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Impulsivity and Trauma Exposure in Adolescents

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Dissertation submitted to the
College of Arts and Sciences
At West Virginia University
in partial fulfillment of the requirements
for the degree of

Doctor of Philosophy
in
Psychology

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Abstract

Trauma exposure is prevalent among adolescents and may have a negative impact on social, educational, and occupational functioning. Research indicates that individual-level variables, such as impulsivity, may be risk factors for exposure to traumatic events but the findings have been mixed. This study examined the relation between impulsivity and accidental trauma exposure using a multi-method, multi-informant procedure with a community sample of 48 adolescents. Mean age was 15.2 ($SD = 1.38$) and the sample was predominantly female (62.5%) and predominantly Caucasian (87.5%). No significant difference was noted between genders in terms of number of traumatic events reported. As a whole, participants endorsed a wide range of potentially traumatic events with every single participant endorsing at least one event and every single event being endorsed by at least one participant with the exception of one (removed from parent's custody). Path analysis suggested that self-reported sensation seeking mediates the relation between self-reported impulsivity and accidental trauma exposure. This study provided valuable information with regards to factors that may serve to inform clinical practice within the area of adolescent trauma exposure. Findings from this study suggest that trauma exposure of any kind is nearly universal within an adolescent population. Given the widespread nature of this phenomenon, it is critically important that clinicians inquire fully about an adolescent's trauma history. Further, findings from this study suggest that clinicians should look beyond a standard view of trauma as being a high magnitude event and instead recognize that trauma is subjective and that even low grade stressors may have significant impact on adolescent functioning. Limitations of this study include small sample size and method variance. As such, future studies should be conducted that address these limitations and are longitudinal in design in order to better understand the relation between impulsivity and trauma exposure.

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Impulsivity and Trauma Exposure in Adolescents

Trauma exposure is a common occurrence with 50% of adults living in the United States having experienced at least one traumatic event in their lifetime, and 33% reporting having experienced four or more traumatic events (Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995; Vrana & Lauterbach, 1994). Exposure to traumatic events may have numerous negative outcomes, including psychiatric disorders, such as posttraumatic stress disorder (PTSD), as well as difficulties in educational, occupational and social functioning. What constitutes a traumatic event, however, is not self-evident. The Diagnostic and Statistical Manual of Mental Health Disorders, Fourth Edition-Text Revision (DSM-IV-TR; APA, 2000) defines a traumatic event as one in which an individual experiences or witnesses an event that involves potential or actual death, injury, or threat to physical integrity of oneself or others and evokes feelings of fear, helplessness, or horror. Given this definition, the determination of what can be considered a traumatic event is highly subjective. Indeed, what is considered traumatic is dependent not only on the nature of the event itself, but also on an individual's interpretation of the event. Despite this subjectivity, several events, such as motor vehicle crashes, acts of interpersonal violence, natural disasters, and war-related experiences are generally accepted in the literature as being traumatic in nature (APA). Although current statistics suggest that trauma exposure is a common occurrence, there is some question pertaining to what factors may contribute to trauma exposure.

Research indicates that there are several different individual-level variables that may impact the likelihood that one will come in contact with a potentially traumatizing event. For example, sociodemographic variables, such as male gender, younger age, lower education, and living in an urban area have been firmly established as risk factors for exposure to a traumatic stressor (Breslau, Davis, Andreski, & Peterson, 1991; Frans, Rimmo, Aberg, & Fredrikson,

2005). More recent investigations have focused on relatively stable individual characteristics, such as impulsivity, as risk factors for trauma exposure (e.g., Joseph, Dalgleish, Thrasher, & Yule, 1997; Kotler, Iancu, Efroni, & Amir, 2001; Willebrand, Kildal, Anderson, & Ekselius, 2002). The present study seeks to further explore the relation between impulsivity and exposure to a range of potentially traumatic events by using comprehensive assessments of impulsivity, including self-report, behavioral laboratory tasks, and parent report.

Trauma Exposure and Outcomes among Children and Adolescents

Children and adolescents, like adults, are exposed to a range of potentially traumatic events over the course of their development. In general, these exposures can be classified as being either: 1) non-preventable or caused by an agent other than the child, or 2) accidental trauma or traumatic events that may have occurred as a direct or indirect result of the child's behavior. Examples of non-preventable trauma include motor vehicle crashes where the child was the passenger, natural disasters, and child maltreatment. These types of traumas are widespread and affect millions of children every year (NTSB, 2006; United States Department of Health and Human Services, 2004). Similarly, a large number of children experience accidental injury, and in many cases, the injury may have been preventable. Over six million children are injured each year as a result of events such as falls, burns, sledding, roller-blading, biking, skiing, and playing on trampolines (www.usa.safekids.org, 2006).

Although the topography of these traumatic events is quite different, research indicates that the experience of any traumatic event can have a negative impact on an individual's psychological functioning. Nevertheless, questions remain whether or not a potentially traumatic event, such as a fall or bicycle accident, has the same negative impact as a more severe event, such as a motor vehicle crash. Existing literature strongly indicates that objective measures of

injury severity, such as the widely used Injury Severity Score (ISS; Baker, O'Neill, Haddon, & Long, 1974) do not correlate with subsequent distress following the traumatic event.

Interestingly, the individual's subjective interpretation of the severity of their injuries does correlate with subsequent distress (Gill, 2002; Hepp, Moergeli, Buchi, Wittmann, & Schnyder, 2005; Zatzick et al., 2002). This suggests that whereas an event such as a simple trip and fall accident may appear to be minor, it is the individual's interpretation of the event that is associated with either a positive or negative outcome. Therefore, even a "minor" traumatic event may cause the same negative outcomes as a more severe event.

Unfortunately, very few researchers have focused on the psychological outcome of individuals who experience accidental injuries. In fact, prior to 1996, no research had been conducted examining the outcome of individuals who experienced traumatic events other than violence, motor vehicle crashes, and natural disasters. More recently, studies have begun to examine the outcomes of individuals who have experienced potentially traumatic events that may have been accidental, such as sporting injuries and bicycle accidents.

As an example of this research, Daviss, Mooney, Racusin, Ford, Fleischer, and McHugo (2000) conducted a study of PTSD among children who were hospitalized for injuries sustained as a result of motor vehicle crashes, bicycle crashes, pedestrian-related crashes, falls, burns, explosions, and sporting injuries. Results found that approximately 94% of all participants, regardless of the nature of the trauma, reported that their experience met Criterion A for a diagnosis of PTSD which specifies that the event involved actual or threatened injury or death to oneself or others and that the event evoked feelings of fear, helplessness, or horror (APA, 2000). Further, nearly 30% of all subjects met either full or partial criteria for PTSD as determined by structured interview (13% full and 17% partial). These findings suggest that negative outcomes

are possible following a traumatic event, no matter how relatively minor the event may objectively appear in terms of type of event experienced and degree of injury sustained.

