ABSTRACT OF DISSERTATION

Carrie Howell Bowling

CHARACTERISTICS AND ACADEMIC PREDICTORS
OF
SELF-REPORTED JUVENILE FIRESETTING

_____

ABSTRACT OF DISSERTATION

_____

Dissertation submitted in partial fulfillment of the requirement for the
degree of Doctor of Philosophy in the College of Education at the University of Kentucky

By

Carrie Howell Bowling

Georgetown, Kentucky

Director: Dr. H. Thompson Prout, Professor of Educational,
School, and Counseling Psychology

Lexington, Kentucky

2011

ABSTRACT OF DISSERTATION

CHARACTERISTICS AND ACADEMIC PREDICTORS
OF
SELF-REPORTED JUVENILE FIRESETTING

KEYWORDS:

_____
Student's Signature

_____
Date

CHARACTERISTICS AND ACADEMIC PREDICTORS
OF
SELF-REPORTED JUVENILE FIRESETTING

By

Carrie Howell Bowling

_____

Director of Dissertation

_____

Director of Graduate Studies

_____

Date

RULES FOR THE USE OF THE DISSERTATION

Unpublished dissertations submitted for the Doctor's degree and deposited in the University of Kentucky Library are as a rule open for inspection, but are to be used only with due regard to the rights of the authors. Bibliographical references may be noted, but quotations or summaries of parts may be published only with the permission of the author, and with the usual scholarly acknowledgements.

Extensive copying or publication of the dissertation in whole or in part also requires the content of the Dean of the Graduate School of the University of Kentucky.

A library that borrows this dissertation for use by its patrons is expected to secure the signature of each user.

Name   Date

_____

_____

_____

_____

_____

_____

CHARACTERISTICS AND ACADEMIC PREDICTORS
OF
SELF-REPORTED JUVENILE FIRESETTING

Carrie Howell Bowling

The Graduate School

University of Kentucky

2011

CHARACTERISTICS AND ACADEMIC PREDICTORS
OF
SELF-REPORTED JUVENILE FIRESETTING

_____

DISSERTATION

_____

A dissertation submitted in partial fulfillment of the requirement for the
degree of Doctor of Philosophy in the College of Education at the University of Kentucky

By

Carrie Howell Bowling

Georgetown, Kentucky

Director: Dr. H. Thompson Prout, Professor of
Educational, School and Counseling Psychology

Lexington, Kentucky

2011

DEDICATION

ACKNOWLEDGEMENTS

TABLE OF CONTENTS

Chapter I: Introduction and Review of Literature

Introduction

Rural and urban residents accustomed to seeing fire engines racing with sirens

wailing and lights flashing are unaware of the problem of juvenile set fires. In 2001, the

United States Fire Administration published findings indicating that an average of 3,650

children age 14 and younger are injured or killed in fires each year. A previous study by

the National Fire Protection Association reported that one-third of all children who died

in fires had set the fire that killed them. (U.S. Fire Administration, 2001) Based on these

statistics, it can be estimated that over 1,200 children each year are killing themselves

through inappropriate use of fire. Additionally, the Office of Justice Programs reports

that in 2006, 49% of the individuals arrested for arson were under the age of 18. Juveniles

are arrested for arson more than any other crime. (U.S. Department of Justice, 2008). If

juveniles accounted for nearly 50% of the murder arrests and children playing with guns

was the cause of over 1,200 injuries or fatalities significant resources would likely be

devoted to solve the problem.

Fire setting, pyromania and arson are topics that have existed in the literature

since Freud explained firesetting through his psychoanalytic model. Helen Yarnell's

studies during the 1940's and 1950's were the first to focus on the behavior of youth

firesetting. Her study in 1940 found that over 70% of adult incarcerated arsonists and

institutionalized pyromaniacs had firesetting histories beginning in childhood. She also

introduced the concept of the ego triad; fire setting, enuresis, and cruelty to animals as

predictors of violence (Yarnell, 1940). The psychoanalytic view of firesetting continued

to pervade the juvenile firesetting research through the 1970's. Beginning in the late

1970's and early 1980's a shift occurred in the study of juvenile firesetting and also in the number of studies being conducted on the topic. Researchers like Fineman (1980, 1995) and Kolko and Kazdin (1986) began to analyze juvenile firesetting from multiple perspectives of a child's life. The social learning and dynamic-behavior models gave clinicians a more thorough framework for understanding children who set fires and assessment tools to use in diagnosis and treatment planning. Even with the increase in interest on the topic in the past two decades, there is still relatively little research on the problem compared to child and adolescent disorders and behaviors. Gaps in the literature remain. Most of the research has focused on individual, environmental and family characteristics of children who set fires with very little attention paid to academic and attentional variables.   This knowledge of predictors and characteristics of juvenile firesetters is based predominantly on studies conducted with inpatient, outpatient and clinic samples.

      The following review of the existing literature summarizes the known predictors and characteristics of juvenile firesetters and provides a brief overview of the social-learning and dynamic-behavioral models of firesetting. A discussion of gaps in the research will highlight the need for this study.

Review of Literature

Characteristics of Juvenile Firesetters

      The characteristics reported in the literature to be associated with firesetting behavior span all dimensions of a child's life and include demographics, behavioral and psychological correlates, family composition, and their environment.

Demographics: Demographic information about children and adolescents who set fires is frequently reported in the research with findings that are common across studies. Age and gender are consistently found to be significant predictors of firesetting behavior with boys of all ages more likely to set fires than their female counterparts.

