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The Relationship Between Trauma and Attention-Deficit/Hyperactivity Disorder Symptomatology in Juvenile Firesetters

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The Relationship Between Trauma and Attention-Deficit/Hyperactivity Disorder Symptomatology in Juvenile Firesetters

Abstract
Firesetting is a serious problem among juveniles in the United States and can have profound consequences, including injury or death, destruction of property, and significant costs for communities. There is also a lack of research regarding potential risk factors of juvenile firesetting. In this study, archival data were used from a suburban residential treatment center to assess potential risk factors, including trauma and Attention-Deficit/Hyperactivity Disorder (ADHD) symptomatology, among juvenile firesetters. The participants in the study included 42 adolescents between the ages of 11 and 16 with a history of firesetting behavior. This study used hierarchical regression analyses to examine hyperactive-impulsive and inattention symptoms, as moderators of the relation between trauma symptomatology and juvenile firesetting. Using the Posttraumatic Stress subscale of the Trauma Symptom Checklist, DSM-IV Hyperactive-Impulsive and Inattentive subscales of the Conners’ Parent Rating Form, and the Juvenile Fire Setting Evaluation and Risk Assessment, no significant results were found. In other words, the relationship between (a) trauma symptoms and hyperactivity-impulsivity and (b) trauma symptoms and inattentiveness did not predict the level of firesetting severity in adolescents in residential care. Limitations, which may have contributed to the current findings are discussed. In addition, clinical and research applications of these results are addressed.

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THE RELATIONSHIP BETWEEN TRAUMA AND ATTENTION-DEFICIT/HYPERACTIVITY DISORDER SYMPTOMATOLOGY IN JUVENILE FIRESETTERS

A DISSERTATION SUBMITTED TO THE FACULTY OF SCHOOL OF PROFESSIONAL PSYCHOLOGY PACIFIC UNIVERSITY FOREST GROVE, OREGON

BY ALLISON OSBORN

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PSYCHOLOGY

JULY 24, 2009

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ABSTRACT

Firesetting is a serious problem among juveniles in the United States and can have profound consequences, including injury or death, destruction of property, and significant costs for communities. There is also a lack of research regarding potential risk factors of juvenile firesetting. In this study, archival data were used from a suburban residential treatment center to assess potential risk factors, including trauma and Attention-Deficit/Hyperactivity Disorder (ADHD) symptomatology, among juvenile firesetters. The participants in the study included 42 adolescents between the ages of 11 and 16 with a history of firesetting behavior. This study used hierarchical regression analyses to examine hyperactive-impulsive and inattention symptoms, as moderators of the relation between trauma symptomatology and juvenile firesetting. Using the Posttraumatic Stress subscale of the Trauma Symptom Checklist, DSM-IV Hyperactive-Impulsive and Inattentive subscales of the Conners’ Parent Rating Form, and the Juvenile Fire Setting Evaluation and Risk Assessment, no significant results were found. In other words, the relationship between (a) trauma symptoms and hyperactivity-impulsivity and (b) trauma symptoms and inattentiveness did not predict the level of firesetting severity in adolescents in residential care. Limitations, which may have contributed to the current findings are discussed. In addition, clinical and research applications of these results are addressed.
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TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABSTRACT</td>
<td>ii</td>
</tr>
<tr>
<td>ACKNOWLEDGMENTS</td>
<td>iii</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td>v</td>
</tr>
<tr>
<td>LIST OF FIGURES</td>
<td>vi</td>
</tr>
<tr>
<td>INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>HYPOTHESES OF THE STUDY</td>
<td>6</td>
</tr>
<tr>
<td>METHODOLOGY</td>
<td>17</td>
</tr>
<tr>
<td>RESULTS</td>
<td>23</td>
</tr>
<tr>
<td>DISCUSSION</td>
<td>29</td>
</tr>
<tr>
<td>REFERENCES</td>
<td>45</td>
</tr>
<tr>
<td>APPENDIX A</td>
<td></td>
</tr>
<tr>
<td>Conners’ Parent Rating Scale-Revised, Long Version</td>
<td>51</td>
</tr>
<tr>
<td>Trauma Symptom Checklist-Adolescents</td>
<td>52</td>
</tr>
<tr>
<td>Juvenile Fire Setting Evaluation And Risk Assessment</td>
<td>53</td>
</tr>
</tbody>
</table>
LIST OF TABLES

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Zero-order Correlations for Firesetting Severity and Predictor Variables Trauma (Posttraumatic Stress) and ADHD (Hyperactivity-Impulsivity and Inattentive) Symptomatology</th>
<th>24</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table 2</td>
<td>Hierarchical Regression Analysis of Trauma Symptomatology and Hyperactivity-Impulsivity on Firesetting Severity</td>
<td>26</td>
</tr>
<tr>
<td>Table 3</td>
<td>Hierarchical Regression Analysis of Trauma Symptomatology and Inattention on Firesetting Severity</td>
<td>28</td>
</tr>
</tbody>
</table>
INTRODUCTION

Juvenile firesetting has become a major problem in the United States. It is a devastating phenomenon with profound consequences. Firesetting can be injurious or deadly to individuals, destructive to property, and costly to the community. Numerous definitions of firesetting have been proposed in the literature. According to the DSM-IV – TR (2000), firesetting occurs when an individual deliberately engages in firesetting behavior with the intention of causing serious damage. Firesetting is a symptom identified under the diagnosis of Conduct Disorder, which is defined as “a repetitive and persistent pattern of conduct in which either the basic rights of others or major age-appropriate societal norms or rules are violated” (DSM-IV-TR, p. 98). Similarly, firesetting can be defined as a deliberate, planned, and persistent behavior, in which an individual has malicious or destructive intent (Sakheim & Osborn, 1999).

It has been estimated that as many as one-third of all children and adolescents will engage in inappropriate play with fire at some point during their childhood (Raines & Foy, 1994). Nearly 250,000 fires in 1993 were thought to have been set by juveniles, under 19 years of age (United States Fire Administration [USFA], 2001b). Juvenile firesetting is increasing, with 53% of all arson fires being started by children under the age of 18 (USFA, 2001b). In addition, juveniles account for 51% of all arson arrests (National Association of State Fire Marshals [NASFM], 2001). Each year, an average of
3,650 children age 14 or younger are injured or killed in residential fires (USFA, 2001a). In 2002, children were responsible for an estimated 13,900 structure fires, which led to 1,250 injuries and 210 deaths (Sharp, Blaakman, Cole, & Cole, 2006).

**Rationale for Study**

To date, the problem of juvenile firesetting has not received the professional attention it deserves. It is a serious, yet relatively unexplored and poorly comprehended issue among mental health researchers and professionals (Gilman & Haden, 2006). As a result of the limited awareness and understanding of juvenile firesetting, few professionals recognize the impact that juvenile firesetting has on adolescents, families, and communities (NASFM, 2001).

Juvenile firesetting has been found to be a strong predictor of severe conduct problems and hence a worse prognosis later in life (Keslo & Stewart, 1986). Based on this finding, in combination with the significant prevalence of juvenile firesetting, clinicians and researchers need to develop fire prevention and intervention programs that are effective for treating juveniles and their families. Development of such programs could reduce the morbidity, mortality, and the economic burden caused by juvenile firesetting (Sharp et al., 2006). In order to develop such programs, it is important to fully understand the specific risk factors and associated triggers of juvenile firesetting to assist in successful treatment of this destructive behavior (Gilman & Haden, 2006). “A full understanding of a juvenile’s specific risk factors for firesetting and associated triggers permits those involved in the treatment process to accurately identify threats to the juveniles’ progress, as well as to better recognize positive or adaptive changes in the juvenile’s behavior” (Gilman & Haden, 2006, p. 14).
According to Stickle and Blechman (2002), there are numerous reasons why studying firesetting is important. These include: a) juveniles set half of all reported fires and have the highest percentage of juvenile arrests for any crime, b) fires are a leading cause of death among young children, second to motor vehicle accidents, c) the consequences of juvenile firesetting include death and serious injury, and d) the cost of juvenile firesetting includes up to $300 million of property damage yearly.

