

CHILDHOOD TRAUMA AND JUVENILE DELINQUENCY: DOES TIMING OF
POSTTRAUMATIC STRESS DISORDER MEDIATE THE ASSOCIATION?

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CHILDHOOD TRAUMA AND JUVENILE DELINQUENCY: DOES TIMING OF POSTTRAUMATIC STRESS DISORDER MEDIATE THE ASSOCIATION?

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ABSTRACT

The prevalence of exposure to traumatic events among American children is staggering. It is also well established that violent victimization increases the risk of juvenile delinquency. Nonetheless, the specific pathways by which traumatic life events lead to delinquent activity among youth are not well understood. Because there are a variety of adverse psychological, emotional, and cognitive consequences of trauma, it is important to understand the different ways in which these consequences affect behavior. A potential mechanism of increasing interest to scholars is Posttraumatic Stress Disorder (PTSD). Using the 1995 National Survey of Adolescence, the current research study demonstrates the importance of using a developmental perspective to investigate the mechanisms by which PTSD increases the risk of juvenile delinquency. Exhibiting signs of PTSD at younger ages can have more deleterious effects on a child's life trajectory than developing it later in life. Adolescents who ever developed PTSD are also more at risk of juvenile delinquency, regardless of the developmental period in which they first exhibited signs. In addition, the findings indicate that victimization, witnessing violence, and experiencing other traumatic life events are still strong predictors of juvenile delinquency, even when PTSD is included in the model. Supporting previous research, surrounding oneself with deviant peers also increases youth's chances of criminal behavior. These findings suggest that while PTSD is an important component of a youth's risk of committing a crime, there are

other essential conduits that lead traumatized youth towards juvenile delinquency. The current study implies that child welfare, mental health, and juvenile justice systems are intricately intertwined regardless of whether these systems acknowledge their overlapping populations. Encouragingly, there are evidenced-based treatments available that have been shown to effectively reduce PTSD symptoms with lasting results. Until families and child-serving agencies identify these symptoms, however, youth will go untreated.

The research and writing of this thesis
is dedicated to my dad, Tom, and my sister, Annie. I would not be where I am today without
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CHAPTER 1: INTRODUCTION

The prevalence of exposure to traumatic events among American children is staggering. Estimates based on a nationally representative sample indicate that 12.5% of children are maltreated (e.g., abused, neglected, bullied); 8% are victims of sexual abuse or assault; and more than one third of children have either directly witnessed domestic or community violence or been confronted by it (e.g., the murder of a parent not outside of the child's presence) (Finkelhor, Ormrod, Turner, & Hamby, 2005; Finkelhor, Hamby, Ormrod, & Turner, 2009; Kilpatrick, Ruggiero, Acierno, Saunders, Resnick, & Best, 2003). It is also well established that violent victimization increases the risk of juvenile delinquency (Nofziger, 2003; Schwartz & Proctor, 2000; Finkelhor et al., 2009; Kilpatrick, Acierno, Saunders, Resnick, Best, & Schnurr, 2000; Wood, Foy, Layne, Pynoos, & Boyd, 2002). Research suggests that somewhere between nine and 29% of children who have had contact with the child welfare system later engage in delinquent behavior (Herz, Ryan, & Bilchik, 2010), and up to 60% of serious violence juvenile offenders have been victims of violent crimes (Wood et al., 2002; Dembo, Williams, Wothke, Schmeidler, & Hendricks, 1992). Nonetheless, the specific pathways by which traumatic life events lead to delinquent activity among youth are not well understood. A potential mechanism of increasing interest to scholars is Posttraumatic Stress Disorder (PTSD). Studies reveal that trauma directly affects mental functioning, including heightened reaction to threatening situations, impairments in memory and attention, increases in both the risk of depression, and the likelihood of social problems among youth, such as substance abuse, risk taking, and dropping out of school (Harris, Putnam, & Fairbank, 2004; Sansone, Dakroub, Pole, & Butler, 2005)

Just as is true among adults, not every child who is victimized or exposed to traumatic events develops PTSD. Moreover, the characteristics that differentiate those who do and do not

suffer the symptoms of the anxiety disorder are only beginning to be identified (Hagenaars, Fisch, & van Minnen, 2011). According to available evidence, PTSD rates vary considerably, ranging for example from 60% among sexually abused children to 24% to 35% of inner-city adolescents exposed to community violence (Bloom, 2002). Research indicates that the risk of PTSD increases with temporal proximity to and severity and frequency of the traumatic exposure, trauma-related parental distress, and age of the child (Wethington, Hahn, Fuqua-Whitley, Sipe, Crosby, Johnson, & Chattopadhyay, 2008). Insufficient attention has been given to understanding how the implications of PTSD may vary across developmental stages. Trauma experienced in early childhood presents a particular concern as it can disrupt key developmental processes such as executive function, secure attachment and interpersonal relationships, setting the stage for later psychopathology (Heim & Nemeroff, 2001; Shipman, Zeman, Fitzgerald, & Swisher, 2003; Schore & Schore, 2008). Adolescence is also a period of particular developmental vulnerability, as it is the stage during which the brain undergoes maturation and refinement, but whereas areas associated with motor and sensory processes mature early, the part of the brain responsible for planning, decision-making and impulse control does not fully mature until the early twenties. Given limits to their decision-making capacity, adolescents are also less able to resist coercive influence (Society for Neuroscience, 2007; Steinberg & Scott, 2003). Yet, little to no research exists on whether the link between PTSD and juvenile delinquency varies across crucial stages in human development.

The goal of the present study is to address these gaps in the scholarly literature using data from the 1995 National Survey of Adolescents (NSA). Using a developmental perspective, the analysis will investigate the mechanisms by which PTSD resulting from childhood and adolescent victimization increases the risk of juvenile delinquency. The survey includes

questions related to seven types of delinquent activities. The experience of PTSD is distinguished both by the “stressor” -- victimization, witness to violence, and other extraordinarily stressful event – as well as by the age at onset of PTSD symptoms. Four developmental periods are examined – ages zero to four; five to nine; 10 to 13; and 14 to 17. To examine youth’s additional risk of delinquency while currently suffering from PTSD, a dummy variable is also used to indicate whether the adolescent experienced PTSD symptoms within the last six months. The dependent variable, juvenile delinquency, is a dummy variable determined by whether adolescents reported engaging in behaviors including theft, burglary and assault within the past year. Given that the dependent variable is binary, a series of probit models are estimated to identify whether youth ever developed PTSD, and if so, how the type of trauma as well as timing of the onset of PTSD symptoms affects the probability of juvenile delinquency. Moreover, a dummy variable of peer delinquency is used to examine respondents’ peer groups as an additional pathway towards delinquent behavior. Individual and family characteristics are included as controls (i.e., race, sex, age, parents’ income and education levels, as well as family structure and substance abuse problems).

CHAPTER 2: BACKGROUND LITERATURE

Juvenile Justice System

The U.S. juvenile justice system is overburdened and costly. Each year, police arrest 2.2 million juveniles with 1.7 million referrals to juvenile courts; an estimated 100,000 youth are detained in jails and other detention facilities on any given night. While the juvenile justice system originated from the premise that youthful offenders should be rehabilitated, the “treatment model” fell out of public favor in the 1980s and 1990s when there was a widespread

perception that juvenile crime was on the rise and dealt with too leniently. In response, forty-seven state legislators and the District of Columbia made their juvenile justice systems more punitive (Bilchik, 1999).

Legal scholars, policymakers and child advocates continue to argue for age distinctions in culpability based on scientific evidence that adolescents are less competent than adults at making autonomous choices, managing their impulses, and both perceiving risks and calculating their consequences (Scott & Steinberg, 2003). The fact that many adolescent offenders do not become lifetime criminals reinforces the notion that their ill-advised choices relate directly to factors and processes that are peculiar to their developmental stage (Scott & Steinberg, 2003). There is a clear need to understand the factors that increase the risk of juvenile delinquency.

Prevalence of Victimization among Juvenile Offenders

Adolescents' experience with and exposure to violence is a pervasive problem in the United States. Research shows that youth are three times more likely to become victims of violent crimes than adults (Wood et al, 2002), and over 905,000 children are victims of child abuse and neglect each year (Zielinski, 2004). During the 2004 to 2005 school year alone, there were 107,000 rapes, sexual assaults, robberies, and aggravated assaults against age 12 to 18 year olds adolescents on school campuses (Dinkes, Cataldi, Kena & Baum, 2006). As disturbing as these statistics are at the national level, there is a considerable overrepresentation of violent victimization among youthful offenders (Nofziger, 2004; Schwarts & Proctor, 2000; Finkelhor, Hamby, Ormrod, & Turner, 2009; Kilpatrick et al., 2000; Wood et al., 2002).

Youth who have contact with the child welfare system, and have thus been exposed to traumatic events, are 55% more likely to be arrested later on in life and are disproportionately represented in the juvenile justice system (Herz, Ryan, & Bilchik, 2010). An estimated nine to

29% of children who have had contact with the child welfare system later engage in delinquent behavior (Herz et al., 2010), and up to 60% of serious violence juvenile offenders have been victims of violent crimes (Wood et al., 2002; Dembo, 1992).

The question that naturally arises is what are the pathways by which traumatic experiences in childhood affect the subsequent antisocial behavior of adolescents? This is the focus of the next section.