Male gender is highly associated with fire setting. Across studies, firesetting is more prevalent in boys than girls with rates as high as 69-91% in some samples. (Henderson & MacKay, 2009, Kolko & Kazdin, 1990, Kolko & Kazdin, 1991, Kolko & Kazdin, 1994, Martin, Bergen, Richardson, Roeger, & Allison, 2004, Rasanen, Hirvenoja, Hakko, & Vaisanen, 1995, Sakheim, Osborn, & Abrams, 1991) A study of 18 year old males and females found that 70% of the males reported playing with fire in childhood, with "26 of the 50 males reporting they played with fireworks or firecrackers" as well. Only 44% of the females reported fire setting or fire play (Perrin-Wallqvist & Norlander, 2003, p. 151-154) Boys are also more likely to set multiple fires (Showers & Pickrell, 1987, p. 496)

A child's age is predictive of firesetting behavior and the actual behavior of firesetting and fire play has been found to correlate with developmental age ranges as well. "Fire interest typically occurs between three and five years of age" and "is considered a normal path of development." Actual experimentation with fire "normally takes place between the ages of five years to nine years." (Lambie, McCardle, & Coleman, 2002, p. 74-75) Clinical studies of juvenile firesetters confirm that many children had set their first fire (index fire) when they were between six and eight years old. (MacKay, Henderson et. al., 2006, Sakheim & Osborn, 1999). The average age of many firesetters involved in fire education programs, residential treatment or psychiatric

hospitals is nine years old. (Kolko & Kazdin, 1990, Kolko & Kazdin, 1991, Kolko & Kazdin, 1994). Other studies also indicate a high percentage of children who are identified as firesetters are below twelve years old with a smaller percentage of children falling into the adolescent age range. (Showers & Pickrell, 1987)   According to Showers & Pickrell (1987) the "youngest group of firesetters ages 4 to 8 was significantly more likely to set fires with financial cost of $500.00 or higher." (p. 496) Older age is associated with a child being more likely to seek out ignition materials and also re-offend (Kolko & Kazdin, 1994, p. 119). Data is limited on children over 12 years of age who have set fires. Many areas set 12 years of age as the cut-off for charging children with arson. At this age, children can be remanded to court and enter the juvenile justice system versus the mental health or community services systems.

Behavioral and Psychological Characteristics: Children displaying fire play and firesetting behavior have been found to exhibit a wide variety of other behavioral and psychological problems. These differences have been found even when comparing firesetters and non-firesetters in samples from inpatient, mental health, and hospital settings. A relationship as been found between conduct problems, delinquency, and Attention Deficit/Hyperactivity symptoms and firesetting.

Conduct Disorder and other externalizing behaviors such as aggression and delinquency show in numerous studies (Health, Hardesty, Goldfine, & Walker, 1985, Kafry, 1980, Kolko, Kazdin, & Meyer, 1985, Kolko & Kazdin, 1991, Moore, Thompson-Pope, & White, 1996, Pollinger, Samuels, & Stadolnick, 2005, Sakheim, Osborn, & Abrams, 1991, Slavkin, 2004, Stickle & Blechman, 2002).to correlate with firesetting. It is believed that the presence of conduct problems "may be linked to early

initiation or onset of fire involvement, individual differences in fire interest or may help

sustain interest." Several researchers in the 1980's investigated the relationship between

Conduct Disorder and firesetting. Compared to sex matched controls and control groups,

a larger percentage of juvenile firesetters were diagnosed with Conduct Disorder with

percentages ranging from 60 to 64.5% (Heath, Hardesty, Goldfine, & Walker, 1985;

Showers & Pickrell, 1987). In one study (n=204), 76.9% of children in an psychiatric

outpatient center with a diagnosis of Conduct Disorder exhibited firesetting behavior.

(Health, Hardesty, Goldfine, & Walker, 1985, p. 574). Several researchers (Kolko &

Kazdin, 1991, MacKay et. al., 2006, Sakheim, Osborn, & Abrams, 1991, & Sakheim &

Osborn (1999) studied children identified on a continuum of fire setting from severe to

no-firesetting at all. All of these studies found that a diagnosis of Conduct Disorder was

correlated with higher levels of firesetting behavior. There is some argument that

firesetting is a symptom of Conduct Disorder and therefore the relationship is inherent

and not correlational, however there is no denying that firesetting behavior is a conduct

problem and a relationship exists between the behavior and the diagnosis.

Children who set fires are also more likely to exhibit other problematic and

antisocial behaviors such as aggression, delinquency, stealing and truancy. Within

inpatient and hospitalized samples, firesetters and children who had played with fire were

distinguished by higher scores on aggression and hostility factors (Kolko & Kazdin,

1991) and also received more reports of aggression, delinquency and cruelty (Kolko,

Kazdin, & Meyer, 1985). When comparing children divided into groups by their

firesetting status (non, severe, minor) "children who exhibit higher levels of negative

social behavior, low social skills and poor social judgment are more likely to exhibit

firesetting behavior" (Kolko & Kazdin, 1989, Kolko, Kazdin, & Meyer, 1985, Sakheim, Osborn, & Abrams, 1991, Sakheim & Osborn, 1999.) In a sample of children referred for firesetting behavior, there was a "significant correlation between antisocial behavior and frequency of fire involvement, age of onset of fire involvement, and firesetting recidivism" after controlling for conduct problems. (MacKay et. al., 2006, p. 1081) Studies conducted within community populations also support this finding that antisocial behavior is a strong predictor of firesetting. Martin, Bergen, Richardson, Roeger, and Allison (2004) found the odds of a juvenile with serious antisocial behavior setting a fire was 7 times greater compared to a child rated as having low antisocial behaviors. Children and adolescents who set fires are also more likely to be involved with illegal drugs and display risk-taking behavior. Explaining why the relationships exist between Conduct Disorder, antisocial behaviors, delinquency, aggression and firesetting is difficult but recognizing that these are all significant serious behaviors is easy.