In a similar study, Nugent, Christopher, and Delahanty (2006) utilized a sample of 82 children who presented at an emergency department for treatment for a range of accidental injuries. The investigators determined that approximately 24% of the sample met criteria for either full or partial PTSD at 6 weeks post-accident (7% full and 17% partial). Similarly, Gill (2002) conducted a medical record review of 337 children under the age of 17 who received inpatient medical treatment as a result of accidental injury. Results indicated that 20% of participants received a diagnosis of PTSD.

In addition to PTSD, individuals who have experienced a traumatic event may go on to experience other psychological difficulties. Lifetime trauma exposure has been demonstrated to be related to behaviors that are consistent with psychiatric disorders such as Major Depressive Disorder (Mozley, Miller, Weathers, Beckham & Feldman, 2005), Substance-Related Disorders (Reynolds, Mezey & Chapman, 2005), Panic Disorder (Owens & Chard, 2003), Agoraphobia (Rodriguez, Weisberg, Pagano, Machan, Culpepper & Keller, 2003), Obsessive-Compulsive Disorder (de Silva & Marks, 1999), Generalized Anxiety Disorder (Brown, Campbell, Lehman, Grisham & Mancill, 2001), Specific Phobia (Keppel-Benson, Ollendick & Benson, 2002), and Bipolar Disorder (Orsillo, Weathers, Litz, Steinberg, Huska & Keane, 1996). Approximately 80% of individuals diagnosed with PTSD after a traumatic event meet criteria for at least one other psychiatric disorder in their lifetime (Helzer, Robins & McEvoy, 1987; Breslau et al., 1991).

These and other studies demonstrate how experiencing even “minor” accidental trauma may result in serious, potentially life-long consequences. Therefore, understanding the individual

characteristics, situations and other risk factors that increase the likelihood of exposure to traumatic events is critical.

Risk Factors for Trauma Exposure

To date, researchers have identified several demographic and personality variables that impact the likelihood that one will come in contact with a potentially traumatizing stressor. For example, it has long been recognized that males are generally more likely to experience a traumatic event as compared to their female counterparts (Breslau et al., 1991; Breslau, Kessler, Chilcoat, Schultz, Davis, & Andreski, 1998). One might speculate that this gender difference in trauma exposure exists because, in general, more males as compared to females participate in active combat within the context of military operations. Also, in general, more males than females are actively involved in violent altercations. Of course, one possible exception is domestic violence.

Further, age has also been identified as a risk factor for trauma exposure with children and adolescents being more likely to experience a traumatic event than adults (Amaya-Jackson & March, 1995; Breslau et al., 1998). Age-related findings published by Perkonig, Kessler, Storz, and Wittchen (2000) suggested that traumatic events, such as rape and sexual assault, were most prevalent among females under the age of 15. Results also suggested that traumatic events, such as physical attacks, were most prevalent among adolescent males. Taken together, these findings contribute to our understanding of age (e.g. adolescence as opposed to adulthood) as a risk factor for trauma exposure.

Another factor that has been identified as a risk factor for exposure to traumatic events is a history of exposure to trauma (Breslau, Davis, & Andreski, 1995). It appears as though a relatively small subset of the population experiences proportionately more traumatic events than

the population in general with re-traumatization rates around 33% (Kessler et al., 1995; Vrana & Lauterbach, 1994).

An individual's behavior is another strong risk factor for exposure to trauma. Two aspects of individual behavior, impulsivity and sensation seeking, have been identified as factors partially responsible for exposing individuals to potentially traumatizing situations. For example, an impulsive individual may decide to engage in a drag race on a crowded highway. This behavior then increases the likelihood that the individual may crash his/her vehicle, thus injuring themselves and others. Everyone, at one time or another, has engaged in a behavior that could be considered to be impulsive, such as quickly changing one's plans for the day or ordering dessert after a large meal. However, it is only when this impulsivity becomes dysfunctional and leads an individual into a potentially dangerous situation that one's tendency to act without sufficient forethought is considered to be pathological (Evenden, 1999).

The concept of impulsivity has been defined in numerous ways; for example: "[impulsivity is characterized by] actions that are poorly conceived, prematurely expressed, unduly risky, or inappropriate to the situation and that often result in undesirable outcomes" (Evenden, 1999, p. 348). Similar definitions of impulsivity include "decreased sensitivity to negative consequences of behavior; rapid, unplanned reactions to stimuli before complete processing of information; and lack of regard for long-term consequences" (Moeller, Barratt, Dougherty, Schmitz, & Swann, 2001, p.1784) and as "socially inappropriate or maladaptive [behavior]...being emitted quickly and without forethought" (Oas, 1985, as cited in Kieres, Hausknecht, Farrar, Acheson, de Wit, & Richards, 2004, p. 167). These definitions of impulsivity lead to an intuitive hypothesis that individuals who exhibit higher levels of impulsive behavior are more prone to engage in risky behavior and thus may be at higher risk for experiencing

undesirable consequences (including exposure to a traumatic event) that may be physical (e.g., injury or death of self or others) as well as psychological (e.g., PTSD) in nature.

Because individuals who exhibit high levels of impulsive behavior may put themselves at increased risk for accidental trauma, several researchers have begun to specifically explore levels of impulsivity among victims of preventable injury. For example, Willebrand and colleagues (2002) examined personality traits of 166 individuals who had sustained burn injuries. Results suggested that as compared to a normative sample, burn survivors scored significantly higher on the scale of Impulsivity. In a similar study, Kotler and colleagues (2001) examined levels of anger, suicidality, and impulsivity among individuals with PTSD, individuals with anxiety disorders other than PTSD, and healthy controls. Results found that those individuals with PTSD were significantly higher on measures of suicide risk, anger, impulsivity, and significantly lower on social support.

In a 5-year follow up study of 35 adult survivors of the *Herald of Free Enterprise* disaster, Joseph and colleagues (1997) examined the relation between PTSD severity and impulsivity. Results indicated that a group of survivors diagnosed with high levels of PTSD symptoms scored significantly higher on measures of impulsivity than survivors with low PTSD symptoms. The authors concluded that the findings lend support for the compulsive re-exposure hypothesis. This hypothesis suggests that individuals who survive a traumatic event may go on to display impulsive behaviors and experience an increase in sensation seeking behavior. The hypothesis assumes that this occurs as a result of the individual's need to seek out potentially dangerous situations that mimic or are reminiscent of the original situation in which the individual experienced the initial trauma. Clearly, the question of "which came first," in regards to impulsive behavior and trauma exposure, can only be answered by employing a longitudinal

study design; however, in this study, the authors suggest that impulsive behavior is likely the consequence of trauma exposure.

