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The Path to Violent Behavior: The Harmful Aftermath of Childhood Trauma

Nicholas Michael Perez

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by

Nicholas M. Perez

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Doctor of Philosophy
Department of Criminology
College of Behavioral and Community Sciences
University of South Florida

Major Professor: Wesley Jennings, Ph.D.
Ojmarrh Mitchell, Ph.D.
Joshua Cochran, Ph.D.
Wilson Palacios, Ph.D.

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ABSTRACT

Adverse childhood experiences can lead to a number of harmful outcomes throughout an individual's life, ranging from medical problems to criminal behavior. These traumatic experiences, comprised of different forms of maltreatment and dysfunctional household environments, can affect the development of a child in a variety of different ways. The multitude of developmental changes can produce compounding harmful effects on the child's life and lead to acutely maladaptive outcomes. Under the perspective of developmental psychopathology, the ever-changing biological, psychological, and social dynamics of children who experience trauma can contribute to deficiencies in all aspects of their subsequent development. Each of these developmental changes can lead to problem behaviors during adolescence and further progress the youth down a path toward both externalized and internalized violent behavior.

In this study of youth who came in contact with the Florida Department of Juvenile Justice, the consequences of childhood trauma in the development of juvenile delinquents are examined. This data allowed for the calculation of each child's Adverse Childhood Experiences (ACE) score (Felitti et al., 1998). Using a generalized structural equation model, the effects of ACE scores are estimated on several aspects of each child's personality development, adolescent problem behaviors, and violent outcomes. Specifically, the model evaluates both the direct and indirect effects of the culmination of adverse childhood experiences on the initiation of externalized violence (serious, violent, chronic delinquency) and internalized violence (suicidal behavior), as mediated through the development of personality characteristics (such as

aggression and impulsivity) and adolescent problem behaviors (such as the imitation of deviant peers, school failure and dropout, substance abuse problems, and symptoms of mental illness). This study aims to contribute to the formation of a more complete understanding of the role of childhood trauma in the development of these two types of violent behaviors to improve our assessment and treatment of children who suffer from early-life trauma.

CHAPTER ONE:

INTRODUCTION

Childhood Trauma and Maltreatment

Childhood trauma is an experience that is all too common for youth worldwide. Recent studies have estimated that more than half of children suffer from at least one adverse or traumatic experience during their childhood (Anda et al., 2006; Copeland, Keeler, Angold, & Costello, 2007; Felitti et al., 1998). These experiences can range from different types of maltreatment, including abuse and neglect to traumatically dysfunctional household environments, as a result of family violence, parental separation, household incarceration, household mental illness, and household substance abuse. Each of these traumas can affect the development of the growing child in different ways. Contemporary research has begun to consider the effects of childhood trauma on the likelihood of a number of harmful adolescent and adult outcomes. These empirical analyses have continuously shown that early traumatic experiences can lead to a multitude of developmental problems for the individual throughout their life course (Cicchetti & Toth, 1995; Lamphear, 1985; Trickett & McBride-Chang, 1995).

Any examination or discussion of childhood trauma must first fully conceptualize what is meant by the word "trauma." According to Whitfield (1998), "trauma is any event…that harms the body, self, or spirit. It covers a broad range of hurtful experiences including traumas that involve the physical, sexual, mental, or emotional realms of our being" (p.361). Under this definition, a multitude of different childhood experiences could be included under the umbrella

of childhood trauma. In order to prevent any confusing or confounding effects, numerous studies have developed their own definitions and conceptualization of what constitutes traumatic experiences.

The most commonly discussed forms of childhood trauma are the multiple types of child maltreatment, as the majority of the empirical literature has evaluated the effects of physical abuse, sexual abuse, psychological abuse, physical neglect, and emotional neglect. As such, the concepts of childhood trauma and child maltreatment are consistently intertwined in the empirical literature. Throughout the forthcoming discussion, the terms "trauma" and "maltreatment" will be often used in tandem to describe the adverse experiences suffered during a youth's life (similarly used in: De Bellis, 2001; Graceffa, 2015).

The examination and recognition of the effects of childhood trauma and maltreatment in recent decades was a noticeable shift from past views on the subject. For example, prior to the 1960s, the majority of society did not recognize the prevalence of child maltreatment as a major social problem (Cicchetti & Carlson, 1989). During this time, the rights of children were largely ignored in favor of parental views on conventional disciplinary practices (Cicchetti & Carlson, 1989). Children were often seen as the property of their parents and as a result, harsh corporal punishments and negligent care were commonplace for many families (Crosson-Tower, 2013). In addition, the effects of these experiences were largely neglected as potentially impacting the development of a child's life. This belief is evident in the fact that, despite its continued occurrence throughout history, child abuse was not mentioned in the medical literature prior to the middle of the twentieth century (Dubowitz & Newberger, 1989). As our social institutions continued to progress during the second half of the 1900s, our culture began to acknowledge child maltreatment's existence and its potentially harmful effects (Cicchetti & Carlson, 1989).

Whitfield (1998) remarked that "in all our history, ours is the first generation to recognize the ravages of child abuse and neglect and begin to do something about it" (p.363). By the late 1960s every state in America had enacted some form of mandated child abuse reporting laws (Cicchetti & Carlson, 1989). These laws were extended further with the passing of the Child Abuse Prevention and Treatment Act in 1974 to include the concepts of emotional abuse, physical neglect, and emotional neglect and increase the protective services available to children in need (Stein, 1984). As a consequence of these preventative legal measures, child maltreatment and other traumas had begun to be understood as enormously influential experiences in the lives of children. Our contemporary culture has finally begun to appreciate the seriously detrimental consequences of child maltreatment and adversity for both the individual and society (Cicchetti & Toth, 2005).

Accordingly, research over the past few decades has begun to consider child abuse, neglect, and other traumas as critical concerns in the examination of childhood development and developmental psychology. Scientific examinations have begun to assess the causal and related factors that play a role in the incidence of child maltreatment and trauma (Garbarino, 1977; Pelton, 1978). This line of empirical inquiry has investigated certain social factors, including class and poverty, as correlates for childhood traumatic experiences (Gil, 1970). Beyond the causes of maltreatment, many studies around this time explored the consequences and effects of trauma in childhood and throughout life (Aber & Cicchetti, 1984; Cicchetti & Carlson, 1989). Other aspects of childhood trauma have also been considered, including the prevention and treatment for those children who have suffered through abuse, neglect, or other traumatic experiences (Kempe & Kempe, 1978; Martin, 1978). As a result of these preliminary directions

of investigation, the study of trauma has become an integral part of the biological, psychological, sociological, and various other scientific literatures.

Childhood trauma research has examined a multitude of different aspects of the experience. Some research has examined the role of trauma on the development of the brain (Glaser, 2000), while others have examined its effect on mental illnesses (Mueser et al., 1998) and behavioral problems (Garnefski & Diekstra, 1997). Central to the discussion of behavioral problems is the notion of the "cycle of violence" (Widom, 1989a). According to this concept, individuals who are abused and maltreated early in life are more likely to engage in violence later in life (Maxfield & Widom, 1990; Widom, 1989b). Empirical examinations of this hypothesis have found a pervasive effect of different types of childhood trauma on violent behavior, including serious violent and chronic delinquency (Duke, Pettingell, McMorris, & Borowsky, 2010; Widom, 1989a; 1989b; Zingraff, Leiter, Myers, & Johnson, 1994; Fox, Perez, Cass, Baglivio, Epps, 2015) and suicidal ideation and attempts (Brown, Cohen, Johnson & Smailes, 1999; Dube et al., 2008).

The Present Study

While past studies have shown that higher levels of trauma can predict both internalized and externalized violence, the intervening mechanisms between the childhood experience and subsequent violent behavior have not been fully examined. Accordingly, the present study aims to investigate the mediating mechanisms between a child's experiences of trauma, which can lead to higher risks for violent delinquency and suicidal behavior, using a method of measurement developed in the medical field. This project examines the potentially harmful paths initiated by childhood trauma through two stages of youth development: the development of maladaptive personality traits and the onset of adolescent problem behaviors.

Specifically, this study assesses these paths through two generalized structural equation models testing the effects of a composite score of nine adverse childhood experiences: (1) emotional abuse; (2) physical abuse; (3) sexual abuse; (4) emotional neglect; (5) physical neglect; (6) witnessing household violence; (7) household substance abuse; (8) household mental illness; and (9) household member incarceration on the two violent behavior outcomes: (1) serious, violent, chronic delinquency; and (2) suicidal behavior. Each of these paths also considers multiple mediating effects through the development of two maladaptive personality traits: (1) aggression; and (2) impulsivity and four adolescent problem behaviors: (1) deviant peer imitation; (2) school difficulties and dropout; (3) substance abuse problems; and (4) mental illness[1]. Essentially, the effects of adverse childhood experiences are estimated on the development of the youth's personality, the initiation of problem behaviors, and ultimately, serious violent outcomes.

By estimating these relationships, certain findings were anticipated. For starters, certain key demographic factors were anticipated to influence the prevalence of ACEs in each juvenile's life. Additionally, ACE score was predicted to influence both of the maladaptive personality traits, all four adolescent problem behaviors, and each of the two violent behavior outcomes. The relationship between the ACE score and SVC delinquency and suicidal behavior was also hypothesized to be mediated by the two personality traits and the onset of the four problem behaviors. While the childhood trauma experiences and the developmental changes were expected to exert significant effects on both SVC delinquency and suicidal behavior, the estimates were believed to demonstrate some key differences in the magnitude of the effects.

[1] These models are tested while controlling for the demographic factors of gender, race/ethnicity, and socioeconomic status.

Through the examination of these paths, this project aims to better understand the multiple and interactive relationships between the adversities experienced by children and the two violent outcomes later in life, demonstrating the variety of adverse outcomes of childhood trauma. The understanding of the paths toward these two violent behavior outcomes is of the utmost importance, as these violent behaviors can result in serious harm to the child, the potential victims of violence, and the entire community.

A better comprehension of the changes experienced by these youth at each stage through life can produce numerous important implications for theory and policy. For example, by observing these developmental changes and problem behaviors in a model simultaneously, this study can advance the empirical literature beyond examinations of singular (or a limited number of) effects of trauma. To this point, such an exploration utilizing multiple indicators of trauma, different personality measures, and numerous problem behaviors, has not been conducted. This theoretically and methodologically informed strategy aims to establish which developmental factors and behaviors are more salient for juvenile delinquents to progress down a path toward violent outcomes.

In addition, this investigation aspired to uncover what mechanisms during childhood are more likely for those who become violent towards others and which are more likely for those who become suicidal. This distinction can provide practitioners, such as teachers, counselors, pediatricians, and others, key insights toward identifying those children at the highest risk for these potentially fatal actions during the life stages prior to their actual manifestation. If these children can be identified during earlier stages of childhood and adolescence, where they are demonstrating maladaptive personality traits or adolescent problem behaviors, targeted

interventions can be implemented to curb their behavior and hopefully reduce the far-reaching consequences initiated by their childhood trauma.

While the majority of studies examining childhood trauma pay special attention to abuse and neglect, the current examination expands the scope of childhood trauma beyond solely these adverse childhood experiences by including four other important types of trauma. This present project also discusses and examine the effects of witnessing violence in the household, living with an individual with substance abuse problems, living with an individual with mental illness, and having a household member incarcerated. These additional four traumatic circumstances can elevate the discussion of childhood trauma beyond exclusively abuse and neglect and aims to provide a clearer picture of the effects of multiple adverse childhood experiences.

Research on Childhood Trauma and Maltreatment

Conducting research on childhood trauma can be very difficult. It is often unknown which parents actually mistreat their children, as a significant proportion of the abuse occurs behind closed doors and frequently goes unreported (Sharples, 2008). Even when the behavior is reported, it can be difficult for Child Protective Services (CPS) investigators to fully substantiate the claims due to a lack of witnesses or evidence. According to a recent study by the Child Welfare Information Gateway (2013), the rate of formal reporting to CPS is estimated to be only 28.3 reports per 1,000 children. These reports may represent much lower estimates than the true extent of the problem, as a large number of cases are unknown to CPS agencies (U.S. Department of Health and Human Services, National Center on Child Abuse and Neglect, 1996). In addition, about one-fifth of these reported cases are able to be truly substantiated by the CPS agencies as traumatically abusive or neglectful environments (Child Welfare Information Gateway, 2013). Based on these estimates, the report estimated that the substantiated

maltreatment rate represents only about 9.7 children per 1,000 children per year (Child Welfare Information Gateway, 2013). Accordingly, it can be very difficult to obtain accurate estimates of child abuse merely using official report data.

Utilizing self-report victimization data may also be a troublesome endeavor for individuals interested in studying child maltreatment. Many victims of trauma and maltreatment underreport their experiences (Fergusson, Horwood, & Woodward, 2000; Hardt & Rutter, 2004; McKinney, Harris, Caetano, 2009). Since the victims are often young children, they may underreport due to not being able to accurately report the trauma they are experiencing (English, 1998) or may underreport to conceal their painful experience or shame (Della Femina, Yeager, & Lewis, 1990). For example, children who experience these traumatic experiences are more likely to suffer from cognitive deficiencies, psychological problems, behavioral problems, and serious emotional damage (Cicchetti & Carlson, 1989). These cognitive and emotional problems may prevent the child from being able to accurately express the nature of their trauma to authorities or researchers. Based on these problems, those studying trauma must continue to be mindful of the way they assess childhood trauma and the potential ramifications of these types of experiences.

Due to the complications with assessing victims of trauma, the current analysis does not rely solely on official data or self-report childhood trauma data. Instead, this project utilizes data obtained from a juvenile assessment tool, the Positive Achievement and Change Tool (PACT), administered by a professionally trained caseworker and supplemented by officially reported child abuse records. By utilizing two sources of information, the data can be cross-validated to improve its reliability. In addition, the caseworker is trained to not simply ask *if* trauma has occurred, but instead to look for cues throughout the assessment that indicate the presence of each of the adverse childhood experiences. By utilizing this technique, this project is better

equipped to avoid many of the pitfalls of using solely official records or self-report data independently.

Overview of the Chapters

In the following chapters, the theoretical perspective, empirical literature methodology, results, and conclusions of the present study will be discussed in greater detail. In Chapter 2, "Theoretical Framework," the key aspects of developmental psychopathology will be discussed. This chapter will examine the major components of Dante Cicchetti's works on the harmful effects of childhood trauma throughout each stage of development. Developmental psychopathology specifically studies the growth and progression of adaptive and maladaptive behavior throughout a child's development as a result of their early-life experiences. This section will also reference Richard Jessor's problem behavior theory and how it can be applied to the current study. This theory posits that an underlying syndrome exists that causes a youth to engage in multiple interrelated problem behaviors during adolescence. Finally, two additional major criminological perspectives, the general theory of crime and social learning theory, will be contextualized into the understanding of a juvenile's development toward delinquent and violent behavior following traumatic childhood experiences.

Chapter 3, "Review of the Literature," will detail the empirical support for the present models. This chapter will specifically examine the Adverse Childhood Experiences (ACE) assessment and its findings regarding childhood trauma, as well as two violent behaviors: 1) serious, violent, chronic (SVC) delinquency, and 2) suicidal ideation. This review will go on to discuss the effects of childhood trauma on developmental personality traits: aggression and impulsivity, and certain adolescent problem behaviors: imitation of deviant peers, school difficulties and dropout, substance abuse problems, and the development of mental illnesses.

Next, this section will examine how trauma can impact a juvenile's externalized and internalized violent behavior by exploring serious, violent, chronic delinquency and suicidal behavior independently. Finally, both the direct and indirect effects, through the aforementioned mediating developmental influences, of childhood trauma on violent behavior outcomes will be discussed.

Chapter 4, "Methods," will present the design for the current study. This section will outline the nature of the Florida Department of Juvenile Justice's Positive Achievement and Change Tool (PACT) and how the ACE assessment measures are created. Furthermore, it will detail the measurement of each of the early developmental personality traits, the adolescent problem behaviors, and the violent behavior outcomes. In addition, this section will describe the plan of analysis for the data with specific focus on the planned measurement of the variables and the method of analysis: generalized structural equation modeling.

In the Chapter 5, "Results," the empirical findings of the current analyses will be presented. This chapter will consist of the descriptive statistics for the variables of interest as well as bivariate correlations for these measures. Also, this chapter will detail the results of the two generalized structural equation models, paying special attention to the direct and indirect effects that are estimated. Finally, this chapter will conclude with a cross-model comparison of the standardized effects of the two models to determine if any key differences emerge.

The sixth and final chapter, "Discussion," will contextualize the present study and its results. In order to do this, the empirically substantive findings will be discussed. Consequently, this chapter will also include the strengths and limitations of the study and its design. Furthermore, this chapter will play special attention to the theoretical and policy implications of

the findings. The final portion of this chapter will suggest future directions for empirical analysis and discuss the overall conclusions presented in this study.

CHAPTER TWO:

THEORETICAL FRAMEWORK

This chapter will analyze the relevant theoretical perspectives tied to the examination of childhood trauma and the developmental changes that can occur as a result of the experiences of early life adversity. First, this section will highlight Dante Cicchetti's developmental psychopathology perspective and its relevance in the study of child maltreatment. Second, this section will discuss Richard Jessor's problem behavior theory. Specifically, this theory will be considered in the context of how certain adolescent problem behaviors can manifest and persist in the lives of juveniles. These problem behaviors, in this discussion, will be seen as potential consequences of childhood trauma and potential causes of subsequent maladaptations and delinquency.

Additionally, a section will be devoted to Moffitt's dual taxonomy. This section will consider the neurobiological effects of children that may contribute to their incidence of trauma and their subsequent development. Finally, two important criminological perspectives will be briefly referenced: Gottfredson and Hirschi's general theory of crime and Ronald Akers' social learning theory. These oft-studied theories of criminal behavior will also be examined through a developmental psychopathological framework, where early life trauma can affect a child's level of impulsivity and the nature of the peer associations with which their social learning takes place. Through each of the aforementioned perspectives, the theoretical assertions will be considered

within the framework of how early trauma can initiate a deleterious path toward highly maladaptive and violent behavior.

The Development of Children Trauma

According to Aber, Allen, Carlson, and Cicchetti (1989), many early studies of childhood trauma did not utilize a theoretical approach in empirical examinations, and, in their estimation, "atheoretical research in child maltreatment is only slightly better than no research at all" (p.580). They claim that any study that is not sturdily grounded in a theoretical background does not give any real understanding to the phenomenon and gives no tangible insight to the proper policy implications for children who experience trauma and maltreatment. Although many theories reference the importance of normal development and discuss childhood trauma's effects on delinquent or criminal behavior, one theoretical perspective, originated from the field of developmental psychology, fully examines the step-by-step developmental effects of early life trauma on a number of adverse outcomes throughout childhood and adolescence: developmental psychopathology.

Developmental Psychopathology

The discipline of developmental psychopathology is defined as "the study of the origins and course of patterns of behavioral maladaptation, whatever the age of onset, whatever the causes, whatever the transformations in behavioral manifestation, and however complex the course of the developmental pattern may be" (Sroufe & Rutter, 1984, p.18). Essentially, this approach examines the growth of both adaptive and maladaptive behavior throughout a child's maturation. It specifically looks at different challenges at each age throughout a child's growth to determine the causes for normal and abnormal developmental processes (Causadias, 2013). One of the important realms of this perspective examines the consequences, or sequelae, of

childhood trauma and maltreatment. The developmental psychopathology perspective on child maltreatment was largely shaped by the work of developmental and clinical psychologist Dante Cicchetti in the 1980s and early 1990s (Cicchetti, 1984; Cicchetti & Toth, 1995). Interdisciplinary in nature, Cicchetti's premise is that early-life trauma can lead to adverse outcomes in a variety of different facets of life (Toth & Cicchetti, 2013).

Since child abuse is such a detrimental experience, it can have vast consequences for such a vulnerable population (Cicchetti, 2002). For instance, "child maltreatment may lead to depression, antisocial behavior, personality disorder, [or] future victimization" (Toth & Cicchetti, 2013, p.136). Of these potential ramifications of childhood abuse, only a select few have been studied using empirical methods since Cicchetti posited these potential outcomes over 20 years ago. The developmental psychopathology approach focuses on the interplay between the normal and abnormal developmental processes that occur as a result of one's childhood experiences and specifically references continuity and desistence, risk and protective factors, and internal and external influences on behavior (Cicchetti & Toth, 1995).

According to this perspective, maltreated children suffer from major risks for insufficient maturation and inappropriate adaptation as a result of their unhealthy upbringing, and may instead show numerous symptoms of maladaptive functioning (Cicchetti & Toth, 2008; Manly, Cicchetti, & Barnett, 1994). A greater frequency and higher severity of childhood trauma adversely affects the child's adjustment throughout development (Cicchetti & Toth, 1995). Accordingly, children who experience abuse, neglect, or some other type of traumatic experience are predicted to be more likely to experience developmental difficulties in emotion regulation, personal and peer relationships, self-concept, school adaptation, and display psychopathological traits throughout their lives (Cicchetti & Toth, 1995).

Organizational Perspective on Development. Under the developmental psychopathology perspective, one theoretical viewpoint that attempts to conceptualize the heightened risk of antisocial behavior as a result of childhood trauma is the "organizational perspective on development" (Cicchetti, 1990; Sroufe, 1990; Werner, 1948). According to the organizational perspective, "development occurs as a progression of qualitative reorganizations within and among the biological, social, emotional, cognitive, representational, and linguistic systems proceeding through differentiation and subsequent hierarchical integration" (Cicchetti & Toth, 1995, p.546). Essentially, this perspective states that each stage of development is predicated on the stages that came before it. As such, children who experience normal development during early childhood stages are more likely to be successful in adjusting at later life stages (Sroufe & Rutter, 1984). On the other hand, children who do not experience normal development early in life are less likely to adjust successfully and be more prone to subsequent adverse outcomes.

Ecological-Transactional Model. In accordance with the organizational perspective, Cicchetti and Lynch (1993) developed an ecological-transactional model to consider the processes of child maltreatment and development. According to this model, "an increased presence of risk factors associated with the occurrence of maltreatment at any or at all ecological levels represents a deviation from the conditions that promote normal development" (Cicchetti & Toth, 2005, p.415). The occurrence of childhood trauma increases the likelihood of other difficulties which, in turn, collectively hinders normal maturation. As such, children who are maltreated are predicted to experience developmental difficulties throughout each stage of life (Cicchetti & Toth, 1995; 2005). These children may experience developmental complications with learning to regulate their emotions, developing normal social relationships with peers,

adapting to school, and many other difficulties (Cicchetti & Toth, 2005). The trauma, in addition to these early-stage difficulties, is then theorized to impact each subsequent stage of development. As the adversity increases, so too do a number of other risk factors for maladaptive behaviors (Cicchetti & Toth, 2005). In this sense, the traumatic experiences initiate a path of constant developmental problems that continuously and perpetually affect the child's development.

While the theory predicts that early positive development will suggest future positive development, it also acknowledges that some individuals may change paths depending on other conditions. This allows different competencies and maladaptations to be formed at each stage and subsequently impact future development. For example, Cicchetti and Rogosch (1997) showed that some children are able to resist maladaptive and antisocial behavior due to certain resiliency factors in their life (see also: Cicchetti & Rogosh, 2012). In their analysis, children who possessed higher self-esteem and more emotional control were less likely to demonstrate seriously maladaptive behavior.

According to the developmental psychopathology perspective, a child's development is a multi-faceted process that necessitates a more "process-level" understanding of human behavior (Cicchetti & Toth, 2009). This perspective has led to an understanding of the variety of pathways that can lead to different maladaptive behaviors such as ADHD (Sroufe, 1989), conduct disorders (Richters & Cicchetti, 1993), and mental illnesses (Kendall-Tackett, Williams, & Finkelhor, 1993). Accordingly, this perspective can be used to predict any type of maladaptive development in a childhood's life, including the onset of problem behaviors during adolescence.

Problem Behavior Theory

Richard Jessor's problem behavior theory is a widely used social-psychological framework used to explain maladaptation during adolescence (see: Jessor, 1987, 1991; Jessor & Jessor, 1977). Through this perspective, the interrelationships of multiple problem behaviors are seen as indicative of a larger root "syndrome." Jessor (1987) defined a problem behavior as a "behavior that is socially disapproved by the institutions of authority and that tends to elicit some form of social control response whether mild reproof, social rejection, or even incarceration" (p. 332). Under this definition, a number of adolescent problem behaviors have been examined, including alcohol use and abuse, drug use and abuse, smoking, high-risk sexual behaviors, school difficulties, deviant peer imitation, mental health problems, and different forms of delinquency (Ary et al., 1999; Bensley, Spieker, Van Eenwyk, & Schoder, 1999; Bensley, Van Eenwyk, Spieker, & Schoder, 1999; Jessor, 1987).

Essentially, this theory asserts that an underlying tendency toward these problem behaviors contributes to the prevalence of maladaptive outcomes (Willoughby, Chalmers, & Busseri, 2004). Jessor (1987) asserts that the combination of environmental, personality, and behavioral proneness can be used to explain the assortment of adolescent problem behaviors. In this sense, problem behavior theory "shows that problem behaviors are related and that any single problem behavior, such as illicit drug abuse, gang involvement, or criminal activities, must be viewed within the complex system of both adaptive and problem behavior, personality, and perceived environment" (Milkman & Wanberg, 2012, p. 32).

The understanding of these problem behaviors is integral to Cicchetti's discussion of developmental psychopathology and childhood trauma and maltreatment. Studies have shown that maltreatment, parental conflict, and family dysfunction during childhood can be important

predictors in the development of problem behaviors later in life, such as antisocial or aggressive behavior, imitation of deviant peers, higher-risk sexual activities, academic failure, mental illness, suicide, and illicit substance use (see: Ary, Duncan, Duncan, & Hops, 1999; Ary et al., 1999; Bensley, Spieker, Van Eenwyk, & Schoder, 1999; Bensley, Van Eenwyk, Spieker, & Schoder, 1999; Elliott, Huizinga, & Menard, 1989; Mobley & Chun, 2013).

The onset of these problem behaviors have often been considered in response to family or personality factors in the youth's life (Barber, 1992). As developmental psychopathology would predict, the early-life family experiences of trauma contribute to the onset of certain maladaptive problem behaviors that further influence a path toward more serious delinquency. In the context of this discussion, the childhood trauma can initiate proneness toward maladaptation that contributes to antisocial personality development and increases the likelihood of a number of problem behaviors during adolescence. As a result of each additional problem behavior, the youth is even more susceptible to further and more serious deviance (Cicchetti & Toth, 2005; Jessor, 1987). Another perspective in psychology has also considered the developmental problems that pervade the lives of certain children and hypothesized the potential cause for these issues: Moffitt's developmental taxonomy.

Moffitt's Developmental Taxonomy

Drawing from neuropsychology and developmental psychology, Terrie Moffitt (1993) proposed an alternate explanation for antisocial and delinquent behavior in the theory of development taxonomy. Moffitt (1993) suggested there are two distinct types of antisocial behavior: life-course-persistent (LCP) and adolescence-limited (AL). LCP delinquents initiate deviant behavior at a very young age and persist throughout their lives. For this group, deviance is pathological. Though they represent a small percentage of individuals (approximately 5-8%),

LCPs are responsible for the most serious crime (Moffitt, 1993). This definition of the LCP group parallels our understanding of SVC delinquents (Borum, 2003). On the other hand, the AL delinquents engage in delinquent behavior later in adolescence and eventually age-out. These individuals generally commit less serious delinquency and represent the majority of delinquent behavior (Moffitt, 1993).

In proposing two separate groups with divergent trajectories, Moffitt developed two explanations for ASB. While AL delinquents engage in deviant behavior as a result of a maturity gap in which they mimic the behavior of others, LCP delinquents are theorized to engage deviant criminal behavior due to cognitive deficits and learning difficulties as a result of neurodevelopmental deficiencies. They are temperamental as children and begin to engage in deviant development very early. Moffitt (1993) also suggested a genetic link in LCP behavior in which temperamental and impulsive parents lead to ineffective childrearing. The culmination of these adverse factors leads to constant deviance with little chance for reform.

The neurodevelopmental and biological issues that Moffitt (1993) hypothesized contributed to temperamental children and seriously delinquent adolescents (whether they are named SVC delinquents or LCP delinquents), are imperative to consider in this discussion. For example, Barnes, Beaver, & Boutwell (2011) demonstrated that genetic factors explain between 56-70% of the variation in LCP classifications. These genetic differences may contribute to children that are aggressive, impulsive, deviant in a number of aspects of behavior, and often violent (Moffitt & Caspi, 2001). Additionally, these children may be difficult for parents to manage and contribute increasing the amount of adverse experiences suffered during their early life (Moffitt, 1993).

Unfortunately, in the context of the present study, these neurobiological factors cannot be reliably assessed. Accordingly, this perspective cannot substantively inform the research questions being considered. For this reason, it is merely being discussed as a consideration for the reader that, if Moffitt's assertions are accurate, all maladaptive personality traits, adolescent problem behaviors, and violent behaviors may be the result of an underlying genetic factor. Similarly, the experiences of childhood trauma may be augmented as a result of these genetic traits as well. As such, it should be considered that the examination of these factors may be spurious, where all predictors and outcomes may simply be the result of the core unobserved variable of neurodevelopmental deficiency. As this concept cannot be tested in the analysis, one must simply keep this concept in mind when considering the present study.