Children who set fires also exhibit more internalizing behaviors than their peers. Kolko & Kazdin (1991) found that firesetters and matchplayers "received higher internalizing behavior scores on the Achenbach Child Behavior Checklist than the non-firesetter group when comparing children from an inpatient sample. Firesetters received the highest internalizing scores of all three groups. Self-injurious behavior, suicidal thought, and attempts are also found in higher rates among juveniles reporting involvement with fire and matches. In the same study by Kolko and Kazdin (1991) both firesetters and matchplayers received higher scores on self-injury measures than children who never played with fire or matches. Martin, Bergen, Richardson, Roeger, & Allison (2004) also found that firesetters report more suicidal thoughts when compared to peers

who report no firesetting or fire play. In a study comparing juvenile arsonists and juvenile criminals, 74% of the arsonists reported suicidal thoughts and 44% reported attempting suicide. (Rasanen, Hirvenoja, Hakko, & Vaisanen, 1995)

No review of firesetting literature would be complete without discussion of the research on the ego triad of firesetting, enuresis, and cruelty to animals. There is discrepancy in the research with some studies supporting the existence of a relationship between these behaviors and others finding no correlation. The evidence to support the predictive validity of the triad to predict violence is also mixed. Ritvo, Shanok, and Lewis (1983) compared incarcerated male adolescent firesetters and incarcerated boys who had not set fires. They found that "only two of the 27 firesetters had a history of cruelty to animals and similar proportions of firesetters and non-firesetters were enuretic" (p.265). A study by Showers & Pickrell (1987) also found that a low percentage of children identified as firesetters in a study of 186 firesetters and 165 age and sex-matched controls exhibited the triad behaviors. On the other hand, cruelty to animals and others has been shown to correlate with firesetting severity and recidivism. Compared to non-firesetters, firesetters in a residential placement had a higher incidence of past physical violence and cruelty to animals. Sakheim & Osborn (1999) and Slavkin (2001) found that juveniles who were cruel to animals were more likely to engage in recidivistic firesetting and would be categorized as severe firesetters. Contradicting findings from Rasanen, Hirvenoja, Hakko and Vaisanen (1995) found that when comparing juvenile criminals and juvenile arsonists that "none of the violent offenders had ever committed arson" (p.43).

The relationship of enuresis to firesetting is not as heavily studied but an investigation by Slavkin (2001) found that the level of "enuresis in the group of juvenile firesetters identified for the Marion County Arson Investigation Network Firestop program was higher than in a normative sample from a health survey" (p.464). Overall, the predictive validity of the ego triad as traditionally represented does not hold but a relationship may still exist between firesetting, cruelty to animals, and bedwetting. It is possible that a discrepancy exists in the research findings based on which exact behaviors are being correlated as well as the specific population being sampled.

School Functioning and Attention Characteristics: Cognitive, academic and attentional characteristics also differentiate children and adolescents who set fires from their non-firesetting peers. Information on the cognitive functioning and academic performance of juvenile firesetters is more limited than research into the behavioral and psychological functioning of these children. Intelligence as measured by general intelligence tests does not appear to differentiate firesetters from non-firesetters in samples from clinics, school populations and random samples from the community (Kafry, 1980; Kolko & Kazdin, 1994; Kosky & Silburn, 1984; Ritvo, Shanok, & Lewis, 1983) Components of cognitive functioning such as poor planning ability and poor understanding of cause and effect relationships are also associated with children who play with fire (Sakheim & Osborn, 1999).

Firesetters differ from other groups of children on school and academic performance in the few studies conducted utilizing school information. Firesetters and delinquent control groups are found to have "poor academic performance, history of grade failure and truancy" (Showers & Pickrell, 1987, p. 498). These findings also reflect

back onto the behavioral problems associated with firesetting. Typically children with behavior problems perform less well in school so it is expected that children who set fires may also exhibit similar problems.

Children who set fires are also found to have a higher incidence of Attention Deficit Hyperactivity Disorder. Studies suggest that the associated impulsivity plays a role in a juvenile's ability to inhibit their behavior and contributes to playing with lighters, matches and firesetting. When comparing firesetters and non-firesetters, juvenile firesetters with impulsive behavior lost their inhibition when compared to non-firesetters in a residential placement (Sakheim & Osborn, 1999). Additionally firesetters and children who played with matches have been rated higher in "emotionality, impulsivity and lower socialbility than non-firesetters" (Kolko & Kazdin, 1991, p.196). Impulsivity also differentiates between firesetting groups based on severity with more severe firesetters and more persistent firesetters exhibiting more impulsivity. (Sakheim, Osborn, & Abrams, 1991). Of the juveniles referred to a fire setter intervention program in San Diego County, California "between 20-40% of the children had been diagnosed with ADD or exceed(ed) the criterion in the Diagnostic Statistical Manual –Fourth Edition" (Rea, n.d.). Interestingly, in a study conducted by Showers and Pickrell (1987) only 20% of firesetters received a diagnosis of Attention Deficit Disorder (ADD). Further research into the correlation of fire setting and ADD/ADHD would be beneficial to determine the extent that impulsivity plays a role in children's firesetting behaviors. It would also be helpful to determine if management of ADD/ADHD symptoms would also minimize firesetting as well.