The re-exposure hypothesis assumes that individuals who experience trauma seek out sensations that create similar physical or psychological states as the original trauma. However, sensation-seeking behavior is also seen in non-traumatized individuals. Traditionally, the construct of sensation seeking is defined as continuously attempting to contact novel stimuli and situations (Zuckerman, 1994). In fact, the construct of sensation seeking is at the crux of optimal stimulation theory as posited by Zentall and Zentall (1983). This theory represents the synthesis of decades of both basic and applied research and serves as a framework by which the authors explain the basic underpinnings of psychological disorders such as anxiety and ADHD. Optimal stimulation theory has four basic tenets:

- 1.) Organisms will work to maintain optimal levels of arousal, 2.) A wide variety of internal and external conditions can affect arousal level, 3.) Activity functions to regulate levels of stimulus input or level of arousal. Activity can moderate incoming stimulation by providing movement toward or away from sources of stimulation as well as through proprioceptive feedback and predictability, 4.) The general response to a given state of arousal may provide a more reliable and more functional measure of the organism's arousal needs than physiological measures. (p. 465)

According to optimal stimulation theory, hyperactivity and anxiety represent the poles on a continuum of desired arousal. Individuals that display hyperactive behavior are under estimated by the environment and, as such, act in such a way to increase sensory input and stimulation. Individuals that display anxious behaviors, on the other hand, are overstimulated by the

environment and therefore act in such a way to decrease arousal and sensory input (e.g., withdraw).

One area that is not completely understood is the relation between the constructs of impulsivity and sensation seeking. In fact, Zentall and Zentall (1983) tend to use the terms interchangeably but allude to the possibility that impulsive is a term used to describe child behavior while sensation seeking is a term used to describe adult behavior even if the topography of the behavior is the same. Perhaps the connotation of the descriptive language suggests that adult behavior is more goal directed. That being said, there does not seem to be consistency in the literature pertaining to similarities and differences of impulsive versus sensation seeking behavior.

In an attempt to understand how impulsivity and sensation seeking may be related, Mobini, Pearce, Grant, Mills, and Yeomans (2006) examined the relation between impulsivity and sensation seeking using a sample of 100 undergraduate students. Results indicated that participants who were classified as being highly impulsive scored significantly higher on a self-report measure of sensation seeking as compared to less impulsive participants.

As the definitions suggest, impulsivity and sensation seeking are concepts that appear somewhat similar in nature. An individual that exhibits impulsive behavior or sensation seeking behavior is, by definition, acting in such a way that increases the likelihood of experiencing a potentially dangerous situation (i.e., a situation that increases “sensation”). In fact, one might speculate that the *topography* of impulsive behavior and sensation seeking behavior is similar while the *function* of the behavior is the distinguishing feature. For example, one definition of impulsivity suggests that an individual has difficulty inhibiting responding to stimuli. Conversely, the definition of sensation seeking does imply that an individual lacks the ability to

inhibit responding; rather, that an individual chooses to, or is reinforced by, engaging in a potentially risky behavior. Thus, it is possible that impulsivity and sensation seeking are two related, but separate constructs which may operate in conjunction to increase the likelihood that an individual will expose him/herself to an accidental trauma.

Whereas several published studies have supported the link between impulsive behavior and increased likelihood of exposure to an accidental trauma (e.g., Famularo, Fenton, Kinscherff, & Augustyn, 1996; Ford et al., 1999), other studies have failed to support this link (e.g., Wozniak et al., 1999). However, research in this area has utilized a range of different populations, methodologies, assessment instruments, and definitions of key constructs. Such inconsistencies may be the cause of the variable findings reported in the literature.

In addition to utilizing a range of methodologies and populations, many of the previous studies examining the relation between trauma exposure and impulsive behavior have viewed impulsivity within the context of attention-deficit hyperactivity disorder (ADHD). However, in addition to impulsivity, ADHD is also characterized by inattention and hyperactivity. Therefore, simply because an individual is diagnosed with ADHD does not necessarily mean that he/she engages in high rates of impulsive behavior; he/she could have qualified for a diagnosis simply due to his/her difficulties in sustaining attention. Conversely, an individual who frequently engages in impulsive behavior may not necessarily be diagnosed with ADHD. Thus, a reliance on a diagnosis of ADHD could potentially confound the findings of previous studies investigating impulsivity and trauma exposure.

In addition to an over-reliance on formal diagnosis of ADHD as an indicator of impulsivity, an additional problem with the literature examining the relation between trauma exposure and impulsive behavior is the use of single-method, single-informant assessments. As

previously stated, many studies have determined the presence or absence of impulsivity simply by diagnosing (or relying on prior diagnosis of) ADHD. Due to the complex nature of the disorder, clinicians rarely rely on information from a single reporter for diagnosis; opting instead for a combination of multiple sources of information (e.g., parents, teachers) and multiple methods (e.g., interviews, questionnaires). Further, the construct of impulsivity exists on a continuum with individuals exhibiting varying levels of impulsive behavior. Thus, categorizing individuals into “impulsive” and “not impulsive” groupings does not fully represent the nature of the phenomenon.

Present Study

The goal of the current study is to further the literature in a number of ways. The present study does not emphasize a formal diagnosis of ADHD; rather, several dimensions of the construct of impulsivity are assessed. Impulsivity is measured using a multi-method, multi-informant approach, including self-report measures and computer-based tasks. In addition to collecting self-report data from the adolescent as well as obtaining a behavioral measure of impulsivity, one parent or guardian of the adolescent is asked to report on their child’s behavior thus providing collateral data. Additionally, this study proposes to evaluate a specific mechanism of how impulsivity may influence exposure to accidental trauma. Specifically, the study evaluates how the relation between impulsivity and trauma exposure may be mediated by sensation seeking. Finally, the relation between trauma exposure and the other two components of ADHD, hyperactivity and inattention, is examined. It is hoped that by using these methodological approaches we are able to more clearly identify whether or not higher levels of impulsivity are associated with an increased incidence of trauma exposure.

Hypotheses

- Hypothesis 1: Adolescents with higher levels of impulsivity will report having experienced significantly more potentially traumatic experiences that are accidental in nature as compared to adolescents with lower levels of impulsivity. Impulsivity is operationally defined as the scores obtained by the adolescent on the self-report measure of impulsivity and on the behavioral task. Trauma exposure is operationally defined as the number of potentially traumatic events endorsed by the adolescent on the self-report measure of life events.
- Hypothesis 2: The relation between impulsivity and trauma exposure will be mediated through sensation seeking behavior. Sensation seeking behavior is operationally defined as the score obtained by the adolescent on the self-report measure of sensation seeking.
- Hypothesis 3: Two specific dimensions of ADHD, inattention and hyperactivity, will also be related to accidental trauma exposure; however, it is believed that impulsivity will account for more of the overall variance in trauma exposure than will inattention or hyperactivity. Inattention and hyperactivity are operationally defined as the scores obtained by the adolescent on the behavioral task.