In the context of the current examination, however, other more criminological theories have suggested important correlates for the onset and continuity of deviant and delinquent behavior. As such, in line with the developmental psychopathology framework, two important criminological perspectives will be added to the discussion of developmental psychopathology, adolescent problem behaviors, and the path toward serious violent behavior: Gottfredson and Hirschi's general theory of crime and Ronald Akers' social learning theory. These theories will be reviewed in the coming sections.

Essential Criminological Perspectives

Criminological theories have often discussed the role of a youth's development and the onset of problem behaviors on subsequent involvement in delinquent and criminal behavior. For example, certain theories have examined the creation or onset of important early predictors of criminality and delinquency, such as low self-control (Gottfredson, & Hirschi, 1990) or deviant peer associations (Akers et al., 1979; Burgess & Akers, 1966; Sutherland, 1939). The upcoming

sections will discuss these theoretical perspectives within the discussion of developmental psychopathology and the onset of adolescent problem behaviors.

Impulsivity and the General Theory of Crime

One criminological perspective that could be vital to the understanding of maladaptive behavior and violence may lie in the formation of a child's level of self-control. Early childhood trauma may hinder the development of internal self-restraint that may help control future delinquent behavior. In their book, *A General Theory of Crime*, Gottfredson and Hirschi (1990) asserted that all criminal or delinquent behavior is simply a manifestation of an individual's low self-control. They defined self-control as the ability or tendency to resist impulses and delay gratification, and therefore, varying levels of self-control account for the degree to which people are susceptible to their "here and now" desires. Recognizing that crime often produces instant gratification, Gottfredson and Hirschi (1990) contend that the most important consideration is why juveniles abstain from all types of delinquent behavior. They theorize that self-control provides this mechanism. An extensive body of research has established empirical support for the relationship between self-control and delinquency (Arneklev, Grasmick, & Bursik, 1999; Bouffard, Craig, & Piquero, 2014; Gottfredson, 2009; Grasmick, Tittle, Bursik, & Arneklev, 1993; Pratt & Cullen, 2000).

In their premise, self-control is built through effective parenting practices and, specifically, the parents' ability to monitor the child's behavior, recognize any deviance, and discipline the child appropriately (Gottfredson & Hirschi, 1990). Ineffective childrearing, thus, is theorized to be the origin of a child's lack of self-control. Parenting practices have been validated as important predictors of self-control in the empirical literature, but are likely not the sole creator. For example, Hay (2001) showed that while ineffective childrearing does predict a

child's lower level of self-control, the relationship between parenting and delinquency is only partially mediated (see also: Burt, Simons, & Simons, 2006; Perrone, Sullivan, Pratt, & Margaryan, 2004). Despite this partial level of mediation, the parenting practices of a family appear to be crucial to determining a child's level of self-control. As such, parents who engage in traumatic parenting practices or raise the child in a dysfunctional environment may be less likely to develop adequate self-control, and thus, produce a youth who is more likely to engage in violent delinquent behaviors.

For starters, different types of abuse by a caregiver could constitute maladaptive strategies for monitoring and punishment of behavior since harsh or abusive punishments are found to be ineffective disciplinary tactics and actually increase the probability of subsequent delinquency (Azar, 2002; Straus, 1991). In addition, neglectful parenting practices, at their very root, do not allow for the monitoring, recognizing and punishing that Gottfredson and Hirschi (1990) have emphasized as important to impulse-control. Beyond the effects of maltreatment, the abuse of different substances in the household can diminish the effectiveness of parenting practices and lead to more parental dysfunction (Mayes &Truman, 2002).

Similarly weak parental effectiveness has been found for families with caregivers who suffer from symptoms of mental illness, specifically as a result of schizophrenia, psychopathology, depression, anxiety disorders, personality disorders, and other mental illnesses (Zahn-Waxler, Duggal, & Gruber, 2002). Finally, parental separation, due to divorce or incarceration, and serious parental conflict have also been found to impact the effectiveness of parenting practices that could be integral to the creation of self-control (Wilson & Gothman, 2002). Accordingly, the traumatic experiences in childhood may decrease parental effectiveness in generating a child's self-control, leading to a more impulsive and potentially delinquent youth.

As a result of this impulsive personality, a number of problem behaviors may be initiated during adolescence, including substance abuse (Grano, Virtanen, Vahtera, Elovainio, & Kivimaki, 2004; Gullo & Dawe, 2008), academic difficulties (Merrell and Tymms, 2001; Miyakawa, 2001; Rosenthal, 1998), mental illness (Swann, Steinberg, Lijffijt, & Moeller, 2008), and deviant peer associations (Baron, 2003; Wright, Caspi, Moffitt, & Silva, 1999).

Deviant Peers and Social Learning Theory

Another main criminological theory that could be incorporated into the developmental psychopathology model pertains to how individuals learn violent behavior through their interactions with deviant or antisocial peers. The main concepts of criminological learning theories are rooted in Edwin Sutherland's (1939) theory of differential association. Sutherland's theory asserts that criminal behavior is learned through interactions with intimate personal groups. This process can consist of learning how to commit a particular crime or learning the motives and attitudes supporting delinquent behavior. Since not every juvenile who associates with deviant peers will become delinquent, Sutherland's (1939) theory only posits that the likelihood of delinquent behavior will be increased when an individual associates with a greater amount of delinquent peers.

Following Sutherland's original differential association theory, Robert Burgess and Ronald Akers (1966) developed a revision, incorporating concepts of operant conditioning into the original differential association model to expand its predictive power. This led to Akers colleagues' (1979) rebranding of the theory as social learning theory. Social learning theory incorporated Sutherland's original ideas regarding the learning of delinquent and criminal behavior through peer associations, but also expanded the theory to include reinforcement and imitation (Krohn, 1999). Reinforcement considers the rewards and punishments of our behavior

from those we have personal relationships with, while imitation refers to the replication of the behavior of others. The assertions underlying learning theories have been substantiated in the empirical literature for decades. Considering a variety of delinquent behaviors, antisocial individuals have consistently been found to associate with other antisocial individuals (Akers et al., 1979; Brauer, 2009; Cochran, Sellers, Wiesbrock, & Palacios, 2011; Pratt et al., 2010).

This theory is relevant within the context of Cicchetti's developmental psychopathology perspective because the developmental changes, incurred as a product of childhood trauma, may actually increase the likelihood of deviant peer associations (Smith & Thornberry, 1995). The challenges suffered by children who experience childhood trauma may hinder them from developing "normal" prosocial peer relationships (Cicchetti & Toth, 2005). For example, maltreated children are often more antisocial, more likely to cause distress with peers, and are more regularly disliked by peers (Cicchetti & Toth, 2005; Dodge, Petit, & Bates, 1994). Consequently, they may seek out or be compelled to associate with other maladaptive or antisocial youth (Anthonysamy & Zimmer-Gembeck, 2007). Through this process, they may learn from one another and reinforce or imitate one other's delinquent behavior, becoming further propelled toward a pathway of chronic violent behavior. In fact, the association with deviant peers have been considered an adolescent problem behavior in the developmental psychological literature (see: Dishion, Patterson, Stoolmiller, & Skinner, 1991). Accordingly, it may be related to the onset of other types of problem behaviors and further promote maladaptive outcomes (Jessor, 1987).

Summary

In culmination, each of the aforementioned criminological theoretical perspectives may provide important correlates for violent behavior in the developmental psychopathology

framework. It is important to note that the present study is not a test of any of the aforementioned theories, but it is instead using the concepts put forth by each theorist to guide the research questions and empirical models. As these theories indicate that each of these contributors for violence is potentially altered by a child's upbringing and socialization, trauma and adverse experiences may offer the essential mechanism for maladaptive outcomes in each of these areas. Accordingly, these children may become more impulsive due to their under-developed self-control, associate more with deviant peers, and experience further childhood maladaptations and adolescent problem behaviors as a result of their early childhood trauma. As such, these concepts are considered within the developmental psychopathological framework. In the upcoming review of the empirical literature, the current research on these relationships will be discussed more extensively.

CHAPTER THREE:

REVIEW OF THE LITERATURE

This chapter will review the current empirical literature on the variety of topics of interest to this analysis. First, it will review an assessment tool that has been used for nearly two decades in a variety of different fields to assess childhood trauma: the Adverse Childhood Experiences (ACE) assessment. Second, two violent outcomes will be defined and considered: 1) serious, violent, and chronic (SVC) delinquency, and 2) suicidal behavior. Third, a review of the effects of childhood trauma will begin with the research on important demographic variables and their effects on the incidence of childhood trauma and maltreatment. Following this, research on the effects of different types of childhood trauma on the development of two maladaptive personality traits will be summarized: aggression and impulsivity.

Beyond a consideration of maladaptive personality traits, the literature covering childhood trauma and four adolescent problem behaviors will be examined: deviant peer imitation, school difficulties and dropout, substance abuse problems, and mental illnesses. Vital to this discussion is also the indirect effects of trauma on these behaviors through the intervening mechanisms of the aforementioned maladaptive personality traits, so each problem behavior discussion will contain a section describing the indirect effects of childhood trauma through aggression and impulsivity. Finally, childhood trauma will be discussed as a predictor for the onset of the two violent behavior outcomes, i.e., SVC delinquency and suicidal behavior. These relationships will be considered as direct associations, as well as indirect associations through the

mediating effects of maladaptive personality traits and adolescent problem behaviors. Through this review, a clearer picture of the multiple long-reaching and long-lasting effects of childhood trauma can be explored. For the purposes of this particular study, childhood trauma will be discussed as related to the ten items outlined by the Adverse Childhood Experiences (ACE) assessment.

Adverse Childhood Experiences (ACE) Assessment

The Adverse Childhood Experiences (ACE) assessment was developed in 1998 by Felitti and colleagues to examine the relationship between childhood trauma and the most common causes of death. Their study surveyed over 17,000 adults who used Kaiser-Permanente health insurance in San Diego to distinguish the negative childhood experiences that were related to serious health problems in adulthood (Felitti et al., 1998). The sample consisted of largely middle-class adults who were generally well-educated. The original assessment included measures of emotional abuse, physical abuse, sexual abuse, witnessing household violence, household substance abuse, household mental illness, and having an incarcerated member of the family. Subsequent research has since included physical neglect, emotional neglect, and parental separation or divorce. Cumulatively, these experiences of childhood trauma comprise an assessment of ten distinct items. Each individual's ACE score is calculated by simply summing the total number of the ten ACEs experienced during childhood.

Felitti and colleagues (1998) found that the majority of respondents were exposed to at least one ACE during their childhood (52.1%). Their results indicated that 11.1% had been emotionally abused, 10.8% had been physically abused, and 22.0% had been sexually abused. Additionally, 18.8% grew up with a household member with a mental illness, 25.6% witnessed household substance abuse, 12.5% witnessed household violence, and 18.8% grew up with a

family member who spent time incarcerated (Felitti et al., 1998). Individuals with higher levels of ACEs experienced increased health risks for alcoholism, drug abuse, depression, suicide, poor health, and obesity throughout life. ACEs also predicted the presence of numerous diseases and health problems, such as heart disease, high blood pressure, chronic lung disease, skeletal fractures, liver disease, cancer, and early death (Felitti et al., 1998). Their results also showed that the ACE score demonstrated a graded relationship with these outcomes, where the exposure to multiple ACEs demonstrated an exponentially more damaging health effect. This finding indicated that physical health problems may originate as a result of multiple traumatic experiences in childhood that have not been sufficiently processed or treated.

Subsequent ACE Research

Beyond this seminal study, a plethora of research has examined the life effects of childhood trauma using the ACE assessment. These studies have demonstrated that higher ACE scores have been linked to a variety of destructive behaviors, such as smoking (Anda et al., 1999), alcoholism (Dong et al., 2005), obesity (Burke, Hellman, Scott, Weems, & Carrion, 2011), mental illness (Chapman, Dube, & Anda, 2007; Felitti & Anda, 2009), depression (Dube, Felitti, Dong, Giles, & Anda, 2003), risky sexual behavior (Hillis, Anda, Felitti, & Marchbanks, 2001), adolescent pregnancy (Hillis et al., 2004), and homelessness (Herman, Susser, Struening, & Link, 1997). Each of these assessments has validated the ACE assessment as an effective predictor of a variety of negative and maladaptive outcomes throughout life.

Beyond an influence on these physical health problems, another specific area of research has examined the prevalence of ACEs in juvenile delinquents. Research by Grevstad (2010) showed that juvenile delinquents had three times higher ACE scores than what was reported in the original Felitti sample. The results also revealed that individuals with higher ACE scores

were more likely to display problem behaviors related to school difficulties, substance abuse, and self-harming behaviors. More recent studies have also indicated that ACEs may increase the odds of involvement in the criminal justice system (Baglivio et al., 2013). Youth with higher ACEs were more likely to both offend and re-offend than youth with lower ACEs. In addition, higher ACE scores have also been shown to predict the likelihood of serious, violent, and chronic (SVC) delinquency in juveniles (Fox, Perez, Cass, Baglivio, & Epps, 2015) and suicidal behavior (Dube et al., 2001). The surfacing of this area of empirical inquiry has provided an important step into the consideration of ACEs as a correlate for the two types of violent behaviors with distinct etiologies and characteristics.

Serious, Violent, Chronic (SVC) Delinquency

In any given population of juvenile delinquents, a certain proportion of them commit offenses at the highest rate and are most violent in their delinquency. This group is known as serious, violent, and chronic (SVC) delinquents (Loeber & Farrington, 1998). Although SVC delinquents represent a very small proportion of total offenders, they commit a majority of serious offenses. In fact, less than one-tenth of juvenile delinquents commit more than half of all serious violent offenses (Piquero, 2011). According to Elliott (1994), serious, violent, and chronic delinquency most often begins during adolescence (between ages 12 and 20). His results showed that initiation of serious and violent offending after age 20 is essentially zero. As such, the group of juvenile delinquents who engage in serious violent behavior at an early age is more likely to persist in their violent behavior into adulthood (Elliott, 1994).

Farrington (1982) further examined the presence of violence in chronic criminal behavior. He found that so-called "violent" delinquents rarely commit exclusively violent crimes, but instead generalize in their antisocial behavior committing a variety of different

offenses. In this sense, the majority of crimes that violent delinquents commit are not violent. Although these delinquents rarely "specialize" in violence, violent individuals tend to be more chronic in their criminal behavior than their nonviolent counterparts (Farrington, 1978). Violent criminals commit more acts of antisocial behavior and have a higher probability of offending (Farrington, 1982). Accordingly, the contributing factors for violent delinquency have been found to closely mirror the contributing factors of chronic persistent delinquency (Brame, Mulvey, & Piquero, 2001; Elliott, Huizinga, & Morse, 1986; Farrington, 1991; Piquero, Jennings, & Barnes, 2012).

As discovered by Loeber, DeLematre, Keenan, and Zhang (1998), children regularly move through "pathways" of problem delinquent behaviors. The behavior that originates as minor maladaptive or antisocial actions can intensify into more serious types of violence. As such, children with earlier onsets of antisocial behavior have more time to progress through their respective criminal pathway and escalate to more elevated and serious crimes (Loeber et al., 1998). Thus, children who initiate aggression earlier in life[2] would be anticipated to be more likely to progress into more serious and more violent delinquent behavior during their later adolescent years (Loeber et al., 1998). These SVC delinquents are often found to have numerous developmental, social, and psychological risk factors that heighten their propensity for chronic violence throughout life (Fox, Jennings, & Piquero, 2014).

Suicidal Behavior

Violent behavior does not exclusively consist of external actions directed toward others. Some violence is internalized through self-injurious behaviors and suicide. For American adolescents, suicide is the third leading cause of death and averages over 4,000 deaths per year

[2] Children who experience early-life trauma and maltreatment would be at greater risk to initiate antisocial behavior early in life, according to the developmental psychology perspective.

(Center for Disease Control, 2014). This figure accounts for about 20% of all deaths each year (Kaslow, 2014). According to Kaslow (2014), in a nationally-representative sample of high school students, approximately 16% of adolescents had considered suicide at some point and about 8% had attempted suicide one or more times. In her sample, certain risk factors emerged from all realms of the adolescent's life (intrapersonal, social, environmental, and cultural). The presence of these risk factors suggests that suicide is not a random or arbitrary choice, but it is instead precipitated by specific developmental processes and life events that may drive the juvenile toward self-destructive behaviors.

Accordingly, within a developmental psychopathology framework, a number of maladaptive changes throughout childhood and adolescence may impact a juvenile's risk for suicidal ideation or attempts (see: Mazza & Reynolds, 1998; Windle, 2004). Developmental problems in childhood related to early life adversity, major adjustment difficulties, and psychopathology have been found to be important predictors of suicidal behavior (Fergusson & Lynksey, 1995). Research has also indicated that traumatic or stressful events can lead to lower self-concept and increase the likelihood of suicidal ideation (Wilburn & Smith, 2005). For example, according to Wagner (1997) family dynamics during childhood, such as abuse, maltreatment, trauma, and household dysfunction are considered risk factors for both suicidal ideation and attempts during adolescence. Other research has considered the external factors that can negatively affect a child's temperament and personality, which through their relationships to certain adolescent problem behaviors, can predict suicidal behavior (Windle, 2004).

Contributing factors for SVC delinquency and suicidal behaviors have been located throughout the formative years of a youth's life. Research has examined the childhood experiences, the development of maladaptive personality traits, and adolescent problem

behaviors that may increase the likelihood of engaging in these harmful and violent behaviors. The upcoming review of the literature will focus predominantly on the effects of ACEs on violent behavior. It will pay special attention to the direct effects and indirect effects of trauma throughout the child's maturation and development. As such, to understand the full scope of the pathway from childhood trauma to violence, a number of other mediating variables will be considered, including personality development and adolescent behaviors. In the coming sections, the empirical literature will be examined regarding ACEs and their adverse effects throughout multiple stages of development in a child's maturation toward the onset of violent behavior.

Background Demographics and ACEs

Research has shown that experiences of childhood trauma are not evenly distributed in society. Adverse early-life experiences may vary based on a number of demographic factors affecting a family's dynamics. Past investigations have demonstrated that the gender of a child and their family characteristics, such as race/ethnicity and socioeconomic status, may play a role in the level or type of trauma suffered (Gil, 1970). For example, in a study of different types of child maltreatment, Scher, Forde, McQuaid, and Stein (2004) found that certain background factors emerged as important correlates of different forms of abuse and neglect. Their results indicated that emotional abuse was more likely to occur for female children (OR=1.83) and in White families (OR=1.64). On the other hand, physical neglect was more common for male children (OR=1.8) and in African American families (OR=1.64). Finally, females reported higher prevalence of sexual abuse (OR=3.75), as well as experiencing multiple types of contemporaneous maltreatment (OR=1.75). In accordance with these findings, sexual abuse has

consistently been shown to be a more common experience for female children than male children (Briere & Elliott, 2003; Cappelleri, Eckenrode, & Powers, 1993).

Other research has found a relationship between a family's financial resources and levels of maltreatment (Gil, 1970). For example, Brown (1984) found that numerous types of child abuse and neglect are inversely related to social class. This relationship was relatively weak, but it demonstrated that those of lower social class reported higher levels of child maltreatment. In another study of the effect of socioeconomic status on child maltreatment, the U.S. Department of Health and Human Services (1996) found that child sexual abuse was reported to occur more than 17 times more often in families with incomes below $15,000 per year than in families with incomes above $30,000. Other studies have similarly sustained that children of minority (OR=2.63) or lower income (OR=3.02) families were more likely to report higher levels of general experiences of maltreatment (Brown, Cohen, Johnson, & Salzinger, 1998). Their results suggested that children of lower educated parents and parents with lower occupational prestige were more likely to experience higher levels of both child abuse and neglect.

Abuse and neglect represent a large portion of the potentially harmful experiences for children, but they are not the sole origin of childhood trauma. Parental imprisonment is an increasingly common traumatic experience for many children. Today, more children are raised in homes broken by the incarceration of a parent than in the past (Wildeman, 2009). This condition is differentially experienced in the African American community. According to Wildeman (2009), in 1978, 1 in 40 White children and 1 in 7 African American children had a parent imprisoned, but by 1990, these fractions had increased to 1 in 25 and 1 in 4 respectively. As such, African American children are more likely to be raised in a home affected by familial incarceration.

These results indicate that childhood trauma, though widely dispersed throughout society, may be affected by certain demographic factors. The gender of the child and the race/ethnicity and socioeconomic status of the family may play key roles in contributing to the prevalence of childhood trauma. As these factors may contribute to the suffering of adverse childhood experiences, their consideration is central in any discussion of the maladaptive outcomes of American youth. Following these negative early life experiences, divergent paths may emerge that affect the child's development throughout all subsequent phases of maturation and growth.

ACEs and Maladaptive Personality Development

The experiences of early childhood trauma may affect the personality development of a child in a number of ways. The adverse effects of abuse, neglect, family disruption, and family dysfunction can permeate the child's biological, psychological, and social maturation. Abuse and neglect can deeply hinder the child's development in childhood and early adolescence (Cicchetti & Toth, 1995; Lamphear, 1985; Trickett & McBride-Chang, 1995). Additionally, research has shown that abuse and neglect during the formative years can even affect the child's brain which can impede normal development and lead to certain maladaptive personality traits and subsequent problematic behavior patterns (Cicchetti & Toth, 2005). Beyond experiences of abuse and neglect, other types of trauma also affect the child's developmental processes in a variety of facets of their life (Gabel & Shindledecker, 1993; Murray, Farrington, & Sekol, 2012).

Similarly, family disruption, specifically as a result of parental imprisonment, can affect a child's development (Miller, 2006). It is estimated that approximately 1.5-2.0 million children currently are growing up with an incarcerated parent (Glaze & Maruschak, 2008). Losing the potentially positive influence of a parent can damage the child's bond to their parents and is associated with acute developmental changes (Reed & Reed, 1997). In this section, the specific

relationships between the assortment of childhood trauma and the development of two maladaptive personality traits will be considered. Specifically, the associations between traumatic childhood experiences and a youth's level of aggression and level of impulsivity will each be discussed. These two traits are hypothesized to originate in childhood and be relatively stable throughout life (Farrington, 1994; Gottfredson and Hirschi, 1990; Olweus, 1979).

Aggression

Experiences of childhood trauma have long been linked to aggression in children even when controlling for other key risk factors (Aber, Allen, Carlson, & Cicchetti, 1989; Erickson, Egeland, & Pianta, 1989). One of the major areas of study in this realm surrounds the link between abuse and childhood aggression. For example, Farrington (1978) found that harsh discipline was the most salient predictor of aggression during early childhood. This association is often explained through the model of the cycle of violence, where those who are victimized early in life become more aggressive and violent towards others (Dodge, Bates, Pettit, 1990; Widom, 1989a).

Supporting this claim, Klika, Herrenkohl, and Lee (2012) found that physical abuse was a predictor of early aggressive and antisocial behavior in childhood and throughout the life course (Swogger, You, Cashman-Brown, and Conner, 2010). In another examination of this relationship, Stouthamer-Loeber, Loeber, Homish, and Wei (2001) showed that victims of maltreatment, in addition to higher levels of aggression, also often demonstrated problems with authority and greater disobedience. Furthermore, early neglect has also been supported as an important predictor of higher levels of childhood aggression (Kotch et al., 2007).

These findings highlight the substantial and long-term effects that physical abuse can initiate. Even more "conventional" forms of physical punishment have been shown to be related

to subsequent aggression in children. In fact, Taylor, Manganello, Lee, and Rice (2010) found that even minor forms of corporal punishment, such as spanking, at age 3 were associated with increases in the levels of aggression at age 5. This relationship was found despite controlling for prior level of aggression and demographic variables. Other forms of abuse can also affect a child's development of antisocial behavior. Allen (2011) found that childhood emotional abuse predicted subsequent forms of aggression towards others. This relationship was found to be mediated, though, by developmental problems related to the fostering of positive interpersonal relationships.

Family member incarceration also provides important insight into the initiation of childhood aggression. For example, in a meta-analysis of the effects of parental incarceration, Murray, Farrington, and Sekol (2012) found that experiences of parental incarceration were consistently related to levels of childhood aggression. When controlling for parental criminality and level of pre-incarceration antisocial behavior, the pooled effect size indicated a 10% increase in the risk of aggression in those growing up with a parent in prison compared to those without an incarcerated parent. Furthermore, Wildeman (2010) found that parental imprisonment is associated with higher levels of aggression, even in the children of parents charged with nonviolent offenses.

In addition to family member incarceration and maltreatment victimization, parental substance abuse in the home has been shown to contribute to severe aggression in children (Gabel & Shindledecker, 1993). Finally, the witnessing of violence in the household has also been suggested as a major correlate for aggression. Sousa and colleagues (2011) found that a dual exposure to both child abuse and witnessing domestic violence significantly increases the child's risk for aggression. This effect of suffering from both experiences was much greater than

each individual experience alone. These findings support the notion that the effects of each of these childhood traumatic experiences may be cumulative and graded, as multiple types of trauma may predict even more acute development of aggression.

Impulsivity

A child's level of impulsivity is also considered an important determinant for subsequent behavior and conduct. Unfortunately, early childhood trauma may impede the child's development of self-control, and thus, lead to more impulsivity. Gottfredson and Hirschi's (1990) conceptualization defined self-control as the ability to delay gratification and resist immediate impulses and contends that effective parenting practices are the sole cause of differential levels of self-control in children. This relationship between parenting and a child's level of self-control has been found in a number of empirical studies (Gibbs, Giever, & Martin, 1998; Hay, 2001; Hope, Grasmick, & Pointon, 2003; Lynskey, Winfree, Esbensen, & Clason, 2000; Unnever, Cullen, & Pratt, 2003). As such, parents who are incarcerated, absent, neglectful, or abusive may be less likely to utilize positive childrearing practices and succeed in sculpting the child's self-control during their developmental years (Bornstein, 2002).

Abuse is often the result of an escalation of poor or maladaptive disciplinary practices (Rodriguez, 2003). If the parents are unable to effectively monitor or discipline their children, they may become frustrated or angry and turn to more harsh and violent reprimands (Azar, 2002). Abused and neglected children regularly show lower impulse control than non-abused children (Haapasalo & Pokela 1999). In fact, Erickson, Egeland, and Pianta (1989) found that abused children were rated by their teachers as having much lower impulse-control than non-maltreated children. The early traumatic experiences from childhood may also severely damage their developing brain and diminish the key inhibitory processes needed to effectively restrict

behaviors and regulate emotions (Braquehais, Oquendo, Baca-Garcia, & Sher, 2010). Correspondingly, persistent distress, as a result of abuse or neglect, is associated with increases in impulsivity and an interference with the capabilities for conduct control (Braquehais et al., 2010; Roy, 2005).

Many studies have suggested that the parent-child environment is vital to creating self-control. Effective parental management and positive disciplinary practices significantly predict self-control (Cullen, Unnever, Wright, & Beaver, 2008; Gibbs, Giever, & Higgins, 2003; Hay, 2001). Supervision also regularly plays a role in the development of self-control, as youth who are supervised less demonstrate lower levels of self-restraint and higher impulsivity (Hope, Grasmick, & Pointon, 2003). As such, children who grow up in a household characterized by abuse or violence or children who grow up with a parent who is absent or incarcerated are less likely to be provided the necessary supervision to foster impulse-control (Block, Block, & Gjerde, 1986; Harrist & Ainslie, 1998). Overall, studies have suggested that traumatic childhood experiences can lead to serious problems with a child's ability to regulate their levels of impulsivity (Nader & Fairbanks, 1994).

While the aforementioned studies have indicated that certain traumas can lead to maladaptive personality traits, none have considered the impact of multiple traumas on the onset of both traits simultaneously. Each study simply has looked at one type of child maltreatment or adverse childhood experience and its effect on either aggression or impulsivity later in life. The present study aims to address this gap in the research by considering the effect of nine distinct traumas on the development of both maladaptive personality traits simultaneously. By considering a number of factors at once, a clearer understanding of the underlying association can emerge.

ACEs and Adolescent Problem Behaviors

In addition to the maladaptive personality traits that are associated with childhood trauma, a number of subsequent adolescent problem behaviors may also be associated with adverse childhood experiences. ACEs have been shown to be related to a number of enduring long-term outcomes (Anda et al., 2006). Abuse victimization is related to a number of physical, psychological, and social problems that persist later in life (Dube et al., 2005; Leeb, Lewis, & Zolotor, 2011; Moeller & Bachmann, 1993; Mullen, Martin, Anderson, Romans, & Herbison, 1996). Specifically, this section will focus on four different adolescent problem behaviors: the imitation of deviant peers, school difficulties and dropout, the development of substance abuse problems, and the development of a mental illness. Many of these problem behaviors may be directly associated with experiences of childhood adversity, but these relationships may also be mediated through the aforementioned maladaptive personality traits the child has developed as a result of their trauma. In addition, these problem behaviors may also be related to one another, contributing to further problematic conduct (Jessor & Jessor, 1977; Jessor, 1987). Regardless of the nature of the path, the exploration of these relationships is vital to the understanding of the ensuing adversity related to early childhood trauma.

Deviant Peer Imitation

The circumstances surrounding a child's home life can directly impact the types of individuals they interact with and imitate during their formative peer encounters. An analysis by Fergusson and Horwood (1999) found that a number of factors can contribute to a youth affiliating with deviant peers. Relevant to this discussion, their results showed that parental conflict and violence, childhood abuse, and parental substance abuse were significant predictors of later deviant peer association. In addition, Dishion, Patterson, Stoolmiller, and Skinner (1991)

showed that positive parental disciplinary practices were related to lower levels of peer antisocial behavior in children. Correspondingly, the children who habitually face negative parent-to-child interactions (including physically and verbally abusive relationships) displayed a higher prevalence of deviant peer associations. Brody and colleagues (2001) similarly concluded that nurturing parenting practices are related to lower levels of antisocial peer involvement, while more traumatic parenting practices were associated with a greater number of deviant peer affiliations.