Family and Environmental Factors

Research into the etiology of juvenile firesetting has investigated the

environmental and familial characteristics that correlate with juvenile firesetting. Results

are varied, with some studies finding significant correlations between family composition

and a child living environment and the likelihood that they will set fires and while others

conclude that there is no difference.

Basic family demographics such as family size, median income, and family

composition have been included in multiple studies. Kosky & Silburn (1984), Kolko,

Kazdin, & Meyer (1985) and Kolko & Kazdin (1991) found no significant difference in

family demographic variables when comparing firesetters to other groups of children in

hospitalized, inpatient or psychiatric outpatient samples. More recent study results show

that there "was not a relationship between the number of fires set and an adolescent's

living environment" (Pollinger, Samuels, & Stadolnick, 2005, p.348). Additionally birth

order and the number of children in a family appear to have no relationship to a child's

firesetting status.

Parent marital status does appear to predict a child's involvement with fire.

"Firesetters are more likely to come from families where parents had never been married

and to live in a home with a step parent or significant other adult" (Showers and Pickrell,

1987, p. 497). In a study by Kosky and Silburn (1984) comparing firesetters with children

who had not set fires, 2/3 of the children identified as firesetters had parents who

separated compared with 1/3 of the non-firesetters. Twenty-six percent were living with

their mother only and the other 31% were living with a biological parent and a step-

parent (p.252). Similar findings from (Ritvo, Shanok, & Lewis, 1983) indicate that even

when comparing juvenile firesetters to incarcerated male juveniles with no fire history, the number of "firesetters with a biological mother in the home was significantly lower than the number of non-firesetters" (p.263). Recent findings from Henderson & MacKay (2009) examining firesetters in a juvenile firesetter intervention program found that a high percentage (66%) lived with at least one biological parent, although it is not clear if the other biological parent was also at home or the identified parent was the single caregiver. Previous findings from Kolko and Kazdin (1991) indicate that only 12% of the children identified as firesetters resided with both biological parents. Kafry (1980) found the relationship between a child having both biological parents in the home to be important in reducing firesetting behavior. Children who "lived with both biological parents had a lower tendency to play with fire relative to children who lived in other family constellations" (p.9).

Several studies have found that a large percentage of families with children identified as juvenile firesetters fall into lower socio-economic classes. Two studies by Kolko and Kazdin (1991, 1994) found approximately 60% of children in the identified firesetter group fell into lower SES classes and nearly 50% received public assistance. Henderson & MacKay (2009) studied children involved with a firesetter intervention program and found that "36% lived in households with annual incomes less than $20,000" (p. 132). It makes sense that children from lower socioeconomic classes and homes with only one consistent caregiver may be more likely to set fires. Lack of supervision has clearly been linked to firesetting. Parents working to support a family or a single parent cannot provide the same level of supervision as a "stay-at-home" mom or a home where there are two consistent parents.

Child-parent relationships have also been the subject of investigation to determine the basis for firesetting behavior. There is information from empirical studies suggesting that in many situations, fractured and stressed parent-child relationships exist where a child exhibits firesetting behavior. Several studies by Kolko and Kazdin (1991, 1994) found that parents of firesetters reported more arguing and fighting with their child. "Power struggles are also more common between children identified as firesetters and their parents than non-firesetters and their parents" (Sakheim & Osborn, 1999, p.420). Not surprisingly, "parents of firesetters also reported less acceptance and less-child centeredness than parent of no fire children" (Kolko & Kazdin, 1990, p. 234). Only a longitudinal study could determine whether parental acceptance existed prior to the firesetting or whether these parental behaviors were in response to challenging behaviors displayed by the child. Sakheim, Osborn, and Abrams (1991) and Sakheim and Osborn (1999) studied the relationship characteristics of children with firesetting behavior that were living apart from their families, comparing children classified as extreme and minor risk firesetters and children with no firesetting history. In both studies, children in both the minor and extreme firesetter groups had intense anger over parental rejection and abandonment. Additionally, these children wished for a "reunion with their paternal figure, an absent father in the minor group" more than in the severe risk group. The researchers felt this desire to reunite with a parental figure may be stronger in the minor risk group due to their "better capacity to form attachments and experience object ties" (Sakheim, Osborn & Abrams, 1991, p. 500). Children in the minor and severe risk groups also expressed "revenge fantasies and anger "and were easily enraged. According to Sakheim, Osborn and Abrams (1991) children who lack attachments and who are

"chronically angry" are more likely to act out and in the case of these children, set fires (p. 495).

Parental discipline is another environmental factor that predicts children who set fires. Two studies suggest that children who set fires come from homes with less structure, inconsistent rules enforcement, lax discipline, and less monitoring (Kolko and Kazdin, 1990, Kazdin & Kolko,1986). Unlike many of the previously mentioned studies, these studies were conducted with children from both nonpatient, inpatient and outpatient populations, suggesting a much more representative sample with more generalizable findings. Additionally, the parents of children who set fires have been found to utilize harsh discipline and ineffective mild punishment with no real repertoire of behavior management skills. A study by Ritvo, Shanok, & Lewis (1983) found that 18% of incarcerated adolescent firesetters had been burned severely at some point with some of the burns received as a form of punishment administered by an adult caregiver. One child reported having his "feet burned for lighting fires" and another was beaten with a hot spatula (p. 246). On the other end of the continuum, a study of preschool parents indicated that very few of the parents scolded or spanked their children for setting fires. Instead they reported "talking to the child, feeling scared, or angry and calling emergency services" (Pollack-Nelson, Faranda, Porth, & Lim, 2006, p. 175). All of the findings suggest that better parent education is needed to enable parents of children who set fires to effectively deal with the behavior. It is unclear however whether the relationship between ineffective and inconsistent discipline and firesetting is causal or correlational.