Method

Participants

Participants were 56 community adolescents between the ages of 13 and 17 who were recruited in two mid-Atlantic states, New Jersey and West Virginia. The data collected from eight participants were dropped from the analyses because computer error rendered the data files unusable.

One parent or guardian of the adolescent was asked to provide information pertaining to the adolescent as well. Exclusion criteria included motor or sensory deficits that would interfere with completing questionnaires and tasks on a computer and diagnoses of mental retardation or pervasive developmental disorder, as per parent report. No participants were excluded.

Adolescent Measure-Dependent Variable

Life Events Scale (LES; Costello, Angold, March, & Fairbank, 1998). The LES was developed as a module of the Child and Adolescent Psychiatric Assessment (CAPA). It is intended for use in an interview format; however, for the purposes of this study the measure was modified to be completed in a self-report format. Specifically, each item of the interview format was simply provided in a written format to the participant as opposed to being presented orally. The LES requires respondents to indicate whether or not they have ever experienced a wide range of both high magnitude and low magnitude stressors. For each event the respondent endorses, a short series of follow-up questions must be completed in order to gather more qualitative information pertaining to each event. This measure is scored using a simple count procedure in which each item endorsed by the respondent is summed.

For the purpose of this study, the examiner identified each type of traumatic event included on the LES as being one in which the child either had an active role or passive role in the event. The child's role in the event was determined based on a series of follow-up questions that were asked following endorsement of a specific. Please see Table 1 for a complete listing of how the events were classified.

As the title of this measure suggests, this assessment is designed to determine whether or not an individual has experienced a broad range of events that may be potentially traumatic. Given the subjective nature of trauma, the researcher purposefully chose a broad measure of life events

in order to capture a full range of experiences. Another reason why this measure was chosen for use in this study is because it is a measure of *trauma* (an event) not *posttraumatic stress* (an outcome). Posttraumatic stress, although clearly closely related to trauma exposure, is beyond the scope of the present study.

Adolescent Measures-Independent Variables

Barrett Impulsiveness Scale, Version 11 (BIS-11; Patton, Stanford, & Barratt, 1995). The BIS-11 is a 30-item self-report assessment of impulsivity that utilizes a Likert-type rating scale of 1-4 (1 = Rarely/Never, 4 = Almost Always). For each item, respondents indicate the frequency of each behavior ranging from “Rarely/Never” to “Almost Always.” The BIS-11 assesses three different aspects of impulsive behavior: 1) Attentional, 2) Motor, and 3) Non-planning. Additionally, a Total Impulsiveness score is calculated. For the purpose of this study, the Total Impulsiveness score was used. Internal consistency for the BIS-11 is good, with alpha coefficients ranging from .79-.83 (Patton, Stanford, & Barratt, 1995). An investigation by Branstetter, Grady, and Goldfine (In Press) suggests that the BIS-11 relates to other measures of impulsivity such as the behavioral disinhibition scale on the Integrated Visual and Auditory Continuous Performance Test (IVA + Plus; Sandford & Turner), $r(57) = .33, p < .001$ and a hypothetical monetary delay discounting task, $r(57) = .28, p < .05$.

Integrated Visual and Auditory Continuous Performance Test (IVA + PLUS; Sandford & Turner, 1994). The IVA + Plus is a continuous performance task that is administered via computer and utilizes both auditory and visual stimuli. It is frequently used as a component of determining a diagnosis of ADHD. The 13 minute task is comprised of 500 trials of 1's and 2's in a semi-random pattern with the stimuli shifting between auditory and visual presentation. The participant is asked to click the mouse every time they see or hear the number 1 and refrain from

clicking the mouse every time the number 2 is presented. During different portions of the test the presentation of either the 1 or the 2 will dominate which serves to create a situation where the respondent will need to either remain vigilant or inhibit a primed response.

The IVA + Plus was designed to tap into each of the components of ADHD—impulsivity, inattention, and hyperactivity. As such, the IVA + Plus yields two quotient scores and one scale score that are purported to correspond with each symptom cluster of ADHD. The Full Scale Response Control Quotient (RCQ) is based on scores on both the Auditory and Visual Response Control Quotients which assess Prudence, Consistency, and Stamina which reportedly relate to the construct of impulsivity. As such, this scale score was used as an independent variable as a measure of impulsivity. Further, because the construct of prudence was posited by the designers of the IVA + Plus to be a relatively pure measure of impulsivity, this scale score was used as an independent variable of the construct of impulsivity as well. Specifically, the prudence score is derived from the type and number of commission errors committed by the respondent. The second diagnostic scale is the Full Scale Fine Motor Attention Quotient (AQ) and is comprised of scores on both the Auditory and Visual Attention Quotients which assess Vigilance, Focus, and Speed which reportedly relate to the construct of inattention. As such, this scale score was used as an independent variable as a measure of inattention. Finally, the IVA + Plus yields a Fine Motor Regulation Quotient (HQ) which is calculated based upon extraneous movement as measured through the computer mouse. This score is reported to relate to hyperactivity. As such, this scale score was used as an independent variable as a measure of hyperactivity. All scores have a mean of 100 and a standard deviation of 15 with scores between 0 and 59 suggesting clinically significant difficulties.

The norms for the IVA + Plus were developed based on the performance of 781 volunteers between the ages of 5 and 90. In terms of psychometric validation, this measure evidenced a sensitivity of 92% and specificity of 90%. Findings reported by Sandford, Fine and Gordon, (1995) as cited by Sandford and Turner (1994) indicate that the IVA + Plus has shown concurrent validity with other continuous performance measures such as the TOVA and the Gordon as well as self-report measures such as the Connors Abbreviated Symptom Questionnaire. Test-retest reliability for the Full Scale Response Control as well as the Auditory and Visual Response Control ranged from .37-.41 while correlations were somewhat higher for the Full Scale Attention Quotient as well as the Auditory and Visual Attention Quotient (.66-.75).

Multidimensional Anxiety Scale for Children (MASC; March, 1997). In order to control for the potential overlap between anxiety symptoms and attentional difficulties, the MASC was included as a measure of adolescent anxiety. Examples of the overlap between anxiety and attention problems include difficulties sitting still, wandering thoughts, and not appearing to listen when spoken to directly.

The MASC consists of 39 items which comprise four subscales (physical symptoms, harm avoidance, social anxiety, and separation/panic) and a measure of Total Anxiety. Each item is rated on a four-point, Likert-type scale with the anchors being “never true about me (0)” and “often true about me (3).” For the purpose of this study, the Total Anxiety score will be used. Determining the differential impact of different facets of anxiety is beyond the scope of the present investigation.