Abusive or harsh discipline is not the only traumatic event that can negatively affect a child's peer associations. Chapple, Tyler, and Bersani (2005) found that both physical and emotional neglect in childhood was predictive of peer adjustment problems as well as associating with deviant peers. Beyond the traumatic effects of abusive or neglectful parenting, the trauma of growing up in a household with someone suffering from a mental illness has also shown to affect peer interactions and lead to reduced social competence (Billings & Moos, 1983; Thomas, Forehand, & Neighbors, 1995). Furthermore, exposure to family violence has also been found to correspond with peer conflict resolution difficulties, increasing the risks of associating with deviant or antisocial peers (Margolin & Gordis, 2004).

Associations Through Maladaptive Personality Traits. Abused children may associate with deviant friends for a number of reasons. Maltreated children have been rated as significantly lower in social competency than non-maltreated children by their teachers and found to be much less popular in their classes (Erickson, Egelend, & Pianta, 1989). More in-depth investigations of why maltreated children often struggle with peer relations has indicated that children who experienced trauma are more likely to be either aggressive or withdrawn toward other children in their age group (Galdston, 1971; George & Main, 1979; Hoffman-

Plotkin, & Twentyman, 1984; Mueller & Silverman, 1989). "Maltreated children tend to behave more aggressively and may be rejected by or isolate themselves from conventional peers. This may lead them to seek associations with other antisocial children" (Smith & Thornberry, 1995, p. 470).

This assertion was supported by the results of Anthonysamy and Zimmer-Gembeck (2007), which found that abused children were more likely to be aggressive or withdrawn, and thus, more commonly disliked by the majority of their peers. Essentially, personality changes brought about by the traumatic experiences tend to push away peers with more prosocial conduct (see also: Patterson, Debaryshe, & Ramsey, 1989), and as a result, the child may be pushed into friendships with similarly antisocial peers. Whether occurring organically or as a result of social isolation, the association with and imitation of deviant peers appears to be influenced by childhood experiences and the resulting developmental changes the individual experiences.

Furthermore, research has also found that higher levels of impulsivity are related to associating with deviant peers during adolescence (Baron, 2003; Wright, Caspi, Moffitt, & Silva, 1999). McGloin and Shermer (2009) also found that a child's lower self-control and higher number of deviant peer associations were associated. Similar to aggression, this may occur due to children who display more impulsivity experiencing rejection by "normal" peers, and self-selecting into deviant peer groups (Chapple, 1989; DeMuth 2004). Through their impulsive personality and resulting behavior, the children may be ostracized from prosocial associations and turn toward more antisocial and deviant peers. These early maladaptations can also impact the social development of the child within their peer group. As such, they may not be able to maintain lasting friendships with prosocial peers and may be more likely to associate with more deviant and troubled classmates.

School Difficulties and Dropout

Adverse childhood experiences can also negatively affect a child's level academic success. The experiences of trauma may affect the child's intellectual abilities or their involvement in their educational pursuits, resulting in substantially weakened school comprehension and performance (Erickson, Egeland, & Pianta, 1989). A study by Eckenrode, Laird, and Doris (1993) utilized a matched sample of maltreated children and non-maltreated children and showed that the maltreated group performed lower on both standardized tests and received lower overall grades than the control group. In their analysis, children who were victims of neglect showed the most pervasive academic deficiencies. Similarly, Kurtz, Gaudin, Wodarski, and Howing (1993) found that abused and neglected children experienced severe academic problems with language and math proficiency. Their results also showed that abused children were more likely to repeat a grade, while neglected children were significantly higher in levels of truancy. Lastly, Leiter and Johnsen (1994) also found that maltreated children receive worse grades, lower test scores, and have higher absences (see also: Kendall-Tackett & Eckenrode, 1996; Shonk & Cicchetti, 2001; Zolotor et al., 1999).

Family disruption, as a result of divorce or an incarcerated parent, can also have dramatic effects on the educational success of the child. For example, Astone and McLanahan (1991) found that children who live with single parents are less likely to receive necessary support and assistance and, as such, their school achievement is negatively affected. Their results demonstrated that children who do not have both parents available to help them in their formative education demonstrated significantly lower grades and had worse attendance in school. Other empirical research has suggested that the witnessing of violence is related to lower grades and more days absent from school (Bowen, & Bowen, 1999; Hurt, Malmud, Brodsky, Giannetta,

2001). Finally, dysfunctional household environments due to parental substance abuse have been found to be related to weakened school performance (Moss, Vanyukov, Majumder, Kirisci, & Tarter, 1995).

Not surprisingly, early educational problems are also regularly associated with resulting school dropouts. Children with higher levels of educational disengagement, lower levels of school participation, and weakened academic achievement also have higher rates of dropping out prior to graduation (Ensminger & Slusarcick, 1992; Fetler, 1989; Garnier, Stein, & Jacobs, 1997; Mahoney & Cairns, 1997). Some studies located the origins of these effects from as far back as the first grade (Alexander, Entwisle, & Horsey, 1997; Jimmerson, Egeland, Sroufe, & Carlson, 2000). This shows the potentially life-changing effects that can occur as a result of the school difficulties that are influenced by experiences of trauma early in childhood.

Children who experience trauma during childhood are also shown to be more likely to get in trouble in school. Abused and neglected children have significantly more suspensions and disciplinary problems than children who do not report abuse or neglect (Eckenrode, Laird, & Doris, 1993; Kendall-Tackett & Eckenrode, 1996). These studies showed that the disciplinary problems continued to persist throughout adolescence. In addition to disciplinary problems, children who drop out of school are more likely to originate from families experiencing some level of separation or instability (Garnier, Stein, & Jacobs, 1997). The separation may result from divorce or incarceration, and instability may be the product of family drug abuse, family mental illness, or any form of violence or abuse. For example, children who have parents with a mental illness have more academic difficulties and lower GPAs (Billings & Moos, 1983; Tannenbaum & Forehand, 1994).

Accordingly, child maltreatment and trauma is considered a serious risk factor for school failure or dropout (Kurtz, Gaudin, Wodarski, & Howing, 1993). Constructive parental concern and involvement in a child's education is associated with lower rates of subsequent high school dropout (Barnard, 2004). In addition, children who live in single parent families are more likely to drop out of school prior to graduation and are less likely to receive a diploma or GED (Astone, & Mclanahan, 1991). The family dynamics that are damaged by divorce or imprisonment are more likely to prevent the necessary parental involvement and decrease the chances of successful school completion. The findings of these studies suggest that childhood adversity can be a major predictor of academic difficulties, school discipline, truancy, and dropout.

Associations Through Maladaptive Personality Traits. In addition to these direct associations, school difficulties and dropout may be affected by the development of personality traits associated with childhood traumatic experiences. According to Brook and Newcomb (1995), childhood aggression has been found to affect a youth's academic achievement throughout all stages of their education. Furthermore, Loveland, Lounsbury, Welsh, and Buboltz (2011) demonstrated that early physical aggression was predictive of an adolescent's high school GPA. Their results showed that aggression accounted for 16% of the variance in GPA.

Likewise, Garnier, Stein, and Jacobs (1997) described that the process of dropping out of school is a multi-step process with roots in early-life development. A multitude of dynamic factors exist and interact to lead to the circumstances surrounding the child's educational outcome. For starters, children who are aggressive early in life often have lower GPAs and perform worse in school (Gumora & Arsenio, 2002). These children are eventually more likely to adjust poorly in school, have more disciplinary problems, and have stronger odds of

eventually dropping out (Kokko, Tremblay, Lacourse, Nagin, & Vitaro, 2006; Ladd & Burgess, 2001, McLeod, & Kaiser, 2004). .

A child's level of impulsivity and self-control is also crucial to the prediction of school difficulties and dropout. Children with higher impulsivity achieve lower grades and weaker achievement (Meade, 1981; Merrell & Tymms, 2001). This was even found when controlling for the youth's IQ level (Duckworth & Sligman, 2005; Miyakawa, 2001). In addition, compared to school completers, youth who dropout have higher levels of impulsivity and exhibit less self-control (Garrison, 1983; Rosenthal, 1998). Since education is a process that involves great deal work and delayed gratification, it is not surprising that individuals who prefer impulsive or easy decisions would be more prone to experiencing difficulties and dropping out prior to completing their education (Spinella & Miley, 2003). These findings support the notion that these two key personality traits, which are related to childhood trauma, may also be associated with school difficulties and dropping out of school in adolescence.

Substance Abuse Problems

Alcohol. Children who experience early childhood trauma may be at an increased risk for utilizing alcohol to cope with their emotions. In fact, each of the ten individual adverse childhood experiences was related to general lifetime alcohol use (Dube et al., 2006). Beyond this, increased levels of childhood trauma are able to predict earlier ages of drinking initiation. For example, Rothman, Edwards, Heeren, and Hingson (2007) found that physical and sexual abuse, household mental illness, household substance abuse, and parental separation were each independently associated with earlier drinking onset. In these cases, the household environment was so stressful that the child felt the need to drink to cope with their negative emotions. In

addition to early onset, childhood trauma has also been used to predict heavier levels of drinking throughout childhood and adulthood (Waldrop et al., 2007).

Above the earlier onset and heavier use, experiences of childhood adversity have been connected to alcohol use disorders (AUDs) as well. For example, child abuse has been found to be connected to problem drinking behaviors (Dube, Anda, Felitti, Edwards, & Croft, 2002; Makhija & Sher, 2007; Simpson & Miller, 2002). This problem drinking can exist in the form of either abuse or dependence. Adolescents experiencing these two types of AUDs were 6 to 12 times more likely to have a history of physical abuse and 18 to 21 times more likely to have a history of sexual abuse (Clark, Lesnick, & Hegedus, 1997). Anda and colleagues (2002) showed that the assortment of adverse childhood experiences is predictive of later-life alcoholism, above and beyond the effect of solely growing up with an alcoholic parent.

Exposure to substance abuse in the household has also been associated with a child's subsequent substance abuse. In fact, Widom and Hiller-Sturmhofel (2001) found that parental alcohol abuse is also associated with physical or sexual abuse of the child which can further compound the child's likelihood of alcohol-related problems in the future. Other research has found that the odds of each additional ACE are two- to thirteen- times higher if a parent abuses alcohol in the household. These findings suggest that alcoholic parents are more likely to provide a traumatic home environment and may further fuel the child's subsequent alcohol abuse or dependence. Essentially, these different types of adverse experiences may interact to create an even more substantial effect.

Drugs. In addition to alcohol use and abuse, childhood adversity is connected to the use of a variety of other mood-altering substances. Dube and colleagues (2003) found that each adverse childhood experience was related to an early initiation of illicit drugs, with each ACE

increasing the likelihood of early initiation by two- to four- times. Their study showed that ACE prevalence strongly predicted drug use problems and drug addiction as well. Ireland, Smith, and Thornberry (2002) found that persistent maltreatment throughout childhood and adolescence is related to higher levels of adolescent drug use. Experiencing physical and sexual abuse during childhood has been related to both the ever-use of intravenous drug use and an earlier initiation of intravenous substances (Kerr et al., 2009; Ompad et al., 2005). Growing up in a non-intact family (possibly as a result of separation or incarceration) was also predictive of higher levels of controlled substance usage (Flewelling & Bauman, 1990). Finally, higher levels of abuse and other traumas are predictive of multiple substance use as well, where the individual is using several types of illicit drugs and alcohol simultaneously (Harrison, Fulkerson, & Beebe, 1997).

Associations Through Maladaptive Personality Traits. Adolescent drug use may also be affected by childhood trauma indirectly through the development of aggression and impulsivity. In a study by Jester and colleagues (2008), children who demonstrated early life aggression had earlier onsets of drinking and marijuana use than those who did not. A higher level of childhood aggression was also predictive of significantly higher individual and polydrug use during adolescence (Brook & Newcomb, 1995; Brook, Whiteman, & Finch, 1992; Roth, 1994). Finally, aggression and conduct problems during childhood and adolescence have been found to be related to chronic substance abuse and dependence persisting into adulthood (Fergusson, Horwood, & Ridder, 2007).

This relationship between early childhood aggression during and substance abuse problems during the adolescent years may exist for a number of reasons. Brook, Whiteman, and Finch (1992) speculated that the anger expressed through early life aggression may later manifest as a rebellion towards traditional social values. This rebellion may take place in the form of drug

experimentation and abuse. They also believe that the insufficiency of emotional control of early aggression may later be revealed through the drive for immediate gratification that mood-altering substances deliver.

Impulsivity is also uniquely associated with an adolescent's involvement with drugs and alcohol. Gottfredson and Hirschi (1990) hypothesized that deviant behavior, such as drug use and addiction, provide an immediate gratification, and as such, would be favored by those who were highly impulsive with low self-restraint. Adolescence is a phase distinguished by impulsive, spontaneous, and risk-seeking behavior, and it is also a period where many adolescents experiment with drugs and alcohol. Accordingly, higher levels of impulsivity are consistently associated with initiation, abuse, and dependence of mood-altering substances, including nicotine, alcohol, and illicit drugs (Dawe & Lawton, 2004; Grano, Virtanen, Vahtera, Elovainio, & Kivimaki, 2004; Gullo & Dawe, 2008; Verdejo-Garcia, Lawrence, & Clark, 2008). These findings align with Gottfredson and Hirschi's (1990) predictions and provide further support that impulsivity may be a mediating mechanism between childhood adversity and substance use or abuse.

Mental Illness

Adverse childhood experiences have consistently demonstrated dramatic effects on the mental health of the victim. Victims of chronic childhood trauma are more likely to experience posttraumatic stress disorder (PTSD) as a result of their experience (Copeland, Keeler, Angold, & Costello, 2007). PTSD may lead to a variety of forms of mental health issues, including anxiety and depression. A variety of ACEs have demonstrated strong associations with depressive symptoms, and the cumulative effect of the ACE score has been found to be predictive of a higher prevalence of depression (Aber, Allen, Carlson, & Cicchetti, 1989;

Schilling, Aseltine Jr., & Gore, 2007). Children who are maltreated have been found to be three-times more likely to experience depression in their lifetime (Brown, Cohen, Johnson, & Smailes, 1999).

In addition to symptoms of depression, abused children have increased risks of anxiety disorders, conduct disorders, and suicidal ideations (Fergusson, Boden, & Horwood, 2008). In the study by Fergusson and colleagues (2008), children who were physically abused had 1.5 times higher rates of mental illness, while the rates of children who were sexually abused had 2.4 times higher rates. Similarly, Garnefski, and Diekstra (1997) found that a history of sexual abuse predicted the onset of several serious mental illnesses (see also: Beitchman et al., 1992). These problems were more prominent in male victims of sexual abuse than female victims. Abused children also exhibit lower self-esteem and greater hopelessness regarding their future (Allen & Tarnowski, 1989). Research has also shown that children who do not receive adequate physical care or are neglected by their parents have elevated rates of psychosocial disorders throughout their life (Maughan & McCarthy, 1997).

Growing up in a household characterized by violence may also affect the psychological wellbeing of the child. Witnessing violence has been shown to predict a child's general psychopathology (McCloskey, Figueredo, & Koss, 1995), as well as depression and anxiety (Hurt et al., 2001). Other studies have shown that household violence likely occurs in concurrence with other traumatic events, such as abuse, parental separation or divorce, household substance abuse problems, and parental incarceration (Spaccarelli, Sandler, & Roosa, 1994). As such, these traumatic events may work in harmony to influence subsequent negative mental health outcomes.

Associations Through Maladaptive Personality Traits. In addition to childhood trauma, the aforementioned maladaptive personality traits are also pivotal in the understanding of adolescent mental illness. For instance, childhood aggression has been found to be more common in those adolescents who develop mental illnesses, such as depression (Jaffee et al., 2002). Furthermore, Serbin, Moskowitz, Schwartzman, and Ledingham (1991) found that a sample of children with a higher level of aggression had significantly higher psychiatric problems during adolescence. The aggressive group of children also received more psychiatric treatment and services than non-aggressive children.

In addition to aggression, the association between higher levels of impulsivity and depression has been well-substantiated above the effect of other important risk factors (d'Acremont, & Van der Linden, 2007; Corruble, Benyamina, Bayle, Falissard, & Hardy, 2003; Grano et al., 2007). Impulsivity may also be related to more serious mental illnesses, including bipolar disorder, and other serious mood disorders. Najt and colleagues (2007) found that impulsivity is both state-related, as well as trait-related, to bipolar disorder (see also Peluso et al., 2007). Additionally, in a sample of purely bipolar subjects, impulsivity was significantly associated with higher levels of depression, hopelessness, hyperactivity, and manic episodes (Swann, Steinberg, Lijffijt, & Moeller, 2008). Collectively, these results suggest that these two maladaptive personality traits can drastically affect the psychological state of a person. Accordingly, childhood trauma likely may indirectly increase the risks for mental illness through these intervening variables.

Interrelationships Between Adolescent Problem Behaviors

Deviant Peer Imitation and Other Problem Behaviors. As discussed by Jessor's problem behavior theory, each of these four adolescent problem behaviors (deviant peer

imitation, school difficulties and dropout, substance abuse problems, and mental illness) may be interrelated and increase the odds of the onset of additional problem behaviors (Jessor, 1987; Jessor & Jessor, 1977). For instance, Cairns, Cairns, and Neekerman (1989) showed that youth who affiliate with deviant individuals are also at a heightened risk for dropping out of school. Other studies have found that the bonding with deviant peers can exert a direct effect on school failure above all early academic effects (Battin-Pearson et al., 2000). This finding accentuates the relationship between peer affiliations and the process of dropping out of school. Fergusson and Horwood (1998) elaborated on this relationship, claiming that children with early life conduct and educational issues are more likely to associate with deviant peer groups that further "reduce their commitment to…continued educational achievement" (p.1106).

Substance abuse may also be impacted by peer pressure, and thus, can be affected by the adolescent's deviant associations. Many empirical studies have specifically examined alcohol and drug use as the outcome of differential association, definitions favorable to deviance, reinforcement, and imitation. Akers, Krohn, Lanza-Kaduce, and Radosevich (1979) found that social learning from deviant peers accounted for 68% of the variance in marijuana use (39% of marijuana abuse) and 55% of the variance in alcohol use (32% of alcohol abuse). Subsequent research has found similarly strong relationships between deviant peers and substance use and abuse (Elliott, Huizinga, & Ageton, 1985; Johnson, Marcos, & Bahr, 1987; Orcutt, 1987).

Deviant peer relationships have also been related to the development of mental illness in adolescence. In longitudinal studies of this relationship, higher levels of deviant peer associations were associated with increases in symptoms of depression and other major mental illnesses (Fergusson, Beautrais, & Horwood, 2003; Fergusson, Wanner, Vitaro, Horwood, & Swain-Campbell, 2003). Likewise, Brendgen, Vitaro, and Bukowski (2000) found that, although

adolescents with deviant or antisocial friends report less feelings of loneliness than those without any close friends, they do also exhibit comparable levels of depressive symptoms.

Brendgen and colleagues (2000) went on to speculate about the causal mechanisms of this association, stating that "adolescents with deviant friends may be at risk for depression despite being protected from social isolation…because depressive feelings, compared to loneliness, may be fostered by a wider range of aversive experiences than mere social isolation." (p.183). For example, they cite that deviant youth may have weaker or lower quality friendships and may experience combative relationships with parents as a result of their friends and their behavior. As such, these lower quality or negative relationships can affect the mental state of the juvenile and lead to depression or other mental difficulties.

School Difficulties and Dropout and Other Problem Behaviors. Academic performance and success may also be related to substance use and abuse. Bryant and colleagues (2003) showed that diminished academic interest, achievement, and poor school behavior were all associated with teenage alcohol and marijuana use. This relationship may exist due to academic difficulties encouraging school disengagement, which may inhibit positive structure in the juvenile's life. This lack of structure may hinder the child's formative education experiences and push the child to pursue other interests such as truancy and delinquency. In these situations, the "lack of structure and exposure to delinquent peers is likely to permeate multiple contexts of development and be associated with increased substance use and problem behavior" (Bryant et al., 2003, p.386).

Reciprocally, substance abuse has been found to be related to weakened school performance. Early alcohol, marijuana, and cocaine abuse have each been found to predict both lower adolescent academic success (Jeynes, 2002) and school attendance (Engberg, & Morral,

2006). It is also important to note that youths who regularly abuse drugs have higher rates of school dropout (see: Garnier, Stein, & Jacobs, 1997; McCaffrey, Pacula, Han, & Ellickson, 2010; Roebuck, French, & Dennis, 2004). These findings highlight the complexity of this association and suggest that a multi-directional association may exist.

Children who experience school difficulties are regularly also found to be at an elevated risk for depression and other mental illnesses. Adolescents with lower grade point averages and those who experienced large declines in grade point average from the previous school year were more likely to become depressed than other students (Frojd et al., 2008; McCarty et al., 2008). This relationship may also be reciprocal though, as mental illnesses such as depression may affect school performance. Supporting this notion, Andrews and Wilding (2004) found that depression symptoms predicted subsequent decreases in exam grades. These multi-directional effects demonstrate the critical nature of further understanding the association between school difficulties and mental illness.

Substance Abuse Problems and Other Problem Behaviors. Substance abuse problems may co-occur with mental illness as well (Brown et al., 1989; Deas, 2006). This relationship was explored by Regier and colleagues (1990). Their results showed that individuals with a mental illness had significantly higher odds of also having an addictive substance abuse disorder (OR=2.7). This relationship was even stronger for those who abuse drugs, not including alcohol (OR=4.5) (Regier et al., 1990). Conversely, Rohde, Lewinsohn, and Seeley (1996) examined the effect of substance abuse problems on the incidence of mental illnesses in adolescence. Their results showed that juveniles with greater levels of alcohol abuse had higher rates of depressive disorders and disruptive behavior disorders. In fact, over four-fifths of the sample of alcohol abusing or dependent youth demonstrated some other form of psychopathology. Their results

indicated that more serious alcohol disorders traditionally followed the onset of particular mental disorders (Rohde, Lewinsohn, & Seeley, 1996; see also: Deas, 2006; Deykin, Levy, & Wells, 1986).

Other research has indicated that the use of alcohol, marijuana and polysubstance abuse is predictive of depression, anxiety, and conduct disorders in juveniles (Greenbaum, Prange, Friedman, & Silver, 1991; Neighbors, Kempton, & Forehand, 1992). This research has highlighted the extensive difficulties in delineating any sort of causal mechanism. Instead the two problem behaviors are seen as transactional influences, where "each will influence the other, leading to a spiraling effect for both disorders" (Neighbors, Kempton, & Forehand, 1992, p. 384). A potential reason for this transactional relationship may be self-medicating behavior, where the substance abuse is used to alleviate the emotional distress of depression, anxiety, or other mental illnesses, although the substance abuse can actually exacerbate the symptoms of the mental illness (Deykin, Levy, & Wells, 1986; Simons, Conger, & Whitbeck, 1988). Irrespective of the underlying mechanism of this relationship, the co-occurrence of these two problem behaviors may intensify the effects of both and further propel a youth toward severely antisocial and violent behavior.

Again, the plethora of aforementioned studies have examined the role of childhood trauma on the onset of adolescent problem behaviors. Other research has also suggested relationships between maladaptive personality traits and problem behaviors, and amongst the multiple problem behaviors themselves. While these results underscore the importance of the present study, once more, each study has predominantly looked at one (or a few types) type of adverse childhood experience and its effect on the presence of one problem behavior during adolescence. The onset of these behaviors is much more likely to be rooted in a variety of

experiences, as opposed to a singular or handful of predictors. As such, the present study aims to fill the hole in the literature using the nine different ACEs and the estimation of four important adolescent problem behaviors simultaneously. This study will also consider the mediating effects of personality development on this relationship. By considering a number of factors at once and the presence of mediating variables, the data can demonstrate a better view of the true paths of these relationships.

ACEs and Violent Behaviors

Experiences of childhood trauma and maltreatment can ultimately lead to serious juvenile violent behavior. There are two ways this behavior can be expressed: the adolescent can act outwardly and commit violent acts toward others, or on the other hand, the adolescent can internalize their problems and become inwardly violent. Moylan and colleagues (2009) found that traumatic childhood experiences, such as abuse and witnessing domestic violence, increase a child's risk for both externalizing *and* internalizing their negative emotions. Similarly, Malinosky-Rummell and Hansen (1993) demonstrated that many studies have found that child maltreatment is associated with violent delinquent behavior, as well as self-injurious and suicidal behavior. As such, a number of studies have examined how different types of childhood adversity can increase the likelihood and prevalence of these violent outcomes.

ACEs and Serious, Violent, Chronic (SVC) Delinquency

Although the majority of maltreated children do not become violent, numerous longitudinal studies have substantiated a relationship between childhood trauma and chronic adolescent violence (Farrington, 1989; Lansford et al., 2007; Smith & Thornberry, 1995; Widom, 1989b; Wolfe, Scott, Wekerle, & Pittman, 2001). For example, each ACE, as well as the ACE score, has been found to predict SVC delinquency (Fox, Perez, Cass, Baglivio, Epps,

2015). Specifically, children who are abused have been found to have three times the odds of becoming serious, violent delinquents (Zingraff, Leiter, Myers, and Johnson, 1993). Additionally, a higher level of ACEs has been shown to predict membership in a group trajectory of earlier onset and more chronic styles of offending (Baglivio, Wolff, Piquero, & Epps, 2015).

According to Lewis, Mallouh, and Webb (1989), abuse, combined with other adverse childhood experiences and developmental problems, can provoke and incite subsequent violent behaviors. Consistent with the cycle of violence, this violent conduct has been found to persist even into adulthood (Maxfield & Widom, 1990; Widom, 1989c). Felson and Lane (2009) furthered our understanding of this relationship by showing that children who are physically abused are more likely to become physically abusive adults, and children who are sexually abused are more likely to become sexually abusive adults. This array of findings has led Maas, Herrenkohl, and Sousa (2008) to state that physical abuse may be the most consistent predictor of the perpetration of chronic violence.

Not all research has been so conclusive. Opposing this view, Yun, Ball, and Lim (2011) concluded that physical abuse alone was unrelated to chronic violence, but instead childhood neglect and sexual abuse was each independently predictive. Furthermore, psychological and emotional abuse has been shown to be predictive of self-reported violence, explaining more than 50% of the variance in one analysis (Song, Singer, & Anglin, 1998). Sexual abuse of female children has been shown to be a significant predictor of violence, doubling the odds of a violent arrest (Siegel & Williams, 2003). In addition to involvement in violence, child maltreatment may also increase the frequency of violent acts committed. In an examination of low-income minority children, maltreatment during childhood was associated with initiation of violence, as well as the number of violent petitions for a juvenile (Mersky & Reynolds, 2007).

Witnessing household violence, co-occurring with child abuse, may also increase the likelihood of youth violence (Dahlberg, 1998). Children who live in homes with higher levels of family conflict have higher rates of violent offenses during later adolescence (McCord, 1979). Furthermore, Herrenkohl and colleagues (2008) surmised that the effects of domestic violence and child abuse simultaneously may trigger compounding or "double whammy" effects (p. 7). In these cases, the consequences of both experiences in conjunction are worse than the effects of each individually. Beyond cases of maltreatment and witnessing family violence, household member incarceration has been shown to increase violent behavior. For instance, children who grow up with an imprisoned father were more likely to act-out violently than those without (Fritsch, & Burkhead, 1981).

Clearly, many different adverse childhood experiences are associated with subsequent violence perpetration. Duke, Pettingell, McMorris, and Borowsky (2010) tested the effects of a number of ACEs simultaneously on a youth's commission of violence. In their analysis, physical abuse, sexual abuse, witnessing abuse, and household substance abuse each were independently associated with general adolescent violent crimes, as well as bullying, fighting, dating violence, and weapon carrying. Cumulatively, each additional ACE increased the risk of each types of violence by 35% to 144%. The relationship between childhood trauma and serious chronic violence is well corroborated, but like other adolescent outcomes, it may be mediated by the development of maladaptive personality traits or adolescent problem behaviors that are also influenced by childhood adversity (Herrenkohl, Huang, Tajima, & Whitney, 2003). While many of these studies have found a relationship between trauma and violence, a scarcity have examined the relationship while considering potentially mediating variables that research has shown to be important risk factors for SVC delinquency.

Maladaptive Personality Development and Serious Violent Chronic Delinquency.

Aggression. Early childhood aggression is considered one of the most important risk factors for persistent adolescent violence (Dahlberg, 1998; Dahlberg & Potter, 2001; Farrington, 1978; 1989; 1991; Nagin & Tremblay, 1999). Aggression is believed to be one of the most stable personality traits, averaging a .63 correlation over time (Olweus, 1979). The stability of aggression and violence throughout childhood and adolescence is well-documented in other research (Farrington, 1994; Loeber, 1982; Loeber & Hay, 1997; Olweus, 1979). Accordingly, SVC delinquents regularly demonstrate significantly higher aggression throughout their childhood (Huizinga & Jakob-Chien, 1994). One study revealed that, of the children who show aggressive and violent tendencies before age 9, 62% became serious violent adolescent delinquents (Thornberry, Huizinga, & Loeber, 1995). This high level of stability does not necessarily mean that all aggressive children will become aggressive adults, but it certainly indicates an association between early aggression and violence throughout life.