Physical and sexual abuses are additional environmental characteristics that have been shown to relate to firesetting in children and adolescents. In some studies the level

of abuse and neglect reported by juvenile firesetters is significant compared to other groups, but in studies where the comparison group is incarcerated juveniles or youth in mental health treatment programs the results are less significant. In a study of respondent's from a women's shelter, children identified as firesetters "experience significantly more emotional neglect and physical abuse" (Showers & Pickrell, 1987, p. 498). Children from homes with marital violence were found to be "2.4 times more likely to set fires than those residing in nonviolent homes" and children from homes where spousal partner "harmed pets and drank in higher quantities were also significantly more likely than other children to start fires" (Becker, Stuewig, Herrera, & McCloskey, 2004, p. 908). No significant differences were found in abuse reports when comparing firesetters and non-firesetters in a sample of children taken from community mental health centers and a medical hospital (Showers & Pickerell, 1987). Similarly, both incarcerated male adolescent firesetters and incarcerated males with no fire setting history reported similar percentages of abuse and violence in the home (Ritvo, Shanok, & Lewis, 1983). Although the generalizability of these results is questionable due to the samples, the information about the relationship is important. Physical and sexual abuse increases a child's likelihood of setting fires two-fold and is also commonly reported by incarcerated youths. Clearly the impact of abuse on children and adolescents has implications for multiple areas of their behavior.

Practical Models of Firesetting

The dynamic-behavioral and social-learning model of firesetting both take multiple facets of a child's life into consideration when assessing and intervening with the behavior. These two theoretical models integrate the many previously discussed

characteristics in order to explain firesetting behavior. Additionally, the researchers responsible for these models created assessment tools that make the models particularly useful for clinicians working with this population of children and adolescents.

Dynamic-Behavioral Model

Dr. Kenneth Fineman's work in the early 1980's led to the development of the dynamic-behavioral model (Fineman, 1980, Fineman, 1995). The dynamic-behavioral model looks at firesetting from multiple perspectives and seeks to identify many potential factors that can lead a child to set fires. Three sets of factors influential to child fire behavior are identified by Fineman (1980); personal and individual characteristics, family and social circumstances and immediate environmental conditions. Firesetting is viewed as an "interaction between dynamic historical factors that predispose the firesetter toward a variety of maladaptive and antisocial acts, historical environmental factors that have taught and reinforced firesetting as acceptable, and immediate environmental contingencies that encourage firesetting behavior" (Stadolnik, 2000, p. 18). Maladaptive coping and behaviors are only one piece of the puzzle when viewing firesetting from a dynamic-behavioral perspective.

This theory and model is unique in that it is "constructed to explain firesetting" and instantaneous environmental reinforces are considered. These include "impulsivity triggers" such as anger or rejection and crime scene variables that provide insight into the "goals" of the firesetting behavior (Gannon & Pina, 2010, p. 231). Firesetting aimed at a property or person is viewed differently than a child playing with matches. Responses to the firesetting and the child's thoughts prior, during and following the behavior are also investigated.

The dynamic-behavioral model is also clinically useful. It helps a practitioner identify a set of factors related to a child's individual characteristics, family and social circumstances and environment that make a child at risk for firesetting. Fineman's assessment forms can be used by professionals to assess children and adolescents in the three areas contributing to the behavior as well as the sequence of events surrounding the firesetting. The Comprehensive Fire Risk Evaluation (CFR) and the Juvenile Firesetter Child and Family Risk Surveys are both assessment instruments that can be used to assess a child's firesetting behavior (Fineman, 1995, Moynihan & Flesher, 1998). These instruments provide information about the function and goals behind a child's firesetting behavior. Separate family and child measures provide useful information in identifying discrepancies in the perspectives of the caregivers compared to the responses of the child. As mentioned previously, the risk of future firesetting in this model is related to" history of firesetting, severity of psychopathology, motive and intent to harm underlying the act and the firesetter's post offense response" (Gannon & Pina, 2010, p. 233). Using the forms and interviewing the child and caregiver separately can provide valuable information about all of these areas. The forms also serve as guide for intervention and referral (Gaynor, 2002). It should be noted that there is some argument about the validity and reliability of these measures. Specifically, no normative data has been compiled for these measures and FEMA has not conducted any data analysis on information collected (DiMillo, 2002).

Social Learning Model of Juvenile Firesetting

Social learning theory originally was described by Albert Bandura in the 1970's and integrated into a juvenile firesetting model by Kolko and Kazdin (1986). Social-

learning is an influential theory in shaping our understanding of the firesetting problem, with implications for identifying children based on risk and treatment design.

Bandura's social learning theory is founded on his belief that people can learn by watching others and "individuals do not actually inherit violent tendencies, but they modeled them" after observing others (Isom, M., 2010, Cheny, K., 2010). Social learning theory also considers how reinforcement, either intrinsic or extrinsic, increases the likelihood of a behavior. Kolko and Kazdin's (1986) social learning model of firesetting builds on this premise. Several factors and three domains are identified within this model. The three domains are:

1. Learning experiences and cues
2. Personal repertoire
3. Parent and family influences and stressors.

These domains and their individual, environmental and behavioral components are utilized to determine the "tentative risk" of the child who is setting fires (p. 51).