March, Parker, Sullivan, Stallings, and Connors (1997) published a study outlining the psychometric properties of the MASC in 1997. The internal validity of the Total Anxiety factor

of the MASC is excellent with a reported alpha of .90. Test-retest reliability at 3-weeks and 3-months is adequate with values of .785 and .933, respectively. The MASC has also demonstrated convergent validity with other accepted self-report measures of anxiety, such as the RCMAAS, $r = .633$, $p < .01$ and divergent validity with self-report measures of depression, such as the CDI, $r = .189$).

Sensation Seeking Scale for Children (SSSC; Russo et al., 1993). The SSSC was adapted from the Sensation Seeking Scale developed by Zuckerman (1983). For each of the 19 items, respondents must determine which if a statement is “True” or “False” in regards to their own thoughts and behavior. The SSSC yields a Total score along with three factor scores: 1) Thrill and Adventure Seeking, 2) Drug and Alcohol Attitudes, and 3) Social Disinhibition. For the purpose of this study, the Total score was used.

A community sample of 660 elementary and middle school children along with 168 clinic-referred children was utilized for the standardization and validation of the SSSC. An examination of test-retest reliability produced correlation coefficients ranging from a low of .33 for the Drug and Alcohol Attitudes subscale to a high of .59 for the Total score. The corrected split-half reliability estimates ranged from .63 for the Social Disinhibition subscale to .85 for the Total score. Internal consistency ranged from .67 for the Social Disinhibition subscale to .83 for the Total score.

Demographic Form. All adolescents completed a basic demographic form. Questions on this form pertained primarily to age, gender, race, spirituality, and religiosity. For the purpose of this study, the variables of age, gender, and race were used.

Parent/Guardian Measure-Independent Variable

The parent or guardian completed the following measure:

Child Behavior Checklist-Parent Report (CBCL; Achenbach, 2000). The CBCL is one of the most widely used parent-report assessments of child behavior. Parents respond to each of the 118 items while considering their child's behavior currently as well as over the past six months. Each item is rated on a Likert-type scale with responses ranging from 0 (Not True) to 2 (Very True/Often True).

The CBCL yields an overall competence score as well as scores for each of the three competence scales: Activities, Social Relations, and School Performance. Further, scores are calculated for eight different cross-informant syndromes (Aggressive Behavior, Anxious/Depressed, Attention Problems, Rule-Breaking Behavior, Social Problems, Somatic Complaints, Thought Problems, Withdrawn/Depressed) and six DSM oriented scales (Affective Problems, Anxiety Problems, Somatic Problems, Attention-Deficit/Hyperactivity Problems, Oppositional-Defiant Problems, and Conduct Problems). Finally, the CBCL produces scores for Internalizing, Externalizing, and Total Problems.

For the purpose of this study, the Attention-Deficit/Hyperactivity Problems DSM oriented scale was used as it most closely (although not perfectly) tapped into the construct of impulsivity that is of interest in this investigation. The psychometric properties of the CBCL have been well researched and, as such, the CBCL is one of the most widely used broad band measures of child psychopathology. The measure is widely used internationally and has been translated into over a dozen languages.

Procedure

The study was advertised in various formats throughout the communities including posted information at local businesses, pamphlet distribution at medical offices, email lists, and word of

mouth. Upon learning of the study, participants or their parent/guardian contacted the researcher and scheduled a date and time for participation. All adolescents received \$20 for their time.

Participants were given the option completing the study in either the Adolescent Research Laboratory in the Life Sciences Building on the downtown campus of West Virginia University or at a mutually agreed upon location, such as their home. Participants completed assent and consent forms as well as Health Insurance Portability and Accountability Act (HIPAA) notification forms. The adolescent completed the BIS, SSSC, LES, MASC, and IVA + Plus. In many cases, parents requested to complete the consent and HIPAA forms ahead of time because they could not coordinate a time with their adolescent to both be present for study participation. In those cases, the examiner provided the parent with the parent forms (demographic and CBCL) and an addressed and stamped envelope so that the measures could be mailed back. Unfortunately, CBCL data were obtained for only 24 of the 48 participants.

Results

Data Cleaning

The data were examined in order to insure all variables met the assumption of normality of distribution for further inferential statistical analyses. No variables were identified as having skew greater than 3 or a kurtosis greater than 10 and were therefore determined to be normally distributed. There were no missing data.

Sample Characteristics

The data from 48 participants were included in the analyses. Twenty participants were recruited from West Virginia and twenty-eight participants were recruited from New Jersey. The two samples did not differ significantly with regards to demographic variables or study variables. The mean age of participants was 15.2 (SD = 1.38) with an age breakdown of 12.5% 13-year-

olds, 25% 14-year-olds, 14.6% 15-year-olds, 25% 16-year-olds, and 22.9% 17-year-olds. The sample was predominantly female (62.5%) and predominantly Caucasian (87.5%). Sample characteristics are presented in Table 2. Mean scores and standard deviations for each of the independent and dependent variables are presented in Table 3.

As a whole, participants endorsed a wide variety of potentially traumatic events. The most commonly reported event was death of a relative (sum = 64), followed by breaking up with a significant other (sum = 39), trip and fall type accidents (sum = 38) and moves (sum = 38). No significant differences were noted between genders in terms of number of events reported (both accidental and non-accidental). One significant between-gender finding was noted with males reporting significantly more bicycle accidents as compared to females, $F(1,46) = 7.895, p < .05$.

Analyses

Hypothesis 1: Adolescents with higher levels of impulsivity will report having experienced significantly more potentially traumatic experiences that are accidental in nature as compared to adolescents with lower levels of impulsivity. Pearson's Product Moment Correlations were used to explore the relation between impulsivity and traumatic event exposure, see Table 5). Results suggest that Hypothesis 1 was not supported as none of the measures of impulsivity correlated significantly with any of the LES scales.

Hypothesis 2: The relation between impulsivity and trauma exposure will be mediated through sensation seeking behavior. Given that the multiple measures of impulsivity did not significantly correlate with one another, and therefore could not be combined into a composite measure of impulsivity for the purposes of regression analyses, path analyses were conducted to address Hypothesis 2. The path model seen in Figure 1 demonstrated acceptable overall data-model fit, $\chi^2(8) = 10.49, p = .23, CFI = .95, RMSEA = .08$. Results of the path model suggest

that higher BIS Total scores are associated with increased SSSC scores. No other measures of impulsivity were related to sensation seeking. The results of the path model also demonstrated a significant relation between increased SSSC scores and higher number of accidental traumas. To examine if sensation seeking was a significant mediator between self-reported impulsivity and exposure to accidental trauma, a Sobel test was conducted. Results suggest that sensation seeking is a significant mediator of the relation between self-reported impulsivity and accidental trauma exposure, $p < .05$. Additionally, AMOS 7.0 provides estimate of indirect or mediated effects. The standardized indirect effect of self-reported impulsivity and exposure to accidental trauma was .15. Given these results, Hypothesis 2 was supported.