Although no single factor is likely to be the cause of juvenile firesetting, a growing body of literature suggests that trauma symptomatology related to childhood maltreatment and hyperactivity-impulsivity and inattention symptoms of Attention-Deficit/Hyperactivity Disorder (ADHD) may play a significant role in the development of juvenile firesetting. However, additional research on the relationship between trauma symptomatology, hyperactivity-impulsivity and inattention symptoms of ADHD, and juvenile firesetting is warranted due to the paucity of previous research.

Purpose of Study

The purpose of this study was to investigate potential risk factors, including trauma and hyperactivity-impulsivity and inattention symptoms of ADHD that may be contributing to juvenile firesetting behavior. More specifically, this study investigated the relationship between the level of trauma symptom severity and hyperactive-impulsive and inattentive symptomatology on firesetting severity. Using a moderator model, it is hypothesized that ADHD symptoms, specifically hyperactivity-impulsivity and inattention, will impact the relation between trauma symptomatology and severity of firesetting.
This study addressed methodological problems identified in previous studies, including unclear definitions of constructs. Many studies discuss trauma-related symptoms, ADHD, and firesetting; however, few studies specifically operationally define what these constructs entail. Furthermore, this current study used standardized, narrowband measures to assess trauma and ADHD symptoms, which have been significantly lacking in numerous studies. Only two studies (both unpublished dissertations) were identified that assessed trauma symptomatology using a standardized narrowband measure (Murphy, 2004; Wilder, 2007). In addition, while numerous studies have assessed ADHD symptomatology, no studies have used a standardized narrowband measure, such as the Conners’ Parent Rating Scale to assess ADHD. The Conners’ Parent Rating Scale is a measure that is frequently used in research and clinical settings to assess severity level of ADHD symptoms (Conners, 1997). This study was intended to help clinicians and researchers better understand specific risk factors associated with firesetting behavior and provide further theoretical, empirical and clinical understanding for identifying, treating, and preventing firesetting behavior in juveniles.

Theoretical Framework

Numerous theories have been proposed to describe juvenile firesetting. Some of these include opportunity theory (Cohen & Felson, 1979), expressive trauma theory (Lowenstein, 1989), and stress theory (Lyng, 1990). However, based on clinical and research findings, it appears that social learning theory best explains firesetting behavior in juvenile delinquents because of its inclusion of numerous domains (Kolko & Kazdin, 1986). Within this model, three groups of risk factors are proposed, including a) early learning experiences and cues, b) a personal repertoire of cognitive and behavioral
limitations, and c) family influences and significant stressful life events. When these factors are combined, they may result in an individual having an interest in fire, difficulty solving problems in appropriate ways, and exposure to stressful life events such as parental psychopathology, abuse, and parental absence (Moore, Thompson-Pope, & Whited, 1996).

Looking first at early learning experiences and cues, modeling or vicarious experiences, such as observing a parent who works in a fire-related occupation (e.g., firefighter) may contribute to firesetting behavior. A child, who has an early interest or direct experiences with fire, may also be more likely to set fires later in adolescence. Furthermore, availability of adult models and accessibility to incendiary materials can contribute to juvenile firesetting. The availability of firesetting devices makes it more likely that an individual will set fires, especially if he or she is curious about fires. Antecedents to fire-related situations can include peer pressure to set fires, the presence of adults or peers who smoke or engage in firesetting acts, and fire-related materials that are carelessly left by caretakers (Kolko & Kazdin, 1986).

An individual’s personal repertoire can include difficulties within the cognitive, behavioral, and motivational domains. In the cognitive domain, a child or adolescent may have limited fire-awareness and fire-safety skills leading to an inability to understand the consequences and hazards associated with firesetting. This could include a child or adolescent who evidences symptoms of ADHD, Inattentive Type. A child or adolescent with these difficulties may have difficulty understanding and paying attention to specific outcomes of behavior. Children or adolescents with ADHD, Inattentive Type frequently engage in activities without considered thought and often appear as if their mind is
somewhere else, thus not listening or thinking about consequences of behavior (DSM-IV, 2000). Looking at behavioral consequences, a child or adolescent may evidence ineffective interpersonal skills or covert antisocial behaviors. Motivational components address reasons why children and adolescents start fires. This can vary from curiosity to intention to destroy property. A child or adolescent may also engage in firesetting without fully thinking about the consequences. This may be indicative of a child or adolescent with ADHD, Hyperactive-Impulsive type, one who thinks impulsively without fully thinking through the consequences.

The last domain in this model regarding risk factors for firesetting is family influences and stressors. This may include exposure to child maltreatment, limited parental supervision and monitoring, parental distance and uninvolvment, parental psychopathology, and stressful life events.

Hypotheses of Study

The following hypotheses were examined in this study:

1. Juveniles with higher levels of trauma symptomatology will evidence more severe levels of firesetting behavior than juveniles with lower levels of trauma symptomatology.

2. Hyperactivity-impulsivity symptomatology associated with ADHD will moderate the relation between trauma symptomatology and severity of firesetting. In other words, participants with lower levels of hyperactivity-impulsivity will have a weaker relation between level of trauma symptomatology and severity of firesetting; whereas participants with high levels of hyperactivity-impulsivity will
have a stronger relation between trauma symptomatology and severity of firesetting.

3. Inattention symptomatology associated with ADHD will also moderate the relation between trauma symptomatology and severity of firesetting. More specifically, lower levels of inattention will be associated with a weaker relation between levels of trauma symptomatology and severity of firesetting; whereas for high levels of inattention, a stronger relation will be observed between trauma symptomatology and severity of firesetting.

REVIEW OF THE LITERATURE

While many factors likely contribute to juvenile firesetting behavior, certain attributes have been found to be more common among juvenile firesetters. This study will focus on two factors: level of trauma symptom severity and ADHD symptomatology.

Trauma Symptoms among Juvenile Firesetters

Significant trauma-related symptoms can occur as a result of child maltreatment (i.e., physical abuse, sexual abuse, psychological/emotional abuse, or neglect). For the purpose of this study, trauma will be defined based on the DSM-IV as this is how mental health professionals typically understand trauma. According to the DSM-IV (2000), a traumatic event occurs when a person experiences, witnesses, or is confronted with an event that involved actual or threatened death, serious injury, or a threat to one’s physical integrity and the individual’s reaction involved intense fear, helplessness, or horror (in children, this may include disorganized or agitated behavior). Child maltreatment can be defined as a “parenting failure—a failure to protect a child from harm, and a failure to provide the positive aspects of a parent-child relationship that can foster development”
Child maltreatment can be particularly stressful because the child lacks a parent who can support and help the child cope with difficulties (Ronen, 2001). As a result of exposure to child maltreatment, adolescents may develop a wide range of trauma-related symptoms, including posttraumatic stress disorder (PTSD), dissociation, anxiety symptoms, depressive symptoms, anger, lowered restraint, difficulties with impulse control, inability to suppress aggression, and other various behavioral problems (Cohen, Deblinger, & Mannarino, 2005; Steiner, Garcia, & Matthews, 1997). Exposure to traumatic events can affect a child’s physical, personality, and emotional development, and can predispose him or her to behavioral, emotional, or cognitive disorders (Ronen, 2001). Only a portion of adolescents who are exposed to child maltreatment will meet full criteria for PTSD; however, a large percentage will endorse a variety of trauma-related symptoms that can be detrimental to one’s well-being (Margolin & Vickerman, 2007). Trauma-related symptoms may be related to the onset of firesetting behavior. A child who is experiencing significant difficulties related to exposure to a traumatic event may be impaired in his or her ability to tolerate stress, thus increasing impulsivity and anger (Fineman, 1995).