Scholars have considered why some aggressive children do not persist in their aggressive violent behavior. They have theorized that these children may possess certain resiliency factors that discourage subsequent violence. In this direction, Herrenkohl and colleagues (2003) discovered that the relationship between early aggression and subsequent violence was diminished for those with protective factors, such as a positive family environment and constructive school experiences. Correspondingly, the relationship was heightened for children who are experiencing additional risk factors, such as antisocial peers (Herrenkohl et al., 2003). Further studies have examined different violence trajectories for aggressive children. Brame, Nagin, and Tremblay's (2001) analysis of both early-onset and late-onset aggression and violent

behavior found that individuals with greater levels of early-childhood aggression were much more likely to continue their violent behavior into adolescence than later-onset children.[3]

Impulsivity. Impulsivity throughout adolescence may increase a child's potential for violence. As referenced in sections above, a lack of self-control may increase the likelihood of impulsive and risk-seeking behaviors such as delinquent or aggressive actions (Farrington, 1989). Farrington's (1989) results indicated that impulsivity during childhood was able to predict the perpetration of subsequent violence in later adolescence (OR=1.5). Baron (2003) showed that low impulse-control was a strong predictor of violent delinquency when controlling for other important demographic risk factors. These effects were actually stronger for violent crime than for property crime and drug use. DeWall, Baumeister, Stillman, and Gailliot (2007) expanded on this relationship, showing that individuals with low self-control were more likely to behave violently when provoked. Their higher level of impulsivity and lack of self-restraint made their response to insults or taunts more likely to be violent. Despite these findings, no current study has considered aggression and impulsivity as mediators for the relationship between childhood trauma and SVC delinquency. In addition to these key early maladaptive personality changes, problem behaviors during adolescence may also be related to the perpetration of SVC behavior.

Adolescent Problem Behaviors and Serious Violent Chronic Delinquency.

Deviant Peer Imitation. A child's peer associations have been considered an integral part in the development of delinquent behavior for decades. Individuals who associate most frequently with delinquent peers are predicted to engage in more antisocial and violent activities (Ageton, 1983; Farrington, 1989; Maguin et al., 1995; Thornberry, 1998). Herrenkohl and

[3] Brame, Nagin, and Tremblay (2001) found that very few children demonstrate high-level late-onset aggressive behavior.

colleagues (2000) found that deviant peer associations predicted violent behavior throughout adolescence. Their results also showed that youths with multiple additional risk factors were markedly more likely to commit acts of violence (see also: Dahlberg, 1998). In addition, children with antisocial siblings also have shown higher rates of violent behavior (Farrington, 1989; Maguin et al., 1995). As suggested prior, higher levels of childhood trauma may lead to greater imitation of delinquent peers, and these deviant peer relationships may further contribute to higher levels of SVC delinquency.

School Difficulties and Dropout. Maltreated children are often more likely to experience early school difficulties. Poor grades and weak attachment to school during early adolescence has been found to predict higher levels of violence throughout the subsequent years of adolescence (Ellickson & McGuigan, 2000). This relationship has been corroborated by additional research as well (Dahlberg, 1998; Denno, 1990; Farrington, 1989; Saner & Ellickson, 1996). Moreover, those with lower commitment to school in childhood and early adolescence have higher rates of violence (Maguin et al., 1995). Lastly, those who display in-school behavior problems are also more likely to experience chronic criminal involvement throughout adolescence and into adulthood (Tobin & Sugai, 1999). Correspondingly, Zingraff, Leiter, Johnsen, and Myers (1993) found that stronger academic performance, more compliant in-school behavior, and strong school attendance may substantially reduce the level of antisocial and violent behavior in at-risk groups. As such, a child's school performance and experience during their formative years may have a vital role in the mediation of the relationship between childhood trauma and SVC delinquency.

Beyond the effects of early poor school performance, dropping out of school may also be related to SVC delinquency in juveniles. Studies have shown that dropping out of school is

associated with more chronic delinquent behavior (Thornberry, Moore, & Cristenson, 1985). These findings have been furthered to consider serious violent crime as well. For example, Ikomi (2010) found that higher rates of school dropout were related to more chronic rates of violent felony referrals. In a sample of exclusively male high school dropouts, 29% were serious violent delinquents and another 20% were serious non-violent delinquents (Huizinga & Jakob-Chien, 1998). This showed that nearly half of male high school dropouts became a serious delinquent, and slightly more than one-quarter became SVC delinquents. Combating this, many schools have implemented high school "minimum leaving ages." Anderson (2012) found that these minimum dropout requirements exerted negative effects on the violent (and property) crime rates of 16 to 18 year-old students. This finding is explained through the notion that a juvenile being present at school reduces their potential opportunities to engage in criminally violent activities.

Substance Abuse Problems. In addition, a larger proportion of SVC delinquents abuse alcohol, marijuana, and other illicit drugs than other types of offenders or non-offenders (Loeber & Farrington, 1998). Accordingly, the use and abuse of alcohol and illicit drugs may also increase the likelihood of committing some type of youth violence (Fergusson, Lynskey, & Horwood, 1996; Friedman, 1998; Wagner, 1997). More frequent use of hard drugs during early adolescence has been shown to predict subsequent violence for both men and women, and more frequent early adolescent alcohol use predicted subsequent violence in men only (Friedman, Kramer, Kreisher, & Granick, 1996).

In a review of the abundance of studies connecting substances to violent behavior, Boles and Miotto (2003) demonstrated that past research has successfully linked serious violence to the abuse of alcohol, sedatives, amphetamines, stimulants, phencyclidine, and hallucinogens. Each of these classes of substances has been shown to increase the probability of subsequent violent

crime. These relationships may be related to the psychosocial factors of drug and alcohol abuse or the result of the psychopharmacodynamics of these mood-altering substances.

Regardless of the specific function of the relationship, the work of Day and colleagues (2013) has shown that substance abuse may play an important role in mediating the observed relationship between child maltreatment and violent behavior. As with many other adolescent problem behaviors, though, this association may not be unidirectional and, instead, merely indicative of a common root cause or risk factor (Fagan, 1993; Fergusson, Lynskey, & Horwood, 1996; Wagner, 1996). Thus far, research has not been able to discern the nature of the relationship sufficiently enough to make any conclusive causal statements, but the recognition of this underlying association is imperative to understanding the development of chronically violent youth.

Mental Illness. The relationships between substance abuse and violence may also be amplified by comorbidity for individuals who also meet the criteria for mental illnesses (Fazel et al., 2009; Van Dorn, Volavka, & Johnson, 2011). Although the majority of SVC offenders do not suffer from mental illnesses, many studies have often shown that mental illnesses are a major risk factor for developing violent behavior (Borum, 2000; Fazel, Gulati, Linsell, Geddes, & Grann, 2009; Grisso, 1999; Harris, & Lurigio, 2007; Huizinga & Jakob-Chien, 1994; Markowitz, 2011). For these individuals, the risk for violence "may be particularly associated with delusions involving perceived threat of harm by others" (Borum, 2000, p.1269). Often times, these juveniles suffer from mood disorders, personality disorders, or schizophrenia that increases their propensity for persistent violent behavior (Flynn, Rodway, Appleby, & Shaw, 2014; Scott, & Resnick, 2006; Walsh, Buchanan, & Fahy, 2002).

Multiple Adolescent Problem Behaviors. Huizinga and Jakob-Chien (1994) examined the collective impact of multiple juvenile problem behaviors (school difficulties, drug use problems, psychopathology, etc.) and SVC behavior. The effect of multiple problem behaviors during youth was pronounced on the incidence of SVC behavior. Of all males in the sample who experienced four different types of problem behaviors, 81% were also SVC delinquents and of all females who experienced four different types of problem behaviors, 85% were also SVC delinquents. This finding reveals the potentially compounding nature of adolescent problem behaviors and their collective influence on serious, violent, chronic delinquency. Collectively, these studies suggest that, despite its absence in the empirical literature, the examinations of childhood trauma, the development of early maladaptive personality traits, and adolescent problem behaviors are of the utmost importance to understanding the origins of SVC delinquency.

ACEs and Suicidal Behavior

In addition to externalized violent behavior, many children who experience childhood adversity internalize their feelings and act violently through suicidal behavior. As mentioned prior, suicide is the one of the most common causes of death for American adolescents (Center for Disease Control, 2014). Research suggests that the risk may be dramatically higher for those who experience traumatic events during their upbringing. In a study of the effects of ACEs and suicide attempts, Dube and colleagues (2001) showed that each ACE increased the odds of an attempted suicide by two- to five-times. In addition, the ACE score demonstrated a graded effect, increasing exponentially for each additional experience. Their analysis showed that adolescents who experienced seven or more different adverse experiences in childhood had a suicide rate of 31.1% (compared to only 3.8% in the complete study sample).

According to Brown, Cohen, Johnson, and Smailes (1999), adolescents who experienced childhood trauma and maltreatment are three times more likely to become suicidal. The largest effect on suicide attempts was found for children who were sexually abused. For these youth, the risk of multiple suicide attempts was eight-times higher than those who had not been sexually abused. Similarly, Plunkett and colleagues (2001) found that the rate of suicide for victims of child sexual abuse may actually be 10.7 to 13 times larger than the national rate. Beyond sexual abuse, physical abuse in childhood is also found to be a significant predictor of suicidal behavior (Ystgaard, Hestetun, Loeb, & Mehlum, 2004; see also: Joiner et al., 2007). Finally, Greer (1980) showed that parental loss for over a year (potentially as the result of divorce, separation, or imprisonment) was significantly more prevalent for adolescents who had attempted suicide than those who had not. In the same vein as violent crime, suicidal behavior may be further affected by the childhood personality changes associated with adverse childhood experiences. While many of these studies have sustained the relationship between trauma and suicide, a lack of studies have considered this relationship while including potentially mediating variables in the model that past research has found to be salient risk factors for suicidal behavior.

Maladaptive Personality Development and Suicidal Behavior.

Aggression. The self-destructive nature of suicide may be tied to certain qualities of early childhood and lifetime aggression (Brown, & Goodwin, 1986; Garrison, McKeown, Valois, & Vincent, 1993; Giegling et al., 2009). This association was explained by Conner, Duberstein, Conwell, and Caine (2003) as the result of a specialized subtype, called reactive aggression. Individuals who are reactively aggressive (compared to proactively aggressive) are more susceptible to impulsive and angry outbursts to external events. As such they experience

emotional dysregulation and are exceptionally vulnerable to emotionally and psychologically distressing situations that place them at a higher risk of attempting or committing suicide.

In another study of exclusively patients in a psychiatric setting, higher levels of aggression were found in those who attempted suicide than those who did not (Mann, Waternaux, Haas, & Malone, 1999). In addition to the findings in clinical samples, Ille, Huber, and Zapotoczky (2001) corroborated the aggression-suicidality relationship in a mixed sample of both clinical patients and healthy individuals (see also: Doihara et al., 2008). Further substantiating this relationship, Swogger, You, Cashman-Brown, and Conner (2011) found that, experiences of childhood physical abuse were related to the onset of suicidal behavior, but the relationship was mediated by the individual's level of aggression.

Impulsivity. Studies have also examined the role of impulsivity in the commission of suicide. Attempters and completers of suicide have both shown higher levels of impulsivity (Maser et al., 2002). Two fairly recent articles have considered impulsivity as the mediating influence between childhood trauma and subsequent suicidal behavior. Roy (2005) found that childhood trauma was significantly associated with impulsivity, which was predictive of future suicidal behavior. Expanding this relationship, Braqueahais, Oquedndo, Baca-Garcia, and Sher (2010) explained that severe trauma is associated with increased levels of impulsivity, which may reduce the ability of the brain to restrain negative or harmful behaviors. As such, it is suggested that impulsivity may provide an important link between childhood trauma and suicidality. Irrespective of these findings, no research has fully considered aggression and impulsivity as potential mediators for the association found between trauma and suicidal behavior. Beyond these two maladaptive personality traits, adolescent problem behaviors must also be taken into account as contributors for adolescent suicide.

Adolescent Problem Behaviors and Suicidal Behavior.

Deviant Peer Imitation. Few research projects have examined the effect of adolescent's deviant peers on suicidal behavior. Prinstein and colleagues (2010), however, did examine the effect of peers on non-suicidal self-injurious behaviors (NSSI). Their results showed significant peer socialization effects, such as associating with peers who take part in self-injurious behaviors, were related to an individual engaging in NSSI. This relationship, however, was only found in female subjects. While these results are in no way definitive, the consideration of deviant peer imitation within the context of multiple adolescent problem behaviors may still provide important insights for youth suicidal behavior.

School Difficulties and Dropout. School performance has also been cited as an important risk factor in suicidal behavior. Studies have shown that suicide attempters have lower levels of academic success (Lewis, Johnson, Cohen, Garcia, & Velez, 1988). According to Dukes and Lorch (1989) the perceived importance and satisfaction with a juvenile's academic achievement were each linked to adolescent suicide. The authors suggested that a weakened focus on academic performance may negatively affect the child's self-esteem, leading to a higher level of hopelessness and the perception of a lack of purpose in life. These damaging emotions may then increase the propensity for future suicidality. This relationship was reinforced by the work of Richardson, Bergen, Martin, Reoger, and Allison (2005), indicating that the group of adolescents who perceived their academic performance as "failing" had a likelihood of suicide attempts five-times greater than those who considered their performance "above average."

School dropout or expulsion may also negatively affect the self-image of the adolescent, and thus, may increase their propensity for internalized violent behavior. As such, high school dropouts are often considered an "at-risk group" for suicidal behavior (Silverman & Felner,

1995). Daniel and colleagues (2006) examined the risk level for suicide in those who drop out of school using a prospective and naturalistic assessment. Their results indicated that school difficulties and dropout were strongly related to one another, and they found children who struggled in school and eventually dropped out were more likely to report suicidal attempts (Daniel et al., 2006).

Substance Abuse Problems. In addition to individuals who experience school difficulties or dropout, other adolescent problem behaviors are also considered risk factors for suicidality. For example, the use and abuse of mood-altering substances is also deemed a leading risk factor for suicide. Many youth use substances to escape or cope with the negative emotions that may eventually lead to self-destructive behaviors, such as suicide. Early alcohol initiation (before the age of 13) was associated with a significantly higher incidence of suicidal ideation and attempts (Swahn & Bossarte, 2007; Swahn, Bossarte, Ashby, & Meyers, 2010). In addition, "distressed" drinking and heavy drinking were each associated with attempting suicide (Schilling et al., 2009). Alcohol dependence is also recognized as a key contributor to subsequent suicidal behavior (Murphy, 2000).

Adolescent drug abuse is also closely related to suicidal behaviors (Brent, 1995; King et al., 2001; McKenry, Rishler, & Kelley, 1983). Among individuals deemed to be at-risk for high school dropout, involvement with drugs further predicted an increased probability of suicide (Thompson, & Eggert, 1999). These adolescent problem behaviors may provide key insight for understanding the association between trauma and self-destructive and suicidal behavior. For example, Dube and colleagues (2001) found that adolescent substance abuse problems (and mental illnesses) partially mediated the relationship between adverse childhood experiences and suicide attempts.

Mental Illness. Finally, adolescent mental illnesses are also closely tied to suicidal behavior. Youth who report symptoms of mental illnesses, such as depression, are considered to be especially at risk for suicidal ideation (Alsaker & Dick-Niederhauser, 2006; Brent et al., 1988; Drake & Cotton, 1986; Garland, & Zigler, 1993; Hatcher-Kay & King, 2003; Takahashi, 2000). Shaffer and colleagues (1996) estimated that over 90% of individuals who committed suicide in their sample met the criteria for some form of psychiatric diagnosis, such as mood disorders, disruptive disorders, bipolar disorder, or depression. The aforementioned research concerning suicidal behavior suggests that maladaptive personality traits and adolescent problem behaviors may provide key predictors for its inception. These studies, however, have not considered the effects as mediators between experiences of childhood trauma and adolescent suicidal behavior. In light of the current research, these factors appear to potentially warrant necessary attention in examinations of adverse childhood experiences and suicide attempts.

Summary

In conclusion, a vast amount of empirical research has examined the multitude of relationships relevant to the current study. While many of these studies have substantiated significant effects for the variables of interest, none of these studies have examined the relationships between childhood trauma, the development of maladaptive personality traits, adolescent problem behaviors, and serious violent behavior simultaneously. The estimation of these effects altogether can help resolve any confusion or conflicting explanations for the etiology of SVC delinquency and suicidal behavior.

The consideration of childhood trauma as a cause of both of these outcomes appears to be an important line of inquiry, but the aforementioned two personality traits (aggression and impulsivity) and four adolescent problem behaviors (deviant peer imitation, school difficulties

and dropout, substance abuse problems, and mental illness) may help clarify the associations found between adverse childhood experiences, SVC delinquency, and suicidal behavior. As such, the present analysis aims to fill this gap in the empirical literature and provide a better understanding of the multiple mediating mechanisms between childhood trauma and serious violent behavior. Consequently, the next chapter will explicitly describe specific details of the project's design.

CHAPTER FOUR:

METHODOLOGY

The present study seeks to improve upon the collection of past studies by examining the relationships among the multitude of aforementioned complex variables together simultaneously to better understand the observed pathways between the ACEs and two violent juvenile outcomes. As explained in the prior chapters, childhood trauma can affect nearly all aspects of the child's development into adulthood. To date, however, no empirical studies have examined the assortment of the effects of multiple types of childhood trauma throughout childhood and adolescence in context to assess the resulting effects on both externalizing and internalizing violent behaviors.

The present analysis aims to evaluate the direct effects of ACEs on SVC delinquency and suicidal behavior, and also assess the indirect effects of the ACEs through their relationships with two maladaptive childhood personality traits, aggression and impulsivity, and four adolescent problem behaviors, deviant peer imitation, school difficulties and dropout, substance abuse problems, and mental illness. By looking at both the direct and indirect effects of adverse childhood experiences, a better grasp of their cumulative impact can be determined. A stronger comprehension of the impact of childhood adversity on key personality traits and adolescent problem behaviors can facilitate an understanding of the potentially compounding effects of childhood trauma in the lives of SVC delinquency and suicidal youth. This line of research will

then aim to recommend more meaningful and effective interventions to prevent the progression toward each of the two types of serious violent behaviors.

Research Questions

This project attempts to answer a variety of questions regarding the associations of variables present in the lives of juveniles. Specifically, five main research questions are tested:

(1) Are certain key demographic variables, such as gender, race/ethnicity, and socioeconomic status, related to the number of adverse childhood experiences that an individual exhibits?

(2) Does the ACE score predict the development of higher levels of aggression as well as higher levels of impulsivity?

(3) Does the ACE score predict the presence of four adolescent problem behaviors, such as deviant peer imitation, school difficulties and dropout, substance abuse problems, and mental illnesses? Related to this consideration, the model also assesses if this relationship is mediated by the development of higher levels of aggression and impulsivity.

(4) Does the ACE score predict two different violent outcomes: serious, violent, chronic (SVC) delinquency and suicidal behavior? Similar to the previous models, the project determines if this relationship is mediated by the development of aggression and impulsivity or the presence of the four adolescent problem behaviors.

(5) Are the model effects for the model predicting externalizing violent behavior (serious, violent, chronic delinquency) markedly different than the model predicting internalizing violent behavior (suicidal behavior)?

Hypotheses

In light of the collection of the empirical research that has discussed the variables of interest in the model, certain results to these research questions were hypothesized. For starters, the demographic factors of gender, race/ethnicity, and socioeconomic status were predicted to significantly affect a child's level of ACEs. Gender was predicted to influence the types of trauma experienced and minorities and lower socioeconomic status families were predicted have higher rates of ACEs. These findings would support the work of Sher and colleagues (2004) and Brown and colleagues (1998).

Additionally, ACE scores were hypothesized to substantiate the current literature and significantly impact a child's personality development in each of the two domains: aggression (see: Aber et al., 1989) and impulsivity (see: Haapasalo & Pokela 1999). In this result, the experiences of childhood trauma were expected to mediate any relationships between the demographic variables and the two relatively stable personality characteristics.

In addition to the predicted impacts on the maladaptive personality measures, ACE scores were expected to significantly increase the likelihood of each of the adolescent problem behaviors. As found in past research, children who experience trauma are predicted to be more likely to associate with deviant peers (see: Fergusson & Horwood, 1999), experience school difficulties and dropout (see: Erickson et al., 1989; Kendall-Tackett & Eckenrode, 1996), develop a substance abuse problem (see: Dube et al., 2002; Dube et al., 2003; Ireland, Smith, & Thornberry, 2002), and suffer with a mental illness (Aber et al., 1989; Brown et al., 1999; Fergusson et al., 2008). These relationships were anticipated to be partially mediated by the personality measures of aggression and impulsivity, but the ACE score was still projected to exert a direct significant effect and increase the odds of each of the negative juvenile outcomes.

Furthermore, ACE scores were presumed to be predictive of both externalized and internalized violent behavior outcomes. In accordance with the current literature, higher levels of childhood trauma will increase the likelihood of serious violent chronic delinquency (see: Farrington, 1989; Fox et al., 2015; Zingraff et al., 1993) and suicidal behavior (Brown et al., 1999; Dube et al., 2001). This relationship was anticipated to be partially mediated by each of the maladaptive personality factors and adolescent problem behaviors, but the ACE score was still predicted to directly influence the violence outcomes in a significant way. This finding is believed due to the inability to include all possible mediating mechanisms between childhood trauma and violence in the model.

Finally, while each of these mediating variables was predicted to influence the initiation of both SVC delinquency and suicidal behavior, the effects of the two models were projected to show some major differences. For example, it was assumed that the presence of mental illness will be more strongly associated with suicide attempts, whereas evidence of aggression and deviant peer imitation would be more strongly associated with SVC delinquency. Although these key differences were anticipated, the overall results were believed to still indicate the importance of each stage of development on the onset of serious violent behaviors.

Sample and Data

The data used for this project was collected by the Florida Department of Juvenile Justice (FDJJ)[4]. The sample consists of de-identified juveniles who received a delinquency referral in the state of Florida and aged out of the juvenile justice system between January 1, 2007 and December 31, 2012. At the time of their FDJJ referral, each youth was administered a Positive Achievement and Change Tool (PACT) assessment. The PACT is a risk/needs assessment

[4] This project was approved by the University of South Florida Institutional Review Board with Dr. Bryanna Fox (previous Co-Chair) listed as the Principal Investigator on the study. See Appendix A.

consisting of a semi-structured interview with a juvenile probation officer, a case file examination, and an appraisal of the child's official child abuse records. Based on the PACT assessment, a specialized case plan is created to suitably assist the juvenile. The PACT consists of two versions: a Pre-Screen (46 items) and a Full Assessment (126 items).

PACT Full Assessment

The Full Assessment contains "the following 12 domains: criminal history, gender, school, use of free time, employment, relationships, family and living arrangements, alcohol and drugs, mental health, attitudes/behaviors, aggression, and skills" (Baird et al., 2013). Currently, FDJJ assesses each juvenile with the Pre-Screen when they enter the system. Individuals who score as moderate-high or high risk to re-offend are then assessed using the Full Assessment. The final sample included in the data is comprised of only those who were administered the PACT Full Assessment (n=64,329). The aim of the PACT is to determine a juvenile's likelihood to re-offend and review the presence of certain risk and protective factors.

PACT Reliability and Validity

The PACT was derived from Washington State Juvenile Court Assessment (WSJCA),[5] and was altered to reflect Florida's terminology and include additional mental health measures (Baglivio et al., 2013). In Florida, researchers have found the PACT to be a valid measure of recidivism risk across different sub-samples (Baglivio, 2009; Baglivio, & Jackowski, 2013). These studies have shown that the risk score creates a significant predictor of recidivism for both genders and across race and ethnicity (Baglivio et al., 2013). Although the PACT assessment is traditionally validated in samples of exclusively Florida youth, Martin (2012) found that the PACT also has moderate predictive validity in a sample of juveniles in Texas for total-sample

[5] The WSJCA has demonstrated moderate predictive validity for a juvenile's subsequent recidivism (Barnoski, 2004).

and males-only. Results showed that a higher proportion of high-risk youth recidivated compared to those youth at the low-risk levels. This finding was found for each risk level (High, Moderate-High, Moderate, and Low). On the other hand, the results showed the PACT demonstrated poor predictive validity for female delinquents. In addition, the PACT is unique for risk assessments in that it emphasizes the background factors, both historical and contextual, surrounding the child to verify that all information is properly noted (Fox et al., 2015).

The PACT is also considered a reliable and valid measure of each juvenile delinquent due to its cross-validation procedures. "Responses to the PACT were based on official records, self-report from the juvenile, and perceptions of the probation officer" (Martin, 2012). By utilizing these distinct sources of information, the data is believed to address any errors or inaccuracies. For example, the juvenile probation officers are required to make follow-up contacts (to official agencies and official records) to corroborate the information obtained in the interview. This allows for the caseworker to verify the accuracy of the responses provided and ensure the data is as precise as possible before it is entered into the PACT database.

Measures

Demographic Variables

To begin, the analysis includes important demographic variables for each juvenile. The gender of the youth was coded as "0" for females and "1" for males. The race/ethnicity of the juvenile was coded based on the evaluation of the juvenile caseworker during the PACT assessment and consists of four categories: "White," "African American," "Hispanic," or "other." In the analysis, each of the minority groups, (African American, Hispanic, and other) will be dummy coded to compare their effects to the "White" reference group. Lastly, the socioeconomic status of the juvenile's family was coded based on the PACT and contains four

interval categories of household income: “Under $15,000,” “From $15,000 to $34,999,” “From $35,000 to $49,999,” and “$50,000 and Over.” These important background variables are considered at each stage of analysis to take into account any potential influence on the outcomes of interest.

ACE Items and ACE Score

The first stage of the analysis examines the presence of adverse childhood experiences. Based on information collected in the PACT, each ACE item was coded dichotomously based on the presence (1) or absence (0) of the experience in the child’s life. In this study, the items used to calculate the composite ACE score consists of: (1) emotional abuse; (2) physical abuse; (3) sexual abuse; (4) emotional neglect; (5) physical neglect; (6) witnessing household violence; (7) household substance abuse; (8) household mental illness; and (9) household member incarceration. The coding process for each ACE item is outlined in Table 1. One of the ten ACE items (parental separation or divorce) is not able to be accurately assessed from the FDJJ PACT data. As such, an overall ACE score, ranging from zero to nine, was created by summing the number of ACE items present in the history of each juvenile in the sample. This method of ACE coding aligns with the technique used in recent research (Fox et al., 2015). Again, these measures are not based exclusively on official records or on the youth’s self-reporting, but instead the evaluation of the youth by a trained caseworker and supplemented by official records, so these measures are not affected by a lack of formal reporting to Child Protective Services (CPS).

Table 1. ACE Items and Corresponding PACT Measures

ACE Item	Corresponding PACT Measure
ACE 1: Emotional Abuse	Family willingness to support youth: *Hostile, berating, and/or belittling of youth* OR Level of conflict between parents, youth, siblings: *Verbal intimidation, yelling, heated arguments* OR *Threats of physical abuse*
ACE 2: Physical Abuse	History of violence/physical abuse: *Victim of violence/physical abuse at home* OR *Victim of violence/physical abuse in foster/group home* OR *Victimized by a family member* OR *Victimized by someone outside the family* OR *Attacked with weapons*
ACE 3: Sexual Abuse	History of sexual abuse/rape: *Sexually abused/raped by a family member* OR *Sexually abused/raped by someone outside the family*
ACE 4: Emotional Neglect	Family willingness to support youth: *Little or no willingness to support youth* OR Family members youth feels close to or has a good relationship with: *Does not feel close to any family members*
ACE 5: Physical Neglect	History of being a victim of neglect: *Victim of neglect*
ACE 6: Witnessing Household Violence	Level of conflict between parents, youth, siblings: *Threats of physical abuse* OR History of witnessing violence: *Has witnessed violence at home* OR *Has witnessed violence in a foster/group home*
ACE 7: Household Substance Abuse	Problem history of parents who are currently involved with the household: *Parental alcohol problem history* OR *Parental drug problem history* OR Problem history of siblings who are currently involved with the household: *Sibling alcohol problem history* OR *Sibling drug problem history*

Table 1. ACE Items and Corresponding PACT Measures (Continued)

ACE Item	Corresponding PACT Measure
ACE 8: Household Mental Illness	Problem history of parents who are currently involved with the household: *Parental mental health problem history* OR Problem history of siblings who are currently involved with the household: *Sibling mental health problem history*
ACE 9: Household Member Incarcerated	History of jail/imprisonment of persons who were ever involved in the household for at least 3 months *Mother/female caretaker* OR *Father/male caretaker* OR *Older sibling* OR *Younger sibling* OR *Other member* OR Jail/imprisonment history of persons who are currently involved in the household *Mother/female caretaker* OR *Father/male caretaker* OR *Older sibling* OR *Younger sibling* OR *Other member*

Maladaptive Personality Development

The second stage of analysis considers the role of ACEs on two maladaptive personality traits during the child's life. At this portion of the model, demographic characteristics and the youth's ACE score are used predict early adolescent problems in two important areas of personality development. This stage includes outcome measures signifying the traits of aggression and impulsivity. The first of these concepts was measured using a factor score comprised of related PACT items, while the second was assessed by the juvenile case worker

based on the semi-structured interview with the youth. The measurement description for each personality trait will be described in the forthcoming sections.