Hypothesis 3: Inattention and hyperactivity will also be related to accidental trauma exposure; however, it is believed that impulsivity will account for more of the overall variance in trauma exposure than will inattention or hyperactivity. No significant bivariate correlation was found to exist in the predicted direction between the variables of accidental trauma exposure and hyperactivity and inattention. A hierarchical linear regression analysis was conducted to explore the amount of variance in accidental trauma explained by impulsivity (using the BIS scores, based on the results of the path analysis), inattention (IVA+ Attention Quotient) and hyperactivity (IVA+ Hyperactivity). Results demonstrate none of these independent variables accounts for a significant amount of variance in accidental trauma exposure, and the overall model was non-significant, $F(3,44) = .68, p = .56$. As such, Hypothesis 3 was not supported.

Exploratory Analyses

Correlations. To further explore relations between study variables, Pearson's Product Moment Correlations were calculated, see Table 5. Notable results were that the LES Non-Accidental scale correlated significantly with scores on the MASC with higher levels of anxiety

being associated with a greater number of reported non-accidental traumas, $r(46) = .412, p = .004$. Additionally, accidental trauma exposure was found to correlate significantly with gender, with male gender being related to a greater number of accidental trauma exposures, $r(46) = -.319, p = .027$. Accidental trauma exposure was also found to correlate significantly with sensation seeking, with higher levels of sensation seeking being associated with a greater number of reported accidental traumas, $r(46) = .285, p = .05$. Total score on the LES correlated significantly with scores on the Attention Quotient of the IVA + Plus, $r(46) = .293, p = .043$, with higher reported levels of overall trauma exposure being associated with higher levels of attention as measured by the IVA + Plus. This same scale on the IVA + Plus was found to correlate with the LES-Non-Accidental scale as well, with higher levels of exposure to non-accidental trauma being associated with higher levels of attention, $r(46) = .293, p = .043$.

Finally, several correlations were noted between variables of impulsivity and sensation seeking. Scores on the BIS were found to correlate significantly with scores on the SSSC, $r(46) = .583, p = .000$, as well as with scores on the Attention Quotient, $r(46) = -.322, p = .026$, and scores on the Response Control Quotient, $r(46) = -.297, p = .041$.

Variance Models. In order to better understand the relation between variables, a multiple linear regression with backward elimination was conducted. This method begins with a saturated model with all relevant predictors entered simultaneously. Next, each predictor is evaluated, one at a time, for the reduction of the overall model R^2 that would result from that variable's deletion from the model (Pedhazur, 1997). Variable whose removal results in an insignificant reduction in R^2 are then deleted. A final model results when no further predictor variable can be deleted from the model.

Separate models were developed for each component of the LES (Total, Accidental, Non-Accidental). Variables entered into the model were total scores on the BIS, MASC, SSSC, HQ, AQ, RCQ, and gender. With regards to the Accidental LES score, the overall final model was significant and gender remained as an important predictor, $F(1, 47) = 5.212, p = .027, R^2 = .10$. For the LES-Non-Accidental score, the overall model was also significant and anxiety remained as an important predictor, $F(1, 47) = 9.418, p = .004, R^2 = .17$. Finally, for the LES-Total score the overall model was significant and Attention remained as an important factor, $F(1, 47) = 4.321, p = .043, R^2 = .09$.

Given the significant observed correlation between anxiety and gender and trauma exposure, a moderation model was tested in order to further explore this finding. Anxiety, gender, and an anxiety by gender interaction term were entered simultaneously into a regression model with accidental trauma exposure as the dependent variable. This moderation model was not significant, $F(1, 47) = 2.357, p = .085$.

Correlational analyses were performed in order to examine the potential relations between each individual item (i.e., each specific traumatic event) on the LES and the independent variables. Two significant correlations were revealed. Having a parent in jail (current or past) was significantly negatively correlated with each of the three quotient scores of the IVA + Plus (Attention, $r(46) = -.322, p = .026$; Response Control, $r(46) = -.357, p = .013$; and Hyperactivity, $r(46) = -.410, p = .004$); lower scores on these quotients are suggestive of greater level of difficulty in these areas. Also, trip and fall type accidents were significantly positively correlated with scores on the Attention Quotient of the IVA + Plus, $r(46) = .337, p = .019$.

In order to explore the parent report of impulsivity, select analyses were run using only the participants whose parent completed the parent report ($N = 24$). ANOVAS were performed in order to examine differences between groups (CBCL vs. No CBCL) in terms of demographic factors and independent variables. Age differed significantly between groups, $F(1, 47) = 5.810, p = .020$ with the CBCL group being significantly younger than the No CBCL group. Also, gender differed significantly between the groups, $F(1, 47) = 10.455, p = .002$. The CBCL group was comprised of 14 males and 10 females while the No CBCL group was comprised of 4 males and 20 females. The groups did not differ in regard to any of the independent variables. Parent report scores on the CBCL were correlated significantly with scores on the BIS, $r(22) = .584, p = .003$ as well as with two quotients of the IVA + Plus, Attention, $r(22) = -.539, p = .007$, and Hyperactivity, $r(22) = -.488, p = .016$. In both cases, higher levels of ADHD symptomatology as reported by parents on the CBCL were related to higher levels of measured inattention and hyperactivity.

Discussion

This purpose of this study was to contribute to the current body of research in the area of trauma exposure and impulsivity through the use a multi-method, multi-informant procedure. Results suggested mixed support for the study hypotheses. The first hypothesis specified that impulsivity would relate significantly to number of self-reported potentially traumatic experiences that were accidental in nature. In fact, no significant bivariate correlation was found between impulsivity and trauma exposure, either accidental or non-accidental. The second hypothesis stated that the relation between impulsivity and trauma exposure would be mediated through sensation seeking behavior. Results of a path analysis designed to test this relation supported this hypothesis. The final hypothesis specified that inattention and hyperactivity would

also significantly relate to accidental trauma exposure; however, impulsivity would account for more of the overall variance in trauma exposure than would inattention or hyperactivity. Study findings were not suggestive of significant relations between accidental trauma exposure and impulsivity, hyperactivity, or inattention and this hypothesis was not supported. The following sections will review and discuss the significant findings in this study as well as identify study limitations, clinical implications and future directions.