While numerous studies have examined the relationship between child maltreatment and juvenile firesetting behavior (Ritvo & Shanok, 1983; Sakheim, Osborn, & Abrams, 1991; Yarnell, 1940), little research has been conducted on the prevalence and impact of trauma symptomatology on juvenile firesetters. Only two empirical studies to date has been conducted that examine the relationship between trauma symptoms and firesetting. In that study, it was predicted that the presence of childhood trauma and trauma symptoms in firesetters and nonfiresetters in a psychiatric inpatient treatment
facility would be significantly different (Murphy, 2004). More specifically, it was hypothesized that inpatient firesetters had experienced more traumatic events and would evidence higher levels of trauma symptoms than inpatient nonfiresetters. Trauma symptom severity among firesetters was also compared to the normative group used for the development of the Trauma Symptom Checklist. The study consisted of 33 firesetters and 33 nonfiresetters matched for gender and age. The age of participants ranged from 6 to 13 years old. Contrary to hypotheses, the researcher found no significant difference in the amount of traumatic experiences between the children in the firesetting and nonfiresetting groups. Further, inpatient firesetters did not evidence higher levels of trauma symptomatology than inpatient nonfiresetters. However, inpatient firesetters and nonfiresetters evidenced higher levels of trauma symptoms than children in the normative group. It is important to note that this study consisted of children ages 6 to 13 and did not include an adolescent sample. Further, the researcher’s measurement of firesetting behavior and the inclusion criterion for firesetting is unclear.

In a second study, the relationships between life events, trauma symptoms, and firesetting behaviors among 60 8-year-olds was examined (Wilder, 2007). Using data from the Longitudinal Studies of Child Abuse and Neglect, the author found firesetters had a greater accumulation of recent stressful life events compared to nonfiresetters. Additionally, firesetters were more likely to have had a history of sexual abuse, emotional neglect, educational neglect, and a lack of supervision compared to nonfiresetters. Trauma symptoms, however, did not differentiate firesetters from nonfiresetters. In this study, limitations included a limited age range and unclear definitions of trauma and firesetting behavior.
The relationship between firesetting and child maltreatment is better documented in the literature and will be touched on briefly. As early as 1940, Yarnell reported on case studies, in which he cited a child firesetter who had been exposed to abuse from his father. In another study that examined the characteristics of 186 firesetters and 165 age- and sex-matched controls at two state psychiatric hospitals, significant differences were found between firesetters and nonfiresetters for neglect and physical abuse, with firesetters experiencing both types of maltreatment in greater magnitude (Showers & Pickrell, 1987). Another study that assessed the relationship between firesetting and child maltreatment (Root, MacKay, Henderson, Del Bove, & Warling, 2007) found that children with histories of child maltreatment evidenced higher levels of firesetting. They concluded that the presence of maltreatment is a risk factor for a more severe course of firesetting.

In conclusion, minimal research has been conducted on the relationship between trauma symptomatology and juvenile firesetting. While the results of these studies are inconclusive, numerous studies have examined the relationship between child maltreatment and juvenile firesetting behavior. A significant relationship between child maltreatment and juvenile firesetting has been established, with higher and more severe forms of child maltreatment being associated with higher levels of firesetting.

ADHD Symptomatology among Juvenile Firesetters

ADHD, a well-studied childhood disorder is used to describe children and adolescents “who persistently display levels of activity that are far in excess of their age group, are unable to sustain attention, interest, or persistence as well as their peers do in their activities, longer-term goals, or the tasks assigned to them by others, or whose self-
regulation lags far behind expectations for their development level” (Barkley, 2003, p. 75). Researchers have identified two distinct behavioral categories for the diagnosis of ADHD, including a) Hyperactivity-Impulsivity and b) Inattentiveness. Hyperactive-impulsive behavior, also known as Disinhibition, is a multidimensional construct, involving a variety of distinct forms of inhibitory impairments (Barkley, 2003). Children and adolescents with hyperactivity-impulsivity manifest difficulties with excessive activity level and fidgetiness, less ability to stay seated when required, greater touching of objects, moving about, running, and climbing than other children, playing noisily, talking excessively, acting impulsively, interrupting others activities, and being less able than others to wait in line or take turns (American Psychiatric Association, 2004).

Similar to the construct of hyperactivity-impulsivity, inattention represents a multidimensional construct. Children and adolescents with inattention evidence an inability to sustain attention or persist at tasks or play activities, remember and follow through on rules and instructions, and resist distractions while participating in activities (Barkley, 2003). Studies that have examined the diagnosis of ADHD as well as hyperactivity-impulsivity and inattentive symptoms in relation to firesetting will be discussed in turn.

ADHD is a prevalent diagnosis among juvenile firesetters and many studies have found a significant relationship between juvenile firesetting and a diagnosis of ADHD (Becker, Stuewig, Herrera, & McCloskey, 2004; Zipper & Wilcox, 2005). For example, at least 20% of child firesetters in one study had a diagnosis of ADHD (Showers & Pickrell, 1987). Kuhnley, Hendren, and Quinlan (1982) compared juvenile psychiatric inpatients who had a history of firesetting behavior with a comparable nonfiresetting
group. Using the DSM-III, the researchers found only 2 out of 12 diagnoses evidenced a significant difference between juvenile firesetters and nonfiresetters. These diagnoses included Attention Deficit Disorder and Conduct Disorder.

In a study that examined the prevalence and characteristics of firesetting among psychiatrically disturbed children, the results revealed that outpatient children who had a diagnosis of ADHD were more frequently involved in firesetting activities than children with other diagnoses (Kolko & Kazdin, 1988). In another study, the child’s level of externalizing behavior was related to firesetting recidivism, as measured by the CBCL (Kolko, Herschell, & Scharf, 2006). However, the authors did not elaborate on this finding and therefore it is unclear what specific types of externalizing behaviors were significant.

Researchers have found a significant relationship between juvenile firesetters and hyperactivity-impulsivity symptomatology (Sakheim, Osborn, & Abrams, 1991; Sakheim, Vigdor, Gordon, & Helprin, 1985). For example, 55% of child firesetters in one sample were reported to be “hyperactive” (Gruber, Heck, & Mintzer, 1981). Hyperactive-impulsive symptoms may cause impairment and distress that contribute to the onset of juvenile firesetting. For example, a child or adolescent diagnosed with ADHD may be particularly impulsive and, therefore, might be more likely than other children to set fires. Symptoms of hyperactivity and impulsivity include a child or adolescent who often fidgets or squirms in seat, frequently leaves seat when remaining seated is expected, feels restless, has difficulty engaging in leisure activities quietly, is often “on the go,” often interrupts or intrudes on others, blurts out answers before questions have been completed, and has difficulty awaiting turn (DSM-IV, 2000).
In one study, firesetters demonstrated higher levels of externalizing symptoms, as measured by the Child Behavior Checklist (CBCL) and Youth Self Report (YSR) and higher levels of impulsivity, as measured by the Emotionality, Activity, Socialability, and Impulsivity-Temperament Scale (EASI) than nonfiresetters (Kolko & Kazdin, 1991). The authors indicated that certain personal attributes, including impulsivity may increase the likelihood of interpersonal conflicts and inability to understand consequences. Zipper and Wilcox (2005) reported that juvenile firesetters tend to act impulsively, in an externalizing fashion when dealing with situations that cause intense reactions, rather than thinking about the consequences of their behavior. Other researchers looked at the characteristics of firesetters independent of the diagnosis of conduct disorder (Kolko, Kazdin, & Meyer, 1985). They found that firesetters received higher scores on externalizing symptoms and were rated as more hyperactive than nonfiresetters; however, this difference was not significant. It is possible that this difference was not significant because a broadband measure was used to assess hyperactivity. On the Minnesota Multiphasic Personality Inventory-Adolescents (MMPI-A), juvenile firesetters in a psychiatric inpatient facility were found to have higher scores on the clinical scale of mania, indicting that this population is more impulsive and hyperactive than nonfiresetters (Moore, Thompson-Pope, & Whited, 1996).

Symptoms of ADHD, Inattentive Type include failing to give close attention to details, making careless mistakes in schoolwork, work, and other activities, having difficulty sustaining attention or persisting at tasks, failing to listen when spoken to directly, having difficulties following through on rules and instructions, difficulty concentrating, failing to finish assignments, forgetting, losing things that are necessary
for tasks or activities, and being easily distracted by extraneous stimuli (DSM-IV, 2004). No studies were identified that assessed ADHD, Inattentive Type independent of ADHD, Hyperactive-Impulsive Type. However, it is possible that the two subtypes of ADHD may have different clinical relevance when attempting to understand juvenile firesetting behavior.