Aggression. The "aggression" latent variable construct was comprised of seven distinct indicator variables representing different facets of aggression in the PACT. The factor was created using (1) the level of belief in yelling and verbal aggression to resolve a conflict; (2) the level of belief in fighting and physical aggression to resolve a conflict; (3) level of anger; (4) tolerance for frustration; (5) empathy, remorse, sympathy, or feelings for the victim; (6) acceptance of responsibility for antisocial behavior; and (7) evidence of prior violent or aggressive behavior not included in the juvenile's criminal record. The measurement of this factor can be found in Figure 1.

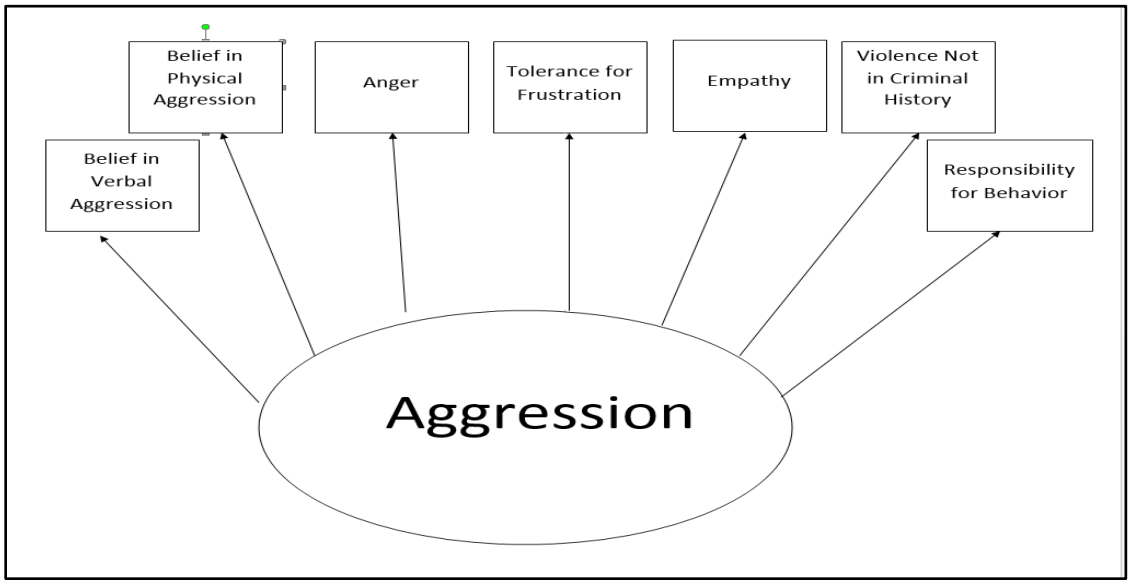

Figure 1. Aggression Measurement Model

The "evidence of prior violent or aggressive behavior not included in the juvenile's criminal record" measure is coded as a dichotomous indicator of the presence of some violent

aggressive outbursts, infliction of physical pain, using a weapon, or other violent activities that the youth has not been previously arrested for. All other indicators demonstrate a sequential level of belief or ability for the individual. For example, tolerance for frustration is coded as "Rarely gets upset over small things or has temper tantrums," "Sometimes gets upset over small things or has temper tantrums," or "Often gets upset over small things or has temper tantrums."

Impulsivity. The second childhood developmental personality variable, "impulsivity," was ascertained based on the juvenile caseworker's determination of the juvenile's impulsivity. Based on their PACT evaluation, the juvenile is coded as one of four levels of impulsivity: (1) usually thinks before acting; (2) sometimes thinks before acting; (3) impulsive; often acts before thinking; or (4) highly impulsive; usually acts before thinking.

Adolescent Problem Behaviors

The third stage of analysis considers the role of ACEs and the aforementioned developmental personality traits on adolescent problem behaviors. At this section of the model, demographic characteristics, the youth's ACE score, and maladaptive personality traits were used to predict the presence of four adolescent problem behaviors: deviant peer imitation, school difficulties and dropout, substance abuse problems, and mental illness. The measurement process for each outcome variable will be described in the sections to come.

Deviant Peer Imitation. The "deviant peer imitation" measure was comprised of an indicator variable signifying the level of admiration and imitation of antisocial friends. This variable is coded as either "Does not admire/imitate antisocial peers," "Somewhat admires/imitates antisocial peers," or "Admires/imitates antisocial peers."

School Difficulties and Dropout. The "school difficulties and dropout" factor was comprised of seven separate indicator variables derived from the data. The factor was created

using (1) the level of belief in the value of an education; (2) school involvement; (3) amount of school suspensions; (4) seriousness of school conduct; (5) school attendance; (6) academic performance; and (7) school dropout or expulsion. The measurement of this factor can be found in Figure 4.

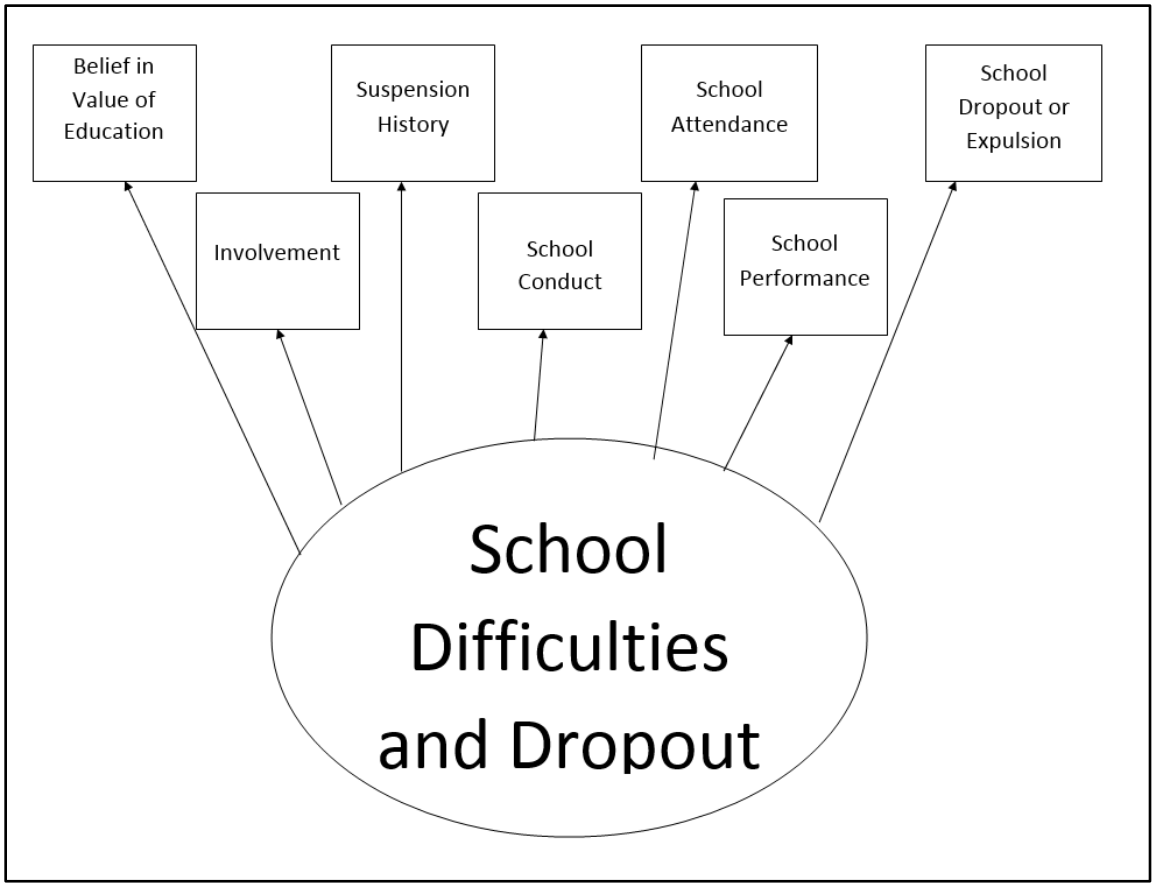

Figure 2. School Difficulties and Dropout Measurement Model

These items are ordinally assessed by the juvenile caseworker for each juvenile. For example, school attendance is coded as either "Good attendance, few unexcused absences," "No unexcused absences," "Some partial-day unexcused absences," "Some full-day unexcused absences," or "Habitual truant."

"School dropout and expulsion" was coded in a binary fashion based on the PACT item assessing the youth's current school enrollment status. Juveniles who have either "Dropped out" or been "Expelled" at the time of their most recent PACT assessment are coded as "1," whereas all juveniles who have "Graduated," are "Enrolled full-time," "Enrolled part-time," or only temporarily "Suspended" are coded as "0." Although a current suspension does indicate the presence of some sort of behavioral difficulties at school, it is temporary and does not suggest that the youth will not return and complete school in a normal fashion following the discipline.

Substance Abuse Problems. "Substance abuse problems" are assessed by the caseworker to determine if there are any signs of substance abuse problems. These can include a past or current use of a substance in a manner that may disrupt education, cause family conflict, interfere with friends, cause any health problems, or contribute to criminal behavior. The case worker also looks for signs of tolerance (needing increasing amounts of the drug to achieve the same level of intoxication) or withdrawal. If the youth has experienced any of these symptoms indicating a problem with drugs or alcohol, they are coded as "1," while all others are coded as "0."

Mental Illnesses. Finally, "mental illnesses" was determined based on the caseworker's PACT assessment regarding a variety of symptoms of mental disorder. Juveniles who indicate symptoms of general mental health problems, depression, somatic complaints, or thought disturbances comprise the group with mental illnesses. These individuals are coded as "1," and all others without any identified mental illness symptoms are coded as "0."

Violent Behavior Outcomes

The final stage of analysis entails the prediction of the externalized and internalized violent behavior outcomes. In two separate models, the aforementioned demographics, ACE

score, maladaptive personality traits, and adolescent problem behaviors are used to predict serious, violent, and chronic (SVC) delinquency, as well as suicidal behavior. The measurement process for the violent outcome variables will be detailed in the upcoming sections.

Serious, Violent, Chronic Delinquency. SVC delinquency represents a special category of juvenile delinquents. While the term has been used by many scholars using varying definitions depending on the method of analysis, it consistently demonstrates three general features. Loeber, Farrington, and Waschusch (1998) detailed their definition of what constitutes an SVC delinquent as: "(1) committing a serious offense; (2) committing a delinquent act, such as "homicide, aggravated assault, robbery, kidnapping, voluntary manslaughter, rape or attempted rape, or arson of an occupied building"; and (3) an elevated frequency of offending" (p.15). As Loeber and colleagues (1998) explained, the major debate over the notion of SVC delinquency is what constitutes an elevated frequency.

For the purpose of this paper, the requirement for chronic delinquency was drawn from Huizinga, Esbensen, and Weiher (1994)'s definition of three or more serious offenses. As such, "SVC delinquency" consists of all juveniles with three or more felony referrals, in which one or more felony referrals is an against-person violent offense. Those individuals in the data whose criminal record meets these qualifications are coded as "1" for the presence of SVC delinquent delinquency, and those who do not meet these qualifications are coded as "0."

Suicidal Behavior. "Suicidal behavior" was similarly coded in a binary fashion. Juveniles who are determined to have attempted suicide in their lives are coded as "1," and all individuals with no prior suicide attempts are coded as "0."

Analytic Procedure

In order to test the aforementioned research questions, a complex empirical model is needed. For the purpose of this study, the analysis consists of two generalized structural equation models. The first model considers the effects of demographics, ACEs, childhood personality traits, and adolescent problem behaviors on the exhibition of SVC delinquency. The second model considers the effects of these variables on the manifestation of suicidal behavior. These statistical models test the mediating effects of each variable through a technique known as generalized structural equation modeling.

Generalized Structural Equation Modeling

Research on human behaviors is complex, often encompassing many variables interacting in tandem to produce an observable effect. While traditional causal relationships assume that a predictor variable produces some sort of measureable change in an outcome, hypotheses rarely presume this type of direct relationship without considering the influence of other variables. For this reason, alternative techniques must be used to uncover the true nature of these mediating relationships. Mediation occurs when a third variable functions as the mechanism by which an independent variable produces a change in the dependent variable. In other words, the mediator serves as an intervening variable between the stimuli and response and accounts for the relationship found between X and Y (Baron & Kenny, 1986; Holmbeck, 1997; James & Brett, 1984). In this sense, the mediator "provides the researcher with a story about the sequence of events that leads" to an outcome (Kenny, 2008, p.355).

Structural equation modeling (SEM) is regarded as a powerful method of testing mediating relationships (Cole & Maxwell, 2003; Hayes, 2009; Holmbeck, 1997; Iacobucci, 2008; James, Mulaik, & Brett, 2006). SEM is a form of multivariate regression in which the

outcome variable of one equation can become the predictor variable in the next (Fox, 2002). SEM addresses these multifaceted relationships by utilizing a confirmatory procedure in which "a model is proposed, a theoretical diagram is generated, and an examination of how close the data is to the model is completed" (Walker & Maddan, 2013, p.476). Essentially, the SEM procedure tests if the nature of the data is consistent with the hypothesized model.

SEM offers researchers improved sophistication through the combination of a measurement model and a structural model. The measurement model improves reliability through the accommodation of multi-item scales to produce underlying latent constructs for the predictor variables, the outcome variable and the mediator variable in one model (Iacobucci, 2008). As opposed to traditional regression models which assume there is no measurement error, SEM directly estimates and reports the measurement error present in the model (Iacobucci, Saldanha, Deng, 2007). The structural model allows the researcher to examine complex mediating relationships including multiple mediator paths and complex causal chains (Iacobucci, 2008). The structural model allows the researcher to concurrently analyze both direct and indirect effects to more effectively evaluate the mediating function and assess the overall fit of the model.

SEM, however, creates an equation system which requires the data to meet certain requirements of statistically linear relationships (Statacorp, 2013a). This would require a normally distributed and continuous level measure of the outcome variable. Since nearly all variables in the DJJ PACT data are either dichotomous or ordinal level measures, the data does not meet the underlying assumptions of linear relationships. In order to estimate a structural equation model with this data, a different method was necessary: a generalized structural equation model (GSEM). Generalized models allow for variables that do not fit the

characteristics of a normal distribution (Skrondal & Rabe-Hesketh, 2004). These generalized models can accommodate both continuous and categorical outcome variables within the context of the measurement and structural models (Muthen, 1984; Skrondal & Rabe-Hesketh, 2004; Statacorp, 2013a).

In order to estimate the GSEM model, the current analysis utilized Stata 13's *Model Builder* feature (Statacorp, 2013b). This feature allowed the construction of both a measurement model to design the nature of the latent factors and a structural model to form the hypothesized relationships among the latent and observed variables (Skrondal & Rabe-Hesketh, 2004). Through this design, two distinct generalized models were created: one with the outcome of serious violent chronic delinquency and one with the outcome of suicidal behavior. Using the *Model Builder*, the variables were coded based on their respective measurement properties and the hypothesized paths of the relationships were specified. The *Model Builder* also allowed for the design of the latent variable constructs of maladaptive personality traits and certain adolescent problem behaviors (see Figures 1-4).

GSEM Models

First, the structural model for the GSEM with the "SVC delinquency" outcome is found in Figure 3. This model consists of background demographic characteristics, the onset of adverse childhood experiences, maladaptive childhood personality traits, adolescent problem behaviors, and the final SVC delinquency outcome. Each stage of the model predicts some level of mediation of the effects from the previous stage. The predictor variable paths, however, indicate the presence of both direct and indirect effects on the outcome measure at the next stage of analysis.

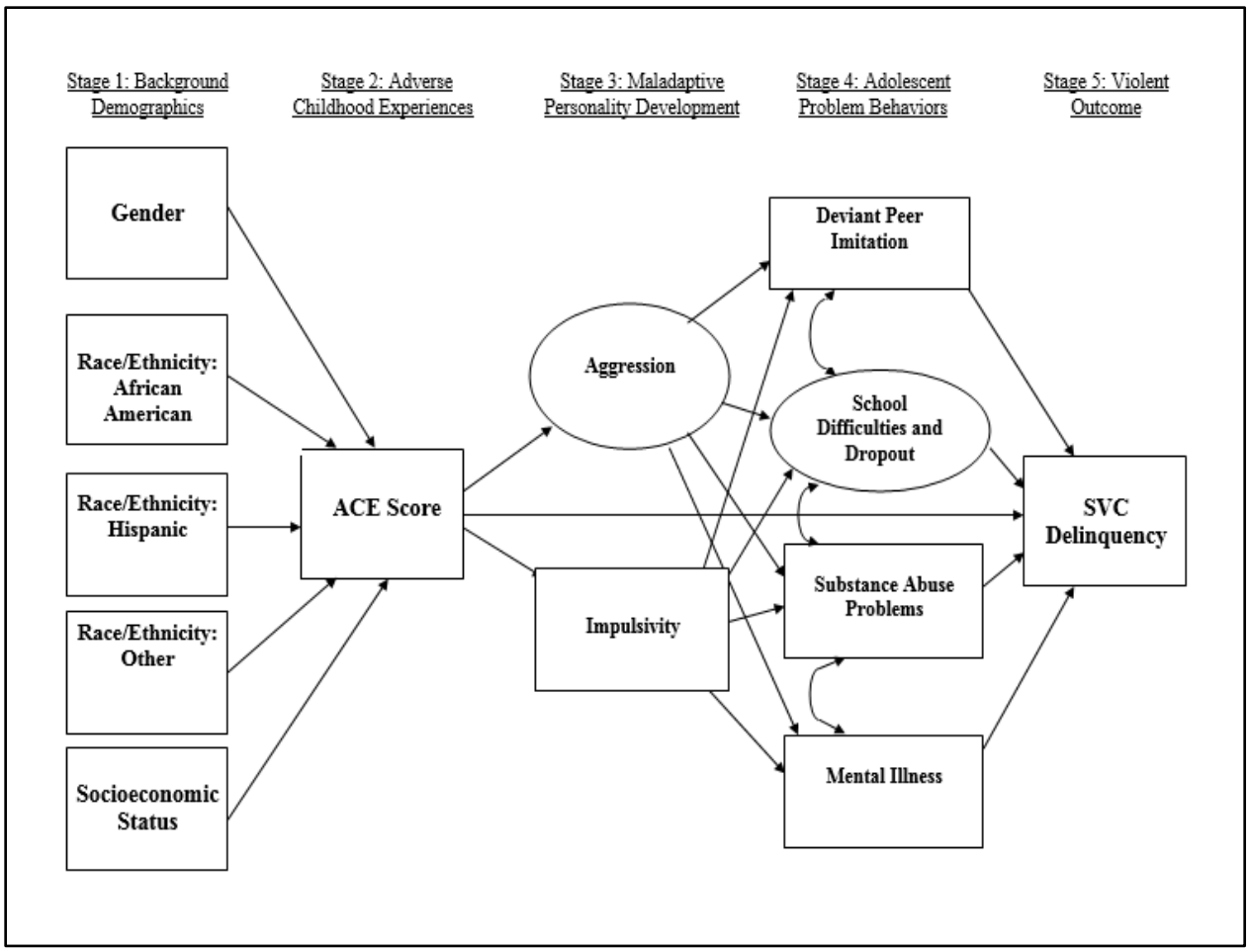

Figure 3. SVC Delinquency Structural Model[6]

Secondly, the structural model for the GSEM with the "suicidal behavior" outcome is found in Figure 4. Mirroring the SVC delinquency model, this model consists of demographic characteristics, the onset of adverse childhood experiences, the development of maladaptive personality traits, adolescent problem behaviors, and suicidal behavior. Again, each stage of the model predicts some level of mediation of the effects of the previous stage, and allows for the estimation of the direct and indirect effects on the outcome at the next stage of analysis.

[6] For the simplicity of the model representation, only arrows between each stage are shown. In the actual model, all variables at preceding stages are included as predictors of variables at each subsequent stage.

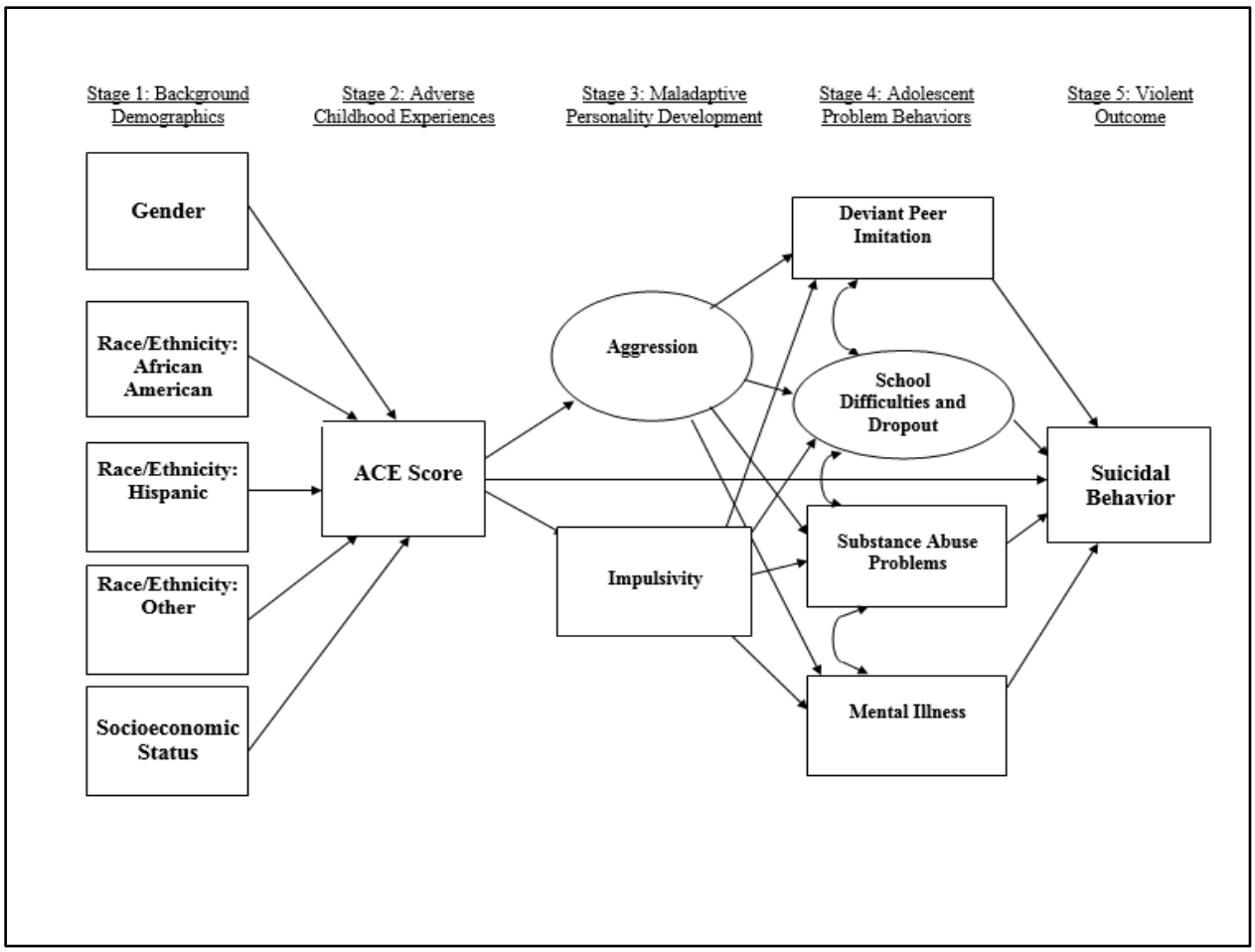

Figure 4. Suicidal Behavior Structural Model[7]

By testing the direct and indirect effects of the variables in the model simultaneously, the standard errors for the coefficients are lower, and thus, the coefficient estimates are more reliable (Iacobucci, 2008). In addition, while GSEM does not allow the estimation of all "goodness-of-fit statistics" for the model that SEM offers (RMSEA, TLI, CFI, etc.), it does offer the estimation of the Akaike's information criterion (AIC) and Bayesian information criterion (BIC) to measure model fit. Additionally, the fit of the model and the effects of each construct on the respective outcomes can be compared between the two violent behavior models (Statacorp, 2013a). This

[7] For the simplicity of the model representation, only arrows between each stage are shown. In the actual model, all variables at preceding stages are predictors of variables at each subsequent stage.

capability allows for the approximation of which variables are more salient for the perpetration of SVC delinquency or the onset of suicidal behavior. For these reasons, the suggested method of generalized structural equation model is powerful enough to fully analyze the model to estimate reliable and accurate results to answer the current research questions.

Again, these models do not represent a test of any theory specifically, but instead, their creation was guided by the notions of a number of developmental and criminological perspectives. The output of these models were interpreted in Stata 13 to test the research questions. For starters, the measurement models for each of the latent childhood development measures demonstrated the factor loadings for the observed variables and their statistical relationships to the underlying latent constructs (Brown, 2006). Based on the structural models, the direct and indirect effects of each variable on the outcome measures were uncovered.

Summary

Through the structural model's estimation procedures, results aim to yield five main findings to answer the research questions of interest: (1) the effects of background characteristics on the adverse childhood experiences (ACEs); (2) the direct effect of ACEs on childhood personality development, and the direct and indirect effects on adolescent problem behaviors and the violent behavior outcome; (3) the direct effects of childhood personality development on adolescent problem behaviors, and the direct and indirect effects on a violent behavior outcome; (4) the direct effects of adolescent problem behaviors on the violent behavior outcome; and (5) the comparative standardized effects between the two models for each predictor and mediator variable on the respective violent outcome. These findings will be discussed in the subsequent chapter.

CHAPTER FIVE:

RESULTS

This chapter will review the current study's findings through a number of different phases. The first phase will feature the descriptive statistics of the sample, specifically detailing the demographic characteristics of the juveniles in the sample and the prevalence of each individual ACE and the total ACE scores. This phase will also provide the response percentages for the maladaptive personality trait indicator variables for aggression and impulsivity, the adolescent problem behavior indicator variables for deviant peer imitation, school difficulties, substance abuse problems, and mental illnesses, and the violent behavior outcome variables of SVC delinquency and suicidal behavior. The second phase will summarize the bivariate correlations between the individual ACEs. This phase will also detail the measurement models for the latent factors present as mediators in the model: aggression and school difficulties and dropout. Additionally, this phase will display the bivariate relationships between the two maladaptive personality traits, between the four adolescent problem behaviors, and between the two violent behavior outcomes. These preliminary phases will provide a summary of the variables of interest and a review of their observed bivariate relationships in the FDJJ data.

The next phase of the analysis will describe the results of the two generalized structural equation (GSEM) models for the two violent outcomes: SVC delinquency and suicidal behavior. The first four stages of the models are identical, so the effects of the demographics, ACEs, maladaptive personality traits, and adolescent problem behaviors will be detailed simultaneously. These discussions will reveal the direct and indirect effects observed in each of the two models.

Once the model effects reach the violent behavior outcome stages, the discussion will be divided into two sections describing the estimates for each model separately. This phase will also compare the effects between the two GSEM models, examining where the effects of the two models are similar and where they are different. The final phase will detail the results of post-hoc estimation and sensitivity analyses to further explore the results of the GSEM models.

Descriptive Statistics

Table 2 presents the demographic background information for the sample. The sample is predominantly male (78.33%). Additionally, the sample is largely divided among the four racial/ethnic categories. The juveniles are 42.88% African American (non-Hispanic), 38.23% White (non-Hispanic), 15.37% Hispanic, and 3.52% other racial/ethnic category. Compared to the racial/ethnic distribution of the United States, this represents a much larger proportion of African American juveniles and much smaller proportions of White juveniles (U.S. Census, 2014). Finally, the vast majority household incomes of the youths' families falls below $35,000 per year. Although 53.87% of families make between $15,000 and $34,999, 19.46% fell below $15,000 per year. Only 18.03% of families made between $35,000 and $49,999 per year and less than one-tenth lived with families that made above $50,000 per year (8.64%). Although the original sample consisted of 64,329 youth, only 63,400 had data on their socioeconomic status. The others were missing information on this variable. As such, these cases have been dropped from the data.

Table 2. Demographic Characteristics

Variable		*%*
Gender *(n=63,400)*	Male	78.33%
	Female	21.67%
Race/Ethnicity *(n=63,400)*	White, Non-Hispanic	38.23%
	African American, Non-Hispanic	42.88%
	Hispanic	15.37%
	Other	3.52%
Socioeconomic Status *(n=63,400)*	Under $15,000	19.46%
	$15,000-$34,999	53.87%
	$35,000-$49,999	18.03%
	$50,000 or over	8.64%

The key predictor in the current study is childhood trauma, measured using the ACE assessment. Table 3 presents the prevalence of each individual ACE in the sample. The data indicate that each ACE is experienced by between approximately 9% and 66% of the juveniles. The most common experience was having an incarcerated household member (65.92%). About one-third of the juveniles also witnessed household violence (33.25%) or experienced emotional abuse (32.53%), while over one-fourth experienced physical abuse (26.53%). Additionally, 24.37% of youth grew up with a family member who abused substances, 13.28% experienced physical neglect, 13.16% experienced emotional neglect, and 12.28% grew up with a mentally ill family member. Finally, the most uncommon ACE was sexual abuse at 9.22%.

