted law enforcement between ages 5-8. Correlations between these alternative indicators of early onset delinquency and all other measures included in our analyses are presented in Appendix A. Without exception, supplemental analyses revealed age of onset or the early onset of delinquency to be significantly and negatively associated with both the number of adult criminal charges and the likelihood of committing a violent adult offense. Moreover, the magnitude of the effects of these alternative indicators increased when youth who first contacted law enforcement between ages 5-8 were removed from the sample. In a similar fashion, we conducted auxiliary analyses using alternative measures of intellectual functioning (i.e. WRAT scores). Again, the results were substantively the same as those presented.

Beyond exploring alternative measurement specifications for our primary explanatory measures, we took several steps to explore the robustness of our results. First, we inspected collinearity diagnostics for each model and variance inflation factors for all measures were below 2.5, a conservative criterion suggested by Allison (1999). Second, we probed extensively for the presence of outlying and influential cases. Removing cases with standardized residual values above  $\pm 3.0$ , a fairly conservative criterion, did not lead to substantively altered conclusions. Third, we

tested the sensitivity of the results to sample modifications by implementing a 10% random sample deletion and re-estimating the models. These modifications failed to uncover any substantive deviations from the reported results. Fourth, while we include an exposure measure capturing time at risk (number of years as an adult) in our analysis, it is possible that detention or incarceration time would limit exposure. The data do not provide an indicator of the total time an individual was detained or incarcerated, however, sentence length is linked to offense severity. As such, we conducted supplemental analyses after removing youth and adult homicide offenders. The results from these analyses were substantively the same as those presented. Finally, we explored the influence of additional control measures on both dependent variables. These data provided a number of potential independent variables; however, some measures were omitted from the reported analyses due to excessive levels of missing data. The additional variables included in auxiliary analyses include: school behavior problems, high school dropout, truancy, family public assistance, family disruption (single parent headed household), abuse and maltreatment, and drug or alcohol use. All supplemental analyses yielded results substantively similar to those reported in terms of coefficient sign, size, strength, and significance. Overall, the results are robust and relatively invariant to alternative model specifications and we are confident that the omission of such variables did not significantly bias the findings.

## DISCUSSION AND CONCLUSION

Moffitt predicted that delinquent youth follow one of two criminal trajectories over the life course; adolescence limited (AL) or life course persistent (LCP). She asserted that a number of factors, including early onset delinquency and attenuated levels of intellectual functioning, could be assessed to identify individuals with an increased probability of becoming LCP or chronic offenders. Prior research largely supports Moffitt's contentions; however, it is imperative that researchers continue to investigate the robustness and generalizability of prior findings to add to the foundation of this important subject matter in life-course criminology. The current study contributes to the literature by assessing the offending patterns of individuals from youth through early adulthood. Specifically, data on a cohort of 508 youth exiting a group of Louisiana juvenile correctional facilities were examined for 1976 and 1988. This study serves as a good counterpart to the extant literature in that our sample includes a number of both violent and chronic offenders. Black youth are well represented in the sample and offenders were drawn from communities spanning the urban / rural divide. These data also offer advantages often garnered from either official or self-report data and are thus uniquely positioned to

contribute to the literature on life course criminology and criminal careers.

In addition to providing official offending data, these data provide indicators pertinent to analyses of criminal trajectories over the life course, such as intellectual functioning, mental disorder diagnoses, and family criminal history. Although these data were collected 25 years ago, our findings are consistent with prior research and would likely be no different had more current data been available. In particular, the social and economic landscape of Louisiana has changed very little along a number of critical dimensions. In 2008, Louisiana had the highest murder and incarceration rates among all states with more than 40,000 adults incarcerated and 40% serving sentences greater than 10 years. Nearly 40% of inmates have been convicted of a violent crime, making Louisiana the 6<sup>th</sup> most violent state. Moreover, more than 4,200 juveniles are currently under state supervision, 12% in juvenile prisons (Council for a Better Louisiana 2011).

Whereas prior studies have focused on age specific cohorts of youth, many of which never commit a serious offense, the current study analyzed data on a cohort of serious delinquents exiting a secure juvenile correctional facility. Moreover, chronic offenders are likely over represented in the current sample. Due to considerable variation in age across the sample, it was necessary to control for age related opportunity effects. For example, an offender released in 1976 at age 10 would only have 4 years to offend as an adult when data were collected again in 1988, whereas a juvenile released in 1976 at age 18 would have a 12 years of opportunity to offend as an adult. Controlling for such opportunity effects and additional control measures, our analyses indicated that youth with neuropsychological deficits, measured with a summary scale of verbal ability, spatial ability, and a full scale IQ, were more likely to become violent and chronic adult offenders. In addition, age at first contact with law enforcement was significantly negatively associated with both the likelihood of committing a violent crime and chronic offending during early adulthood. That is, individuals who began their criminal careers at an earlier age are significantly more likely to be charged with a violent crime as an adult as well as significantly more offenses.