While many studies have discussed the prevalence of ADHD in juvenile firesetters, few researchers have used methodologically sound procedures to measure it. In some studies, no standardized measures were used. In other studies, a standardized broadband measure, such as the CBCL or YSR was used to assess ADHD or externalizing symptoms. Further, no researchers have assessed the relationship between inattentive symptoms and firesetting behavior. Many researchers indicated that they studied ADHD; however, it is unclear if they included inattentive symptomatology in their studies. Other limitations include that many studies used a young population, ages six to 13.

Only one study did not find a relationship between firesetting and a diagnosis of ADHD (Heath, Hardesty, Goldfine, & Walker, 1985). These researchers reported that there were no cases of attention deficit disorder in the firesetting group. However, the researcher did not use a standardized measure to assess for ADHD symptomatology. In addition, a small sample size was used, which may not have allowed for significant findings. Another study failed to find a relationship between firesetting and hyperactivity (Kosky & Silburn, 1984). The data for this retrospective study, however, was gathered through an initial psychiatric assessment, in which no information is available as to how the researchers measured and assessed variables.
In conclusion, a significant relationship between ADHD symptomatology and juvenile firesetting has been established, with the presence of ADHD symptoms being strongly associated with a more severe level of firesetting. In addition, researchers have found a significant relationship specifically between hyperactivity-impulsivity symptomatology and juvenile firesetting. No studies were identified, however, that have assessed the relationship specifically between inattentive symptomatology and juvenile firesetting, independent of hyperactivity-impulsivity.

Comorbidity of Trauma and ADHD Symptomatology

No studies thus far have examined the relationship between trauma and ADHD symptomatology among juvenile firesetters, even though there are many similarities between these variables (Cuffe, McCullough, & Pumariega, 1994; Famularo, Fenton, Kinscherff, & Augustyn, 1996). For example, children and adolescents who have experienced a traumatic event may present with symptoms of hyperarousal, hypervigilance, and intrusive re-experiencing. Children and adolescents with symptoms of hyperarousal and hypervigilance also often have difficulties with attention and hyperactivity (Cuffe et al., 1994). Fineman (1995) also discussed that exposure to a traumatic event may reduce one’s ability to tolerate stress, which can lead to increased impulsivity.

Two hypotheses are available to explain the prevalent relationship between trauma and ADHD symptomatology (Cuffe et al., 1994). On one hand, children and adolescents with ADHD may be at a higher risk for experiencing a traumatic event or being a victim of child abuse due to his or her increased dangerous behaviors, impulsivity, or genetic predisposition towards impaired impulse control. On the other
hand, PTSD-like symptoms of hyperarousal, hypervigilance, and impaired concentration may contribute to impulse and attention regulation, thus creating an ADHD-like syndrome that is mistakenly diagnosed as ADHD. In addition, numerous trauma symptoms such as avoidance, emotional numbing, and social detachment could contribute to motivational or problem-solving deficits often found in ADHD (Ford et al., 1999).

Summary

Based on previous research, it can be tentatively concluded that exposure to child maltreatment and ADHD symptomatology are significantly related to juvenile firesetting. While maltreatment has been found to be a significant risk factor for firesetting behavior, less empirical research has assessed the relationship between trauma symptoms related to child maltreatment and juvenile firesetting. In order to reach more definitive conclusions on the relationships between trauma symptoms, ADHD symptoms, and juvenile firesetting behaviors, additional studies are warranted. In addition, it is essential to conduct methodologically sound studies that define variables and implement standardized measures.
Methodology

Research Method and Design

Participants

Participants in this study included 42 boys who were clients in a residential treatment center in a suburb of a mid-size West Coast city. All of the participants had a documented history of firesetting behavior and participated in a firesetting evaluation (i.e., The Juvenile Fire Setting Evaluation and Risk Assessment). Firesetting, based on the Juvenile Fire Setting Evaluation and Risk Assessment, was defined as “a purposeful collection of materials to burn to produce a blaze” (Henry, 2005). Participants’ age ranged from 11.2 to 16.4 years old with a mean of 14.33. The sample was comprised of 33 Caucasians (78.6%), 3 Hispanics (7.1%), 2 African Americans (4.8%), 2 Native Americans (4.8%), and 2 Biracial (4.8%).

The participants in this study were referred to residential treatment by the state’s juvenile justice system or child welfare system. The boys and their legal custodians completed the residential treatment center’s standard informed consent form, which includes information on the rights and the limits of confidentiality, at the time of admission.

Measures

*Conners’ Parent Rating Scale-Revised, Long Version (CPRS-R:L).* The CPRS-R:L (Conners, 1997) is an instrument that assesses ADHD symptoms and evaluates
problem behaviors in children and adolescents, ages 3 to 18. The CPRS-R:L provides a rating of a child’s behavior within the past month and is typically completed by a parent or a caregiver. In this study, a member of the residential treatment staff completed the CPRS-R:L with the adolescent. The CPRS-R:L contains 80 items, which are answered on a four-point Likert scale (ranging from $0 = \text{not true at all}$ to $3 = \text{very true}$). This measure contains 10 subscales, including the Oppositional, Cognitive Problems/Inattention, Hyperactivity, Anxious-Shy, Perfectionism, Social Problems, Psychosomatic, Conners’ Global Index, DSM-IV Symptom subscales, and ADHD Index subscales.

For the purpose of this study, the DSM-IV Hyperactive-Impulsive and DSM-IV Inattentive Index subscales were utilized. Raw scores for each subscale were calculated and converted to standard scores, in this case $T$-scores. $T$-scores of 65 or above are usually taken to indicate a clinically significant problem and higher scores are indicative of more severe problems. High scores on the DSM-IV Inattentive Index subscale are indicative of children who are inattentive, have more academic problems, have difficulties organizing their work, have difficulty completing tasks, and appear to have trouble concentrating on tasks that require sustained mental effort. Children who obtain high scores on the DSM-IV Hyperactivity Index subscale typically have difficulty sitting still, feel more restless and impulsive than most individuals their age, and have the need to always be “on the go.” No items on this measure are reverse scored.

The CPRS-R:L was normed on over 8,000 children, from 45 states in the United States and 10 provinces in Canada. Internal consistency reliabilities range from .75 to .94 with the Cognitive Problems/Inattention and Hyperactivity subscales having internal consistencies of .93 and .85, respectively (Conners, Sitarenios, Parker, & Epstein, 1998).
Test-retest reliabilities range from .62 to .85 (Conners, 1997). Construct validity has been demonstrated based on the results of a factor analysis that was used to construct the scales and by correlations between parallel scores from the measures. This measure has good convergent, divergent, and discriminant validity.

*Trauma Symptom Checklist (TSCC).* The TSCC (Briere, 1996) is a self-report measure that assesses trauma symptomatology in children and adolescents, ages 8 to 17, including exposure to child maltreatment (physical, sexual, and psychological abuse) and neglect. The questions on the TSCC ask the child about specific thoughts, feelings, and behaviors and how often each of these things happens. Each item is rated according to its frequency of occurrence using a four point Likert scale (ranging from 0 = *never* to 3 = *almost all of the time*). The TSCC consists of 54 items, two validity scales and six clinical scales. The validity scales include the Under-Response and Hyper-Response subscales. The Under-Response subscale represents a tendency towards denial or a need to appear symptom-free. The Hyper-Response subscale indicates a general overresponse to items, a need to appear extremely symptomatic, or a state of being overwhelmed by traumatic stress. According to Briere (1996), a profile is considered invalid if a participant omits six or more items, obtains a T-score of 70 or above on the Under-Response scale, or obtains a T-score of 75 to 89 on the Hyper-Response scale.

The clinical scales include the Anxiety, Depression, Posttraumatic Stress, Sexual Concerns, Dissociation, and Anger subscales. In this current study, the Posttraumatic Stress (PTS) subscale was utilized. Raw scores were calculated for each clinical scale. Raw scores were then converted to standard scores, in this case *T*-scores. *T*-scores at or above 65 are considered clinically significant. *T*-scores in the range of 60 through 65 are
suggestive of difficulty or may indicate subclinical symptomatology. The PTS subscale, based on DSM-IV criteria consists of items reflecting classical posttraumatic stress disorder symptomatology, including intrusive thoughts, sensations, and memories of painful past events, nightmares, fear of men or women, and cognitive avoidance of negative thoughts and memories. A higher score is indicative of more severe symptomatology.