Table 3. Individual ACE Prevalence Estimates

Individual ACE	**%**
ACE 1: Emotional Abuse	32.53%
ACE 2: Physical Abuse	26.53%
ACE 3: Sexual Abuse	9.22%
ACE 4: Emotional Neglect	13.16%
ACE 5: Physical Neglect	13.28%
ACE 6: Household Violence	33.25%
ACE 7: Household Substance Abuse	24.37%
ACE 8: Household Mental Illness	12.28%
ACE 9: Incarcerated Household Member	65.92%

The total summative ACE score for each juvenile was generated by adding these nine measures for each juvenile, producing a score ranging from 0 to 9. The average ACE score was 2.31 (SD=1.85). Only 16.74% of youth in the sample experienced no adverse childhood experiences, indicating that 83.26% exhibited at least one ACE. Nearly 60% of the sample experienced two or more ACEs. The overall prevalence of ACEs progressively decreases for each additional experience. Less than 2.5% of the sample experienced seven or more ACEs during childhood. The individual and cumulative breakdown of the prevalence for each ACE score can be found in Table 4.

Table 4. ACE Score Prevalence Estimates

ACE Score	**%**	**Cumulative %**
0 ACEs	16.74%	16.74%
1 ACEs	24.06%	83.26%
2 ACEs	19.53%	59.21%
3 ACEs	14.97%	39.68%
4 ACEs	10.70%	24.71%
5 ACEs	7.30%	14.01%
6 ACEs	4.29%	6.71%
7 ACEs	1.92%	2.42%
8 ACEs	0.45%	0.50%
9 ACEs	0.05%	0.05%

The breakdown of the responses for each of the indicators for the maladaptive personality traits can be found in Table 5. The first maladaptive personality trait being assessed is "aggression." "Aggression" is a latent variable comprised of seven observed indicator variables. In the creation of this latent variable, certain key findings emerge from the seven indicator variables: (1) a majority of youth indicated that they sometimes believe in the use of verbal aggression (56.72%) and another 17.83% often exhibit a belief in verbal aggression; (2) a majority of youth indicated that they sometimes or often believe in the use of physical aggression (54.13%); (3) a majority of juveniles had a history of at least occasional anger towards others

(71.83%); (4) a majority at least sometimes gets upset over small things (70.43%); (5) only about one-quarter of the sample has no empathy (23.23%); (6) a majority minimize or excuse their delinquent behavior (52.51%); and finally, (7) a third have a history of violent or aggressive behavior (33.64%)

The second maladaptive personality trait is "impulsivity." "Impulsivity" is assessed by the juvenile case worker using the PACT item with four different categories. The data indicates that, concerning "impulsivity," only 10.90% of individuals in the sample regularly think before acting. An additional 43.14% sometimes act without thinking. Finally, 36.04% often act before thinking, while 9.93% of juveniles in the sample are considered highly impulsive and regularly act before thinking.

Table 5. Maladaptive Personality Trait Descriptive Statistics

Maladaptive Personality Trait	*Indicator Variable*	*Means & Standard Deviations*	*Response*	*%*
Aggression	Belief in Verbal Aggression	$\bar{x}$ = *1.92* *SD =0.65*	*(1) Rarely* *(2) Sometimes* *(3) Often*	25.45% 56.72% 17.83%
	Belief in Physical Aggression	$\bar{x}$ = *2.45* *SD =0.93*	*(1) Never* *(2) Rarely* *(3) Sometimes* *(4) Often*	19.47% 26.40% 42.90% 11.23%
	Anger	$\bar{x}$ = *2.42* *SD =1.00*	*(1) No history of anger* *(2) History of occasional anger* *(3) History of consistent anger* *(4) History of aggressive reactions to anger*	18.17% 40.79% 21.81% 19.22%
	Tolerance for Frustration	$\bar{x}$ =*1.89* *SD =0.69*	*(1) Rarely gets upset over small things* *(2) Sometimes gets upset over small things* *(3) Often gets upset over small things*	29.57% 51.69% 18.74%
	Empathy	$\bar{x}$ = *1.89* *SD =0.75*	*(1) Has empathy* *(2) Has some empathy* *(3) Does not have empathy*	33.65% 43.12% 23.23%
	Responsibility for Behavior	$\bar{x}$ = *1.95* *SD =0.77*	*(1) Accepts responsibility for deviance* *(2) Minimizes or excuses deviance* *(3) Accepts antisocial behavior as okay* *(4) Proud of antisocial behavior*	28.02% 52.51% 15.37% 4.09%
	Aggression Not Found in Criminal History		*(1) No aggression/violence not in record* *(2) Signs of aggression/violence not in record*	66.36% 33.64%
Impulsivity	Level of Impulsivity	$\bar{x}$ = *2.45* *SD =0.81*	*(1) Usually thinks before acting* *(2) Sometimes thinks before acting* *(3) Impulsive; often acts before thinking* *(4) Highly impulsive; usually acts before thinking*	10.90% 43.14% 36.04% 9.93%

The breakdown of the responses for each of the indicators for adolescent problem behaviors can be found in Table 6. The first adolescent problem behavior, "deviant deer imitation" is assessed using the youth's level of imitation and admiration for antisocial friends. The results indicate that about 63.64% somewhat admire/imitate or admire/imitate their antisocial friends, while 36.36 do not admire/imitate antisocial friends.

The adolescent problem behavior, "school difficulties and dropout," is composed of seven distinct indicators of school behaviors. Using these indicators, certain results are highlighted: (1) most youth at least somewhat believe in the value of an education (88.37%); (2) very few youth are involved in any school activities (8.00%); (3) most youth had been suspended at least once (82.02%), and more than one-quarter had been suspended more than seven times (25.71%); (4) nearly three-quarters (71.37%) had conduct problems that were reported to teachers, parents, or the police; (5) 64.98% had numerous unexcused absences or were classified as a habitual truant; (6) nearly 70% had GPAs below 2.0 with mostly C's, D's and F's; and (7) 43.89% had dropped out or were expelled from school at the time of their assessment.

The third and fourth adolescent problem behaviors, "substance abuse problems" and "mental illness," were each assessed by the juvenile case worker based on the youth's official records and the semi-structured interview. The results showed that almost half (49.85%) of juveniles had some abuse problem with drugs or alcohol. In addition, 62.24% reported some symptom of a mental illness, such as depression, anxiety, or more serious mental disorders.

Table 6. Adolescent Problem Behavior Descriptive Statistics

Adolescent Problem Behavior	*Indicator Variable*	*Means & Standard Deviations*	*Response*	*%*
Deviant Peer Imitation	Admiration and Imitation of Antisocial Friends	$\bar{x}$ = *1.79* *SD =0.69*	*(1) Does not admire/imitate antisocial friends*	36.36%
			(2) Somewhat admires/imitates antisocial friends	48.11%
			(3) Admires/imitates antisocial friends	15.53%
School Difficulties and Dropout	Belief in the Value of Education	$\bar{x}$ = *1.68* *SD =0.67*	*(1) Believes in the value of an education*	43.50%
			(2) Somewhat believes in the value of an education	44.77%
			(3) Does not believe in the value of an education	11.73%
	Involvement	$\bar{x}$ = *3.23* *SD =0.86*	*(1) Involved with 2 or more school activities*	5.26%
			(2) Involved in 1 school activity	2.74%
			(3) Interested but not involved in school activities	35.73%
			(4) Not interested in school activities	46.28%
	Suspension History	$\bar{x}$ = *3.52* *SD =1.81*	*(1) No suspensions or expulsions*	17.98%
			(2) 1 suspension or expulsion	14.67%
			(3) 2 or 3 suspensions or expulsions	22.45%
			(4) 4 or 5 suspensions or expulsions	12.48%
			(5) 6 or 7 suspensions or expulsions	6.71%
			(6) More than 7 suspensions or expulsions	25.71%
	School Conduct	$\bar{x}$ =*3.43* *SD =1.17*	*(1) Has received recognition for good behavior*	2.18%
			(2) No problems with school conduct	26.45%
			(3) Problems reported by teachers	19.54%
			(4) Problem calls to parents	28.96%
			(5) Problem calls to police	22.87%
	School Attendance	$\bar{x}$ = *3.54* *SD =1.40*	*(1) Good attendance; few absences*	14.58%
			(2) No unexcused absences	11.70%
			(3) Some partial-day unexcused absences	8.74%
			(4) Some full-day unexcused absences	34.30%
			(5) Habitual truant	30.68%

Table 6. Adolescent Problem Behavior Descriptive Statistics (Continued)

Adolescent Problem Behavior	*Indicator Variable*	*Means & Standard Deviations*	*Response*	*%*
School Difficulties and Dropout	School Performance	$\bar{x}$ =3.96 *SD* =0.89	*(1) Honor student; mostly A's*	0.60%
			(2) Above 3.0 GPA; mostly A's and B's	4.09%
			(3) 2.0 to 3.0 GPA; mostly B's and C's	25.38%
			(4) 1.0 to 2.0 GPA; mostly C's and D's	38.33%
			(5) Below 1.0 GPA; some D's and mostly F's	31.60%
	School Dropout or Expulsion		*(0) Not currently dropped out or expelled*	56.11%
			(1) Currently dropped out or expelled	43.89%
Substance Abuse Problems	Diagnosis of a Substance Abuse Problem		*(0) No substance abuse problem*	50.15%
			(1) Substance abuse problem	49.85%
Mental Illness	Diagnosis of a Mental Illness		*(0) No mental illness*	37.76%
			(1) Mental illness	62.24%

The final descriptive statistics reported are the prevalence of each of the violent behavior outcomes: SVC delinquency and suicidal behavior. These findings are presented in Table 7. The results indicate that 16.66% of those in the sample are characterized as SVC delinquents (three or more offenses with at least one violent). On the other hand, only 1.97% of those in the sample had reported attempting suicide at some point in their life.

Table 7. Violent Behavior Outcome Descriptive Statistics

Violent Behavior	*n*	*%*	*SD*
Serious, Violent, Chronic (SVC) Delinquents	10,714	16.66%	0.37
Suicide Attempters	1,266	1.97%	0.14

Bivariate Correlations and Latent Factors

The bivariate correlations were then examined for the variables of interest. Table 8 presents the correlations for each of the nine ACE indicators. All correlations between the ACE indicators were significant ($p<0.01$). The ACE item correlations ranged from 0.02 to 0.52. The strongest correlation was found between experiences of physical abuse and witnessing household violence ($r=0.52$). On the other hand, the weakest correlation was found between household members with mental illness and emotional neglect ($r=0.02$). The vast majority of the correlations were relatively weak, falling below 0.25.

Table 8. Bivariate Correlations of the Individual ACEs

	ACE 1	ACE 2	ACE 3	ACE 4	ACE 5	ACE 6	ACE 7	ACE 8	ACE 9
ACE 1: Emotional Abuse	1.00								
ACE 2: Physical Abuse	0.14	1.00							
ACE 3: Sexual Abuse	0.09	0.32	1.00						
ACE 4: Emotional Neglect	0.15	0.10	0.07	1.00					
ACE 5: Physical Neglect	0.10	0.30	0.24	0.14	1.00				
ACE 6: Household Violence	0.18	0.52	0.26	0.12	0.31	1.00			
ACE 7: Household Substance Abuse	0.16	0.18	0.11	0.06	0.21	0.25	1.00		
ACE 8: Household Mental Illness	0.09	0.12	0.08	0.02	0.10	0.13	0.11	1.00	
ACE 9: Incarcerated Household Member	0.12	0.18	0.09	0.05	0.17	0.22	0.28	0.12	1.00

All correlations were significant at the $p<0.001$ level.

Table 9 presents the results of eighteen chi-square tests between each of the nine ACE indicators and the two violent behavior outcomes. With the exception of the test between sexual abuse and the outcome of SVC delinquency, all other chi-square tests were significant. This indicates that each of the ACE indicators are more likely to occur in the violent behavior outcome group than the group who do not engage in the violent behavior outcome.

Table 9. Chi-Square Results for ACEs and Violent Behavior Outcomes

	SVC Chi-Square	Suicidal Behavior Chi Square
ACE 1: Emotional Abuse	$x^2=305.22$ ($p<0.001$)	$x^2=191.06$ ($p<0.001$)
ACE 2: Physical Abuse	$x^2=356.45$ ($p<0.001$)	$x^2=750.69$ ($p<0.001$)
ACE 3: Sexual Abuse	$x^2=2.40$ ($p=0.122$)	$x^2=611.72$ ($p<0.001$)
ACE 4: Emotional Neglect	$x^2=55.75$ ($p<0.001$)	$x^2=84.48$ ($p<0.001$)
ACE 5: Physical Neglect	$x^2=450.12$ ($p<0.001$)	$x^2=386.06$ ($p<0.001$)
ACE 6: Household Violence	$x^2=232.04$ ($p<0.001$)	$x^2=798.51$ ($p<0.001$)
ACE 7: Household Substance Abuse	$x^2=207.10$ ($p<0.001$)	$x^2=143.94$ ($p<0.001$)
ACE 8: Household Mental Illness	$x^2=58.29$ ($p<0.001$)	$x^2=188.17$ ($p<0.001$)
ACE 9: Incarcerated Household Member	$x^2=413.12$ ($p<0.001$)	$x^2=71.72$ ($p<0.001$)

Next, the analysis required the creation of the three latent variables. First, the indicators were assessed for the latent factor of "aggression." The majority of the bivariate correlations for the "aggression" are moderate to strong. The weakest correlations within the "aggression" indicators was found between the presence of violence or aggression not found on their criminal record and both the youth's willingness to take responsibility for their behavior and the (r=0.26) and their level of empathy (r=0.27). The strongest correlation was found between the belief in physical aggression and the belief in verbal aggression (r=0.67). The rest of the correlations fall between 0.30 and 0.53.

The aggression latent factor was created using the seven indicator variables. The factor loadings for each indicator are presented in Table 10. The weakest factor loading was found for aggression not found in the criminal history at 0.46, while all other loadings ranged between 0.70

and 1.42. The Cronbach's alpha coefficient for this factor was found to be 0.82. After its creation, the correlation between this factor and impulsivity was estimated. The bivariate relationship between these two maladaptive personality traits was moderately strong (r=0.51).

Table 10. "Aggression" Latent Variable Factor Loadings

Indicator Variable	**Factor Loading**	**Standard Error**
Belief in Verbal Aggression	1.00	Constrained
Belief in Physical Aggression	1.42***	0.01
Anger	1.35***	0.01
Tolerance for Frustration	0.78***	0.01
Empathy	0.70***	0.01
Responsibility for Behavior	0.87***	0.01
Aggression Not Found in Criminal History	0.46***	0.00

* p<0.05; ** p<0.01; *** p<0.001

The adolescent problem behavior latent factor for school difficulties and dropout was then created using seven distinct indicators. The correlations between these variables indicate a wide range of relationships. The correlations also range from relatively weak (r=0.12) to quite strong (r=0.57), with the strongest correlation found between school performance and school attendance. These measures, while interrelated, each demonstrate a different aspect of school difficulties and problems. The factor loadings for these indicators are presented in Table 11. The factor loadings for these indicators ranged from 0.42 to 2.63. The strongest indicators were found to be school attendance and school suspensions, while school dropout was found to be a weaker indicator of the latent variable. The Cronbach's alpha coefficient for this factor was found to be 0.71.

Table 11. "School Difficulties and Dropout" Latent Variable Factor Loadings

Indicator Variable	Factor Loading	Standard Error
Value of Education	1.0	Constrained
Performance	1.66***	0.02
Involvement	1.05***	0.01
Suspensions	2.19***	0.03
Conduct	1.71***	0.02
Attendance	2.63***	0.02
School Dropout	0.42***	0.01

* $p<0.05$; ** $p<0.01$; *** $p<0.001$

Table 12 presents the correlations for the four adolescent problem behavior measures: deviant peer imitation, the latent factor of school difficulties and dropout, substance abuse problems, and mental illness. The strongest correlation was found between deviant peer associations and school difficulties and dropout (r=0.41). Moderate to weak correlations were found among the other relationships (between 0.16 and 0.26).

Table 12 also presents the correlation between the ACE score and the adolescent problem behaviors. The strongest relationship for the ACE score is found with mental illness (r=0.38). The ACE score has weak to moderate relationships with the other three problem behaviors (between 0.20 and 0.34).

Table 12. Bivariate Correlations of the ACE Scores and Adolescent Problem Behaviors

	DPI	SDD	SAP	MI	ACE
Deviant Peer Imitation	1.00				
School Difficulties & Dropout	0.41	1.00			
Substance Abuse Problems	0.24	0.25	1.00		
Mental Illness	0.16	0.26	0.18	1.00	
ACE Score	0.26	0.34	0.20	0.38	1.00

All correlations were significant at the $p<0.001$ level.

Finally, the relationship between the two violent behavior outcomes was estimated. Chi-square analyses revealed that of those who were SVC delinquents, 2.6% had attempted suicide, while only 1.8% of non-SVC delinquents had attempted suicide ($x^2 = 26.96$, $p<0.001$). Though significant, this difference of less than 1% demonstrates a less-than-substantive relationship. Overall, despite its statistical significance, this relationship is weak and suggests these two violent behavior groups are quite different in this sample.

Generalized Structural Equation Models

At this stage of the analysis, all necessary variables have been examined and the three latent variables have been created. Accordingly, the GSEM model was ready to be estimated to answer the five proposed research questions. The first stage of the analysis focused on the demographic effects on the level of ACE scores. The second stage of analysis focused the ACE's effect on the two maladaptive personality traits. The third stage examined the direct and indirect effects of ACEs on adolescent problem behaviors. The fourth stage of the analysis analyzed the direct and indirect effects of ACEs on the two violent outcomes. Finally, a model comparison was conducted to determine where the effects are similar and where they differ. The effects of these two GSEM models can be found in Table 13. Depending on the nature of the outcome variables, various coefficients were reported in the table. Most estimates are reported as unstandardized coefficients (b), but since some outcome variables in the model are dichotomous, they were reported, instead, as odds ratios (OR).

Table 13. GSEM Coefficient Estimates Models 1 & 2.

Predictor Variables	Direct Effect Estimates								
	1: ACE	**2: Maladaptive Personality Development**		**3: Adolescent Problem Behaviors**				**4: Violent Outcome**	
	ACE Score *(b)*	Aggression *(b)*	Impulsivity *(b)*	Deviant Peer Imitation *(b)*	School Difficulties & Dropout *(b)*	Substance Abuse Problems *Exp(b)*	Mental Illness *Exp(b)*	SVC Delinquency *Exp(b)*	Suicidal Behavior *Exp(b)*
Gender	-0.77*** (0.02)	0.03*** (0.00)	0.21*** (0.02)	0.36*** (0.02)	0.08*** (0.00)	1.78*** (0.04)	0.73*** (0.02)	3.89*** (0.04)	0.46*** (0.03)
Race/Ethnicity: African American	-0.52*** (0.02)	0.14*** (0.00)	0.11*** (0.02)	0.29*** (0.02)	0.05*** (0.00)	0.57*** (0.01)	0.61*** (0.01)	2.86*** (0.03)	0.43*** (0.03)
Race/Ethnicity: Hispanic	-0.78*** (0.02)	0.08*** (0.01)	-0.01 (0.02)	0.18*** (0.02)	0.04*** (0.00)	0.90*** (0.02)	0.79*** (0.02)	1.52*** (0.04)	0.73** (0.07)
Race/Ethnicity: Other	-0.85*** (0.04)	0.14*** (0.10)	0.08** (0.02)	0.28*** (0.04)	0.05*** (0.00)	0.57*** (0.03)	0.73*** (0.04)	2.56*** (0.06)	0.57** (0.11)
Socioeconomic Status	-0.29*** (0.01)	0.003 (0.002)	0.01* (0.02)	0.11*** (0.01)	-0.02*** (0.00)	1.20*** (0.01)	1.05*** (0.01)	1.01 (0.02)	1.03 (0.04)
ACE Score		0.15*** (0.001)	0.22*** (0.02)	0.08*** (0.01)	0.02*** (0.00)	1.14*** (0.01)	1.39*** (0.01)	1.06*** (0.01)	1.28*** (0.02)
Aggression				1.01*** (0.01)	0.26*** (0.01)	2.18*** (0.05)	4.39*** (0.11)	2.62*** (0.09)	3.43*** (0.29)
Impulsivity				1.03** (0.02)	0.08** (0.00)	1.24** (0.02)	1.16** (0.02)	1.08*** (0.02)	1.58*** (0.07)
Deviant Peer Imitation								1.13*** (0.02)	0.79*** (0.04)
School Difficulties and Dropout								1.61*** (0.02)	0.83* (0.09)
Substance Abuse Problems								1.06** (0.02)	1.09 (0.07)
Mental Illness								1.28*** (0.03)	--

* $p<0.05$; ** $p<0.01$; *** $p<0.001$; Standard errors in parentheses. n=63,400; Model 1: AIC=786,914.20; BIC=787,593.50; df=75; Model 2: AIC=747,494.40; BIC=748,173.70; df=75.

Demographic Effects on ACEs

To answer the first research question, the data was analyzed to determine if any key differences emerged in the experiences of ACEs as a result of the juvenile's demographic characteristics. In this section of the GSEM model, the ACE score was regressed on gender, the three dummy coded racial/ethnic groups (African American, Hispanic, and other; with White omitted to serve as the reference category), and socioeconomic status. The estimates of this section of the model can be found in the first column of Table 13.

Each of the demographic variables were significant predictors of the ACE score. Being male significantly reduced the juvenile's ACE score (b= -0.77, p<0.001). Additionally, the three racial/ethnic categories, African American (b= -0.52, p<0.001), Hispanic (b= -0.78, p<0.001), and other (b= -0.85, p<0.001) also predicted a reduced level of ACE scores when compared to White juveniles. Finally, juveniles from families with higher annual incomes experienced fewer traumas and had lower ACE scores (b= -0.29, p<0.001). While the presence of an effect of demographic characteristics on the ACE score was expected, many of these effects were in the opposite direction. Although research substantiates that lower SES families have higher levels of childhood trauma, past research has found that male children and minority children often experience higher levels of a number of traumas (Scher et al., 2004; Wildeman, 2009). These findings will be discussed more in the sections to come.

ACE Effects on Maladaptive Personality Traits

The second research question was answered using the portion of the model predicting maladaptive personality traits. In this section of the GSEM model, the two maladaptive personality traits (aggression and impulsivity) were regressed on the ACE score as well as the

demographic characteristics. These estimates are found in Table 13, in the second major column.

Aggression. Even when controlling for demographic characteristics, higher ACE scores were found to significantly increase the juvenile's level of aggression (b= 0.15, p<0.001). The demographic characteristics, however, were not fully mediated by the introduction of the ACE score. The respondent's level of aggression was also significantly increased by being male (b= 0.03, p<0.001) or by being a member of each of the three minority racial/ethnic groups (African American (b= 0.14, p<0.001), Hispanic (b= 0.08, p<0.001), and other (b= 0.14, p<0.001). Socioeconomic status was not found to be a significant predictor of a youth's level of aggression.

Impulsivity. Impulsivity was also increased by a number of predictors. Again, a higher ACE score was predictive of a higher level of impulsivity, while controlling for the youth's background (b= 0.22, p<0.001). Levels of impulsivity were also significantly increased by being male (b= 0.21, p<0.001), being African American (b= 0.11, p<0.001), and being a member of the other racial/ethnic category (b= 0.08, p<0.01). Socioeconomic status also exerted a small, but significant effect, where those of higher SES had higher levels of impulsivity (b= 0.01, p<0.05).

ACE Effects on Adolescent Problem Behaviors

The third stage of analysis answered the research question regarding the effects of ACE scores on adolescent problem behaviors. Within this stage of the model, demographic predictors were included, as well as the maladaptive personality traits from the previous section. These estimates are located in the third major column of Table 13.

Deviant Peer Imitation. The first adolescent problem behavior being examined was deviant peer imitation. A higher ACE score directly increased the juvenile's level admiration and imitation of their deviant peer associations (b= 0.82, p<0.001). All demographic

characteristics also significantly affected the juvenile's admiration and imitation for delinquent and deviant peers. Being male (b= 0.36, p<0.001), being African American, (b= 0.29, p<0.001), being Hispanic (b= 0.18, p<0.001), being of the "other" racial/ethnic category (b= 0.28, p<0.001), and being of higher socioeconomic status (b= 0.11, p<0.001) each directly increased the level of admiration and imitation of deviant peers. Finally, higher levels of each of the two maladaptive personality traits of aggression (b= 1.01, p<0.001) and impulsivity (b= 1.03, p<0.001) also directly increased the juveniles' level of admiration towards their deviant peer associations.

The ACE score's indirect effect on deviant peer imitation was also estimated through aggression and impulsivity. The results indicated that there was a significant and indirect effect through both aggression (b= 0.03, p<0.001) and impulsivity (b= 0.05, p<0.001). This increased the total effect of ACEs on deviant peer associations from 0.08 to 0.16 (p<0.001).

School Difficulties and Dropout. The second adolescent problem behavior being predicted was school difficulties and dropout. Higher ACE scores directly increased the juvenile's level school difficulties (b= 0.02, p<0.001). Again, all demographic characteristics also significantly affected the juvenile's level of difficulties or misconduct in school. Being male (b= 0.08, p<0.001), being African American, (b= 0.05, p<0.001), being Hispanic (b= 0.04, p<0.001), being of the "other" racial/ethnic category (b= 0.05, p<0.001), and being of lower socioeconomic status (b= -0.02, p<0.001) each directly and significantly increased the juvenile's level of school difficulties. Finally, higher levels of each of the two maladaptive personality traits of aggression (b= 0.26 p<0.001) and impulsivity (b= 0.08, p<0.01) also increased the juveniles' level of school difficulties.

The ACE score's indirect effect on school difficulties and dropout was also predicted through the presence of aggression and impulsivity. The results indicated that there was a significant and indirect effect through aggression (b= 0.06, p<0.001), as well as impulsivity (b= 0.05, p<0.001). This brought the total cumulative effect of ACEs on school difficulties and dropout from 0.02 to 0.13 (p<0.001).

Substance Abuse Problems. The third adolescent problem behavior of interest was substance abuse problems. Since this is a dichotomous outcome, these effects are reported as odds ratios (OR). A higher ACE score directly and significantly increased the juvenile's odds of displaying problems with substance abuse (*OR*= 1.14, p<0.001). Furthermore, each of the demographic characteristics significantly affected the juvenile's odds of developing a substance abuse problem. Being male (*OR*= 1.78, p<0.001), being White as opposed to African American, (*OR*= 0.57, p<0.001), Hispanic (*OR*= 0.90, p<0.001), or the "other" racial/ethnic category (*OR*= 0.57, p<0.001), and being of higher socioeconomic status (*OR*= 1.20, p<0.001) each directly increased the youth's likelihood of reporting substance abuse problems. Finally, higher levels of each of the two maladaptive personality traits of aggression (*OR*=2.18, p<0.001) and impulsivity (*OR*= 1.24, p<0.01) directly increased the juveniles' likelihood of substance abuse problems.

The ACE score's indirect effect on substance abuse problems again was calculated through the mediating variables of aggression and impulsivity. The results indicated that there was a significant indirect effect through both aggression (*OR*= 1.11, p<0.001) and impulsivity (*OR*= 1.05, p<0.001). This increases the total odds-ratio of ACEs on substance abuse problems from 1.14 to 1.34 (p<0.001).

Mental Illness. The fourth and final adolescent problem behavior examined was mental illness. Again, since the presence of a mental illness is a dichotomous outcome, these effects are

reported as odds ratios (OR). The ACE score directly increased the juvenile's likelihood of symptoms of mental illness (*OR*= 1.39, $p<0.001$). All demographic measures also significantly affected the juvenile's likelihood of developing a mental illness. Being female (*OR*= 0.73, $p<0.001$), being White as opposed to African American, (*OR*= 0.61, $p<0.001$), Hispanic (*OR*= 0.79, $p<0.001$), or the "other" racial/ethnic category (*OR*= 0.73, $p<0.001$), and being of higher socioeconomic status (*OR*= 1.05, $p<0.001$) each increased the odds of developing a mental illness. Finally, higher levels of each the two maladaptive personality traits of aggression (*OR*= 4.39, $p<0.001$) and impulsivity (*OR*= 1.16, $p<0.01$) also directly increased the juveniles' likelihood of mental illness.

As with the previous three adolescent problem behaviors, the ACE score's indirect effect was calculated for mental illness through aggression and impulsivity. The results showed a significant and indirect effect through aggression (*OR*= 1.21, $p<0.001$) and impulsivity (*OR*= 1.03, $p<0.001$). These indirect effects increase the total odds-ratio of ACEs on substance abuse problems from 1.39 to 1.73 ($p<0.001$).

ACE Effects on Violent Behavior Outcomes

The above effects were identical for both GSEM models. At this stage of the analysis, the results differed with respect to the final violent behavior outcome variable. This section of the results was examined to answer the fourth research question regarding the relationship between ACEs and violent behaviors. Since each of these outcomes are dichotomous, the results will be reported as odds ratios (OR). The first section will detail the model utilizing SVC as the outcome variable, while the second will detail the model with suicidal behavior as the outcome. The results of each of these models can be found in the final two columns of Table 13.

GSEM Model 1: SVC Delinquency. In Model 1, nearly all predictors significantly increased the odds of a juvenile becoming an SVC delinquent. The ACE score significantly and directly increased the odds of a juvenile becoming an SVC delinquent (*OR*= 1.06, *p*<0.001). In the case of the demographic characteristics, males (*OR*= 3.89, *p*<0.001), African Americans (*OR*= 2.86, *p*<0.001), Hispanics (*OR*= 1.52, *p*<0.001), and those of the "other" racial/ethnic category (*OR*= 2.56, *p*<0.001) were each significantly more likely to become SVC delinquents. Socioeconomic status exerted no direct significant effect on SVC delinquency.