Kolko and Kazdin (1991) have created several semi-structured interviews to assess varying risk factors related to firesetting based on the social learning model. The Firesetting Risk Interview assesses personal, familial and social dimensions related to firesetting, The Children's Firesetting Interview looks at the child's knowledge of fire, their exposure to fire through others and supervision and discipline (Hardesty & Gayton, 2002). These instruments are reported to have good re-test reliability and internal validity.

The social learning model shares conceptual themes with the dynamic-behavior model. Both the social-learning and dynamic-behavioral model look at a child's

experiences, individual characteristics and environment when assessing firesetting risk. Firesetting is also viewed as an outcome "of an interaction between individuals and their social and physical environment" (Epps & Hollin, 2000, p.37). The social-learning model requires practitioner to look for individual risk factors as well as situational risk factors, unlike the psychoanalytic model where a child's firesetting is viewed as a problem with the child and little or no focus is placed on the environment. A strong example of the social learning model as it relates to juvenile firesetting is the statistic that "one contributing factor to the predominance of children involved in lighter and match fires is smoking. If one or more of a child's parents smoke, matches or lighters may be more readily available in the home. A child in a home with a smoker is twice as likely to be involved with fire play as a child in a home with a nonsmoker" (United States Fire Administration, 2004, p. 4, 5). In this example, utilizing the social learning model of juvenile firesetting, a practitioner would consider that the child had seen their parents smoking and from this vicarious experience learned how to use the lighter.

The models discussed have contributed greatly to the understanding of firesetting behavior. In many ways, the complexity of the behavior is also reflected in the many areas of assessment addressed by the social-learning and dynamic-behavioral models. Not only are a child's individual characteristics important when analyzing firesetting, but also their previous experiences, family and environment.

Gaps in the Research

While there has been significant research on juvenile firesetting in the past twenty to thirty years, gaps in the literature remain. Most of the research has focused on individual, environmental, and family characteristics of children who set fires. This

section will discuss the lack of research on juvenile firesetters' academic and school functioning as well as the relationship between bullying and fire setting. Finally, the lack of large samples will be reviewed.

Many specific facets of cognitive functioning have been cited as contributing to firesetting behavior however little research has specifically looked at overall cognitive abilities of these children and even fewer studies have investigated academic and school functioning. A handful of researchers (Kafry, 1980; Kolko & Kazdin, 1994; Kosky &, Ritvo, Shanok, & Lewis, 1983; Silburn, 1984) have investigated differences in the overall intelligence quotients between firesetters and non-firesetters in samples from clinics, school populations, and community venues. These studies found no difference in overall cognitive functioning. Other studies pulling out aspects of cognitive ability such as formal operations, planning ability and understanding of cause and effect relationships do reveal differences between children identified as firesetters and those who had not set fires. (Cole, Grolnick, & Schwartzman, 1993, Sakheim & Osborn, 1999)

Even less is known about how children who set fires perform academically. Two studies by (Kolko and Kazdin, 1991 and Kafry,1980) found that firesetters can be differentiated from their peers academically and have depressed social skills and behavior problems, respectively. Showers and Pickrell (1987) found that both firesetters and children in a delinquent control group both showed poor academic performance, a history of failing grades, and truancy. These limited studies suggest that firesetters are differentiated from other children in the classroom, just as other children with behavioral challenges can be identified. Unfortunately, with the exception of these few studies little has been done to assist teachers in identify a child who is at-risk for firesetting in the

same way efforts have been taken to identify children at-risk for other types of violence. This is very unfortunate given that during the "2003 to 2005 school year, 14, 700 fires occurred on non-adult school properties. The primary cause of fires in schools is incendiary or suspicious in nature. These statistics are not surprising given that the same children occupy the school buildings daily, and the same issues of access, supervision and ignition materials exist in the school setting. Children who have access to lighters at home can easily bring these things into to the school and set fire to toilet paper or trash in a waste basket. Sharp, Roe-Sepowitz and Boberg (2009) specifically examined the differences in bullying experiences between children who set fires in schools and those who set fires at a location other than school property. School firesetters reported "higher rates of victimization by bullies, did not perceive themselves as getting good grades and reported being picked on and made fun of." They also reported "being called names by others, being left out of activities and staying home due to being bullied" (p. 92). The authors point out that fire setting at school may be a reaction to bullying with similarities to the reasons given by school shooters for their actions. Following the Columbine shootings and the National School Safety Center began conducting analysis of violent incidents on school property. The Center released a checklist of early warning signs for use in identify children at risk for violence. As suggested by Sharp et. al (2009) several of the items on the NSSC checklist refer specifically to behaviors associated with juvenile firesetting including "is preoccupied with weapons, explosives or other incendiary devices, displays cruelty to animals, has little or no supervision or support from parents or a caring adult, has been bullied and/or bullies or intimidates peers or younger children." (National Center for School Safety, 1998).

Studies conducted with large samples populations are rare. Of the studies examined, the majority utilized populations of less than 200 individuals, ranging from 17 to 192. (Swaffer & Hollin 1995, (MacKay, Henderson, Del Bove, Marton, Warling, & Root, 2006) Only 3 had datasets containing more than 1000 individuals. (Kosky & Silburn, 1984, Martin, Bergen, Richardson, Roeger, & Allison, 2004, Dadds & Fraser, 2006)

Summary

Much of the research on juvenile firesetting has focused on identifying characteristics and typologies of children who set fires and explaining the etiology of the behavior. Many theoretical perspectives have been developed to frame the problem, with the dynamic-behavioral and social-learning models standing out as the most comprehensive. Both of these theories propose that firesetting is a complex behavior that is the result of many factors including; personal and individual characteristics, family and social circumstances and immediate environmental conditions.