Normative data was obtained from over 3,000 nonclinical youth across the United States. Internal consistency reliabilities for five of the six clinical scales (excluding the Sexual Concerns subscale) range from .82 to .89. For the validity scales, the Under-Response scale has an alpha level of .85 and the Hyper-Response scale has an alpha level of .66. Convergent and discriminant validity have been demonstrated based on correlations with other measures, such as the Children’s Impact of Traumatic Events Scale-Revised, CBCL, YSR, and Children’s Depression Inventory (Briere, 1996). The TSCC has been found to discriminate between traumatized and nontraumatized children and adolescents. Construct validity was evidenced through significant correlations with similar measures and higher scores on the TSCC for children with histories of stressful or traumatic events.

*Juvenile Fire Setting Evaluation and Risk Assessment (JFSERA).* The JFSERA (Henry, 2005), developed in 2005 is a structured interview used in a clinical setting to determine the need for specific firesetting treatment. The primary goal of this assessment is to collect information representing a range of incidents in the juvenile’s past, the firesetting details, and his experience of the incident. This assessment relies on an individual’s self-report. The JFSERA is only administered to an adolescent who has a
history of firesetting behavior or if there is concern about the adolescent setting fires in the future. The purpose of the measure is to determine the risk of recidivism and to determine if the adolescent should receive specific and comprehensive treatment for firesetting. The JFSERA begins with an identification of an adolescent’s firesetting incidents in chronological order. Each incident is rated for severity using the Fire Incident Rating Scale. The JFSERA also evaluates an adolescent’s firesetting behavior through 17 questions, in the domains of firesetting history, fire knowledge, prior firesetting treatment and education, firesetting thinking and arousal, and self-understanding.

For the purpose of this study, firesetting severity was assessed using one section of this measure, specifically the Fire Incident Rating Scale. This scale assesses the severity of each specific incident of firesetting on a scale of 1 to 5 (1 = “repeated play in spite of being told no where property is not damaged and people are not harmed. Includes candle play with candles, lighting matches in ashtray or other safe place” and 5 = “Serious property damage with immediate risk of harm to self or others, or with harm or death”), with a score of 5 being the most severe level of firesetting behavior. The average score for all of an adolescent’s firesetting incidents was used in this study.

Because of the novelty of this assessment, no psychometric properties have been established.

Procedure

Data was obtained from a residential treatment facility for boys, using archival data that was in a pre-established, anonymous data set. The data set included information from a variety of measures, including the Trauma Symptom Checklist, Conners’ Parent Rating Scale, and Juvenile Fire Setting Evaluation and Risk Assessment, all which were
analyzed in this study. The battery of assessment measures used in this study were typically administered when an adolescent was first admitted into the residential treatment facility. Upon intake, an adolescent completed the TSCC, a self-report measure. In addition, a residential staff member completed behavior checklists, including the Conner’s Parent Rating Scale. If there were reported concerns related to firesetting behavior, an adolescent was referred for a thorough evaluation using the Juvenile Firesetting Evaluation and Risk Assessment. This occurred at the residential treatment facility and was administered by a residential staff member or predoctoral practicum student.

Data were collected between 2005 and 2008 and was entered into a database established by a licensed clinical psychologist at the residential treatment facility. When data were entered, no identifying information (e.g., client’s name, birthdate) was included. This allowed for the database to remain anonymous. The proposed study was first submitted to the residential treatment facility’s Institutional Review Board (IRB) for approval. After receiving approval from the residential treatment facility, the proposed study was submitted to Pacific University’s IRB for final approval.
Results

Descriptive Statistics

The mean T score on the TSCC Posttraumatic Stress subscale for the entire sample was 49.20 (SD = 13.92), in the Average range, indicating this population was not experiencing a significant amount of PTSD symptomatology. On the Conners’ Rating Scale DSM-IV Hyperactivity-Impulsivity subscale, the mean T score was 62.07 (SD = 16.97), in the Mildly Atypical range. On the Conners’ Rating Scale DSM-IV Inattentive subscale, the mean T score was 55.49 (SD = 9.41), in the Average range. Firesetting was measured on a 5-point scale. The average severity of firesetting behavior was 3.7, with a range of 1 to 5. Means, standard deviations, and intercorrelations of variables are presented in Table 1.
Table 1
Zero-order Correlations for Firesetting Severity and Predictor Variables Trauma
(Posttraumatic Stress) and ADHD (Hyperactivity-Impulsivity and Inattentive) Symptomatology)

<table>
<thead>
<tr>
<th>Variable</th>
<th>M</th>
<th>SD</th>
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<th>2</th>
<th>3</th>
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</thead>
<tbody>
<tr>
<td>Firesetting Severity</td>
<td></td>
<td></td>
<td>-.051</td>
<td>.032</td>
<td>.060</td>
</tr>
<tr>
<td>Predictor Variables</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Posttraumatic Stress symptoms</td>
<td>49.20</td>
<td>13.92</td>
<td>--</td>
<td>.197</td>
<td>.217</td>
</tr>
<tr>
<td>2. DSM-IV Hyperactive-Impulsive</td>
<td>62.07</td>
<td>16.97</td>
<td>--</td>
<td></td>
<td>.660*</td>
</tr>
<tr>
<td>3. DSM-IV Inattentive symptoms</td>
<td>55.49</td>
<td>9.41</td>
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</tr>
</tbody>
</table>

Note: *p <.01

Hypothesis One

The first hypothesis stated juveniles with higher levels of trauma symptomatology (T) would evidence more severe levels of firesetting behavior (F) than juveniles with lower levels of trauma symptomatology. The regression equation, as depicted in Equation 1 in the first step with trauma symptomatology as a predictor of severity level of firesetting was not significant ($F(1, 38) = .076, p = .785$; see Tables 1 and 2). Thus, contrary to the hypothesis, level of trauma symptomatology was not a predictor of firesetting severity.

$$\beta_F = \beta_0 + \beta_T$$  (1)
Moderator Model

A moderator variable interacts with an independent variable to partition the effects of the independent variable (Baron & Kenny, 1986). A series of hierarchical regression analyses were used to determine whether a moderator model fits for the second and third hypotheses, which included the relation between trauma and ADHD symptomatology in adolescents with firesetting behavior. The two domains of ADHD, including hyperactivity-impulsivity and inattentiveness were examined separately. Multiplicative models were used to test the moderator model for each variable.

To conclude that a moderator model existed, it must have been found that the interaction between trauma symptomatology and hyperactivity-impulsivity ($\beta_T + \beta_H$) was a statistically significant predictor of the severity level of firesetting behavior in adolescents. It must also have been found that the interaction between trauma symptomatology and inattentiveness ($\beta_T + \beta_I$) was a statistically significant predictor of the severity level of firesetting behavior in adolescents in order to conclude that a moderator model existed. In each analysis, trauma symptoms were entered in step 1. Hyperactive-impulsive or inattentive symptoms was entered in step 2. The results of these analyses are reported in Table I and II, respectively.

Hypothesis Two

The second hypothesis stated hyperactivity-impulsivity symptomatology (H) associated with ADHD would moderate the relation between trauma symptomatology (T) and severity of firesetting (F). In other words, it was anticipated participants with lower levels of hyperactivity-impulsivity would have a weaker relation between level of trauma symptomatology and severity of firesetting; whereas participants with high levels of
hyperactivity-impulsivity would have a stronger relation between trauma symptomatology and severity of firesetting. Hyperactivity-Impulsivity (H) was examined as a moderator, as depicted in Equation 2.

\[ \beta_F = \beta_0 + \beta_T + \beta_H + \beta_{TH} \]  

Equation 2

As shown in Table 2, results of the hierarchical regression analysis did not support the moderator model for the interaction of trauma symptomatology and hyperactivity-impulsivity. Regression results indicated that trauma symptomatology combined with hyperactivity-impulsivity symptomatology did not predict severity level of firesetting (F (2, 37) = .070, p = .934). Trauma symptomatology scores were entered into the model first and were not a significant predictor of firesetting severity, accounting for only 0.2% of the variance in the score. Hyperactive-impulsive symptoms, the second factor added to the model, also did not contribute any unique explanation, accounting for only 0.4% of the variance.