Mechanisms of the Effect of Victimization on Delinquency

A notable share of children who are physically or sexually abused, or exposed to domestic or community violence, suffer adverse psychosocial outcomes ranging from minor to severe mental health problems including major depressive episodes (Buka, Stichick, Birdthistle, & Earls, 2001; Groves, 1999). In recent years scholars have focused increasing attention on a specific constellation of stress-related symptoms that appear in the aftermath of seriously traumatic events, known as Posttraumatic stress disorder (PTSD). The American Psychiatric Association (2000) defines PTSD as an “anxiety disorder diagnosed at least one month following a traumatic event and characterized by intrusive re-experiencing of a traumatic event, avoidance of trauma-related cues, and physiological hyperarousal symptoms.” While the majority of research concerning PTSD has focused on adults, war veterans in particular, PTSD symptomology among children and adolescents is receiving increasing attention. In particular, evidence from several studies reveals a strong association between childhood victimization and PTSD (Kilpatrick et al., 2000; Kilpatrick et al., 2003; Wood et al., 2002; Hanson, Self-Brown, Fricker-Elhai, Kilpatrick, Saunders, & Resnick, 2006). In their 2003 study, for example, De Bellis and Thomas reported that approximately 80% of abused children met the diagnostic criteria for at least one mental health disorder by the age of 21, including depression,

posttraumatic stress disorder, anxiety, eating disorders, reactive attachment disorder and suicide attempts.

Studies of incarcerated youth found that between 60-80% meet the criteria for at least one mental disorder, and the majority of these youth meet the criteria for more than one (Abt Associates, Inc, 1994; National Institute for Mental Health, 2002). Both male and female incarcerated youth are significantly more likely to display levels of PTSD symptomology than non-detained high school students with similar characteristics, including all three PTSD cluster subscales, including re-experiencing, arousal, and avoidance symptoms (Wood et al., 2002; Cauffman, Feldman, Waterman, & Steiner, 1998; Steiner & Karnik, 2006).

To understand the implications of PTSD on the risk of delinquency, we first need to understand the effects of PTSD on children.

Stress and the Human Brain

Significant advances in neuroscience and neural-imaging in recent decades have dramatically expanded our understanding of normal brain development (Shonkoff & Marshall, 2000). Much has been uncovered, for example, about the complex interconnections between biological regulation and experiences that result in optimal development (Shonkoff & Marshall, 2000). While it is important to stress that there is more individual variation than “inevitability” when it comes to insults to healthy brain development, the experience of trauma can alter the architecture of the brain (Shonkoff & Marshall, 2000).

Extremely stressful and traumatic experiences can result in chronic increased levels of neuroendocrine hormones, which can damage the hippocampus, a crucial component of the brain for memory intake (Becker-Weldman, 2005). On average, abused and neglected children perform worse on cognitive, language and other academic tests (U.S. Department of Health and

Human Services, 2003). Maltreated children who develop mental health problems are even more likely to underperform than children who have been abused or severely neglected without psychological disorders. In addition, children diagnosed with posttraumatic stress disorder are significantly more likely to learn less and at slower rates, have heightened sensitivity to interference, and are less likely to recall words on memory tests than maltreated children who do not exhibit posttraumatic stress disorder symptoms (Yasik, Saigh, Oberfield & Halamandaris, 2007).

In addition to decreased verbal and working memory, like adults, children diagnosed with PTSD often demonstrate impairment in executive functioning, affect regulation, and attention; along with increased impulsivity (Beers & De Bellis, 2002; Samuelson, Kreuger, Burnett, & Wilson, 2006; Gilbertson, Gurvitz, Lasko, Orr, & Pitman, 2001). Although their study compared abused and maltreated children to their non-traumatized counterparts without controlling for PTSD, Becker-Weldman (2005) found that children who were victimized have smaller corpus callosum and underdeveloped orbitofrontal cortex. These brain-circuit deficiencies are associated with emotional regulation difficulties, problems with cause-effect thinking, trouble articulating emotions, low empathy, difficulty making social connections, and lack of a conscience (Becker-Weldman, 2005). Despite the brain's ample plasticity, problems of this nature often persist through adulthood.

Brain synapses and receptors within most regions go through dramatic periods of overproduction and pruning during two phases of life: immediately before birth and during the transitions from childhood and adolescence to adulthood. Consequently, it is reasonable to hypothesize that the experience of severe trauma resulting in PTSD would have different consequences for children depending on their developmental stage.

Developmental Stage and Increased Vulnerability

There is conflicting evidence as to whether the likelihood of developing PTSD varies across child age. While Famularo, Fenton, Kinscherff, Ayoub, and Barnum (1994) found that younger maltreated children were more likely to experience PTSD compared to older maltreated children, there is contradicting research that finds that older youth are more likely to develop PTSD after maltreatment (Kilpatrick et al., 2003, Whitbeck & Hoyt, 1999; Whitbeck, Hoyt, Johnson, & Chen, 2007).

Age differentials in the *risk* of PTSD notwithstanding, clinical evaluations reveal that the symptoms of PTSD vary across the lifecycle of childhood (Anderson, 2005). Some children diagnosed with PTSD at a younger age use make-believe, drawings and stories to reenact the stressful events, while others express their lingering stress indirectly, for example with separation anxiety or unrelated fears, such as of monsters (Perrin, Smith, & Yule, 2000). Behavioral regression, such as bedwetting and thumb-sucking, often occurs among young PTSD sufferers (Armsworth & Holaday, 1993). Perrin and colleagues (2000) note that the ways in which young children re-experience and express their distress related to a traumatic event is likely to change as they grow and mature.

Some researchers argue that maltreatment at a very young age could be more harmful since young child are still developing informational processes that affect attribution biases and social problem solving skills (Dodge & Price, 1994; Keiley, Howe, Dodge, Bates, & Pettit, 2001) and as such, are “extremely vulnerable to developmental deviations” (Weitzman, 2005, p. 323). Moreover, an important milestone of early childhood is the development of secure attachments with parents and other caregivers, which in turn lead to “feelings of security, self-worth, and trust in others. The trust that is built through a consistent and nurturing relationship with the primary

caregiver is essential for successful social and emotional adaptation throughout development” (Keiley et al., p.892). For example, Dubowitz, Papa, Black and Starr (2002) found high levels of depression and withdrawal symptoms among 3 year olds who had experienced emotional, physical and/or environmental abuse and neglect. Among abused and maltreated infants, 80% expressed symptoms related to attachment disorder (Becker-Weidman, 2005).

A convincing argument can also be made that given their greater cognitive awareness aware of the meaning of maltreatment, older children may be more likely to experience psychological consequences, including self-blame, anger, depression, and PTSD than younger children (Conte & Schuerman, 1987). Cashmore (2011) argues that while “infants and young children are clearly vulnerable to abuse and neglect...the ‘window’ does not close, however; and there are other peak periods of both significant brain development and increased risk- beginning in early adolescence and continuing through adolescent to early adulthood” (p.1).

Older youth gravitate towards risky lifestyles to cope with their feelings of negativity that result from exposure to victimization (Begle, Hanson, Danielson, McCart, Ruggiero, Amstadter, Resnick, Saunders, & Kilpatrick, 2011). Researchers hypothesize that risky behavior becomes a coping mechanism for dealing with fear and stress related to past traumatic and violent experiences. There has been some research to suggest that a youth’s cognitive, psychological, and social-emotional functioning moderates exposure to traumatic and violent events and a youth’s antisocial behavior (Nebbit & Lombe, 2008; Sanders-Phillips, 1997). Low self-esteem is another byproduct of PTSD among children, which is associated with poor decision-making, especially as relates to friendship choices and willingness to “go along with the crowd.” Adolescents with PTSD face a greater likelihood of taking risks.

Peers and the Risk of Delinquency

Research has indicated a strong relationship between peers' behavior and juvenile delinquency, where peer delinquency has a stronger effect on an individual's likelihood of engaging in deviant behavior than either family or neighbor characteristics (Nebbitt & Lombe, 2008; Fergusson, Horwood, & Swain-Campbell, 2003; Barnow, Lucht, & Freyberger, 2005). Youth who use alcohol, marijuana or other drugs are at an increased risk for being victimized; this is especially true for female substance abusers (Windle & Windle, 2005). Youth who spend more time away from home, particularly during the evening and night hours, are more likely to be a victim of a crime (Kennedy & Forde, 1990).

Many researchers point to youth's peer circles as the primary cause of increased risk of victimization. One of the earliest proponents of the lifestyle theory, Sutherland (1947) argued that the peer groups foster the development of attitudes and beliefs surrounding delinquent behavior as well as the abilities and/or skills to engage in delinquent activities. Using the same data as the current study, Nofziger (2003) found peer deviance as one of the strongest predictors of juvenile delinquency. Nofziger argues that it is the youth's deviant lifestyle that puts them at risk of victimization rather than victimization as a risk for deviant lifestyles. Proponents of the lifestyle model point to retaliation for previous deviant acts committed by a youth and/or his or her peers as a major reason for increased victimization. While emotional attachment to parents has a significant correlation with juvenile delinquency, researchers have found that the correlation is much weaker once peer deviance is controlled (Aseltine, 1995).