Although significant progress has been made in understanding why children set fires, gaps in the research remain. Much of the previous research on the characteristics of children who set fires is based on small samples from clinical, hospital or referred populations. Children whose firesetting behavior is this severe are not representative of the children typically referred to fire departments, guidance counselors and local community health agencies. Although the information gained from these studies provides insight, the generalizability of the results can be questioned. Finally, there has been little research on the school and academic experiences of children who set fires, including their attention, impulsivity and hyperactivity. Acknowledging the complexity

of the roots and actions of firesetting behavior means looking at all components of a child's life. Children and adolescents spend half their day at school. Further understanding the relationship academic and school functioning and firesetting may shed additional light on why some children set fires and some do not.

Purpose, Research Questions and Hypotheses

The purpose of this study is to consider the characteristics of children who set fires and then further identify which school related variables are predictive of this behavior. The academic and school functioning of children identified as firesetters has only been minimally researched and therefore discovering differences in the academic and school functioning of self-reported firesetters and non-firesetters would be relevant for teachers and school-based mental health practitioners. Although ADHD and firesetting has been better studied, the findings are mixed. Further investigation of self-reported attention problems will lead to further understanding of whether impulsivity plays a role in firesetting. On a broader national scope, the true prevalence of juvenile firesetting behavior needs additional inquiry. Most fires set by children and adolescents are never reported to a fire department due to the parent's not discovering the child's behavior or caregiver's choosing not to report this behavior to authorities.

The hypotheses for the research questions are based on the research literature and the need to investigate predictors of juvenile firesetting that are less studied. The first hypothesis addresses gaps in the research regarding the academic and school functioning of children who also report firesetting behavior. The second hypothesis will look at attention problems and their relationship to firesetting. Multiple studies have found that impulsivity is associated with firesetting (Kafry, 1980; Kolko & Kazdin, 1991; Sakheim

& Osborn, 1999; Sakheim, Osborn, & Abrams, 1991) and the research also indicates that

a diagnosis of ADHD is associated with firesetting. Hypothesis three relates to the

prevalence of self-reported firesetting in a large data set consisting of a random sampling

of children from across the country. Previous studies conducted with normative

populations from smaller geographic areas (a city or school district) provide a variety of

prevalence rates. The final hypothesis also relates to self-reported firesetting in a large

national data set and associations with internalizing, externalzing and overall total

problems reported by firesetters and non-firesetters.

> The following research questions will define the study:

1.	After controlling for gender, age, and ethnicity can a child's academic performance predict whether he/she will or will not set fires?

2.	After controlling for gender, age and ethnicity, are children with attention problems more likely to set fires?

3.	What is the prevalence of firesetting in a national normative population? Are the characteristics of children who set fires in a national, normative population consistent with the characteristics reported in the literature from clinical, inpatient, and outpatient samples?

Hypothesis related to each research question are as follows:

1. It is hypothesized that a youth's self-reported performance in school will predict the likelihood that he/she engages in firesetting behavior after controlling for gender, age and ethnicity.

2. It is hypothesized that overall attentions problems and ADHD symptoms will predict firesetting after controlling for gender, age and ethnicity.

3. It is hypothesized that more males than females will report setting fires, with low prevalence in general.

4. It is hypothesized that internalizing problems, externalizing problems, total problems, and lower overall competence will be associated with firesetting.

Chapter II: Method

Data Source

This study utilized existing data samples for the Achenbach System of Empirically Based Assessment www.aseba.org, October 22, 2010.) The ASEBA is a comprehensive system that has been researched and used widely since first introduced in 1965. The various forms document both qualitative and quantitative information and include descriptive data, plus competence, adaptive and problem scores. The ASEBA is used in a variety of settings, including schools, medical facilities, public health agencies, and other social and mental health services (www.aseba.org, October 22, 2010). Additionally, the ASEBA has been used in multiple studies on juvenile firesetting. (Del Bove, Caprara, Pastorelli, & Paciello, 2008, Pierce & Hardesty, 1997, French, 2008, Kolko, Herschell, & Scharf, 2006, Faranda, Katsikas, Lim, & Fegley, 2007, Pollinger, Samuels, & Stadolnick, 2005, Nadeau-Gaunce, 2001) Several prominent manuals on juvenile firesetting also recommend the inclusion of the ASEBA report forms in the assessment of children who set fires. (Sakheim & Osborn, 1994, Stadolnik, 2000, Kolko, Nishi-Strattner, Wilcox, & Kopet, 2002)

The Youth Self Report/ 11-18 (YSR) and Child Behavior Checklist (CBCL) data was analyzed for this study. The CBCL for children ages 6-18 is completed by parents or surrogates and the YSR for ages 11-18 completed by the youth. Cross-informant data was utilized to gather as much information as possible about youth who set fires.

The Youth Self-Report includes 112 and the CBCL includes 113 individual items. The juvenile or parent/surrogate is asked to rate each item on a scale from 0 to 2. A rating of "2" is used if the item is "very true" of the child or adolescent while a rating of "1" indicates that the described behavior is "sometimes or somewhat true". A rating of "0" is assigned to items that are "not true" of the juvenile.