Table 2

<table>
<thead>
<tr>
<th>Regression Results</th>
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<tr>
<td>b</td>
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<tr>
<td>--------</td>
</tr>
<tr>
<td>Step 1</td>
</tr>
<tr>
<td>Trauma Symptomatology</td>
</tr>
<tr>
<td>Step 2</td>
</tr>
<tr>
<td>H-I Symptomatology</td>
</tr>
</tbody>
</table>

Notes: H-I = Hyperactivity-Impulsivity
Hypothesis Three

The third hypothesis stated inattentive symptoms (I) associated with ADHD would also moderate the relation between trauma symptomatology (T) and severity of firesetting (F). More specifically, it was anticipated that lower levels of inattention would be associated with a weaker relation between levels of trauma symptomatology and severity of firesetting; whereas for high levels of inattention, a stronger relation would be observed between trauma symptomatology and severity of firesetting. Inattention (I) was examined as a moderator, as depicted in Equation 3.

$$\beta_F = \beta_0 + \beta_T + \beta_I + \beta_{TI}$$  \hspace{1cm} (3)

As shown in Table 3, results of the hierarchical regression analysis did not support the moderator model for the interaction of trauma symptomatology and inattention. Regression results indicated that trauma symptomatology combined with inattentive symptomatology did not predict severity level of firesetting ($F (2, 37) = .133, p = .878$). Trauma symptomatology scores were entered into the model first and were not a significant predictor of firesetting severity, accounting for only 0.2% of the variance in the score. Inattentive symptoms, the second factor added to the model, also did not contribute any unique explanation, accounting for only 0.7% of the variance.
Table 3

Results of Hierarchical Regression Analysis of Trauma Symptomatology and Inattention on Firesetting Severity

<table>
<thead>
<tr>
<th>Regression Results</th>
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<tr>
<td>$b$</td>
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<tr>
<td>Step 1</td>
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<tr>
<td>Trauma Symptomatology</td>
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<tr>
<td>Step 2</td>
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<tr>
<td>Inattentive Symptomatology</td>
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</table>
DISCUSSION

Juvenile firesetting is a widespread problem in the United States with potentially serious implications. It is also an enormously understudied area in the field of psychology. For these reasons, it is important to better understand the potential risk factors that may be contributing to juvenile firesetting behavior. In this study, three potential risk factors including trauma, hyperactivity-impulsivity, and inattentive symptoms of ADHD were investigated in relation to juvenile firesetting.

In this current study, a moderator model was used to assess whether there is a relationship between trauma and ADHD symptomatology on juvenile firesetting. Three hypotheses were examined in this study, including (1) Juveniles with higher and more severe levels of trauma symptomatology will evidence more severe levels of firesetting behavior than juveniles with lower levels of trauma symptomatology, (2) Hyperactivity-impulsivity symptomatology associated with ADHD will moderate the relation between trauma symptomatology and severity of firesetting. In other words, participants with lower levels of hyperactivity-impulsivity will have a weaker relation between level of trauma symptomatology and severity of firesetting; whereas participants with high levels of hyperactivity-impulsivity will have a stronger relation between trauma symptomatology and severity of firesetting, and (3) Inattention symptomatology associated with ADHD will also moderate the relation between trauma symptomatology and severity of firesetting. More specifically, lower levels of inattention will be associated with a weaker relation between levels of trauma symptomatology and severity
of firesetting; whereas for high levels of inattention, a stronger relation will be observed between trauma symptomatology and severity of firesetting.

Contrary to the first hypothesis, a relationship between trauma symptomatology and firesetting behavior was not found. This is divergent from other research which has demonstrated that children with high levels of trauma and exposure to stressful life events evidenced more severe firesetting behavior compared to a normative sample (Murphy, 2004). The findings in this current study, however, were consistent with a previous study that did not find a significant relationship between trauma or PTSD symptomatology and juvenile firesetting (Wilder, 2007). In this study, the researcher also assessed posttraumatic stress levels using the TSCC and found no significant differences in posttraumatic stress levels between children who had a recent history of setting fires and children who did not have a recent history of setting fires.

Although there has been minimal research conducted on trauma symptoms in relation to juvenile firesetting, it is important to note numerous researchers have found a significant relationship between child maltreatment and juvenile firesetting (Ritvo, Shanok, & Lewis, 1983; Root, MacKay, Henderson, Del Bove, & Warling, 2007; Martin, Bergen, Richardson, Roeger, & Allison, 2004; Sakheim, Osborn, & Abrams, 1991; Showers & Pickrell, 1987; Yarnell, 1940).

The hypothesized moderation models proposed for the (a) relationship between trauma symptomatology and hyperactivity-impulsivity and (b) trauma symptomatology and inattention on firesetting behavior were also not supported in this study. Although there were no identified studies to date that have looked at a moderator model between these variables, trauma (as mentioned previously), hyperactivity-impulsivity, and
Juvenile Firesetters

inattention symptomatology have generally been found to be associated with juvenile firesetting (Becker, Stuewig, Herrera, & McCloskey, 2004; Kuhnley, Hendren, and Quinlan, 1982; Showers & Pickrell, 1987; Zipper & Wilcox, 2005).

Limitations of Current Study

Because numerous researchers have found that stressful life events, including exposure to maltreatment and symptoms of ADHD are related to an increase in juvenile firesetting behavior, it was surprising to find that trauma and ADHD symptoms in this study were not related to firesetting behavior. However, as with any study, there are several factors that may have limited the accuracy and generalizability of this study. These include the recruitment of participants, design of the study, vague description of traumatic event(s), lack of variability in measures, and validity within the firesetting measure. Each of these factors will be discussed in turn.

Recruitment of Participants

First, it is important to note that the data obtained in this study were collected prior to the onset of this study and entered in an anonymous database. Therefore, the researchers associated with this study were unable to verify and confirm the accuracy of the data collected. While it was assured that the data are accurate and precise, it cannot be fully guaranteed. Also, due to the anonymity of the database, limited information was available with regard to many demographic factors, treatment history, and mental health history.

Design of Study

When interpreting the findings for the present study, it is important to recognize that the sample consisted of a small group of adolescent boys who resided in a single
suburban residential treatment center. Therefore, results need to be interpreted with caution and may not generalize to other populations because residential programs vary greatly in size, treatment models, presenting problems, and populations served (Connor, Doerfler, Toscano, Volungis, Steingard, 2004). It would also be helpful to obtain data from different settings, including adolescents who are in juvenile detention centers, foster care homes, outpatient therapy clinics, in-home placements, etc. as this study only obtained data from a single residential treatment center. This would also improve the generalizability of results. The small sample size obtained in this study was also likely problematic and may have prevented the detection of a relationship between variables. Because hierarchical regression was used in this study, a larger sample size would have been more appropriate for as a large population is often needed to detect significant relationships when using this type of statistical analyses.

Additionally, this study sought to better understand the relationship between trauma symptoms, ADHD symptoms, and juvenile firesetting. Due to paucity of research and vague definitions found in previous research, it may have been more appropriate to take a step back and assess less complex relationships. For example, it may have been more beneficial to look at the specific relationship between different trauma symptoms and juvenile firesetting, prior to assessing the relationship or interaction between trauma and ADHD symptomatology.

Participants in this study were chosen based on if they had engaged in identified firesetting behavior. Also, the boys must have participated in a thorough firesetting evaluation to be included in this study. The firesetting evaluation measure was created and implemented in the residential treatment center beginning in 2005. Therefore, any
children who were identified as engaging in firesetting prior to this were not included in this study. It is possible that a proportion of adolescents with a history of firesetting were not identified (e.g., possibly because they were not caught) and thus not included in this study. It would be helpful to also include adolescents who may be able to anonymously self-identify themselves as engaging in firesetting behavior (in addition to those adolescents who have been identified by parents or other professionals as engaging in firesetting behavior).