Conceptual Model

The conceptual model guiding this research is based on the literature on childhood victimization, PTSD, child development and juvenile delinquency (See Figure 1). The model posits that juvenile delinquency is a function of individual and family characteristics, peer

delinquency, traumatic experiences, and PTSD. Specifically, children who have experienced trauma -- stemming from witness to violence, bodily assault (i.e., sexual or physical), or other extraordinarily stressful events – are assumed to be at high risk of developing PTSD, which has both a direct and indirect effect on the probability that youth will engage in illegal activity. Given that research points to the potential for greater harm when PTSD is experienced at earlier stages of childhood, the model also assumes that some of the effect of PTSD will be mediated through the timing of its onset. Additionally, PTSD in adolescents is associated with impaired decision-making, lower resistance to peer pressure and poor impulse control. Thus, the model assumes that these youth are more likely to associate with antisocial peers and engage in illegal activities themselves. Further, it is assumed that keeping company with deviant peers also increases the risk that adolescents will be exposed to violent trauma (e.g., gang violence) and/or victims of physical harm. To account for individual and family characteristics demonstrated to influence the likelihood of juvenile delinquency, these factors are included as controls.

CHAPTER 3: DATA AND METHODS

Data Source

Cross-sectional data were drawn from the 1995 National Survey of Adolescents (NSA), where a national probability telephone sample was utilized. A stratified probability random digit dialing (RDD) six-stage sampling procedure was used to produce a representative sample of adolescents between the ages of 12 and 17 in 1995 (Kilpatrick et al., 2000).

Before conducting interviews with the youth, a parent or legal guardian was interviewed. 79% of eligible households, or 4,236 parents, gave permission for their child to be interviewed, and 4,023 adolescents consented to being interviewed. These participation and completion rates

are comparable yet marginally greater than rates from other studies on adolescents (Kilpatrick et al. 2000). Parental consent was obtained before adolescents were interviewed, and the surveys were administered in either Spanish or English, depending upon the parents' preferences. Once the interviewers obtained permission from the parents, parents were asked demographic questions about the family, and the rest of the survey was administered to the adolescent.

To ensure privacy, the interviewer explicitly asked if the adolescent was in a private situation and could respond openly and honestly. If the adolescent responded no, the interviewer asked for additional times in which to contact the youth, where privacy could be maintained. Additionally, the survey was designed to primarily use close-ended question with one-word answers (yes/no/a person's name) in case the adolescent was not alone while answering questions. In this case, it would be unlikely that the listener would be able to discern any information that would endanger the youth.

While federal regulations prohibit investigators from releasing confidential information without participants' consent, a child-focused clinician on the project team later interviewed adolescents who reported sexual or physical abuse by a family member within the past year and had not disclosed it to anyone. If the youth was found to be in current danger, the clinician first encouraged the adolescent to report the abuse to child protective services. The clinicians were also equipped to report the abuse to CPS if the youth did not come forward; however, no clinicians had to report abuse to CPS during the study. All interviewees were asked if they wanted the toll-free number of Child Help, a national telephone-counseling program for at risk youth, and approximately half of the sample asked for the number (Kilpatrick et al., 2000).

4,023 youth between the ages of 12 and 17 were interviewed, with an oversample of 862 adolescents living in central cities areas defined by the U.S. Census in 1990. Due to this

oversampling, minorities were slightly overrepresented than the 1995 estimate for minority youth in the U.S. Kilpatrick et al. (2000) also weighted data by age, race, and sex to correct for any demographic inconsistencies between the NSA sample and 1995 U.S. census estimates.

Dependent Variable

Within the NSA, a series of questions was asked to determine whether the respondents had engaged in any delinquent behavior *in the past year*. Similar questions were used for juvenile's own delinquent behavior compared to respondents' peer groups. Respondents were asked:

How many times in the past 12 months have you

- (1) stolen or tried to steal something worth more than \$100?
- (2) stolen or tried to steal motor vehicle such as a car or motorcycle?
- (3) broken or tried to break into a building or vehicle to steal something or just look around?
- (4) been involved in gang fights?
- (5) used force or strong-arm methods to get money or things from people?
- (6) had or tried to have sexual relations with someone against their will? or
- (7) attacked someone with the idea of seriously hurting or killing that person?

Note that while peer delinquency includes questions about alcohol and drugs, comparable items were not included in the operationalization of juvenile delinquency used in this study. While drinking and using drugs is an illegal activity for adolescents, I was more concerned with specific externalizing behavior, like theft and assault, which are less common behavior among the average adolescent. Juvenile delinquency was then coded as a dummy variable, where 1 indicates that the respondent admitted to engaging in at least one of the previously mentioned activities in the past year, and 0 indicates they did not.

Key Explanatory Variables

Trauma

Child trauma can be the result of, for example, intentional physical or emotional maltreatment, natural disaster, the death of a family member, divorce, moving to a new home, or changing schools. Moreover, traumatic events can be experienced directly or witnessed. Finally, physical harm perpetrated upon an individual can be of a sexual or other.

For the purposes of this study, four measures were developed to capture different sources of trauma. The first measure accounts for whether a respondent *witnessed* some form of bodily harm being done to someone else. The second and third measures capture whether a respondent *experienced an assault*: sexual or physical. The fourth trauma variable is intended to capture whether a respondent *experienced an extraordinarily stressful event* that could have resulted in bodily harm. The latter might be defined loosely as “unintentional” and include such experiences as natural disasters and serious accidents. The operationalization of each of these measures is outlined below.

Witness to Violence

Respondents were asked a series of questions concerning witnessing violent acts. These included having seen someone being: shot, cut or stabbed with a knife, sexually assaulted or raped, mugged or robbed, threatened with a knife, gun, or some other weapon, or beat up, hit, punched, or kicked to the extent that they were “hurt pretty badly.” A respondent who reported yes to any of these questions is coded 1; zero otherwise.

Bodily Assault

Two separate measures of assault were created. The first identifies whether a respondent was ever the victim of *sexual abuse or assault*, while the second captures whether the respondent reported being *physically assaulted* in a nonsexual way.

Respondents who responded yes to any of the following questions were identified as experiencing *sexual assault* and coded 1 and zero otherwise.

- (1) Has a man or boy ever put a sexual part of his body inside your private sexual parts, inside your rear end or inside your mouth when you didn't want them to?
- (2) Has anyone, male or female, ever put fingers or objects inside your private sexual parts or inside your rear end when you didn't want them to?
- (3) Has anyone, male or female, ever put their mouth on your private sexual parts when you didn't want them to?
- (4) Has anyone, male or female, ever touched your private sexual parts when you didn't want them to?
- (5) Has anyone ever made you touch his or her private sexual parts when you didn't want to?
- (6) *For boys only:* Has a woman or girl ever put your private sexual part in her mouth or inside her body when you didn't want them to?

Physical assault was determined based on an affirmative response to one or more of the following five questions.

Has anyone, including family members or friends ever:

- (1) attacked you with a gun, knife, or some other weapon, regardless of when it happened or whether you reported it to police?
- (2) physically attacked you without a weapon, but you thought they were trying to kill or seriously injure you
- (3) threatened you with a gun or knife, but didn't actually shoot or cut you?
- (4) beat you up, attack you, or hit you with something like a stick, club, or bottle so hard that you were hurt pretty badly?
- (5) beat you up with their fists so hard that you were hurt pretty badly?

Extraordinarily Stressful Events

The final type of trauma considered in this study is that stemming from extraordinarily stressful events that could have potentially caused physical damage to the respondent. A dummy variable was created to capture these "unintentional" events where a respondent is coded 1 if he/she ever experienced any of the following events and zero otherwise: serious accident at school, in a car, or somewhere else; natural disaster such as a tornado, hurricane, flood, major

earthquake or similar natural disaster; other situation in which the respondent was seriously injured or suffered physical damage; or other extraordinarily stressful situation or event.

Measures of Posttraumatic Stress

PTSD Symptoms: Ever and Current

Posttraumatic stress disorder was measured using a modified version of the National Women's Study PTSD Module (Kilpatrick, Resnick, Saunders, & Best, 1989), and the measure was created using the Diagnostic and Statistical Manual of Mental Disorders, 4th edition (DSM-IV) (Kilpatrick et al., 2000). Respondents were given 20 questions designed to ascertain whether they had experienced specific PTSD symptoms. In accordance with the criteria for clinical PTSD, adolescents, who reported ever having had six or more of these symptoms lasting for at least two weeks at a time, are coded 1 on a dummy variable measure of having had *PTSD over the life course*. Symptoms included feeling they had to stay on guard much of the time; difficulty sleeping or falling asleep; being startled easily by unexpected noises, feeling very anxious, fearful or panicky; reacting physically to things that made them recall something that had happened in the past; and having flashbacks, where they imagined they were re-experiencing an unpleasant event. For the complete list of PTSD indicators, see Appendix A. A second binary variable was created to capture *current PTSD*. A respondent who reported experiencing any of the above symptoms, lasting for 2 weeks or more within the past 6 months, is coded as 1 on the current PTSD variable and zero otherwise.

Timing of PTSD Onset

Additional details about PTSD were gathered from respondents, including the age of onset of each of the symptoms in the PTSD inventory. This information is critical to this study, as the goal is to examine differences in the effects of PTSD across different developmental

stages. Respondents with any PTSD symptomology are categorized according to four grouping of age at onset, zero to four; five to nine; 10 to 13; and 14-17 years of age. These age classifications mirror traditional school age groups: preschool, elementary school, middle school, and high school (reference group).

Control Variables

Previous research has indicated that certain individual and family characteristics increase adolescents' risk of delinquent behavior (Mann & Reynolds, 2006). As such, respondents' gender, age, ethnicity, and race were included in the study. Age was measured as a continuous variable, and respondents' age ranged from 12 to 17. Gender was coded as a dichotomous dummy variable, with male coded as 1 and female coded as 0. Respondents' ethnicity was also a dichotomous dummy variable, with Hispanic coded as 1 and non-Hispanic coded as 0. Respondents' race was coded as a series of dummy variables, including White, Black, American Indian, and Other.