To put the criminal propensity of the respondents in the current study into context, youth who first contacted law enforcement between ages 9-11 committed, on average, 4 adult crimes. In comparison, youth whose onset of delinquency occurred between ages 12-14 and 15-17 committed an average of 3.17 and 2.44 crimes as an adult. While supplemental analyses revealed no evidence of an interactive or moderation association between age at first contact and neuropsychological deficits, an examination of the co-occurrence of these risk factors adds to the story told in these data. Sixty-five respondents first contacted law enforcement prior to age 14 and scored 2 standard

deviations below the mean on our measure of intellectual functioning. In comparison, sixty respondents first contacted law enforcement subsequent to turning 14 and scored 2 standard deviations above the mean on our measures of intellectual functioning. The group of respondents characterized by *both* early onset delinquency and neuropsychological deficits committed in excess of 140% more adult crimes compared to their counterparts characterized by late onset delinquency and above average intellectual functioning.

The ability to identify youth who may be headed down the path of violent or chronic offending over their life course can be critical to public policy and crime control efforts. If we can identify youth likely to become chronic or LCP offenders, it may be possible to develop interventions that interrupt this path. By understanding the relationship between age at first contact, neuropsychological deficits, and the seriousness and prevalence of adult offending, policy makers would have an opportunity to design and implement effective programs that postpone the onset of offending and reduce the propensity to offend, thereby reducing the likelihood of violent and chronic adult offending. The data used in the current study indicates youth who first contact law enforcement between ages 9-11 commit nearly twice the number of crimes during early adulthood compared to those who first contact law enforcement between ages 15-17. This suggests that programming directed toward early onset offenders could potentially impact levels of crime for decades to come. Such programming could pay dividends as chronic offenders likely influence the offending patterns of other adolescents through a process of social mimicry (Moffitt 1993). As such, interventions that reduce the criminal propensity of those likely to become chronic offenders may reduce the prevalence of criminal role models and thus their impact on the offending patterns of other youth.

Our primary findings support prior literature testing Moffitt's developmental taxonomy, suggesting early contact with law enforcement and neuropsychological deficits are robust predictors of violent and chronic offending in early adulthood. However, our results may underestimate the impact of these factors on chronic adult offending as we were unable to control for the time a respondent may have been incarcerated, which reduces offending opportunities. Although our findings are consistent with Moffitt's propositions, we cannot discount alternative explanations. Bacon et al. (2009) highlighted stable differences in individuals' propensity to offend over time, which may be supported by our findings. While we control for the nature and number of juvenile convictions, our analyses cannot thoroughly address the population heterogeneity versus state dependence debate (Nagin and Paternoster 2000) centered on the causal impact of age at first contact on adult offending patterns.

Additional limitations of the current study should be addressed in future research. First, the generalizability of the results may be affected by the fact that we analyzed data for a cohort of youth exiting a secure juvenile facility in a single state in one year. The results may be partially driven by the structural, social, and demographic realities of the time period the data were collected; however, Louisiana has changed little in recent decades. There may also be concerns as to whether Louisiana is representative of the U.S. population as it is a rural state with only a handful of urbanized areas but an enduring history of poverty, low education, and high incarceration rates. A second limitation concerns our measurement of neuropsychological functioning. In the absence of direct measures, we utilized scores from the WISC scale, which measures both intellectual and nonintellectual factors and has been described as one of the most trustworthy measures of child intellect (Caspi et al. 1996) and a popular test of executive deficits (Lynam et al. 1993). Numerous scholars contend that the WISC is more a measure of neuropsychological variation than of intelligence (Moffitt 1997; Piquero 2001; Seguin et al. 1995). Although the association between intellectual functioning and both chronic and violent offending has been debated, it has been demonstrated that significant associations exist between low IQ scores and delinquency, antisocial behavior, and violent offending.