Significant Findings

As previously stated, the present study sought to make a significant contribution to the area of impulsivity research by using a multi-method, multi-informant procedure. A self-report measure of impulsivity (BIS) was used as well as parent-report measure (CBCL). Whereas no well-validated secondary-source (i.e., parent report) measure of impulsivity exists, the CBCL was chosen for the present study because it has a DSM-IV oriented ADHD scale, and impulsivity is a component of ADHD (along with hyperactivity and inattention). Previous studies in this area have typically used a DSM-IV diagnosis of ADHD as a proxy measure of impulsivity. Finally, a behavioral measure of impulsivity was used (IVA + Plus). Results on a small sub-set of participants (N=24) indicated that the CBCL correlated moderately well with the BIS, thus suggesting that the child report of impulsive behavior and the parent's perception of impulsive-type behavior (as measured by the CBCL) were consistent. Further, the CBCL was shown to moderately correlate with two of three quotients on the IVA + Plus (Attention and Hyperactivity), thus suggesting that parent report of child inattentive and hyperactive behavior was consistent with a behavioral assessment of child behavior in these two domains. Lastly, self-report of impulsivity (BIS) moderately correlated with two of the three quotients on the IVA + Plus (Response Control and Attention) thus suggesting some agreement between self-report and

measurable inattention and impulsivity (as operationally defined by performance on the IVA + Plus). Taken together, these findings are in line with the findings of previous studies (e.g., Verhulst & van der Ende, 1992) which suggest that as children progress into adolescence, their ability to report on their own problem behaviors may become more accurate, as evidenced by corroboration with parent report as well as by performance on behavioral tasks.

The hypothesis that accidental trauma exposure is significantly related to impulsivity was not supported by this study. To the researcher's knowledge, this is the only study to date that divided reported trauma exposure into the different categories (accidental vs. non-accidental), as well as utilized both behavioral and paper-and-pencil measures of impulsivity in particular (that is, did not use ADHD as a general proxy for impulsivity). As such, this finding cannot be directly compared to previously published reports. However, as presented in the introduction, several studies have examined the relation between general trauma exposure and the construct of impulsivity (within the context of ADHD). The findings of the present study are in line with the findings published by Wozniak and colleagues (1999) which did not support the link between trauma exposure and impulsivity (within the context of ADHD). It is striking to note that no significant correlations were found between any of the several types of impulsivity measures used in this study and trauma exposure. Also, no significant correlation was found between parent report of ADHD symptoms on the CBCL and trauma. One possible explanation as to why this hypothesis was not supported may be related to the decision to use a community sample. As a whole, participants in this study did not endorse clinically significant levels of impulsivity on any of the measures. Perhaps, the community sample is simply under a threshold, thus making it difficult to detect a direct relation between impulsivity and trauma exposure, if one in fact does exist. Previous researchers in this area that have reported a significant relation between trauma

exposure and impulsivity have utilized clinical samples (e.g., Famularo, Fenton, Kinscherff, & Augustyn, 1996; Ford et al., 1999).

The only hypothesis that was fully supported was Hypothesis 2 which suggested that sensation seeking mediated the relation between impulsivity and accidental trauma exposure. All measures of impulsivity were entered into the model and the only one that emerged as significantly related to sensation seeking was scores on the BIS. In zero-order correlations, the self-report measures of impulsivity (BIS) and sensation seeking (SSSC) were found to correlate very highly with each other. Given this fact and the established mediator model, it appears as though impulsivity alone is not necessary or sufficient to directly influence the rate of trauma exposure. However, it is possible that increased levels of impulsivity may lead to increased levels of sensations seeking, which in turn, increase the likelihood of exposure to accidental trauma.

The definitions of impulsivity and sensation seeking presented in the introduction of the present study sound remarkably similar. In fact, Zentall and Zentall (1983) used the terms interchangeable in their theory of optimal arousal. However, the present study found evidence to support that whereas these two constructs (as measured by the BIS and the SSSC) are interrelated, they may play different roles in the outcomes experienced by individuals. That is, the present study did not support the notion that impulsive behavior, in and of itself, is related to an individual exposing him or herself to potentially traumatizing situations. Rather, the results suggest a mediated relation between impulsive behavior and sensation seeking. Whereas the present study is not longitudinal, and cannot make strong causal statements, it should be noted that alternate path models were attempted. Specifically, two alternatives were modeled: first, simply covarying sensation seeking with the measures of impulsivity (that is, removing sensation

seeking as an endogenous variable and making it an exogenous variable). Whereas the SSSC was still significantly related to the LES accidental trauma scale, this model demonstrated poorer data-model fit indices than the model presented in Figure 1. The second alternative model switched the BIS and SSSC measures (i.e., the BIS became the mediator and the SSSC became the predictor). Likewise, this model demonstrated poor data model fit, and significantly reduced key regression coefficients. Both of these alternative models demonstrated that the most plausible relation between the BIS and the SSSC is one where the BIS precedes the SSSC. Again, caution is warranted in this interpretation as the data are not longitudinal; however, the present data fit the model presented in Figure 1 better than the alternatives. To be sure, further studies are clearly in order to examine the relation between these constructs. Nevertheless, the results of the present study to raise the possibility that impulsive behavior is strongly associated with an increase in sensation seeking behavior; which in turn is related to increased accidental trauma. Such findings are important in that knowing an individual's tendency to engage in impulsive behavior alone may not be sufficient to protect him/her for accidental trauma. Rather it may be important to know that if individual is also prone to engage in sensation seeking behavior. This identified relation between self-reported sensation seeking and self-reported impulsivity is in line with findings presented by Mobini and colleagues (2006) who published a similar result.

Limitations

Measures. One measure in particular proved to be less than ideal for use in this study and may have negatively impacted the internal validity of the findings. The LES was chosen as the dependent measure of trauma exposure for two main reasons: 1) it could be easily adapted to a paper-and-pencil format and 2) it captured an extremely wide range of potentially traumatic

events. However, there were two major drawbacks to this measure. First, the measure was originally developed as an interview measure. The adapted self-report format used in the present study, although very energy and time-efficient, may not have assessed traumatic experiences as accurately as the original interview format. It is possible that a richer understanding of a reported traumatic event could have been gained through the use of an interview format. During the course of participation, many adolescents asked the examiner questions about the items on this measure in regards to whether or not something “counted” as a traumatic event. Also, despite instructions, many adolescents were confused by the fact that each item was repeated until the respondent indicated that they had not experienced that type of event. This method was developed to allow individuals to report of more than once instance of a same-category event. Afterwards, one participant commented “oops, I think I said my parents got divorced 5 times.”

The LES allowed for participants to report on a wide variety of accidental traumas such as bike accidents, sporting injuries, trip and fall type accidents. However, many participants verbally suggested to the researcher that these types of events were so common in their life that they were not able to report on them all. In order to gain a better understanding of the frequency and nature of these types of events, in addition to an interview format, a review of physician or hospital records of medical treatment rendered may have been helpful. Of course, it is unlikely that the adolescent received medical care following every event; however, it would have yielded a useful measure of frequency and type of accidents and injuries sustained.

Sample. In addition to small sample size, several sample characteristics may have impacted the external validity of the findings. Gender distribution was unequal with a greater number of females as compared to males participating in the study. A second concern was the racial homogeneity of the participants in that participants were almost exclusively Caucasian.