Additional control variables include parental education, coded into the following categories: less than a high school diploma, high school diploma (reference group), some college, and college degree or more. Annual household income is broken into 7 dummy variables ranging from less than \$10,000 up to more than \$100,000. A dummy variable for disruption in family structure and a dummy variable for whether a member of the adolescent's family ever had a substance abuse/dependency problem were also created. Disruption in family structure is a dummy variable coded as 1 if respondents stated that they had always lived with both of their biological parents and 0 if they had not. The family substance abuse/dependency measure includes both alcohol and drug problems and was determined by respondents' responses to the following questions:

Has anyone either in your family or who lived with you, not counting you,

- (1) drink alcohol so much that it became a problem? For example, did anyone drink so much they got into fights with other people, or started to beat the kids, or couldn't get out of bed the next day, or had difficulty holding a job? and
- (2) use hard drugs, such as heroin, cocaine, speed, or uppers or downers, or have a drug problem?

Peer Delinquency

Because past research has indicated a significant association between peer deviance and adolescents' own criminal behavior, a combination of indicators assessing friends' delinquent behavior *in the past year* should be accounted for. Respondents were asked if in the past year, had any of their friends:

- (1) purposely damaged or destroyed property that did not belong to them?
- (2) used marijuana or hash; stolen something worth less than \$50?
- (3) hit or threatened to hit someone without any reason?
- (4) used alcohol; broken into a vehicle or building to steal something; sold hard drugs such as heroin, cocaine, or LSD?
- (5) suggested that the respondent do something that was against the law?
- (6) gotten drunk once in a while?
- (7) used prescription drugs such as amphetamines or barbiturates when there was no medical need for them?
- (8) sold or gave alcohol to kids under 18? or
- (9) pressured/forced someone to do more sexually than he/she wanted to do?

A dummy variable for peer delinquency is coded 1 if respondents answered yes to any of the aforementioned questions and coded 0 if they responded that none of their friends had engaged in any of said activities.

Table 1 contains the distribution of the sample on all variables analyzed in this study. The sample was split almost evenly between males (50.2%) and females (49.8%), and the majority of the sample was white (N= 2,901, 75.8%). A central city oversample was used to increase the number of racial minority respondents, which lead to 600 black respondents (15.7%); 199 American Indian respondents (5.2%); 67 Asian respondents (1.8%); and 60

respondents who identified themselves as Other (1.6%). Annual household income in 1995 was also recorded. 7.1% of head of households made less than \$10,000; 9.9% made between \$10,000 and \$20,000; 17.1% made between \$20,000 and \$30,000; 16.2% made between \$30,000 and \$40,000; 14.3% head of households made between \$40,000 and \$50,000; 21.9% earned between \$50,000 and \$75,000; 7.9% earned between \$75,000 and \$100,000; and 4.6% of head of households earned over \$100,000. The majority of the head of households held at least a high school degree (only 10% had no high school degree), with 27.4% having some college, and 30.7% held a college degree or more. While only 4.3% of youth responded that at least one of their family members had a substance abuse or dependence problem, 36.5% revealed that they no longer lived with both biological parents. Surprisingly, 73.2% of the sample acknowledged that they had witnessed violence, and 52.8% had undergone an extremely stressful and traumatic event. Additionally, 8.2% of the respondents revealed that they had been sexually abused or assaulted, and 18.3% disclosed that they had been physically assaulted. Based on the DSM-IV criteria, 17.1% of the youth reported ever having experienced PTSD, and 11.1% currently had PTSD at the time of the interview. Of those who had ever had PTSD, 7.3% developed PTSD symptoms while under the age of five; 27.6% were aged five to nine; 44.7% were aged 10 to 13; and 20.3% were aged 14 to 17. When asked about delinquent behavior in the past year, 72.1% of the sample acknowledged that at least one of their peers engaged in delinquent behavior. Only 13.4% of the sample, however, revealed that they had committed a crime in the past year.

Missing Data

With the exception of the dependent variable, I used a multiple imputation (i.e., Stata Impute procedure) strategy to assign predicted values to cases with missing data on analysis variables. The percent of non-response did not exceed 7.8% for any imputed variable.

Limitations

While an extraordinarily rich source of data for the present study, the NSA dataset has some weaknesses that bear mention. First, it is possible that not all respondents were able to remember their exact age when PTSD symptoms first started, thus leaving the potential for recall bias. Before respondents were asked about PTSD however, they were asked about age of onset for a variety of different traumatic events, including sexual and physical assault. Because these types of events are usually very vivid in a person's mind, respondents were more likely to remember when it trauma occurred. As such, asking respondents to first think about age of trauma most likely primed respondents to remember when PTSD symptomology first occurred. To strengthen the study however, longitudinal data that captured respondents' PTSD symptomology each year would have most likely increased validity of respondents' answers.

Additionally, respondents were only asked about delinquent behavior *within the past year*, which precludes me from asserting causality between PTSD and delinquency for every respondent. If age of onset for delinquent behavior had been included in the survey, event history analysis could have been used to simulate longitudinal data. Lastly, it would have been better for the purposes of this analysis if all respondents were 17, rather than aged 12 to 17. Because respondents are currently in different developmental periods, their risk of juvenile delinquency, regardless of other risk factors like trauma and PTSD symptomology, are quite different. Thus, if everyone had been the same age, current age of each adolescent would not have confounded respondents' risk of delinquency.

Methods

The first step in the analysis is to gain a better understanding of the inter-relationships among the key explanatory variables, controls and the dependent variable – delinquent behavior

during adolescence. To accomplish this, Tables 2 through 4 present the results of cross-tabulations. The statistical significance of relationships is assessed using Chi-square and tau-b tests. Next, I move to a multivariate framework to evaluate the marginal effects of PTSD and other respondent and family characteristics on the probability of juvenile delinquency. Specifically, the aim is to identify whether there are age differentials in the marginal effects of PTSD, net of other explanatory and control variables and to reveal the primary pathways through which these effects are transmitted.

To account for complex sampling design in the NSA data set, including the oversampling of minorities all multivariate analyses are conducted using sampling weights and use robust standard errors.

CHAPTER 4: RESULTS

Background Characteristics, Victimization and PTSD

Table 2 provides a breakdown of the characteristics of children according to two classifications of PTSD: ‘ever experienced 6 or more PTSD symptoms’ and ‘experienced any PTSD symptoms in the past six months.’ The table indicates that some groups are at greater risk of developing PTSD than others. For example, females are at a significantly greater risk of both lifetime and current PTSD. While being Hispanic did not raise a youth’s risk of developing PTSD over their lifetime, Hispanic youth were significantly more likely to have PTSD currently than respondents who did not have current PTSD (13.5% versus 9.4%). There were significant race differences as well. White respondents were significantly less likely to develop PTSD, while Black and American Indian youth were significantly more likely to have had PTSD at one point in their life compared to those without PTSD, including those with and without PTSD

currently. Specifically, 20.2% and 7.6% of those who had developed PTSD were Black and American Indian respectively, while only 14.8% and 4.7% who had not developed PTSD were Black and American Indian respectively.

There was also a significant relationship differences between household income and having ever developed PTSD. Higher household income was a protective factor against PTSD, as youth who came from higher income families were less likely to have ever experienced PTSD. However, there was no significant relationship between household income and current PTSD. Parents' education was also a protective factor for both lifetime and current PTSD. Specifically, youth with parents without a high school diploma made up 11.1% of those with lifetime PTSD while only 9.7% of parents without a high school diploma had never developed PTSD. Conversely, youth with parents who had at least a college degree made up 31.9% of the non-PTSD sample and only 25.2% of the lifetime PTSD sample.

Experiencing PTSD differentiated on other family characteristics as well. For example, respondents who no longer lived with both biological parents were more likely to develop PTSD as well as currently have PTSD compared to those without ever developing PTSD (48.0% vs. 34.2%). The same held true for adolescents who had family members with substance abuse and/or dependency problems. Youth with family members with substance abuse problems made up 11.5% of the lifetime PTSD sample, while they only made up 2.8% of the never developing PTSD sample.

Trauma and victimization also increased respondent's risk of developing PTSD. For example, 74.9% of those with PTSD had experienced an extraordinarily stressful event, and astonishingly, 92.7% had witnessed violence. Additionally, compared to those who had not developed PTSD, sexually or physically assaulted adolescents were significantly more likely to

develop PTSD; 54.1% of lifetime PTSD respondents had been victimized while only 16.4% of non-PTSD respondents had been assaulted. Respondents who developed PTSD at each of the developmental periods included were also at a higher risk of currently having PTSD. This relationship points to the fact that respondents who had developed PTSD at young ages were at a higher risk of still exhibiting symptoms almost a decade later. Having friends who were delinquent also raised one's risk of experiencing PTSD, as 92.2% and 95.7% of respondents who had either lifetime or current PTSD respectively also had peers who were delinquent.