The likelihood of becoming an SVC delinquent was increased by both maladaptive personality traits: aggression (*OR*= 2.62, *p*<0.001) and impulsivity (*OR*= 1.08, *p*<0.001), and all four adolescent problem behaviors: deviant peer imitation (*OR*= 1.13, *p*<0.001), school difficulties and dropout (*OR*= 1.61, *p*<0.001), substance abuse problems (*OR*= 1.06, *p*<0.001), and mental illness (*OR*= 1.28, *p*<0.001).

As with the adolescent problem behaviors, the ACE score's indirect effect through the two maladaptive personality traits and the four adolescent problem behaviors was calculated for SVC delinquency. The results indicated that there is a significant and indirect effect through aggression (*OR*= 1.13, *p*<0.001) and impulsivity (*OR*= 1.02, *p*<0.001). There was also a significant indirect effect through deviant peer imitation (*OR*= 1.01, *p*<0.001), school difficulties and dropout (*OR*= 1.01, *p*<0.001), substance abuse problems (*OR*= 1.01, *p*<0.01), and mental illness (*OR*= 1.09, *p*<0.001). Altogether, the direct and indirect effects bring the total odds-ratio ACEs on SVC delinquency from 1.06 to 1.34 (*p*<0.001).

GSEM Model 2: Suicidal Behavior. At this stage of the analysis, it was discovered that the inclusion of mental health problems as a predictor of suicidal behavior was negatively affecting the model. Further analysis revealed that approximately 99% of those who had

attempted suicide were also coded as having a mental illness. In fact, only 8 cases existed in the data where a juvenile attempted suicide and had not been diagnosed with a mental health problem. This is likely the result of the caseworker using attempted suicide as an indicator for a mental illness. As such, to improve the other estimates in the model, the mental health problem variable was removed as a predictor of suicidal behavior and re-estimated.

In Model 2, a majority of the predictors again significantly increased the odds of a juvenile attempting suicide. Similar to SVC delinquency, the ACE score significantly increased the odds of a youth attempting suicide (*OR*= 1.28, $p<0.001$). The estimates for the demographic variables also indicated that females (*OR*= 0.46, $p<0.001$), and Whites compared to African Americans (*OR*= 0.43, $p<0.001$), Hispanics (*OR*= 0.73, $p=0.001$), and the "other" racial/ethnic category (*OR*= 0.57, $p=0.004$) demonstrated increased odds of a suicide attempt. Once more, socioeconomic status did not exert a significant direct effect.

The likelihood of attempting suicide was also significantly increased by both maladaptive personality traits, aggression (*OR*= 3.44, $p<0.001$) and impulsivity (*OR*= 1.58, $p<0.001$). Regarding adolescent problem behaviors, the adolescent problem behaviors of deviant peer imitation (*OR*= 0.79, $p<0.001$) and school difficulties and dropout (*OR*= 0.83, $p=0.04$) actually significantly *decreased* the odds of a juvenile attempting suicide. Alternatively, substance abuse problems was not found to be a predictor of suicidal behavior while controlling for the other variables in the model.

For suicidal behavior, the indirect effect of the ACE score's through the maladaptive personality traits and adolescent problem behaviors was calculated. The results indicated that there was a significant and indirect effect through both aggression (*OR*= 1.13, $p<0.001$) and impulsivity (*OR*= 1.10, $p<0.001$). The results also showed a diminishing indirect effect through

deviant peer imitation (*OR*= 0.99, $p<0.001$). These indirect effects brought the total effect odds-ratio of ACEs on suicidal behavior from 1.28 to 1.60 ($p<0.001$).

Model Comparison

The fifth and final research questions aimed to address the areas of similarity and difference between the effects of Model 1 predicting SVC delinquency and Model 2 predicting suicidal behavior. The results of this phase are found in Table 14. This comparison yielded many differences and some similarities between the estimates. Regarding the demographic characteristics, gender and all three racial/ethnic minority categories produced markedly different effects. Whereas males were more likely to externalize their violence by engaging in SVC delinquency, females were more likely to internalize their behavior by attempting suicide. Similarly, while each of the minority racial/ethnic groups was more likely to become SVC delinquents than White juveniles, each was less likely to attempt suicide than their White counterparts. For both SVC and suicidal behavior, socioeconomic status was nonsignificant when controlling for the other variables in the model.

The ACE score was one area of similarity between the models. The odds of both SVC delinquency and suicidal behavior were increased by higher ACE scores. The effect was found to be stronger for suicide, though (1.21 v. 1.06). Regarding maladaptive personality traits, aggression and impulsivity also each increased the odds of SVC and suicide, though both produced larger effects for suicide (2.65 v. 2.62 and 1.54 v. 1.08, respectively). In the areas of adolescent problem behaviors, deviant peer imitation and school difficulties and dropout were found to increase the odds of SVC delinquency, yet decrease the odds of suicide. The implications of these findings, as they pertain to the differences between externalized and internalized violence, will be discussed in the subsequent chapter.

Table 14. Comparison of Effects on two Violent Outcomes

	SVC Delinquency ***Exp(b)***	**Suicidal Behavior** ***Exp(b)***	**Difference between Effects**
Gender	3.89*** (0.04)	0.46*** (0.03)	+ for SVC; - for Suicidal Behavior
Race/Ethnicity: African American	2.86*** (0.03)	0.43*** (0.03)	+ for SVC; - for Suicidal Behavior
Race/Ethnicity: Hispanic	1.52*** (0.04)	0.73** (0.07)	+ for SVC; - for Suicidal Behavior
Race/Ethnicity: Other	2.56*** (0.06)	0.57** (0.11)	+ for SVC; - for Suicidal Behavior
Socioeconomic Status	1.01 (0.02)	1.03 (0.04)	Identical and nonsignificant
ACE Score	1.06*** (0.01)	1.28*** (0.02)	+ for both; Larger for Suicidal Behavior
Aggression	2.62*** (0.09)	3.43*** (0.29)	+ for both; Larger for Suicidal Behavior
Impulsivity	1.08*** (0.02)	1.58*** (0.07)	+ for both; Larger for Suicidal Behavior
Deviant Peer Imitation	1.13*** (0.02)	0.79*** (0.04)	+ for SVC; - for Suicidal Behavior
School Difficulties and Dropout	1.61*** (0.02)	0.83* (0.09)	+ for SVC; - for Suicidal Behavior
Substance Abuse Problems	1.06** (0.02)	1.09 (0.07)	+ for SVC; Nonsignificant for Suicidal Behavior
Mental Illness	1.28*** (0.03)	--	Not included for Suicidal Behavior

* $p<0.05$; ** $p<0.01$; *** $p<0.001$; Standard errors in parentheses. n=63,400

Post-Hoc Estimation and Sensitivity Analyses

Nonlinear Effects

Following the initial model estimation, additional procedures were carried out to ensure that the data was analyzed most appropriately. For example, it is possible that the effect of the ACE measure on each of the other variables may also be nonlinear. In order to test for this, a new ACE variable was created with fewer categories and estimated as an ordered probit variable. In this new interval level variable, youth with zero ACEs were still coded as 0, and youth with one ACE were still coded as 1, but youth with 2-3 ACEs were coded as 2, youth with 4-6 ACEs were coded as 3, and youth with 7 or more ACEs were coded as 4. This new variable was then

included in the analysis in place of the original ACE measurement to estimate potential non-linear effects.

In this new GSEM model, the direct nonlinear ACE effect was greater than in the original model. The ACE score's direct effect on impulsivity and aggression were each increased to 0.39 and 0.23, respectively. Furthermore, the ACE's direct effect on deviant peer imitation increased slightly to 0.15, and its effect on school difficulties and dropout was increased to 0.04. The odds ratio of the direct effect of the ACE measure increased to 1.27 for substance abuse problems and to 1.61 for mental health problems. Finally, the direct nonlinear ACE measure effect increased to 1.13 for SVC delinquency and 1.44 for suicidal behavior. Additionally, the relative fit indices were improved in the new models for both SVC delinquency (AIC=711,225.30; BIC=711,922.70) and suicidal behavior (AIC=671,829.80; BIC=672,527.20). This improved model fit and the increased effect sizes suggests that the ACE may produce a nonlinear effect, however, further research into this effect would be needed to make any definitive statements.

Random Sample Model Effects

Due to the immense size of the sample, nearly all effects that were estimated in the models were found to be significant. In order to address this, a post-hoc analysis was conducted using a random selection of 10% of the original sample. This produced two models using a randomly-generated sample of 6,433 juveniles. The results of these models are found in Table 15. The results indicate that many of the effects remained close to the original models, only increasing or decreasing slightly. Decreasing the sample size did largely increase the sizes of the standard errors of the estimates. The most pronounced change was found in the significance of the estimates. Some effects were slightly reduced in significance (i.e. from $p<0.001$ to $p<0.01$), while other estimates were found to become nonsignificant in the smaller random sample.

For example, a youth being Hispanic was no longer a significant predictor of substance abuse problems or suicidal behavior. Additionally, a youth being of the other racial/ethnic group was no longer significant for impulsivity, school difficulties or dropout, or mental illness. Socioeconomic status also no longer significantly affected impulsivity or mental illness. Despite these differences, the ACE score remained a significant predictor of both maladaptive personality traits, all four adolescent problem behaviors, and both violent behavior outcomes. Nearly all significant estimates from the full sample models remained significant in the partial models using the random sample of only 10% of all cases.

Age-Graded Opportunity

One final post-hoc consideration was the effect of the juvenile's age on their *opportunity* to experience childhood trauma. For example, a child who is assessed at age 12 has a shorter time period to experience trauma than one who was assessed at age 17. Although the age variable was not included as a predictor in the models, it may be of concern when discussing a child's level of trauma. For this reason, a crosstab analysis was run using the ACE score and age. The results indicated that children who were older had slightly higher prevalence of trauma, likely as a result of the longer period of time to encounter these experiences. Additionally, a one-way ANOVA revealed a significant relationship ($F=6.39$, $p<0.001$), although the ACE score mean differences were not especially large. For instance, the mean ACE score for all age groups only ranged from 2.26 to 2.51 total ACEs. This suggests that, while age may have an effect, it is not dramatically altering the results of the models.

Table 15. GSEM Coefficient Estimates Model 1 & 2 with Random Sample of 10% of Cases

Predictor Variables	Effect Estimates								
	1: ACE	**2: Maladaptive Personality Development**		**3: Adolescent Problem Behaviors**				**4: Violent Outcome**	
	ACE Score *(b)*	Aggression *(b)*	Impulsivity *(b)*	Deviant Peer Imitation *(b)*	School Difficulties & Dropout *(b)*	Substance Abuse Problems *Exp(b)*	Mental Illness *Exp(b)*	SVC Delinquency *Exp(b)*	Suicidal Behavior *Exp(b)*
Gender	-0.69*** (0.05)	0.09*** (0.01)	0.16*** (0.03)	0.39*** (0.06)	0.07*** (0.01)	1.82*** (0.07)	0.69*** (0.08)	4.10*** (0.12)	0.45*** (0.08)
Race/Ethnicity: African American	-0.48** (0.05)	0.13*** (0.01)	0.11*** (0.03)	0.29*** (0.06)	0.05*** (0.01)	0.57*** (0.06)	0.56*** (0.07)	2..78*** (0.09)	0.31*** (0.07)
Race/Ethnicity: Hispanic	-0.72*** (0.07)	0.05* (0.02)	-0.05 (0.04)	0.26** (0.08)	0.03** (0.01)	0.92 (0.08)	0.77** (0.09)	1.61*** (0.12)	0.71 (0.19)
Race/Ethnicity: Other	-0.83*** (0.13)	0.12** (0.03)	0.07 (0.08)	0.48** (0.03)	0.03 (0.02)	0.56*** (0.15)	1.06 (0.17)	2.08*** (0.20)	0.73 (0.39)
Socioeconomic Status	-0.27*** (0.03)	0.01 (0.01)	-0.03 (0.01)	0.12*** (0.01)	-0.03*** (0.01)	1.21*** (0.03)	1.02 (0.04)	0.92 (0.05)	1.05 (0.11)
ACE Score		0.13*** (0.00)	0.39*** (0.01)	0.05*** (0.00)	0.03*** (0.00)	1.19*** (0.02)	1.42*** (0.02)	1.06** (0.02)	1.20*** (0.05)
Aggression				1.16*** (0.07)	0.27*** (0.01)	2.27*** (0.07)	4.19*** (0.08)	2.53*** (0.11)	4.42*** (0.27)
Impulsivity				0.98*** (0.04)	0.07*** (0.01)	1.19*** (0.04)	1.19*** (0.04)	1.20** (0.06)	1.47** (0.20)
Deviant Peer Imitation								1.13* (0.06)	0.95 (0.14)
School Difficulties and Dropout								1.69*** (0.14)	0.77 (0.26)
Substance Abuse Problems								1.13* (0.08)	1.34 (0.16)
Mental Illness								1.33** (0.09)	--

* $p<0.05$; ** $p<0.01$; *** $p<0.001$; Standard errors in parentheses. n=6,433; Grayed boxes indicate changes in significance from the full model.

Summary

This chapter provided a detailed narrative of the results of the current analysis. It began with a discussion of the descriptive statistics and bivariate relationships found between the variables of interest. This section also described the results of the two GSEM models estimated in this analysis and compared the effects on the violent behavior outcomes across the two models. This section concluded with two post-hoc/sensitivity analyses, with one using an interval ACE measure to explore potential nonlinear effects and another using a random sample of 10% of the original data to determine if the effects may have been artificially inflated due to sample size. These results will be further contextualized in relation to the five research questions in the upcoming discussion chapter with a focus on reviewing the noteworthy findings, discussing the variety of implications of this study, evaluating the strengths and limitations of the analysis, and offering potential directions for future research.

CHAPTER SIX:

DISCUSSION

The preceding chapters have introduced the current project and childhood trauma as an issue, covered the developmental, psychological, and criminological theory foundation of the study and the past literature on the topics and relationships of interest, discussed the sample, data, measures, and empirical model being used, and summarized the assortment of results of the analyses. This final chapter will contextualize this investigation in several key ways. The chapter will begin by highlighting the noteworthy findings of the study, specifically bringing attention to the results of the tests of the five research questions. Next, these findings will be further discussed in relation to their potential implications, both for theoretical and empirical advancement in the developmental psychopathology and criminology fields, as well as for practical interventions to reduce the incidence of these prominent adverse outcomes. This chapter will also evaluate the strengths and limitations of the current project. Finally, this chapter will conclude with a commentary on possible directions for future research on childhood trauma, maladaptive personality development, adolescent problem behaviors, and serious violent behavior.

Summary of Findings

This project's analyses revealed many important and interesting findings important for theory, research, and policy in the area of childhood trauma and development. Before delving into the hypothesis testing of the GSEM model, the prevalence of the variables of interest will

first be discussed. Regarding the prevalence of ACEs, a majority of youth (nearly two-thirds) in this sample had lived through the incarceration of one of their immediate family members. Many others had experienced multiple types of abuse, neglect, witnessed household violence, or lived with a substance-abusing or mentally ill family member. As a result of these different experiences, the ACE scores of the youth were widely dispersed, ranging anywhere from zero to nine. A vast majority of youth experienced at least one ACE during their childhood (83.26%), though very few had experienced more than five ACEs (6.71%). This prevalence of childhood trauma was found to be much higher than that of the original Felitti and colleagues (1998) study, as in their sample, only about one-half of respondents reported one ACE. This is likely due to the increased prevalence of childhood trauma in individuals who are processed by the juvenile justice system.

In addition to the prevalence of ACEs, the prevalence of maladaptive personality traits (aggression and impulsivity), adolescent problem behaviors (deviant peer imitation, school difficulties and dropout, substance abuse problems, and mental illness), and serious violent behaviors (SVC delinquency and suicidal behavior) were also estimated for the sample. A large percentage of the sample reported high levels of aggressive and impulsive behavior. Additionally, a large proportion of the FDJJ youth admired and imitated their antisocial friends, many displayed different signs of school difficulties, about half were diagnosed as having a substance abuse problem, and nearly two-thirds demonstrated symptoms of some type of mental illness. Finally, serious violent and chronic delinquency was relatively uncommon, with only about 17% of youth being classified as SVC delinquents. Suicidal behavior was even rarer in the FDJJ sample with only about 2% of youth reporting a suicide attempt in their lives.

The heightened prevalence of the early childhood traumas and these additional behavioral maladaptations had been anticipated in this sample of youth based on the developmental psychopathology framework, as it suggests that early trauma and developmental difficulties can perpetually affect all facets of adolescent development (Cicchetti & Toth, 2005). This was supported by the moderate relationship found between the maladaptive personality traits, and the moderate to weak relationships found among the adolescent problem behaviors. Although significant, the relationship between the two violent behavior outcomes was quite weak and likely simply a reflection of the size of the sample. This finding suggests that these two violent outcomes are likely ends to two varying paths and do not represent parallel conditions. In light of these preliminary findings, the GSEM models were run and produced many meaningful findings.

Regarding the first research question, the structural models revealed that demographic variables were significantly related to a youth's ACE score. Gender, race/ethnicity, and socioeconomic status each were significantly related to the number of ACEs an individual experienced. This supported the early hypothesis that these factors would be important predictors of trauma. As predicted, males and youth of lower socioeconomic statuses did experience more trauma than females or youth of higher SES. Surprisingly, though, youth who were in racial/ethnic minority groups actually had lower ACE scores than their White counterparts. This was contrary to some prior research and warrants subsequent consideration and discussion (see: Brown, Cohen, Johnson, & Salzinger, 1998; Wildeman, 2009).

As it pertains to the second research question, the ACE score significantly predicted higher levels of both maladaptive personality traits: aggression and impulsivity. Specifically, the ACE score exerted a significant effect on each of these two variables even when controlling for the key background characteristics. This finding supported past studies that suggested that

children who experience higher levels of trauma will be more aggressive (Aber et al., 1989) and impulsive (Haapasalo & Pokela 1999).

In response to the third research question, the ACE score significantly predicted higher levels of all four adolescent problem behaviors: deviant peer imitation, school difficulties and dropout, substance abuse problems, and mental illness. This finding supported the prior work regarding the effects of trauma on problem behaviors during adolescence (Aber et al., 1989; Brown et al., 1999; Dube et al., 2002; Dube et al., 2003; Erickson et al., 1989; Fergusson & Horwood, 1999; Fergusson et al., 2008; Kendall-Tackett & Eckenrode, 1996; Ireland, Smith, & Thornberry, 2002).

These relationships were partially mediated by the two maladaptive personality traits (aggression and impulsivity) for each of the four adolescent problem behaviors. Although the ACE score was still a significant predictor for each of the four behaviors, an indirect effect through the two maladaptive personality traits was discovered. Combined with the direct effects, this produced a larger total effect for the ACE score on the behavior. Despite the importance of aggression and impulsivity in the onset of problem behavior, the ACE score's residual direct effect suggests that other aspects of the youth's development may also be affected by childhood trauma that were not included in the current analyses.

In testing the fourth research question, the ACE score significantly predicted a higher likelihood of both violent behavior outcomes: SVC delinquency and suicidal behavior. This result supports previous findings regarding trauma and both SVC offending and suicide (Brown et al., 1999; Dube et al., 2001; Farrington, 1989; Fox et al., 2015; Zingraff et al., 1993). Additionally, the ACE effect on SVC offending was partially mediated by the two maladaptive personality traits (aggression and impulsivity) and the four adolescent problem behaviors

(deviant peer imitation, school difficulties and dropout, substance abuse problems, and mental illness). For suicidal behavior, the effect of the ACE score was only partially mediated by the two maladaptive personality traits (aggression and impulsivity).[8] The ACE score, however, remained a significant predictor for both violent behavior outcomes. Despite the importance of maladaptive personality traits and adolescent problem behaviors in the onset of each violent behavior, the ACE score's enduring direct effect suggests that other aspects of the youth's development may also be affected by childhood trauma that were not included in this analysis.

Finally, in assessing the fifth and final research question, the effects for the SVC delinquency model were found to be markedly different than the effects for the suicidal behavior model. For example, being male and a member of a racial/ethnic minority group were each significant predictors of a higher odds of SVC delinquency and significant predictors of a lower odds of suicidal behavior. Additionally, the effect of the ACE score was larger for suicidal behavior than SVC delinquency. Other predictors were similarly stronger for suicidal behavior, such as aggression, impulsivity, and mental illness. On the other hand, deviant peer imitation, school difficulties and dropout, and substance abuse problems were only significant predictors of a higher likelihood of SVC delinquency. This finding had been anticipated, as it was originally predicted that differences in the model effects would exist and certain maladaptive personality traits and adolescent problem behaviors would be more salient for each outcome.

Overall, these findings suggest that childhood trauma is an important predictor of a number of maladaptive personality traits, adolescent problem behaviors, and violent behavior outcomes. The results also indicate that several personality traits and problem behaviors provide partial mediators of the relationships between childhood trauma and SVC delinquency and

[8] Although deviant peer imitation and school difficulties and dropout were significant predictors, they each reduced the odds of suicidal behavior.

between trauma and suicidal behavior. Although these variables explain some of the path between the ACE score and each violent behavior, a significant direct relationship that cannot be explained by the other variables in the model does still exist. Finally, the models predicting SVC delinquency and suicidal behavior demonstrated major differences in their effects. This suggests that two distinct paths exist for those who end up exhibiting violence towards others and those who become suicidal and direct the violence toward themselves.

Study Implications

The key findings of this research project are of great importance to both the theoretical and empirical literature, as well as for policy and prevention/intervention. Through this project, certain aspects of the key theoretical perspectives have been strongly supported. Others were not so strongly supported. Additionally, when considering the results of this research, critical interventions can be recommended to help in preventing or intervening in the relationship between trauma and violent behavior. These interventions may entail proactive trauma prevention to stop the initiation of the relationship or reactively address the mediating personality traits, the problem behaviors, or the violent behavioral outcomes that occur after the onset of trauma.

Theoretical and Empirical Implications

This study presented a test of a model that was based on many of the core propositions of Dante Cicchetti's developmental psychopathology framework. Though not a specific test of the theory, the model specification was largely based on the major tenets that childhood trauma can initiate a prolonged path of maladaptation that affects many different aspects of the youth's development. The current results provided support for these assertions. For example, childhood trauma was significantly related to a number of adverse psychological and behavioral outcomes,

including aggression, impulsivity, deviant peer imitation, school difficulties and dropout, substance abuse problems, and mental illness. Additionally, childhood trauma was also directly and indirectly related to both SVC delinquency and suicidal behavior. These findings provided support for the assertion that childhood maltreatment and dysfunctional home environments can create "considerable risk for maladaptation" and affect various "domains of development" (Cicchetti & Toth, 2005, p. 410).

Furthermore, this project also provided further insight into the potential predictors of the development of SVC delinquency and suicidal behavior following childhood trauma. For example, aggressive and impulsive individuals are significantly more likely to become violent towards others and towards themselves, but individuals who experience trauma and later associate with and imitate deviant peers are only more likely to become SVC offenders. By identifying support for these key predictors, further theoretical development and refinement can be performed. On the other hand, deviant peer imitation is actually a protective factor for suicidal behavior, as the odds for suicide attempts are significantly lower in those who admire and emulate their antisocial peers. This likely reflects the importance of peer associations, whether prosocial or antisocial, to decrease the drive or motivation for suicide. This finding may provide important implications for the literature, as investigations into deviant peer association or imitation and suicidal behavior have been largely absent from empirical analyses.

This investigation also found support for the main tenets of Richard Jessor's problem behavior perspective. This viewpoint contends that problem behaviors during adolescence will be interrelated (Jessor, 1987, 1991; Jessor & Jessor, 1977). This assertion was supported in that all problem behaviors included in the model were significantly related to one another. The correlations, however, were much lower than expected and may bring doubt upon the

"underlying syndrome" assertion. Additional research is needed to uncover how highly interrelated these behaviors may actually be.

Regarding the criminological perspectives that were considered in this analysis, additional support was found. Supporting the work of Gottfredson and Hirschi (1990), impulsivity was found to be a significant predictor of SVC delinquency, even when controlling for a number of other risk factors. Additionally, impulsivity was found to be a significant predictor of other analogous behaviors, such as substance abuse. It should be noted, however, that contrary to their assertions, other predictors were also significant and stronger predictors of this serious, violent, and chronic type of delinquent behavior. Furthermore, supporting a major tenet of social learning theory (Akers et al., 1979) deviant peer imitation was also a significant predictor of SVC delinquency. Again, this relationship was substantiated while controlling for all other predictors in the model.

Empirically, certain results that were largely inconsistent with the past research also emerged. For example, prior empirical research indicated that children of racial/ethnic minority families would be more likely to experience greater levels of trauma, and thus have higher ACE scores, but this was not found in this analysis. Each of the three racial/ethnic minority groups (African American, Hispanic, and other) were actually predictors of lower ACE scores when compared to the White youth in the sample. Ensuing research should be conducted to uncover the potential causes for this finding and to provide more well-informed implications for each racial/ethnic group.

Additionally, school difficulties and dropout and substance abuse problems were not found to be significant predictors of suicidal behavior. This result did not support the findings of Daniel and colleagues (2006) regarding school problems and suicide or Swahn and Bossarte

(2007) and King and colleagues (2001) regarding substance abuse and suicide. The nonsignificant estimates in this model may simply reflect a decreased relationship as a result of the inclusion of the mental health variable (or other variables) in the model. This should be further examined in subsequent research to better understand the true nature of these relationships.

Finally, this study also provided key implications for the differences between externalized (SVC delinquency) and internalized violence (suicidal behavior). Although some effects were similar between the two outcomes, the effects were quite different in a number of demographic measures. These findings suggest that, while childhood trauma, maladaptive personality development, and adolescent problem behaviors are predicted to increase the likelihood of both SVC delinquency and suicidal behavior, it may manifest differently depending on the background characteristics of the individual. Males and racial/ethnic minorities were more likely to engage in externalized violence, while females and Caucasians were more likely to attempt suicidal behavior. This finding is supported in the literature (see: Baglivio, Jackowski, Greenwald, & Howell, 2014; Blum et al., 2000; Cannetto & Sakinofsky, 1998) and suggests that practical interventions for those who experience trauma may be designed based on certain key background variables to reduce the likelihood of either SVC delinquency or suicidal behavior. Future research on these sub-groups is necessary to fully validate this proposition.

Policy and Practical Interventions

In addition to the implications for theory and empirical research, a number of more practical interventions can also be drawn from this study. For example, the results of this project can be used to support or develop specific programs to deter the paths toward both SVC delinquency and suicidal behavior. Based on the results of this study, a primary goal of

interventions should be the prevention of the onset of childhood trauma. Since childhood trauma is a significant and salient predictor of every one of the model's adverse outcomes, the ability to prevent trauma from occurring should be of the utmost importance. In theory, by preventing the variety of traumatic experiences early in the lives of children, they should be able to develop in more positive and adaptive ways, while being better equipped to avoid the more maladaptive, problematic, and violent behavioral outcomes.

Trauma Prevention. The findings of this study most principally endorse the use of programs to prevent children from experiencing trauma. Early life interventions that provide improved prenatal care and parental assistance have been found to be especially cost-effective practices that can improve the family life of those at-risk of trauma and ensuing adverse outcomes (Cohen, Piquero, & Jennings, 2010; Zigler & Hall, 1989). A recent meta-analysis of parental and family training programs found that they can have substantive benefits on the lives of the children (Piquero, Farrington, Welsh, Tremblay, & Jennings, 2009). In the analysis of 55 distinct studies of family or parent training, robust effects were found on antisocial behavior, conduct problems, and subsequent delinquency over time. These programs demonstrate key value to improvements to the lives of children with little risk for adverse effects (Piquero et al., 2009). As such, they may be valuable in reducing the level of traumatic experiences and preventing a path toward maladaptive outcomes during adolescence.

Another practice, designed to prevent child maltreatment and family conflict, involves home visitations for high-risk families. These interventions are designed to enhance at-risk parents' caregiving abilities, educate them on the effects of child maltreatment, and teach positive problem-solving behaviors (Zigler & Hall, 1989). Some interventions even include nurse home visits during pregnancy and through the formative first years of development. For

example, Olds and colleagues tested such a program and found that nurse visits for unmarried low SES women reduced child maltreatment and reduced subsequent adverse behavior, including delinquency, arrests, convictions, and running away (Olds et al., 1997; Olds et al., 1998; Olds, Henderson, Camberlin, & Talelbaum, 1986). These assessments show that these programs can not only affect the prevalence of trauma, but also reduce the subsequent problem behaviors associated with it (see also: Poole, Seal, & Taylor, 2014). As such, it is recommended that these programs be implemented to reduce the number of children who are maltreated or experience trauma in the home.