Definition of Traumatic Event(s)

In further consideration of the relationship between trauma symptomatology and juvenile firesetting, it would have been helpful to know what type of specific traumatic events the adolescents in this study experienced. The TSCC does not require that a specific traumatic event be identified or described; rather, it asks the adolescent to fill out the measure based on the most significant traumatic event they have experienced. This limitation makes it unclear how different aspects of traumatic events, such as type, frequency, chronicity, and relationship to the perpetrator of the event may influence the severity of the adolescents’ reaction (Haugaard, Reppucci, & Feerick, 1997; Monahon, 1993). While it is not clear in the literature, it may be that certain types of traumatic events have a stronger relationship with firesetting behavior. For example, in one study, the authors found that a lifetime history of physical abuse did not differentiate firesetters from nonfiresetters; however, a lifetime history of sexual abuse did significantly differentiate firesetters from nonfiresetters (Wilder, 2007). Furthermore, firesetters were almost 4 times more likely than nonfiresetters to have been victims of sexual abuse. In addition to these findings, firesetters and nonfiresetters were equally likely to have a
lifetime history of neglect. However, firesetters were more likely than nonfiresetters to have experienced emotional neglect and lack of supervision. This is consistent with previous literature in which children are most likely to set fires during unsupervised times because no one prevents them from engaging in dangerous behavior. The likelihood of firesetting has been shown to increase during hours when adults are working and not closely monitoring children, such as when children get out of school, between the hours of 3:00 and 5:00 PM (Oregon Office of State Fire Marshall, 1998).

In addition to having a better understanding of specific traumatic events, it would also be helpful to know how many traumatic events the adolescents experienced. It is possible that an accumulation of traumatic events (e.g., exposure to domestic violence, physical abuse, and sexual abuse) or exposure to complex trauma has a stronger relationship with firesetting behavior in adolescents than a single, isolated event. Complex trauma can be defined as “the simultaneous or sequential occurrences of child maltreatment—including emotional abuse and neglect, sexual abuse, physical abuse, and witnessing domestic violence—that are chronic and begin in early childhood” (Cook, Blaustein, Spinazzola, & van der Kolk, 2003, p. 4). It may also depend on the severity or extent of the traumatic event(s).

Lack of Variability within Measures

Another interesting and perplexing aspect of this study was the lack of variability in the measures used to assess trauma and ADHD symptoms. More specifically, the adolescents in this study were not experiencing a significant amount of trauma or ADHD symptoms according to the measures used to detect these things. Symptoms of posttraumatic stress, hyperactivity-impulsivity, and inattention were in the Average,
Mildly Atypical, and Average range, respectively. This is contrary to research that has found high levels of trauma and ADHD symptomatology in residential treatment populations (Connor, Doerfler, Toscano, Volungis, & Steingard, 2004; Kjelsberg & Nygren, 2004; Lyons, Libman-Mintzer, Kisiel, & Shallcross, 1998).

There are numerous reasons this study may have found low levels of trauma and ADHD symptoms. Looking at trauma symptomatology first, it is possible that the adolescents in this study were simply underreporting their symptoms. The adolescents completed the TSCC, which is a self-report measure. According to a review by The National Child Traumatic Stress Network (2009), a significant number of clinicians reported that many highly traumatized children obtained extremely low scores on the TSCC. According to this review, the low scores may be due to the TSCC items being face valid. In turn, these adolescents are possibly denying significant symptoms related to trauma, attempting to portray themselves in a positive light, or may be unable to report on their current symptomatology.

The TSCC also does not give an overall score to assess for trauma symptomatology; rather, the TSCC divides symptoms related to trauma into six subscale scores. This study only included one of those subscales, which included the Posttraumatic Stress subscale, a measure that specifically assesses PTSD symptoms. It is possible that this subscale did not include enough items to reliably measure trauma symptomatology. Also, according to a review of the TSCC, the Posttraumatic subscale heavily focuses on intrusion symptoms, and therefore may not accurately measure PTSD symptoms (Ohan, Myers, & Collett, 2002).
It is also possible that the Posttraumatic Stress subscale does not best account for the psychological or emotional reaction experienced by juveniles in residential treatment facilities. Because there are many symptoms associated with trauma, it is possible that reactions to trauma in this population are expressed through different modalities, such as anger, depression, anxiety, or dissociation. It would be important to be aware of these other possible trauma symptoms in future research. In addition to considering different modalities of the expression of trauma, it is important to consider that many children who have been traumatized do not often meet full criteria for PTSD (Azar & Wolfe, 2002), and therefore this measure may not have effectively captured the adolescents’ responses to trauma. This is particularly true for children who have been physically abused (Deblinger, McLear, Atkins, Ralphe, & Foa, 1989). Many researchers have also argued that the criteria developed for the diagnosis of PTSD in the DSM is not developmentally appropriate for children (Deblinger, McLear, Atkins, Ralphe, & Foa, 1989; Fletcher, 2003). While this issue is beyond the scope of the project, it may be a factor that affected the results of this study. Future research should continue to focus on developing the most appropriate diagnostic criteria for PTSD in children and adolescents.

Another possible explanation for the lack of variability on the TSCC is that the adolescents did not perceive their traumatic experience to be as particularly stressful or distressing as hypothesized. The proportion of adolescents who actually experienced events that they considered to be traumatic (i.e., involved real or perceived danger) may have been small, and, as a result, trauma symptoms were not present. Second, even if children in the study did perceive events as traumatic, many children experience transient or even delayed onset of symptoms (Ronen, 2002). It may be that firesetters who
experienced traumatic events did not endorse clinically significant symptoms at the time the measure was completed. It is possible, however, that the adolescents would have endorsed trauma symptoms immediately after the event or will endorse trauma symptoms in the future. In this regard, future research is needed to better understand the progressions of trauma symptoms in adolescents.

Looking next at ADHD symptomatology, it is unclear why low levels of hyperactivity-impulsivity and inattention were reported. The Conners’ Parent Rating Scale was completed upon intake by a residential staff member. It is possible that high levels of ADHD or behavior problems are not observed when they first arrive at the residential treatment facility. This is consistent with the period known as the “honeymoon” phase, as the adolescent transitions into the residential treatment facility. In this situation, a child may be more motivated for treatment and may not present behaviors or symptoms that were present prior to coming into residential care (Summers, 2007). As they become more settled in to their new routine and accustomed to the expectations, and rules, they are likely to revert to old ways of behaving, thinking, and feeling. If this is the case, it would be helpful for residential staff to complete the assessment once the adolescent has been in treatment for a longer period of time or to simply complete the measure numerous times throughout the adolescents’ treatment. It would also be helpful to have a parent or caregiver also fill out the form. This would allow for a more accurate report of the adolescents’ behavior over a longer period of time. It is not clear why residential staff (rather than a caregiver) completed the Conners’ Parent Rating Form. Perhaps, numerous caregivers were unavailable, incapable, or unwilling to complete the checklist.
Validity of Firesetting Measure

The firesetting measure used in this study was implemented to address major limitations noted in other studies. Many studies simply ask if the child or adolescent has ever engaged in firesetting behavior. Many studies also used the Child Behavior Checklist (CBCL) to assess for firesetting behavior (Becker et al., 2004; Faranda, Katsikas, Lim, & Fegley, 2007; Kazdin & Kolko, 1986). The use of the CBCL to assess firesetting behavior is problematic in three ways. First, the CBCL has a single question that vaguely addresses firesetting. It simply asks, “Sets fires.” Second, the CBCL asks the respondent to answer questions regarding behaviors that have occurred in the last 6 months. Third, the CBCL firesetting item did not allow for differentiation between children with a history of firesetting behavior and those children with histories of playing with matches but not setting fires (i.e., matchplayers). This is problematic because children who play with matches tend to have fewer difficulties and lower levels of psychopathology compared to firesetters (Kolko & Kazdin, 1990; Kolko & Kazdin, 1991). On the other hand, the JFSERA uses a rating scale to assess the severity of each firesetting event and also accounts for all previous incidents of firesetting behavior. In this study, the average severity of all firesetting incidents was used.