Table 3 cross-tabulates demographic and explanatory variables according to the timing of PTSD onset. The majority of the two-way relationships are not statistically non-significant. The exceptions include gender, experiencing an extraordinarily stressful event, being victimized – physical assault in particular. Being sexually assaulted did not differ by timing of PTSD. Compared to males, females were marginally more likely to develop PTSD as they got older. Additionally, respondents whose parents had a high school diploma or less were more likely to develop PTSD as they got older. Conversely, those who experienced a stressful event were more likely to develop PTSD at a younger age, and youth who were physically assaulted were significantly more likely to develop PTSD between the ages of five and nine. Multivariate analysis is still clearly needed, as the previous three tables indicate significant relationships among the demographic and explanatory variables. These associations must be controlled for before it is possible to more fully understand the psychological pathways in which trauma and victimization increase youth's risk of delinquent behavior.

Correlates of Juvenile Delinquency

Table 4 reports the relationship between demographic and explanatory variables with engagement in delinquent behavior. With the exception of parents' education, the risk of

committing a crime was correlated to each of the other variables presented. Unlike the risk to develop PTSD, males were at a significantly higher risk of delinquency than females. Male respondents made up 69.8% of the delinquent sample while only 47.1% of those who had not engaged in delinquent activity. Ethnicity and race were also significantly correlated with juvenile delinquency. Hispanics represented 13.5% of youth who had ever committed a crime, while they represented only 9.3% of those who had not. Black and American Indian youth were also disproportionately represented in the delinquent category. Of particular notice, 23.9% of delinquents were Black, while they made up only 14.4% of non-delinquents. Conversely, White respondents represented 77.6% of the non-delinquent category while only 64.2% of those who had committed a crime in the past year.

In terms of family characteristics, both household income and parents' education were statistically correlated with juvenile delinquency, where both variables acted as protective factors against criminal behavior. Conversely, other family characteristics served as risk factors of youth's likelihood to become delinquent. Youth were at greater risk of engaging in delinquent behavior if they no longer lived with both of their biological parents, as well as if they had at least one family member with a substance abuse or dependency problem. Specifically, 55.0% of juvenile delinquents came from broken homes compared to 33.7% who had not committed a crime. While only 3.0% of non-delinquents had family members with substance abuse problems, 12.8% of delinquents did live with someone with a substance abuse issue at one point in their life.

In line with study hypotheses, trauma and victimization were correlated with juvenile delinquency. While it is surprising that 69.6% of non-delinquents had witnessed at least one serious violent act, 96.1% of delinquents had witnessed violence, indicating a strongly

significant difference. Additionally, 74.1% of youth who had committed a crime in the past year had experienced an extraordinary stressful event, while only 49.5% of non-delinquents had undergone such an event. Youth who had been sexually or physically assaulted and abused were also at greater risk of becoming delinquent. While 12.3% of non-delinquents had been physically assaulted, 56.5% of youth who had committed a crime in the past year had also been physically assaulted at one point in their life. Although a somewhat smaller percentage, youth who had been delinquent in the past year were also significantly more likely to have been sexually abused or assaulted compared to non-delinquents (16.5% versus 67.0%). Developing PTSD over one's lifetime was also significantly correlated with committing a crime, as 42.9% of delinquents had PTSD compared to only 13.0% of non-delinquents. Current PTSD was also correlated, where 29.3% of delinquents currently exhibited PTSD while only 8.3% of non-delinquents were categorized as suffering from PTSD at the time of the interview. In line with both of these findings, developing PTSD at each of the developmental time periods also put youth at greater risk of becoming juvenile delinquents. It is important to note that respondents were at least 12 years old at the time of the interview, and developing PTSD under the age of five, for example, still put youth at a higher risk of committing a crime almost ten years later. Youth who developed PTSD during middle school, or between the ages of 10 and 13, were at significantly more risk of committing a crime. Specifically, 19.4% of delinquent respondents had developed PTSD during middle school, while only 3.5% of non-delinquents had developed PTSD during that same time period. Not surprisingly, peer delinquency was also correlated with juvenile delinquency. What is particularly noteworthy, however, is that 97.4% of youth who admitted to committing a crime also had friends who were delinquent.

Predicting Juvenile Delinquency: Probit Analysis

Six models are presented in Table 5 to examine the pathways that lead youth to engage in juvenile delinquency. The first model includes demographic variables only and represents the baseline for all other models. Model 2 adds peer delinquency to examine the incremental effect peer deviance has on explaining juvenile delinquency. Third, traumatic events and victimization are added to the model to understand the impact these types of events have on juvenile delinquency before PTSD is included. The relationship between peer delinquency and trauma/victimization is also examined to more fully grasp their association with one another. In Model 4, lifetime PTSD is added to the model to parse out the specific psychological consequences of trauma and victimization on delinquency. Current PTSD is then added to model five to observe any differences between ever developing PTSD versus currently exhibiting symptoms on engaging in delinquent behavior in the past year. Finally, in Model 6, timing of PTSD is studied to more fully understand the impact of developing PTSD at certain critical developmental periods on juvenile delinquency. The timing of PTSD marginal effects will also be compared to the marginal effects of lifetime and current PTSD shown in Models 4 and 5.

Model 1: Demographic Characteristics

In Model 1, gender, ethnicity, and race were all statistically significant predictors of youth crime. Consistent with past research, male respondents were significantly more likely to engage in criminal behavior than females; being male increased adolescents' risk of engaging in delinquent activity by 11.6 percentage points. Not surprisingly, older youth were also at an increased risk of delinquency. An additional year of life increased a youth's risk of delinquency by 2.1 percentage points. Ethnicity and race also played a role in estimating youth's delinquent behavior. Compared to non-Hispanics, Hispanic youth were 3.9 percentage points more likely to engage in criminal behavior. Unexpectedly, American Indian respondents were at greater risk

than Blacks, although both were at significantly greater risk than White youth. While Black respondents were 6.2 percentage points more likely to have engaged in delinquent activity than White adolescents, American Indian youth were 7.4 percentage points more likely to have committed a crime in the past year than White respondents. Although speculative, these findings point to the theoretical argument that American Indian children often come from extremely fragile social communities that put them at greater risk of deviant behavior, even when controlling for household income and parental education.

Surprisingly, annual household income was not significantly correlated to juvenile delinquency, with the exception of respondents who came from households earning between \$20,000 and \$30,000, which was marginally significant. However, compared to youth from households earning \$50,000 to \$75,000, youth from households earning \$20,000 and \$30,000 were *less likely* to commit a crime within the past year. The non-significant findings might be due in part to household income's relationship with other variables in the model, including parental education, family substance abuse, as well as family disruption. To more fully understand other aspects of socio-economic status, parents' education was included in the model. The results indicated that higher parental education served as a protective factor against delinquency. Compared to parents with only a high school diploma, youth whose parents had a college degree or more were 4.3 percentage points less likely to engage in criminal behavior. This relationship was only marginally significant for youth whose parents had attended some college compared to parents with only a high school diploma, and no relationship was found between youth whose parents did not obtain a high school degree.

While parental education levels played a small role in predicting youth delinquency, having a family member who had substance abuse or dependency problems increased a youth's

risk of committing a crime by 14.7 percentage points, the largest predictor in this model. No longer living with both biological parents also increased a youth's risk of delinquency by 7.8 percentage points. Finally, the overall model explained an astounding 13.9% of the variation in deviant behavior without adding any of the other explanatory variables.

Model 2: Peer Delinquency

Because peer delinquency is often cited as one of the strongest predictors of juvenile delinquency, it was added to Model 2. By adding it second, I was able to discern the incremental increase of explaining peer deviance on juvenile delinquency. Holding the other demographic variables constant, peer delinquency predicted an 11.9 percentage point increase in a youth's likelihood to commit a crime compared to youth who did not associate with deviant peers. Of particular importance, every significant predictor diminished, revealing a correlation between peer deviance and the other variables in the model. This appears to suggest that many of the demographic characteristics increase youth's likelihood of surrounding themselves with deviant peers, which in turn increases adolescents' risk of committing a crime. In particular, having a family member with substance abuse problems predicted delinquency by 4.3 percentage points less once peer deviance was added to the model, suggesting family substance abuse problems push youth toward more deviant peers, as it is unlikely that youth's peer groups increase risk of having family member substance abuse problems. In addition, peer deviance explained an additional 5.5% of the variability in peer deviance, with the entire model explaining 19.4% of the variation in the dependent variable.

Model 3: Trauma and Victimization

To examine the previously tested theory that enduring traumatic events and victimization increases one's risk of engaging in delinquent behavior, witnessing violence, living through an

extraordinarily stressful situation, and being sexually or physically assaulted were added to the regression in Model 3. While enduring an extraordinarily stressful event significantly increased a youth's risk of delinquency by 2.4 percentage points, witnessing violence increased youth's risk of committing a crime by 6.7 percentage points. Being sexually or physically assaulted became the biggest predictor of the model by increasing youth's risk of deviant behavior by 12.1 percentage points. With the exception of household income, which was no longer significant in either Model 2 or 3, each of the previously discussed variables, including peer delinquency, had a reduction in their marginal effects, revealing a correlation between trauma/victimization and each of the concepts. Interestingly, the risk associated with having deviant peers and a family member with a substance abuse diminished by a significant amount. Once traumatic events were added to the model, peer deviance increased a youth's risk of delinquency by 7.0 percentage points instead of 11.9 percentage points predicted in Model 2. The marginal effect of having a family member with substance abuse problems on delinquency dropped from 10.4 to 5.7 percentage points. These findings appear to suggest that, at least to some extent, trauma mediates the relationship between peer deviance and other demographic characteristics, particularly family substance abuse problems. Additionally, Model 3 increased overall explanation of juvenile delinquency by 9.5%, to a total of 28.9%.