A final limitation concerns the fact that our measures of age at first contact and offending patterns are drawn from official records, which introduces the potential for undetected offending and patterns of recidivism. That said prior studies have found considerable overlap in the risk factors associated with both official and self-reported delinquency (Farrington 1992; Kirk 2006). Self-report data may offer a more holistic picture, providing details on individuals, their families, and their environment. However, such data often suffer from several notable weaknesses. Due to focusing on a very specific time period (i.e. the prior 12 months) it is often difficult to develop a complete picture of an individual's offending over time. Moreover, many offenders inaccurately report their contact with police as an arrest when, in fact, they were only detained. Telescoping is also problematic as respondents may have difficulty recalling the timing of events, and therefore inaccurately report criminal activity for the recall period. Such issues have been found to be extensive in certain self-report data. Analyzing the Project on Human Development in Chicago Neighborhoods, Kirk (2006:125) reported that "45.5% of youth officially arrested did not report any arrests in the self-report survey during any of the three interview periods, and that 23.4% of those subjects without an official record nonetheless self-reported being arrested."

Several additional topics for future research can be taken from this discussion. First, additional research is necessary to elucidate the predictors and processes

underlying early onset and chronic offending. A number of explanations for the relationship between age of onset, neuropsychological or intellectual functioning, and offending trajectories have been offered (Bacon et al. 2009; Nagin and Farrington 1992; Piquero and Chung 2001). Unfortunately, our data were unable to address this issue but future research should attempt to develop our understanding of the social processes underlying this debate. Second, studies examining offending trajectories over the life course have largely neglected to examine whether predictors are similar across race and gender groups. Comparisons of predictors of chronic offending across race and gender lines would allow for the development of programming and intervention strategies best suited for diverse populations. Finally, because chronic offenders are over-represented in the current sample, an in-depth qualitative follow-up analysis of the offending patterns of these individuals some 35 years after their initial juvenile offenses could make substantive contributions to the extant literature on criminal career and offending trajectories, similar to works by Sampson and Laub (Laub et al. 1998; Laub and Sampson 1993).

## Notes

<sup>1</sup> The data for this study were originally collected in 1988. The exiting cohort of 1976 was selected as this was the first year Louisiana institutional files were available in electronic format.

<sup>2</sup> Supplementary analyses indicated there were no significant differences between those included in the follow-up and those who could not be located in the search of official state and federal criminal records in 1988.

<sup>3</sup> Five youth committed more than ten offenses and were coded as ten to limit the skew of this measure.

<sup>4</sup> One respondent identified as neither black nor white and was removed from the sample. Supplemental analyses using an indicator of white vs. non-white respondents were substantively the same as those presented.

<sup>5</sup> In supplemental analyses, we considered separate binary indicators for Axis I and Axis II disorders. These results were substantively the same as those presented. There is also an inherent hierarchy of disorders, especially as they relate to criminal offending, therefore we retain the ordinal indicator in the analyses presented.

<sup>6</sup> Estimates of variance explained are based on Nagelkerke's pseudo r-square. While somewhat low, the results from the current analyses (.08 and .12) are comparable to the range of values reported in prior studies (.06 - .16). There are a variety pseudo r-square statistics available for regression models with categorical dependent

variables, none of which are exactly comparable to r-square in the linear regression model (Long and Freese 2006).

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**Appendix A: Zero-Order Correlation Matrix**

	Total Off.	Violence	Age at first contact	AFC ≤13	AFC ≤14	AFC ≤13 (no 5-8)	AFC ≤14 (no 5-8)	WISC	JV Conv.	Property	Urban	Black	Axis Cats.	Family Crim History	Time at risk (Exp.)
Total Off.	1														
Violence	.21**	1													
Age at first contact	-.13**	-.97**	1												
AFC ≤13	-.12**	-.16**	.87**	1											
AFC ≤14	-.15**	-.15**	.82**	.72**	1										
AFC ≤13 (no 5-8)	-.14**	-.17**	.87**	1.0	.71**	1									
AFC ≤14 (no 5-8)	-.16**	-.16**	.83**	.71**	1.0	.71**	1								
WISC	-.18**	-.10**	.06	.07*	.08*	.09*	.10*	1							
JV Conv.	.15**	-.08*	-.27**	-.20**	-.20*	-.19**	-.20**	-.08	1						
Property	.02	-.10*	-.06+	-.04	-.11**	-.05	-.12**	-.08*	-.14**	1					
Urban	.13**	.18**	-.12**	-.13**	-.07+	-.13**	-.07+	-.02	.13**	.00	1				
Black	.03	.10*	-.01	-.03	-.01	-.06	-.03	-.48**	-.02	.02	.20**	1			
Axis cats.	.04	.08*	-.00	-.00	-.02	-.00	-.02	.07+	.13**	-.19**	.07+	.07+	1		
Family Crim History	-.03	.03	-.20**	-.17**	-.15**	-.16**	-.14**	-.06+	.12**	.00	.12**	-.01	.05	1	
Time at risk	.06	-.03	.15**	.08*	.15**	.08*	.15**	.06+	.09*	-.09*	.21**	.03	.04	-.00	1



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