While the JFSERA addresses many weaknesses identified in other studies, it also has a number of limitations. First, the JFSERA has limited empirical support due to the novelty of the instrument. While this assessment provides information in numerous domains in relation to firesetting, the clinical and research applicability and psychometric properties are unknown. Another drawback of this assessment is that it is completed by a residential staff member or predoctoral practicum student, who rates each firesetting
incident on a scale of 1 to 5. The scale is somewhat subjective and open to interpretation. In addition, it is unclear how much training the staff and students received in order to competently and reliably administer this measure. Last, this assessment is dependent on the adolescent’s memory for each specific firesetting event. It is possible that participants may under- or over-report the severity of their behavior or have difficulty remembering particular details of the firesetting event(s). In this regard, it may be helpful to administer this assessment to multiple informants (i.e., adolescent, caregiver, school teacher, probation officer) to get a more comprehensive understanding of the adolescent’s behavior. Including a review of records may also be a helpful addition. It has, however, been found that there is usually a high level of agreement between parents and children in regard to recent firesetting behavior (Kolko & Kazdin, 1988).

Implications for Future Research

This study sought to address the limitations identified in previous research. Standardized, narrowband measures were used to assess trauma and ADHD symptomatology, which has been significantly lacking in other studies assessing juvenile firesetting behavior. This study also sought to use a more standardized definition of the construct of firesetting. In many studies, the definition or construct is not explicitly stated, leaving the reader to define firesetting behavior. In other identified studies, the definition of firesetting may range from curiosity of lighting or playing with matches to a malicious intent to cause harm to a person or property. This study explicitly defined firesetting as occurring when an individual deliberately engaged in firesetting behavior with the intention of causing serious damage (DSM-IV-TR, 2000).
Juvenile firesetting has been identified as a significant problem in the United States and can have serious consequences. As an understudied area, it is important for mental health professionals to continue to study the risk factors, antecedents, and long-term course of juvenile firesetting. Results of this study have future implication for research in the area of juvenile firesetting. In the future, it will likely be beneficial to replicate this study with a larger population. If more participants were obtained, researchers may be better able to detect a relationship between variables. Because obtaining large sample sizes for juvenile firesetters is difficult, it would be helpful for future researchers to collaborate to collect data from numerous treatment sites. It may also be helpful to create regional and national databases to fully understand juvenile firesetting behaviors.

It will also be essential for future researchers to conduct longitudinal and prospective studies to better understand the progression and relationship of firesetting with trauma and ADHD symptomatology. Following children with exposure to trauma, ADHD, and other conduct problems will be helpful in assessing the progression of their difficulties. This may be informative in helping mental health professionals better understand what occurs first, whether it is a specific trauma, onset of ADHD, or firesetting behavior. It will be particularly important to include multiple time points and to assess adolescents after they got through the “honeymoon” stage (especially if a residential treatment staff member is completing the measures). Conducting longitudinal and prospective studies will also help us better understand the process of how some adolescents engage in firesetting behavior and others do not. This is essential in order to ameliorate or prevent firesetting in adolescents.
Validated measures, with adequate psychometric properties should continue to be used when assessing for difficulties associated with trauma and ADHD. It would, however be helpful to use a measure that allows for a more thorough assessment of trauma, including what the traumatic event was, how many traumatic events were experienced, level of severity, frequency, etc. Additionally, further clarification of diagnoses and symptomatology would be helpful. This may include structured interviews, self- and parent-report measures, and a thorough review of adolescent’s history. Additionally, it will be important for future researchers to use a validated firesetting measure. While this specific type of measure is lacking, the JFSERA has a strong potential to fill this gap as it has sought to better quantify and define firesetting. Future research should be conducted on this measure to establish psychometric properties.

Future researchers should consider gathering data from multiple informants (e.g., adolescent, parents, teacher, probation officer, residential staff) to provide a more thorough and well-rounded picture of the child. It would also be helpful to include comparison groups, to compare firesetters with a normative sample and well as a clinical sample with no firesetting behavior. Because of the paucity of research on juvenile firesetting, qualitative research will be helpful in obtaining a better general understanding of firesetters’ motives and why they have a desire to start fires.

Finally, it was beyond the scope of the study to examine all possible risk factors outlined in the social-learning theory of juvenile firesetting (Kolko & Kazdin, 1986). In the future, it will be important to assess other risk factors (as well as protective factors) associated with juvenile firesetting that were not addressed in this study, as it is likely that firesetting is multifaceted and has multiple causes. It is also possible that other
factors better account for the emergence and maintenance of firesetting behavior in adolescents. Other factors to consider include other mental health difficulties (e.g., depression, anxiety, oppositional behavior), substance abuse and dependence, suicidality, peer group, family functioning, and academic difficulties/competence.

Clinical Implications

It was hoped that this study would provide insight into future treatment and assessment of adolescents who start fires. While no clinically significant results were found in this study, it will continue to be important to better understand, treat, and prevent firesetting behavior in juvenile delinquent populations. While little research has been conducted on the treatment of firesetting, numerous treatment options have been suggested. These include psychoeducation, fire safety and prevention (e.g., The Juvenile Fire Awareness and Intervention Program), behavior modification, contingency management strategies, cognitive behavior therapy, or a combination of these interventions (Adler et al., 1994; Cox-Jones, Lubetsky, Fultz, & Kolko, 1990; DeSalvatore & Hornstein, 1991; Kolko, 1983; Kolko, 2001; McGrath, Marshal, & Prior, 1979). Other researchers suggest a “graphing” technique early in treatment to control firesetting behavior (Bumpass, Fagelman, & Brix, 1983). This technique involved sequentially correlating external stress, behavior, and feelings on a line graph. In essence this technique is behavioral, in which a child identifies and graphs the antecedents and consequences of his or her behavior. After getting the firesetting behavior under control, the researchers suggest reverting to a more traditional approach to therapy, which targets specific psychopathology of the child or adolescent.
Due to the limitations identified in this study and the paucity of research on the relationship between trauma symptomatology, ADHD, and juvenile firesetting, it is essential to be cognizant that a relationship may actually exist between these variables. Whether or not trauma-related symptoms or ADHD are related to juvenile firesetting, it is important to treat trauma-related difficulties and ADHD as untreated symptoms can lead to significant costs to society, further psychological problems, and externalizing behavior. For example, research has supported a relationship between untreated ADHD symptomatology and severe conduct problems and substance abuse (Barkley, 2003; Loeber, 1990). In fact, ADHD has been found to be one of the earliest predictors of conduct problems and antisocial disorders, including Oppositional Defiant Disorder, Conduct Disorder, and Antisocial Personality Disorder (Fischer, Barkley, Fletcher, & Smallish, 1993; Hinshaw & Lee, 2003; Lahey, McBurnett, & Loeber, 2000). In turn, firesetting behavior is identified as a diagnostic criterion under Conduct Disorder, which is defined as “a repetitive and persistent pattern of conduct in which either the basic rights of others or major age-appropriate societal norms or rules are violated” (DSM-IV, 2001, p. 98). Therefore, it is essential to treat ADHD prior to it leading to more severe conduct difficulties, such as firesetting and becoming increasingly resistant to treatment. There have been numerous well-researched, empirically supported treatments suggested for the treatment of both trauma symptoms (related to maltreatment) and ADHD.

While the previously identified treatments (e.g., psychoeducation, cognitive behavior therapy) may be helpful in reducing firesetting behavior, they may not account for other difficulties that an adolescent is experiencing in other domains. In other words, specific firesetting treatments only addressing these behaviors may not be helpful in
reducing or ameliorating other problematic behaviors or emotions (e.g., trauma symptoms, ADHD, general life stressors, social difficulties, family discord, etc). Children who set fires would still likely benefit from other interventions to address other difficulties. Incorporation of other interventions targeting other difficulties into specific firesetting treatments and prevention programs may reduce the number of fires set by juveniles and the emotional and financial costs associated with firesetting. Bumpass, Fagelman, & Brix (1982) suggest addressing specific firesetting behavior in the initial phase of treatment followed by additional treatment to address particular difficulties or mental health issues that are present.
References


Appendix A

Conners’ Parent Rating Scale

The complete measure – Conners’ Parent Rating Scale-Revised, Long Version (Conners, 1997) – has been redacted from the online version of this work to preserve the validity and security of the instrument.
Trauma Symptom Checklist

The complete measure – Trauma Symptom Checklist (Briere, 1996) – has been redacted from the online version of this work to preserve the validity and security of the instrument.
Juvenile Fire Setting Evaluation and Risk Assessment

The complete measure – Juvenile Fire Setting Evaluation and Risk Assessment (Henry, 2005) – has been redacted from the online version of this work to preserve the validity and security of the instrument.