Model 4/Model 5: Lifetime and Current PTSD

Model 4 adds lifetime PTSD to the model to parse out the marginal effect PTSD has on juvenile delinquency, while still holding constant other ways in which trauma increases adolescents' risk to commit a crime. The results indicate that youth who had developed PTSD over their lifetime were significantly more likely to engage in delinquent behavior than those who were not identified as ever having PTSD, increasing one's risk by 6.0 percentage points.

Interestingly, while trauma predictors diminished once PTSD was controlled for in the model, bodily assault still increased a youth's risk of juvenile delinquency by 10.0 percentage points, suggesting that there are still other important consequences of victimization besides PTSD that increase a youth's risk of criminal activity. Peer deviance's marginal effect on delinquency also diminished. Along with the significant relationship found in Table 2, these results suggest a significant relationship between associating with deviant peers and developing PTSD. Causation cannot be ascertained however.

To understand any differences in the effect of ever having PTSD compared to currently having PTSD, lifetime PTSD was dropped in Model 5 and current PTSD was added. While youth with current PTSD were statistically significantly more likely to engage in criminal behavior than those who did not exhibit PTSD symptomology at the time of the interview, they were at no more risk than youth who had ever had PTSD. While these are somewhat surprising results, they appear to suggest that PTSD can have lasting effects on behavior even if they no longer exhibit symptoms.

Model 6: Timing of PTSD

In the final model, timing of PTSD was examined to more fully understand the risk factors associated with developing PTSD at different periods in an adolescent's life. Compared to developing PTSD at age 14 or older, youth who began exhibiting signs of PTSD at all younger ages were significantly more likely to engage in delinquent behavior in the past year. Of particular importance is the fact that the youngest developmental period led to an even greater risk. Youth who first exhibited symptoms under the age of five were at 9.1 percentage points greater risk of committing a crime than a youth who experienced PTSD for the first time when they were 14 or older. Additionally, youth who developed PTSD between the ages of five and

nine were 5.4 percentage points more likely to engage in delinquent behavior than adolescents who developed PTSD after the age of 13. Similarly, youth who developed PTSD between the ages of 10 and 13 were 5.6 percentage points more likely to commit a crime compared to youth who developed PTSD later in adolescence. It is also important to note that exhibiting signs of PTSD under the age of five increased youth's risk of committing a crime by more than any other variable, excluding bodily assault, which predicted a 10.41 percentage point increase in youth's likelihood to engage in delinquent behavior. Similar to Model 5, these results reveal that PTSD can have lasting effects on one's behavior, with an additional suggestion that developing PTSD at a younger age can increase adolescents' risk of delinquency compared to those who develop PTSD during older adolescence. Again, it is also clear that there are still other important pathways in which trauma increases respondents' risk of delinquency besides PTSD. Overall, the model explained approximately 30% of the variability in juvenile delinquency, which is comparable to the last three models.

CHAPTER 5: DISCUSSION

It has already been well established that youth who have been victimized during childhood are more likely to come into contact with the juvenile justice system. Incarcerated youth are also more at risk of showing signs of PTSD, a psychological byproduct of victimization and other traumatic events. The current results supported these claims, but also revealed that youth who developed PTSD at younger ages were even more likely to engage in a deviant lifestyle at the time of the interview than youth who exhibited signs of PTSD during high school, even after controlling for peer deviance and other family characteristics. This suggests that the consequences of trauma and victimization, specifically PTSD, can have lasting effects on

behavior, as younger children are more susceptible to the adverse consequences of PTSD. It is important to reiterate that youth who developed PTSD under the age of five were more likely to commit a crime over 8 years later than you who developed PTSD in more recent years. This is consistent with trauma and victimization literature that suggests that young children are more vulnerable to the adverse effects of victimization than older children who might have already developed certain developmental and emotional coping skills that provide older youth with protective factors against acting out after such tragic events.

While previous literature has pointed to the fact that older children are more likely to develop PTSD, exhibiting signs of PTSD at younger ages can have more deleterious effects on a child's life trajectory than developing it later in life. It is possible that some youth started engaging in delinquent behavior before they developed PTSD; however, the likelihood of confounding these results is slim, as it would have showed later PTSD development to increase youth's risk of committing a crime than for younger children, which was not found to be true. While timing of PTSD affected the risk associated with delinquent behavior, adolescents who ever developed PTSD were more at risk of juvenile delinquency, regardless of the developmental period in which they first exhibited signs. This relationship does not differ, however, between ever having PTSD compared to currently having PTSD. Thus, PTSD symptomology, in and of itself, can have serious consequences, and interventions are important and necessary at any age during adolescence.

Because there are a variety of adverse psychological, emotional, and cognitive consequences of trauma, it is important to understand the different ways in which these consequences affect behavior. In addition to timing of PTSD, the findings indicate that bodily assault, witnessing violence, and experiencing other traumatic life events are still strong

predictors of juvenile delinquency, even when PTSD is included in the model. This suggests that while PTSD is an important component of a youth's risk of committing a crime, there are other essential conduits that lead traumatized youth towards juvenile delinquency. This most likely includes other cognitive, social and emotional attributes not accounted for in the current study, and additional research is needed to more fully understand the specific ways in which those consequences affect youth's risk of engaging in a deviant lifestyle.

Lastly, the study found that there were a variety of individual and family characteristics that increase a youth's likelihood of committing a crime. Being male, Hispanic, Black, or American Indian are all significantly correlated with juvenile delinquency, even when peer deviance, victimization, and PTSD are controlled for in the regression. Family characteristics also play a role in a youth's deviant behavior. While parental education was found to be a protective factor, having a family member with a substance abuse problem as well as no longer living with both biological parents increase adolescents' chances of engaging in delinquent behavior. Surprisingly, household income was not found to be associated with juvenile delinquency. As previously stated, this might be due in part to household income's correlation with other variables included in the regression. Supporting previous research, surrounding oneself with deviant peers also increases youth's chances of criminal behavior as well. The results indicated that peer delinquency is also correlated with experiencing victimization and other traumatic events, which in turn increases one's risk of engaging in criminal activity. These results tend to support the theory that many youth end up in a downward spiral towards delinquency. While past research has found that peer delinquency mediates the relationship between trauma and victimization and delinquency, the current study finds that there are other

significant pathways that lead victimized youth towards a criminal lifestyle other than surrounding oneself with deviant peers.

Limitations and Future Study

As I previously stated, there are some weaknesses to the dataset that make it challenging to examine the current research questions. These include recall bias, past year delinquency only, as well as the fact that youth were at different developmental stages at the time of the interview. There are additional limitations as well that should be addressed in future study. First, juvenile delinquency was measured using self-reporting. While this is an acceptable measure, it would be interesting to examine this model in relation to youth who have already had contact with the juvenile justice system. In addition to self-reporting measures, using court records could allow me to examine the risk of getting caught. It is possible that some of the mechanism that increase victimized youth to commit a crime, like PTSD, also increases delinquent youth's likelihood of getting caught. For example, youth who have ever suffered from PTSD might be more likely to engage in behavior that have higher chances of arrest or might be more likely to disregard warning signs of police activity. In addition, the NSA total sample size was 4,023, a relatively small size when examining events and behavior that are relatively uncommon. To strengthen power of the model, additional data should be used that have larger sample sizes.

CHAPTER 6: IMPLICATIONS

The current study represents a significant advance in the research concerning the adverse consequences of trauma and victimization on adolescents' risk to commit a crime. Child-serving agencies and families alike need to be more attentive to children's psychological needs after trauma, particularly after witnessing or experiencing violence. The findings from the current

study imply that child welfare, mental health, and juvenile justice systems are intricately intertwined regardless of whether these systems acknowledge their overlapping populations. While child welfare agencies have started to focus on the psychological and emotional well-being of their clientele, there needs to be an increased awareness that unless preventative measures are taken to alleviate the damaging effects of maltreatment, many of these children will also come into contact with the juvenile justice system; this is especially true for younger children. Additionally, the juvenile justice system must be aware of the risk factors associated with involvement in the justice system. Encouragingly, there are evidenced-based treatments available that have been shown to effectively reduce PTSD symptoms with lasting results (National Center for PTSD, 2008). Until families and child-serving agencies identify these symptoms, however, youth will go untreated. Thus, child-serving agencies must put new policies in place that mandate staff assessment of youth's psychological well-being after trauma, including PTSD symptomology. Younger children should also be given special attention, as maltreatment and other traumatic events can be especially devastating on healthy development.