These visitation efforts can also be enhanced by adding a cognitive training component that focuses on power and competence within the parent-child relationship. An evaluation of such a program was conducted by Bugental and colleagues (2002) in a random sample of high-risk families (based on parent history and circumstances). Their evaluation showed that, while home visitation did reduce the prevalence of physical abuse (23%) compared to the control condition (26%), the greatest reduction in maltreatment occurred in the enhanced home visitation, which included the cognitive component (4%) (Bugental, et al., 2002). This suggests that programs that aim to keep constant visitation and help improve the thought processes of the parents are able to reduce the likelihood of maltreatment in the home. Wasserman and Miller (1998) also cite the importance of parent management training (PMT) and functional family therapy (FFT) to improve family dynamics, reduce family dysfunction, and improve the overall development of the child. These findings suggest that the more comprehensive the prevention program is, the more effective it can be. Based on this research, comprehensive nurse visitation and family training programs are likely the most effective defense for preventing childhood trauma and precluding children from a path that can lead to violent behaviors.

Other types of programs to reduce trauma can also be implemented outside of the home. For example, pediatricians, teachers, day-care workers, counselors, and other specialists may be able to intervene when maltreatment is suspected. Since traumatic experiences of sexual abuse may occur within the home, some prevention programs are best implemented at the school. These programs may include aspects using written materials, role playing, discussions, lectures, multimedia, behavioral training, or dolls/puppet shows to teach children about what constitutes sexual abuse. A meta-analysis of the evaluations of a variety of at-school sexual abuse prevention programs generally found them to be effective (Davis & Gidycz, 2000). Programs that encourage children to be active participants in the program and foster some sort of behavioral skills training were found to be more effective than those that do not. Additionally, programs that contained higher numbers of sessions were also found to be more effective, as those with more than three sessions had effect sizes that were two- to three-times greater than those with less sessions (Davis & Gidycz, 2000). The more inclusive and intensive programs appear to be more effective at teaching the child what constitutes abuse and what they can do to prevent or stop it.

Additionally, efforts to reduce the number of parents who are incarcerated would also be an effective way to reduce the levels of trauma that children experience. This may be done through certain diversionary programs, decriminalization of certain drug offenses, or moving past our country's current mass incarceration model (Kreit, 2010; Tonry, 2014). Fewer individuals who are incarcerated for lengthy sentences would prevent the number of children from going through the traumatic experience of losing a parent during their formative years. Although the ACE assessment considers family member incarceration and child maltreatment to

be two distinct traumas, these two experiences can be somewhat related. For example, "with respect to re-entering the family household (after incarceration), the behaviors and attitudes required for daily survival in violent prison settings are not conducive to family living and positive parenting" (Hairson & Lockett, 1985, 472).

Support programs and behavioral or attitude training for those who re-enter the household after being incarcerated may prevent child abuse and neglect, and thus, prevent one adverse childhood experience from becoming two or more. Accordingly, some prisons around the country are implementing family support programs to prevent abuse from occurring following incarceration. One such program was implemented at Tennessee State Prison, known as Parents in Prison, and aims to improve parental skills and enhance family relationships (Hairson & Lockett, 1985). This program, and others like it, may provide key improvements to the family life following incarceration and aid in preventing child maltreatment for those with parents who are incarcerated.

Finally, efforts to reduce substance abuse in the household and assist parents with mental illnesses would also be beneficial to reducing the level of childhood trauma youth experience and the subsequent adverse traits and behaviors the youth may exhibit. By giving help and assistance to those parents in need, programs can aim to alleviate their individual stresses and prevent them from passing on these traumas to their children. In addition to aiming to prevent trauma experienced by children, programs can also intervene at later stages to reduce the likelihood and presence of maladaptive personality traits, such as aggression and impulsivity, and adolescent problem behaviors, such as deviant peer imitation, school difficulties and dropout, substance abuse, and mental illness, which may manifest after the traumas occur.

Reducing Maladaptive Personality Traits. Based on the prior literature and the results of the current study, in order to reduce serious violent behavior, a number of mediating factors must receive attention in empirically-based interventions (Wasserman & Miller 1998). For example, higher levels of aggression and impulsivity were both directly and significantly associated with increases in the prevalence or likelihood of the four adolescent problem behaviors, as well as both violent behavior outcomes. As such, the reduction of these maladaptive traits in youth who experience trauma may be pivotal in preventing subsequent deviant and violent behavior. Efforts to reduce aggression and impulsivity in children who experience trauma should aim to address both the cognitive and behavioral aspects of the individual. These programs often implement a problem-solving model emphasizing self-evaluation exercises and teaching the youth become more sensitive to the feelings of others (Kendall, Ronan, & Epps, 1991).

A recent meta-analysis evaluated the effects of self-control and impulsivity improvement programs in 34 different studies (Piquero, Jennings, & Farrington, 2010). The reults indicated that self-control improvement programs can produce an effective intervention in reducing both impulsivity and problem behaviors. This effect was found in various contexts, with various outcome measures, and across different weighting procedures. These programs are often implemented during early childhood (prior to age 10) to reduce impulsive and problematic behavior before the time where Gottfredson and Hirschi (1990) hypothesized it would become stable. As such, these early intervention programs may be able to address the child's level of self-control and impulsive behavior before it is too late.

Some schools have implemented programs to reduce the presence of both aggression and impulsivity in youth. Two interventions to address maladaptive personality traits include the

"Classroom-Centered" (CC) intervention and the "Family School Partnership" (FSP) intervention. These programs are administered in early elementary school and aim to reduce the presence of aggression and impulsivity throughout the youth's development (Musci et al., 2013). Musci and colleagues (2013) evaluated such these programs while also considering the effect of genetic traits as moderators. Their results showed that, while CC and FSP interventions are each effective at reducing both aggression and impulsivity, certain genetic traits may alter the magnitude of the effects. Despite the apparent importance of genetic influences, these results still suggest that programs that aim to address aggression and impulsivity can be effective in reducing the expression of these traits. Since each of the adolescent problem behaviors were found to be related to aggression and impulsivity in the current study, these programs (and other similar interventions) may also have indirect long-term effects on the behavioral development of the youth.

Reducing Adolescent Problem Behaviors. Interventions are also recommended to prevent and address the adolescent problem behaviors directly. Numerous interventions have shown solid empirical evidence that they can help prevent the onset of a number of problem behaviors later in adolescence (see: Beardsley, Chien, Bell, 2011). Since deviant peer imitation was a significant predictor of SVC delinquency, its reduction may prevent the onset of externalized violent behavior. Programs that encourage positive peer associations and positive group role models, like "Big Brothers Big Sisters" may help pull individuals who experienced trauma away from subsequent maladaptive or violent behavior (Grossman & Tierney, 1998; Herrera, Grossman, Kauh, & McMaken, 2011; Tierney & Grossman, 2000). Furthermore, peer-mediation and conflict resolution have also shown to have positive effects on the likelihood of subsequent violent behavior (Wasserman & Miller, 1998).

On the other hand, in this study, it was discovered that deviant peer imitation was actually associated with a significant *reduction* in the likelihood of suicidal behavior. This result is likely an indication that any peer relationships, whether they are prosocial or antisocial, are associated with a reduction in suicidal ideation. Thus, the fostering of all types of friendships for individuals who have experienced trauma will likely aid in the prevention of subsequent suicidal behavior. This finding may also suggest that practitioners who interact with the child may be better equipped to predict the path that a youth who has endured childhood trauma may follow. If the youth is more active with deviant or delinquent peers, we can predict that they would be more likely to engage in serious and chronic violence towards others, whereas if they are more withdrawn and lack any peer relationships, they would be more likely to become suicidal.

Additionally, interventions to help address the school difficulties of children who experience trauma may also be a beneficial use of resources. Experiences related to school difficulties and dropout were associated with an increased likelihood of SVC delinquency. To address school difficulties, Oyserman, Terry, and Bybee (2002) evaluated an activities-based program, "School-to-Jobs," which was designed to improve school attitudes and involvement by teaching a youth the connection between their current actions and their future aspirations. The youth who were enrolled in the program demonstrated greater bonds to school, greater concern about their school performance, better attendance, and were in less trouble in school. Academic skills training programs have also shown positive impacts on academic functioning (Wasserman & Miller, 1998). Interventions similar to these may improve the overall school performance of youth who experienced trauma and help prevent subsequent maladaptive or violent behavior.

Beyond the aforementioned programs to reduce problem behavior, interventions are also recommended to address substance abuse in those who experience childhood trauma. Since

substance abuse problems are directly related to SVC delinquency, their prevention and reduction would likely reduce the likelihood of the continuation towards serious violent behavior. Although programs such as "Drug Abuse Resistance Education" (D.A.R.E.) have been found to be largely ineffective, some other school-based programs aimed to reduce drug and alcohol abuse problems have shown promising results for juvenile substance abuse. For example, Gorman (2003) found that programs that were developed in the 1980s and 1990s that utilized scientifically-tested theoretical perspectives, such as social learning theory and problem behavior theory, were able to be successful in preventing the onset of substance abuse.

In his commentary, Gorman (2003) also stressed the importance of science-based substance abuse prevention programs that are consistently and empirically-evaluated. Sussman, Sun, Rohrbach and Spruijt-Metz (2012) tested the effects of one such program, "Project Towards No Drug Abuse" (Project TND) for at-risk high school youth, based on motivation enhancement, education about the consequences of drug abuse, and coping skills management spread over 12 classroom sessions (see also: Lisha, et al., 2012).. Sussman and colleagues' (2012) evaluation showed that substance abuse outcomes were significantly reduced for those who were assigned to the program compared to the control group. Future programs should build on the successes of these scientifically-evaluated interventions to improve their strategies and aim to reduce or prevent substance abuse in at-risk children who have experienced trauma.

In addition to the prevention of substance abuse, the prevention of mental illness in those who experience childhood trauma is also paramount. The presence of mental illness was found to be a significant predictor of an increased likelihood of both SVC delinquency and suicidal behavior. Accordingly, interventions for those who experience trauma that aim to prevent the onset of mental disorders may improve their life paths and reduce their likelihood for serious

violent behavior. These programs that aim to reduce mental illness in youth often involve some sort of cognitive behavioral therapy (Cuijpers, 2003). Anxiety disorder prevention programs (e.g., The Queensland Intervention and Prevention of Anxiety Project, which is a preventative early-intervention program targeted at those who show early mild signs of anxiety or were in the less severe range of anxiety disorders) have been shown to be effective in both reducing existing anxiety disorders and preventing the onset of new disorders (Dadds, Spence, Holland, Barrett, & Laurens, 1997).

Additionally, interventions that are aimed to reduce the development of depression among high risk youth have also been empirically evaluated. Clark and colleagues (1995, 2001) found that programs targeting the treatment of depression and depressive episodes using treatment (administered by a trained therapist) and cognitive restructuring techniques were able to reduce the risk for depression even in a group with parents who had a history of the disorder. These interventions, which consist of up to fifteen hour-long sessions, were predictive of a depression risk reduction of greater than five-times compared to the control group. These findings support the notion that mental illnesses can be targeted and prevented by therapeutic interventions for those who experience trauma and are at a heightened risk of mental illness.

The prevention of mental illness is integral, but in many cases the symptoms of a mental disorder may have already manifested. In these cases, the youth must be helped by teaching them to manage their symptoms. In fact, the developmental psychopathology perspective asserts that "although someone may have a particular [mental] disorder, it is possible that they can deal with it effectively and still achieve competent functioning" (Toth & Cicchetti, 2013). This can be addressed through improvements to our mental health services for teens and those who experience early life trauma. By addressing these problems early in the lives of these

individuals, we can help to provide these individuals the resources and abilities to cope with their illness.

The goal of each of these aforementioned interventions is to prevent or reduce the maladaptive trait or problem behavior from manifesting in those who have experienced trauma to prevent their path from leading toward serious violent behavior. In the paragraphs above, a number of interventions targeting specific aspects of development have been discussed. It should be recognized, however, that these interventions cannot simply occur in isolation and be expected to curb serious violent behavior (Wasserman & Miller, 1998). Instead, the cumulative effect of addressing each of the aforementioned aspects of youth development at the same time would be the best way to truly alter the path between childhood trauma and serious violent behavior during adolescence. Accordingly, this study indicates support for comprehensive interventions addressing childhood trauma, personality development, and multiple problem behaviors in tandem to reduce the likelihood of an individual becoming seriously violent during adolescence. Alternatively, other interventions may also be implemented to address each of the two violent behavior outcomes (SVC delinquency and suicidal attempts) directly after they have already been displayed.

Reducing Serious Violent Behavior. Based on the results of this study, coordinated primary interventions targeting the prevention of childhood trauma, maladaptive personality development, and adolescent problem behaviors are predicted to significantly impact the likelihood of an individual engaging in SVC delinquency or suicidal behavior. It is possible, though, that these interventions are not fully effective. Therefore, interventions that directly target or treat those who are at risk of each of these violent behaviors may also provide a productive method in preventing the onset of these behaviors. As such, specific secondary

interventions can be recommended to reduce the likelihood of SVC delinquency, while others are recommended to reduce the likelihood of suicidal behavior.

As it pertains to SVC delinquency, when a youth comes in contact with the juvenile justice system, their experiences of trauma and the mediating factors related to their personality and behavior should be assessed and considered when determining their risk for serious, violent, and chronic delinquency later in adolescence. In Florida, the Department of Juvenile Justice PACT assessment does just that. The multitude of these factors are taken into account when determining the youth's overall risk for recidivism. These recommendations are then considered during length of sentencing and when recommending diversion programs for the youth. This is an effective use of an empirically-based risk assessment tool that can lead to appropriate and effective juvenile justice interventions.

For example, an individual who has greater experiences of childhood trauma and displays aggression, impulsivity, or any of the adolescent problem behaviors tested in this model would be predicted to have a higher likelihood of becoming an SVC delinquent later in adolescence and may need more intensive attention and treatment up front. On the other hand, an individual without the traumatic experiences during childhood and a lack of these maladaptive traits or problem behaviors would be less likely to evolve into an SVC offender. As such, these low-risk juveniles may be better candidates for more appropriate (and less expensive) community-based correctional services (Vincent, Guy, Gershenson, & McCabe, 2012; Zhang, Roberts, Callanan, 2006).

Other prevention programs outside of the juvenile justice system have also shown promising signs of reducing serious violent delinquency. These programs may target individuals who demonstrate early risk factors and aim to reduce the likelihood for externalized violence.

One program, specifically targeted for children who experience maltreatment and trauma at home, known as "Childhaven," is an ecological-model therapeutic child care program. This intervention "addresses parent, child, and family risk factors for abuse within a protective, nurturing, and therapeutic environment" by improving relationships between the child and parent and providing education, counseling and other services to the family (Moore, Armsden, & Gogerty, 1998, p.4).

This program's effects were evaluated over a 12-year span, yielding results that suggest that those who received the "Childhaven" intervention had an improved path of child and family development that was not found in the control group (Moore, Armsden, & Gogerty, 1998). Another similar program, "The Incredible Years Parent, Teacher, and Child" training series, instead targets children who display early indications of conduct problems. This group intervention contains aspects of both cognitive-behavioral therapy and parental training. This program and others like it have also been shown to reduce the likelihood of violent offending later in adolescence (Welsh, Braga, & Sullivan, 2014; see also: Piquero et al., 2009).

In the reduction of SVC delinquency, there are also tertiary prevention programs, which aim to minimize the behavior once it has already manifested. One area of extensive research has been the use of multisystemic therapy (MST) on the treatment of SVC delinquents. MST is an intervention that "addresses intrapersonal (e.g., cognitive) and systemic (i.e., family, peer, school) factors that are known to be associated with adolescent antisocial behavior" and is "individualized and highly flexible" (Borduin et al., 1995, 571). Results have indicated that MST can be highly effective in reducing violent behavior compared to other interventions (Borduin et al., 1995; Curtis, Ronan, & Borduin, 2004; Henggeler et al., 1992, 1993). Based on

the results of these evaluations, MST may be a strong tool in the reduction and cessation of SVC delinquency after it has already been discovered.

In addition to the various interventions targeted at those who may engage in externalized violence, the results of this study can also recommend interventions to address those who experience childhood trauma and may, instead, turn their violence inward and engage in suicidal behavior. Many recommendations can be made for the prevention of suicide, all stemming from improving the overall mental health of at-risk youth. Enhanced mental health professional services and crisis-service interventions may improve the effectiveness of treatment/psychotherapy and prevent the likelihood of suicide attempts (Gould, Greenberg, Velting, & Shaffer, 2003). Beyond the inpatient treatment, Motto and Bostrom (2001) showed that patients who received consistent follow-up contact (every thirty days to determine whether the patient was adhering to their post-hospital plan) after their hospitalization, due to depression or suicidal ideation, had a significantly lower suicide rate than the group that received no follow-up contact. This may suggest that, beyond the importance of the quality of treatment given during a hospitalization, continued supervision and contact with a mental health professional may help prevent future suicidal behavior from occurring.

Additionally, specialized screening, education of parents, physicians, and the media, school-based skills training, and more focused treatment using antidepressants have all been cited as promising and potentially worthwhile suicide prevention strategies (Gould, Greenberg, Velting, & Shaffer, 2003). With regards to antidepressants, although little research has pharmacologically examined the role of these medications in youth suicide, antidepressants such as selective serotonin re-uptake inhibitors (SSRIs) have shown significant reductions in suicidal ideation in depressed adults and non-depressed adults with personality disorders (Letizia, Kapik,

& Flanders, 1996; Verkes et al., 1998). Furthermore, Gibbons, Hur, Bhamik, and Mann (2006) found that in an aggregated analysis, higher levels of SSRI prescriptions being written in an area are associated with lower youth suicide rates. These findings suggest that improvements to the mental health care system and medical developments may provide important resources in the prevention of suicidal behavior among youth who experienced childhood trauma.

The Use of the ACE Assessment. Finally, the results of the current study also corroborate the use of the ACE assessment as an effective predictor of serious violent behavior and other adverse developmental outcomes. Due to its simplicity (only ten items), this assessment can be easily administered by pediatricians, teachers, counselors, and other adults who interact with children to determine those who may be at-risk for maladaptive, problematic, or violent behaviors later in life. By equipping these professionals with the ACE assessment, interventions can be recommended earlier in the child's life and potentially be more effective in reducing the "downstream wreckage" of a multitude of subsequent developmental problems (Fox et al., 2015). Through each of these implications for policy and practice, the prosocial development of a youth can be improved and the likelihood of potential adverse outcomes throughout each stage of adolescence can expectantly be reduced. Cumulatively, through the recognition of the impact of childhood trauma on the development of the child and the path initiated toward serious violent behavior, these interventions may be able to curb the onset of both SVC delinquency and suicidal behavior.

Strengths and Limitations

The findings and implications of this study can be defended due to the strengths of the current project. For example, the data used in this investigation contains a large amount of cases for the analysis. At over 64,000 cases, the sample far exceeded minimum requirements for the

advanced statistical analyses. As a result of this, more extreme and exceptional behaviors, such as SVC delinquency and suicidal behavior, which are rare in the general population, were still found in larger numbers in this sample. This large sample size also presented some problems with interpreting the significance of the obtained results, so a post-hoc model was estimated with a random sample of youth taken from the original FDJJ sample. By testing and verifying that the results are not simply statistical artifacts due to the size of the sample, the findings can be discussed with greater confidence.

Another advantage of the data is the cross-validation procedures that are utilized to ensure that the information is as accurate as possible. Through the use of the caseworker's interview and official agency records, the information obtained can be validated using multiple sources. This likely prevented collection bias from tainting the data and skewing the results. Also, the thoroughness of the PACT assessment (146-items) allowed for the consideration of several different personality traits and adolescent problem behaviors. Through the inclusion of these measures, the relationships between childhood adversity and serious violent behavior could be contextualized in a more exhaustive and comprehensive manner.

An extensive amount of scholarly research has discussed the harmful effects of childhood trauma on many of these different negative developmental outcomes. The majority of these studies, though, examined only one type of trauma (such as abuse or neglect) and one adolescent outcome (such as substance abuse or other behavioral changes). The current study is unique due to its breadth. By including nine different types of trauma in the ACE score and a variety of personality and adolescent problem behaviors to predict the two types of violence, various effects can be estimated while controlling for the other relevant risk factors. In essence, the present study considered these relationships simultaneously and contextually for juvenile

offenders. Through the inclusion of each additional predictor, a more clear perspective on childhood trauma and its effects on violence was gained.

Finally, the analysis also utilized a statistical technique that is sophisticated enough to assess the complex relationships in the data. For example, the use of structural equation modeling allowed for reduced standard errors and more accurate estimates for the model coefficients (Iacobucci, 2008). In addition, the measurement model component of the GSEM facilitated the construction of the latent variables (aggression and school difficulties and dropout) (Srondal & Rabe-Hesketh, 2004). This also allowed for the tests of the measurement reliability of these complex constructs (Brown, 2006). The use of the GSEM model also permitted the use of non-normal, non-continuous data, which matched the nature of the PACT questions and response choices.

The present study also does have limitations. Since the data were collected as part of a FDJJ risk assessment, and not for the overt purpose of this specific project research, the items did not match all hypothesized constructs perfectly. For example, one of the ACE items (parental separation or divorce) was not able to be accurately measured using the PACT data. As such, it was removed from the list of ACE indicators. Furthermore, the data only contained juvenile offenders who were given the PACT Full Assessment. This only represents a sub-sample (approximately 32%) of the population of juvenile offenders who were processed by FDJJ during the study timeframe. Furthermore, though the PACT assessment is administered by a trained FDJJ case worker, the caseworker's classifications may also be incorrect. Since the individual is not a fully-trained or experienced medical health professional or addiction specialist, their evaluations regarding complex diagnoses may be incorrect or biased.

Beyond these weaknesses, there are also no true "control" subjects in the sample, which may have produced selection bias within the sample. All those who were assessed with the PACT must have engaged in some level of delinquent or deviant behavior to be referred to the Florida juvenile justice system. Whether this was the result of a referral from CPS, the youth's school, law enforcement, or the parents, some adverse circumstance had to occur for the youth to be included in the sample. Accordingly, there are no "control" juveniles from the general population present in the sample.

Another main limitation of the analysis is that the offense data only consists of official delinquency records. As such, only the offenses that have been recorded and processed by FDJJ are included in the data. As with any study using official records data, this could be problematic when characterizing offender classifications (Dunford & Elliott, 1984). For example, individuals may have committed 5 felony offenses, but were only caught or adjudicated for two. According to the data available, this individual would be incorrectly classified as a "non-chronic" offender. These incorrect classifications may skew the estimates obtained in the analysis.

Though the results do indicate significant and substantive findings, these relationships may be spurious and all simply reflect an underlying root cause. As described in the theory chapter of this project, Moffitt (1993) suggested that stable neurobiological problems that are often inherited by the individual may influence all subsequent stages of their development including temperament, behavior, mental capacities, and propensity for violence. Additionally, those who experience these neurobiological abnormalities may be more likely to be difficult children for their parents to handle, and thus, may be more likely to experience higher levels of childhood trauma. Fundamentally, this discussion relates to Nagin and Paternoster's (2000) discussion of population heterogeneity and state dependence. Since the PACT data has no

method of measuring this potentially stable underlying source, we cannot say for certain that the genetic and neurobiological problems that Moffitt (1993) described cannot explain the associations between the variables included in the model.

A final limitation of the data is that, while the model does suggest some semblance of a sequential path, the data cannot truly reveal the causal or temporal ordering of these events. Since the data is gathered at the time of the juvenile's last adjudicated offense, there is no specific indication regarding which events occurred during childhood and which occurred during later adolescence. As a result, no definitive statements of causality can be made. The results can only indicate the presence of an association between the variables of interest. This issue can be addressed, however, using the GSEM model as reciprocal and reverse effects can be considered to ensure that the hypothesized directional paths truly reflect the nature of the data and the hypothesized relationships.

Directions for Future Research

Following this study, many new directions for empirical research emerge. For starters, despite being partially mediated by a number of developmental maladaptations in this study, the ACE score remained a significant predictor of both the onset of SVC delinquency and the onset of suicidal behavior. This finding suggests that future studies must attempt to uncover the other ways that childhood trauma can lead to these violent behavioral outcomes. The current project only utilized two maladaptive personality traits (aggression and impulsivity) and four adolescent problem behaviors (deviant peer imitation, school difficulties and dropout, substance abuse problems, and mental illness) as the mediators between childhood trauma and the two violent outcomes. There may be a number of other important mediators in the context of these relationships. Future research could include additional personality traits and other problem

behaviors that are hypothesized to influence these relationships. If a model is able to fully mediate the relationship between childhood trauma and subsequent violent behavior, we can understand the key developmental areas that need to be addressed in youth who experience ACEs. By recognizing the personality and behavioral changes that may occur between childhood trauma and violence, more scientifically-grounded interventions can be designed.

The present study estimates the general effect of trauma using the ACE assessment. By including each ACE item at identical weights, there is no accounting for the size of each trauma's respective effect. This study only estimated the aggregated effect of multiple traumas on the outcome variables. Furthermore, there is no accounting for the severity or frequency of each traumatic experience, as a child who is abused once is coded the same as a child who was abused every day for multiple years. The effect of trauma is likely more nuanced than simply considering the presence or absence of a certain experience.

Future research could estimate more specific effects of different traumas that were discussed in this study. For example, family member incarceration has long been assessed as a damaging experience for the development of children. Perhaps this experience is largely contributing to the effect of the ACE composite score on violent behavior in this study. Simply using the ACE score as a predictor would be predicted to cloud this effect and could produce misguided conclusions. As such, subsequent studies should consider breaking down the ACE score into its individual items or clusters of items (i.e. abuse/neglect, family disruption, adverse environments) to ascertain which experiences (or types of experiences) are most damaging for the child's development. This could help guide more targeted interventions and policies.

Additionally, this study could also be replicated in other states or at the national level. Since the sample used in the analyses only reflects youth who came in contact with the

Department of Juvenile Justice in the state of Florida, the results may be markedly different in other areas or contexts. In this direction, a comparative study between the results of this project and the results of another state could also be conducted. Furthermore, different data sources could be used to estimate this model. These other data sources could include nationally representative samples that include "control" youth (youth from the general population) as well as those who enter the custody of the state juvenile justice system.

Beyond replicating the study in other areas and using different samples, the measurement of key constructs could be improved. A prospective research design with variables that are intentionally designed to reflect the constructs used in the model would be likely to yield more reliable and valid estimates of the relationships of interest. Since the data used was not collected specifically for this project, many constructs had to be created using the information present in the PACT data. A more directed study design could ensure the constructs are all measured accurately and properly for the model and analysis. Additionally, a longitudinal design could address the complications this study experienced regarding temporal ordering. The ability to assess whether a cause truly occurs before its effect would improve not only the nature of the current study, but also the effectiveness of the practical implications suggested.

Finally, another potentially productive research direction would be the estimation of the GSEM using gender and racial/ethnic moderators for the varying models. The ability to assess whether the results are identical or noticeably different for males and females or White youth and minority youth would provide practitioners strong insight into how certain individuals should be handled. For example, if certain variables are more important for the male sub-sample, programs can be specifically designed to address the problems more prominent for them. Through these

subsequent directions, supplementary well-informed empirical research can be conducted and more effective and successful programs can be advocated and implemented.

Final Thoughts

This project highlights the fact that childhood trauma is a persistent and damaging experience for children. Its prevalence is even greater for those who enter the custody of the juvenile justice system. Through the current research, we can see the diverse and harmful effects that childhood trauma is related to. Children with these experiences are found to be more aggressive, impulsive, have higher levels of deviant peer imitation, have higher levels of difficulties in school, are more likely to abuse substances, and are more likely to develop mental illness. Even worse, they are more likely to engage in serious, violent, and chronic delinquency towards others and more likely to attempt suicide. Through this theoretically and empirically grounded understanding of the development of youth and their paths toward violence, earlier and more effective programs can be designed to help preclude these adolescents from engaging in these two harmfully violent behaviors. Interventions that help prevent trauma and assist with the reduction of maladaptive development for those who do experience trauma must be implemented to benefit both the youth and society. The financial and personal costs of not initiating these practices are too great, and the long-term effects of the paths initiated by childhood trauma are far too harmful.

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APPENDICES

Appendix A: USF IRB Approval

USF
UNIVERSITY OF
SOUTH FLORIDA

RESEARCH INTEGRITY AND COMPLIANCE
Institutional Review Boards, FWA No. 00001669
12901 Bruce B. Downs Blvd., MDC035 • Tampa, FL 33612-4799
(813) 974-5638 • FAX(813)974-7091

1/2/2015

Bryanna Fox, Ph.D.
USF Department of Criminology
4202 E. Fowler Avenue
Tampa, FL 33620

RE: **Expedited Approval for Continuing Review**
IRB#: CR1_Pro00015635
Title: Using Adverse Childhood Experience (ACE) Scores to Identify and Predict Future Offending

Study Approval Period: 1/16/2015 to 1/16/2016

Dear Dr. Fox:

On 12/23/2014, the Institutional Review Board (IRB) reviewed and **APPROVED** the above application and all documents outlined below.

Approved Item(s):
Protocol Document(s):
B.H. Fox IRB- ACE Scores and Future Offending

The IRB determined that your study qualified for expedited review based on federal expedited category number(s):

(5) Research involving materials (data, documents, records, or specimens) that have been collected, or will be collected solely for nonresearch purposes (such as medical treatment or diagnosis).

As the principal investigator of this study, it is your responsibility to conduct this study in accordance with IRB policies and procedures and as approved by the IRB. Any changes to the approved research must be submitted to the IRB for review and approval by an amendment.

We appreciate your dedication to the ethical conduct of human subject research at the University of South Florida and your continued commitment to human research protections. If you have any questions regarding this matter, please call 813-974-5638.

Sincerely,

John A. Schinka, Ph.D.

John Schinka, Ph.D., Chairperson
USF Institutional Review Board