Finally, as previously noted, it is possible that significant findings reported by previous researchers in this area may have been impacted by the fact that clinical samples were used. This study utilized a community sample that, in general, did not appear to represent the full spectrum of impulsivity.

Method Variance. Method variance refers to variability in outcomes that may represent differences in how the outcomes were obtained. This study utilized a multi-method, multi-informant procedure with regards to the assessment of the constructs of impulsivity and sensation seeking. Generally speaking, paper and pencil measures, such as BIS and SSSC or BIS and CBCL, correlated more highly with each other than with scale scores on the IVA + Plus, with some scales on the IVA + Plus not correlating with paper and pencil measures at all (e.g., Prudence). It is unclear if the IVA + Plus simply measured different constructs than the paper and pencil measures or if the paper and pencil measures were more related because of the method utilized in gather that data.

Clinical Implications

Although only one of the major hypotheses of the study was supported, valuable information was obtained with regards to other factors that may serve to inform clinical practice, most notably within the area of adolescent trauma exposure. As previously stated, much of what is known within the area of trauma is specific to adult populations. Far fewer studies examine prevalence and outcomes of trauma within child and adolescent populations. Findings from this study suggest that trauma exposure of any kind is nearly universal within an adolescent population. Every single participant endorsed experiencing at least one potentially traumatic event and every single traumatic event on the LES was endorsed by at least one adolescent with the exception of one event (removed from parent's custody). Given the widespread nature of this

phenomenon, it is critically important that clinicians inquire fully about an adolescent's trauma history during the course of the psychological intake prior to beginning treatment because that trauma exposure may have both medical and psychological implications that could impact the course of treatment. Further, findings from this study suggest that clinicians should look beyond a standard view of trauma as being a high magnitude event and instead recognize that trauma is subjective and that even low grade stressors may have a significant impact on adolescent functioning.

Future Directions

Although this study had several limitations, the results may contribute to the growing research area of impulsivity and trauma exposure within an adolescent population. To the author's knowledge, this is the first study within this area to separate traumatic events into categories (accidental vs. non-accidental) and the first study to firmly separate the diagnosis of ADHD from the construct of impulsivity. Future studies would benefit from addressing several of the limitations of the current study as discussed previously. Additionally, an examination that is longitudinal in nature has long been of need within the field of trauma research as longitudinal investigations are the only way in which causality can be determined. To date, only a handful of studies have utilized this design. The use of an interview format for assessing for trauma exposure coupled with objective medical review would certainly strengthen the basis for what we determine as trauma exposure. Further, the construct of impulsivity could be examined further through the use of parent report measures and teacher report measures.

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Table 1

Life Events Scale Items and Classification

Non-Accidental	Accidental
Death of a relative	Motor vehicle crash*
Death of a friend	Bicycle accident*
Natural disaster	Sports-related accident*
Serious illness	ATV, dirt bike, motorcycle accident*
Witness violent act against other	Violent act against self*
New child in the home	Trip and fall accident*
Removed from parents custody	Fire*
Parental separation	Exposure to toxic agent*
New adult in the home	
Moved	
Changed schools	
Best friend moved away	
Broken up with best friend	
Broken up with boyfriend or girlfriend	
Parent arrested	

* Item was coded as accidental if follow-up questions indicated that adolescent played an active role in the event. Otherwise the item was coded as non-accidental.

Table 2

Demographics

	N	% of Sample
<u>Age</u>		
13	6	12.5%
14	12	25%
15	7	14.6%
16	12	25%
17	11	22.9%
<u>Gender</u>		
Male	18	37.5%
Female	30	62.5%
<u>Race</u>		
White	42	87.5%
Black	1	2.1%
Hispanic	3	6.2%
Other	2	4.2%

Table 3

Means and Standard Deviations of Study Variables

	M	SD
<u>Variable</u>		
BIS	63.81	15.12
IVA + Plus (Attention)	88.81	23.09
IVA + Plus (Hyperactivity)	92.08	13.01
IVA + Plus (Prudence)	83.77	22.37
IVA + Plus (Response Control)	87.52	19.12
LES-Accidental	2.6	2.26
LES-Non-Accidental	7.79	4.56
LES-Total	10.40	5.66
MASC	39.9	17.58
SSSC	8.96	3.98

Table 4

Traumatic Events Endorsed by Participants

Event	Sum
Death of a Relative	64
Relationship Breakup	39
Trip and Fall	38
Move	38
Sports Accident	30
Natural Disaster	29
Breakup with Friend	29
Friend Move	27
Motor Vehicle Crash	24
New School	23
New Child in Home	22

Table 4 (continued)

Event	Sum
Death of a Friend	19
Witness Violence Against Others	18
Bicycle Crash	17
Parental Separation	16
New Adult in Home	13
Violence against Oneself	9
Fire	4
Parent in Jail	3
Diagnosed with Serious Illness	1
Exposure to Toxin	1
Removed from Parents Custody	0

Table 5

Correlation Matrix

	Age	Gender	BIS	MASC	SSSC	RCQ	AQ	HQ	Prudence	LESTOT	LESPASS	LESACT
Age	1.00	.338*	-.090	.085	-.152	.243	-.091	.022	.305*	.068	.165	-.182
Gender	.338*	1.00	-.172	.324*	-.190	.153	-.063	-.025	.063	-.075	.057	-.319*
BIS	-.090	-.172	1.00	-.071	.583**	-.297*	-.322*	-.225	-.129	.086	.060	.094
MASC	.085	.324*	-.071	1.00	-.302*	.260	.352*	.434**	.024	.270	.412**	-.192
SSSC	-.152	-.190	.583**	-.302*	1.00	-.318	-.279	-.168	-.141	.012	-.116	.285*
RCQ	.243	.153	-.297*	-.073	-.318*	1.00	.498**	.265	.592**	-.028	-.016	-.037
AQ	-.091	-.063	-.322*	.352*	-.279	.498**	1.00	.503**	.083	.293*	.293*	.126
HQ	.022	-.025	-.225	.434**	-.168	.265	.503**	1.00	.210	.116	.152	-.028
Prudence	.305*	.063	-.129	.024	-.141	.592**	.083	.210	1.00	-.043	-.050	-.004
LESTOT	.068	-.075	.086	.270	.012	-.028	.293*	.116	-.043	1.00	.929**	.588**
LESPASS	.165	.057	.060	.412**	-.116	-.016	.293*	.152	-.050	.929**	1.00	.247
LESACT	-.182	-.319*	.094	-.192	.285*	-.037	.126	-.028	-.004	.588**	.247	1.00

* $p < .05$, ** $p < .01$

Figure 1: Path Model

Note: All coefficients are standardized.

** = $p < .001$

* = $p < .05$

RCQ = IVA + Plus Response Control, AQ = IVA + Plus Attention, HQ = IVA + Plus Hyperactivity, PRU = IVA + Plus Prudence