APPENDIX A

PTSD Inventory

People experience a variety of moods and feelings from time to time. In your case, has there ever been a period of two weeks or more during which:

1. You had trouble concentrating or keeping your mind on what you were doing, even when you tried to concentrate?
2. You lost interest in activities which usually meant a lot to you?
3. You felt you had to stay on guard much of the time?
4. You deliberately tried very hard not to think about something that had happened to you?
5. You had difficulty falling asleep or staying asleep?
6. You stopped caring about activities in your life that used to be important to you?
7. Unexpected noises startled you more than usual?
8. You kept having unpleasant memories or seeing them in your mind?
9. You had repeated bad dreams or nightmares?
10. You went out of your way to avoid certain places or activities which might remind you of something that happened to you in the past?
11. You deliberately tried to avoid having any feelings about something that happened to you in the past?
12. You felt cut off from other people or found it difficult to feel close to other people?
13. It seemed you could not feel things anymore or that you much less emotion than you used to?
14. You found yourself suddenly feeling very anxious, fearful, or panicky?
15. Little things bothered you a lot or could make you very angry?
16. Disturbing memories kept coming into your mind whether you wanted to think of them or not?
17. You felt a lot worse when you were in a situation that reminded you of something that had happened in the past?
18. You found yourself reacting physically to things that reminded you of something that had happened in the past?
19. The way you think about or plan for the future was changed by something that happened to you in the past?
20. Have you ever had a “flashback,” that is, have you ever had an experience in which you imagined that something happened in the past was happening all over again? (Doesn't have to be two weeks)

Figure 1. Conceptual Model

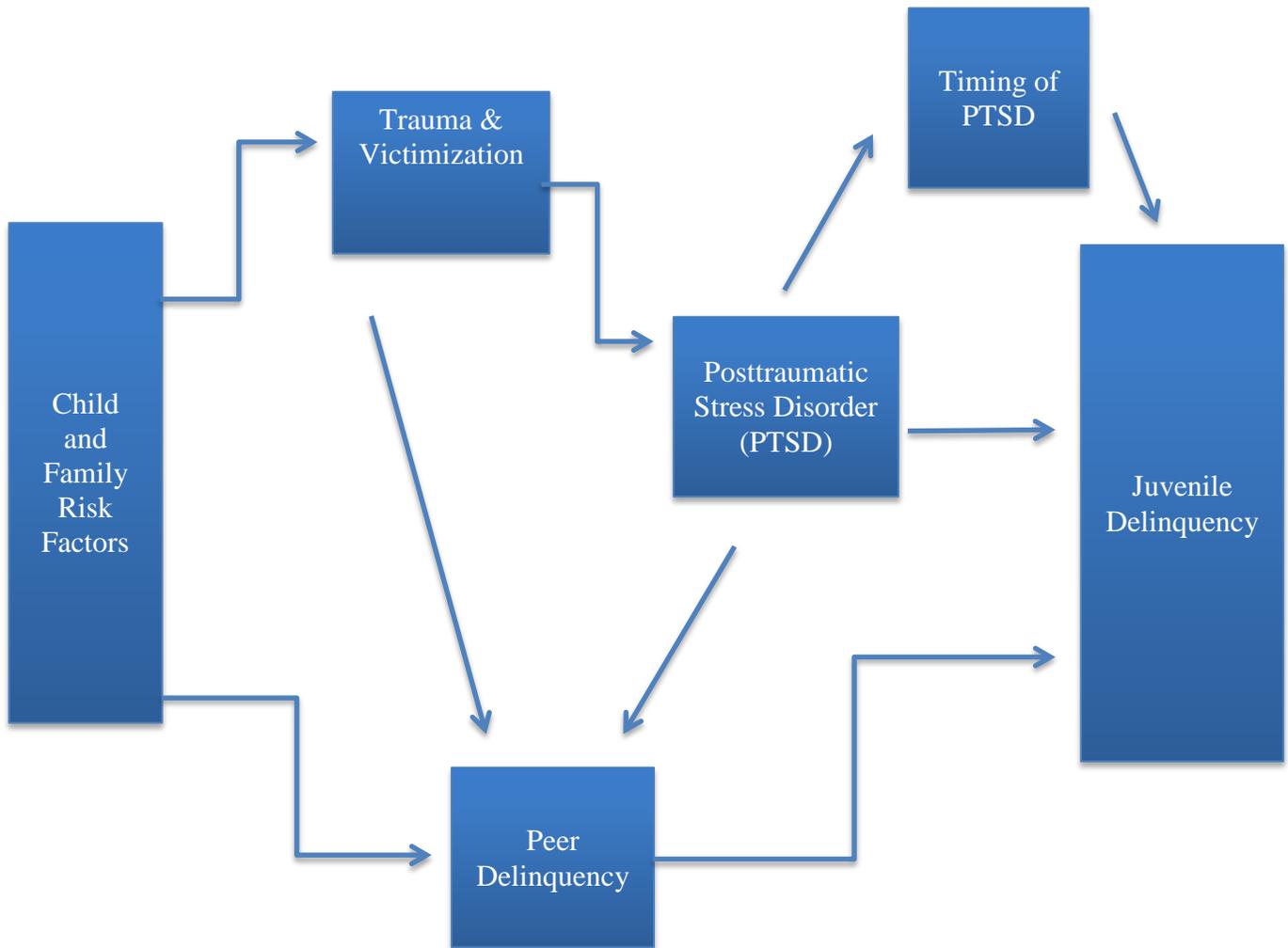


Table 1. Descriptive Statistics For All Variables Of Analysis

	N	%
Gender		
<i>Male</i>	2,018	50.16
<i>Female</i>	2,005	49.84
Age in years (Mean)	4017	14.51 (1.64)
Ethnicity		
<i>Hispanic</i>	390	9.86
Race		
<i>Black</i>	600	15.68
<i>White</i>	2,901	75.80
<i>American Indian</i>	199	5.20
<i>Asian</i>	67	1.75
<i>Other Race</i>	60	1.57
Annual Household Income in 1995		
<i>Less than \$10,00</i>	256	7.09
<i>\$10,000 to \$20,000</i>	356	9.86
<i>\$20,000 to \$30,00</i>	619	17.14
<i>\$30,000 to \$40,00</i>	585	16.20
<i>\$40,000 to \$50,00</i>	515	14.26
<i>\$50,000 to \$75,000</i>	814	22.54
<i>\$75,000 to \$100,000</i>	294	8.14
<i>More than \$100,000</i>	172	4.76
Parent's Education		
<i>Less than High School</i>	401	10.00
<i>High School</i>	1,278	31.87
<i>Some College</i>	1,099	27.41
<i>College or more</i>	1,232	30.72
Family Substance Abuse	173	4.30
Family Disruption	1,468	36.54
Trauma		
Extraordinarily Stressful Event	2,124	52.80
Witness to Violence	2,943	73.17
Bodily Assault	918	22.82
<i>Sexually assault</i>	327	8.24
<i>Physically assaulted</i>	734	18.25
Posttraumatic Stress Disorder (PTSD)		
Lifetime PTSD	686	17.05
<i>PTSD under 5</i>	50	7.31
<i>PTSD ages 5 to 9</i>	189	27.63
<i>PTSD ages 10 to 13</i>	306	44.74
<i>PTSD ages 14 to 17</i>	139	20.32
Current PTSD (<i>past 6 mo.</i>)	446	11.09
Peer Delinquency	2,902	72.14
Juvenile Delinquency	540	13.42

Source: 1995 National Survey of Adolescence

Table 2. Relationships Between Posttraumatic Stress Disorder (PTSD) and Background Characteristics among Adolescents Ages 12 to 17

	Ever Met Clinical Definition of PTSD (6 or More Symptoms)			Had One or More PTSD Symptoms in Past Six Months		
	Yes	No	χ^2	Yes	No	χ^2
	%	%		%	%	
Gender						
<i>Male</i>	39.5	52.34	37.57***	34.30	52.14	50.45***
<i>Female</i>	60.50	47.65		65.70	47.86	
Age in years (Mean)	15.39 (1.63)	14.39 (1.63)		15.15 (1.53)	14.43 (1.63)	
Ethnicity			2.10			7.60**
<i>Hispanic</i>	11.37	9.55		13.54	9.4	
Race						
<i>Black</i>	20.22	14.76	25.04***	20.28	15.10	17.14**
<i>White</i>	69.83	77.01		68.87	76.67	
<i>American Indian</i>	7.62	4.71		8.02	4.85	
<i>Asian</i>	9	1.82		6	1.79	
<i>Other Race</i>	6	1.70		6	1.59	
Annual Household Income in 1995 (Z Score)						
<i>Less than \$10,00</i>	9.13	6.66	-3.40***	8.02	6.97	1.30
<i>\$10,000 to \$20,000</i>	10.74	9.68		11.28	9.68	
<i>\$20,000 to \$30,000</i>	17.47	17.07		15.54	17.34	
<i>\$30,000 to \$40,000</i>	18.43	15.73		17.79	16.00	
<i>\$40,000 to \$50,000</i>	14.58	14.19		15.04	14.17	
<i>\$50,000 to \$75,000</i>	19.55	23.17		20.55	22.79	
<i>\$75,000 to \$100,000</i>	6.25	8.54		8.02	8.16	
<i>More than \$100,000</i>	3.85	4.95		3.76	4.89	
Parent's Education (Z Score)						
<i>Less than High School</i>	11.13	9.77	-3.35***	11.49	9.81	-2.46**
<i>High School</i>	34.99	31.23		34.46	31.55	
<i>Some College</i>	28.70	27.14		28.15	27.31	
<i>College or more</i>	25.18	31.86		25.90	31.32	
Family Substance Abuse	11.53	2.82	104.84***	12.33	3.30	78.55***
Family Disruption	47.95	34.20	46.27***	48.31	35.08	29.90***
Trauma						
Extraordinarily Stressful Event	74.93	48.25	162.53***	77.80	49.68	125.86***
Witness to Violence	92.70	69.16	160.39***	93.05	70.69	100.96***
Bodily Assault	54.08	16.39	458.96***	55.38	18.76	301.99***
<i>Sexually assaulted</i>	24.96	4.78	304.01***	27.42	5.82	243.70***
<i>Physically assaulted</i>	42.86	13.19	335.86***	44.84	14.93	237.90***
Timing of PTSD Onset						
<i>PTSD under 5</i>	7.29	0.00		6.50	0.59	113.04***
<i>PTSD ages 5 to 9</i>	27.55	0.00		26.01	2.04	508.81***
<i>PTSD ages 10 to 13</i>	44.61	0.00		43.50	3.13	919.46***
<i>PTSD ages 14 to 17</i>	20.26	0.00		21.52	1.20	490.98***
Peer Delinquency	93.15	67.82	181.68***	95.74	69.19	139.05***

Source: 1995 National Survey of Adolescence

Note: †p <.10; * p <.05; ** p <.01; *** p <.001.

Table 3. Relationships Between Timing of Posttraumatic Stress Disorder (PTSD) Onset and Background Characteristics among Adolescents Ages 12 to 17

	Ages 0 to 5 %	Ages 5 to 9 %	Ages 10 to 13 %	Ages 14 to 17 %	χ^2
Gender					
<i>Male</i>	50.00	43.92	38.56	31.65	7.54 [†]
<i>Female</i>	50.00	56.08	61.44	68.35	
Age in years (Mean)	14.78	14.47	15.03	16.16	
	(1.72)	(1.64)	(1.42)	(0.88)	
Ethnicity					1.66
<i>Hispanic</i>	10.42	10.70	10.56	14.49	
Race					7.62
<i>Black</i>	13.04	20.69	20.96	20.61	
<i>White</i>	78.26	70.69	68.38	58.70	
<i>American Indian</i>	6.52	6.90	8.25	7.63	
<i>Asian</i>	2.17	0.00	1.72	2.29	
<i>Other Race</i>	0.00	1.72	.69	.76	
Annual Household Income in 1995 (Z Score)					0.88
<i>Less than \$10,00</i>	7.32	14.62	6.74	7.81	
<i>\$10,000 to \$20,000</i>	9.76	9.94	12.77	7.81	
<i>\$20,000 to \$30,000</i>	14.63	14.04	19.15	19.53	
<i>\$30,000 to \$40,000</i>	21.95	21.64	14.18	22.66	
<i>\$40,000 to \$50,000</i>	17.07	14.04	15.25	13.28	
<i>\$50,000 to \$75,000</i>	19.51	16.37	21.63	17.97	
<i>\$75,000 to \$100,000</i>	2.44	3.51	8.51	6.25	
<i>More than \$100,000</i>	7.32	5.85	1.77	4.69	
Parent's Education (Z Score)					-1.52 [†]
<i>Less than High School</i>	8.00	9.52	11.88	12.95	
<i>High School</i>	32.00	35.45	32.67	40.29	
<i>Some College</i>	30.00	29.63	31.68	20.86	
<i>College or more</i>	30.00	25.40	23.76	25.90	
Family Substance Abuse	16.00	13.23	11.44	7.91	3.29
Family Disruption Trauma	56.00	52.91	46.56	41.73	5.55
Extraordinarily Stressful Event	86.00	77.25	75.49	66.91	8.63 [*]
Witness to Violence	94.00	94.18	90.85	94.96	3.38
Bodily Assault	56.00	61.38	53.59	44.60	9.18 [*]
<i>Sexually assaulted</i>	24.49	25.81	25.16	23.02	.36
<i>Physically assaulted</i>	46.00	50.26	42.81	32.37	10.66 [*]
Peer Delinquency	90.00	91.01	93.79	96.4	4.70

Source: 1995 National Survey of Adolescence

Note: [†]p <.10; * p <.05; ** p <.01; *** p <.001.

Table 4. Relationships Between Juvenile Delinquency Status and Background Characteristics among Adolescents Ages 12 to 17

		Engaged in Delinquent Behavior		χ^2	
		Yes	No		
		%	%		
Gender					
	<i>Male</i>	69.81	47.11	96.37***	
	<i>Female</i>	30.19	52.89		
Age in years (Mean)		15.10 (1.52)	14.42 (1.63)		
Ethnicity				8.99**	
	<i>Hispanic</i>	13.46	9.30		
Race				50.91***	
	<i>Black</i>	23.91	14.42		
	<i>White</i>	64.23	77.57		
	<i>American Indian</i>	8.70	4.67		
	<i>Asian</i>	1.19	1.84		
	<i>Other Race</i>	1.98	1.51		
Annual Household Income in 1995 (Z Score)				-3.33***	
	<i>Less than \$10,00</i>	9.82	6.66		
	<i>\$10,000 to \$20,000</i>	12.47	9.45		
	<i>\$20,000 to \$30,00</i>	17.38	17.10		
	<i>\$30,000 to \$40,00</i>	17.18	16.05		
	<i>\$40,000 to \$50,00</i>	13.50	14.38		
	<i>\$50,000 to \$75,000</i>	19.02	23.09		
	<i>\$75,000 to \$100,000</i>	7.16	8.30		
	<i>More than \$100,000</i>	3.48	4.96		
Parent's Education (Z Score)				-5.00***	
	<i>Less than HS</i>	12.92	9.55		
	<i>HS</i>	36.52	31.16		
	<i>Some College</i>	28.64	27.22		
	<i>College or more</i>	21.91	32.08		
Family Substance Abuse		12.80	2.99	109.20***	
Family Disruption		55.02	33.69	91.43***	
Trauma				113.31***	
	Extraordinarily Stressful Event	74.07	49.50		
	Witness to Violence	96.11	69.62	167.19***	
	Bodily Assault	60.93	16.91	514.28***	
	<i>Sexually assault</i>	16.51	6.96	55.68***	
	<i>Physically assaulted</i>	56.48	12.32	611.35***	
PTSD				296.96***	
	Ever PTSD	42.94	13.03		
	Current PTSD (<i>past 6 mo.</i>)	29.26	8.27	208.97***	
Timing of PTSD Onset				22.21***	
	PTSD under 5	3.33	0.92		
	PTSD ages 5 to 9	12.59	3.47		86.82***
	PTSD ages 10 to 13	19.44	5.77		124.38***
	PTSD ages 14 to 17	7.59	2.81	32.01***	
Peer Delinquency		97.41	68.22	198.19***	

Source: 1995 National Survey of Adolescence

Note: †p <.10; * p <.05; ** p <.01; *** p <.001.

Table 5. Marginal Effects of PTSD and Other Background Factors on the Probability of Delinquent Activity among Adolescents Ages 12 to 17

		Demographic Characteristics	Peer Delinquency	Trauma & Victimization	Lifetime PTSD	Current PTSD	Timing of PTSD
		Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Gender							
	<i>Male</i>	.1158***	.0945***	.0735***	.0800***	.0788***	.0776***
Age in years		.0205***	.0079**	.0045*	.0034	.0038†	.0046*
Ethnicity							
	<i>Hispanic</i>	.0390*	.0265†	.0198†	.0186	.0187	.0201†
Race							
	<i>Black</i>	.0616***	.0483***	.0256**	.0242**	.0249**	.0250**
	<i>American Indian</i>	.0738**	.0569**	.0323*	.0295*	.0315*	.0306*
	<i>Asian</i>	.0128	.0003	.0152	.0136	.0123	.0158
	<i>Other Race</i>	-.0241	-.0189	-.0207	-.0135	-.0187	-.0150
Annual Household Income in 1995							
	<i>Less than \$10,00</i>	-.0361	-.0136	-.0242	-.0246	-.0249	-.0232
	<i>\$10,000 to \$20,000</i>	-.0224	-.0136	-.0100	-.0095	-.0105	-.0097
	<i>\$20,000 to \$30,00</i>	-.0307†	-.0182	-.0167	-.0144	-.0144	-.0137
	<i>\$30,000 to \$40,00</i>	-.0057	-.0007	-.0053	-.0006	-.0052	-.0045
	<i>\$40,000 to \$50,00</i>	.0032	.0049	.0032	.0010	.0012	.0023
	<i>\$75,000 to \$100,000</i>	-.0001	.0064	.0033	.0045	.0017	.0053
	<i>More than \$100,000</i>	.0121	.0061	-.0014	.0028	.0017	.0021
Parent's Education							
	<i>Less than HS</i>	.0084	.0052	.0097	.0096	.0088	.0094
	<i>Some College</i>	-.0248†	-.0189†	-.0152†	-.0137	-.0154†	-.0149†
	<i>College or more</i>	-.0432**	-.0338**	-.0230**	-.0224**	-.0230**	-.0232**
Family Substance Abuse		.1465**	.1037**	.0565**	.0487**	.0522**	.0484**
Family Disruption		.0781***	.0565***	.0355***	.0338***	.0350***	.0341***
Peer Delinquency		.	.1186***	.0704***	.0652***	.0673***	.0660***
Trauma							
	Extraordinarily Stressful Event			.0241**	.0182**	.0202**	.0190**
	Witness to Violence			.0672***	.0621***	.0648***	.0634***
	Bodily Assault			.1205***	.1009***	.1088***	.1041***
PTSD							
	Ever PTSD				.0598***		
	Current PTSD (<i>past 6 mo.</i>)					.0530***	
Timing of PTSD Onset							
	<i>PTSD under 5</i>						.0909*
	<i>PTSD ages 5 to 9</i>						.0537**
	<i>PTSD ages 10 to 13</i>						.0562***
Pseudo R2		.1387***	.1937***	.2891***	.3033***	.2974***	.3006***
Pred. P (at X-bar)		.0927	.0681	.0467	.0453	.0460	.0455

Source: 1995 National Survey of Adolescence

Note: N = 4,023. Note: †p <.10; * p <.05; ** p <.01; *** p <.001.

Probit models estimated using 1995 NSA sampling probability weights, robust standard errors and imputed values for missing data.

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