Both forms yield scores for the Empirically Based Syndrome Scales, DSM-Oriented Scales and Competence Scales. The Empirically Based Syndrome Scales are: Anxious/Depressed, Withdrawn/Depressed, Somatic Complaints, Social Problem, Thought Problems, Attention Problems, Rule-Breaking Behavior, and Aggressive Behavior. DSM-oriented scales are: Affective Problems, Anxiety Problems, Somatic Problems, Attention Deficit/Hyperactivity Problems, Oppositional Defiant Problems, and Conduct Problems. The Syndrome Scales are reported as T-scores. T scores of 65 to 69 are considered to be in the borderline clinical range and scores above 70 are within the clinical range. The Competence Scales reflect a child's competence in different areas. The four reported Competence Scales are: Activities, Social, School and Total Competence. On the YSR the self-ratings of school performance is reported as the mean performance under Academic Performance and a School Competence score is not provided.

Firesetting behavior is addressed in the YSR and the CBCL. This question appears as item #72 "I set fires" and "sets fires" on the two forms respectively. The question is rated 0 to 2 and falls under the Rule-Breaking Behavior Scale. The directions indicate that the juvenile and parent/caregiver should rate their behavior in the past 6

months, so only recent firesetting behavior is captured. Item #72 is also considered a critical item that indicates a high risk or safety issue.

The Manual for the ASEBA School-Age Forms and Profiles provides information about the psychometric properties of the ASEBA rating scales including the internal consistency data, test-retest reliability of scale scores and cross informant agreement between scale scores. The reliability of the item scores are reported as the intraclass correlation coefficient. According to Lu and Shara (2007) the "best measure of reliability for continuous data is the intra-class correlation coefficient." (Lu & Shara, 2007) The ASEBA manual indicates that the ICC was utilized because it captures differences in both the rank ordering of scores and also differences in the magnitude unlike the Perason (r) or tests of difference.

The inter-interviewer reliability of items scores was evaluated although the rating scales are designed to be self-administered. The ratings of three interviewers were compared on 723 children. "The overall ICC was .93 for the 20 competence items and .96 for the 188 specific problem items on the CBCL." With a range of 0 (low reliability) to 1 (high reliability) these ICC indicate "very high inter-interviewer reliaiblity." (Achenbach & Rescorla, 2001, p. 100) Test-retest reliability is reported for items and scale scores. The test-retest reliability of item scores was computed from 72 CBCLs using the ICC. They were completed with an interviewer and mother of the youth at a 1-week interval. Only non-referred children were assessed. "The overall ICC was 1.00 for the 20 competenence items and .95 for the 188 specific problem items." This indicates very high test-restest reliability in item scores. (Achenbach & Rescorla, 2001, p. 100) The test-retest reliability of scale scores was computed using Perason correlations (rs) and t tests

of differences between CBCL ratings by parents and the YSR ratings by youths. The reliability was high for the scales selected with a range of .82 to .94 on the CBCL and .80 to .91 on the YSR.

Information about the internal consistency of scale scores is also reported in the ASEBA manual. The Cronbach's alpha for each scale is reported and provides a measure of how well "a scale will produce the same results on different occasions" when the behavior is expected to remain constant. The result is an average of every possible combination of split halves. It is important to note that Alpha is also related to the length of the scale because short scales are less "stable" than long. (Achenbach & Rescorla, 2001, p. 100) A 0 .7 Alpha is considered acceptable. The CBCL scales which were selected for this study had alphas ranging from .63 to .97. These are considered moderately high to high. The School (Behaving) competence scale was the lowest alpha at .63. The lower alphas were on the shorter scales. The internal consistency was higher on the Internalizing, Externalizing and Total Problems; alphas ranged from .90 to .97. The alphas for the YSR scales selected range from .72 to .95. Again, the highest consistency was found on the Internalizing, Externalizing and Total Problems scales which consist of many items although the Competence Scales also received high alphas ranging from .83 to .91. (Achenbach & Rescorla, 2001, p. 101)

Cross-informant agreement information is also reported in the ASEBA manual. Of relevance to this study, CBCLs completed by motehrs and fathers of children referred for a mental health services and combinations of CBCLs and YSR for children in the national survey and in mental health settings were compared. The between parent Pearson rs ranged from .57 to .85 for the scales used in this study. Mothers tended to

rather their children higher than fathers on problem scales. (Achenbach & Rescorla, 2001, p. 103)

Participants and Data Set

Two different data sets available from ASEBA were utilized for this study; the National Survey Data and the Factor Analysis sets. The data in the National Survey Data set was derived from the 1999 National Survey of Children, Youth, and Adults conducted by Temple University's Institute for Survey Research. This data set was utilized to address research questions 3 and 4 and investigate the prevalence of self-reported firesetting as well as some of the characteristics associated with this behavior. Cases in the National Survey Data set were selected from 100 areas representative of the contiguous 48 states in the United States. The eligible residents were selected by "stratified randomized procedures" to generate the desired age distribution and similar proportions of each gender for each age. The final sample contained in the National Survey includes children from 40 states and the District of Columbia.

The second data set utilized is the 1999 Factor Analysis Data set. This data was used for the first two research questions. The Factor Analysis set "consists of referred people and non-referred people with High Total Problem scores from the National Survey" (Achenbach & Rescorla, 2001, p. 74). These "referred and non-referred people" consist of individuals pulled from the larger National Survey Data set and an additional group of youth from 13 outpatient and inpatient mental health services. These reports were from 40 U.S. States, the District of Columbia, one Australian state, and England. The children from the National Survey which are included in the Factor Analysis Data Set received high Total Problem scores but may or may not be receiving services.

Two different data sets were selected for several reasons. Review of both data sets by an ASEBA software engineer assisting this author initially revealed an extremely low percentage (2% or approximately 75 respondents) of children endorsed 1 or 2 to the question "I set fires" in the National Survey Data Set. On the other hand, the ASEBA software engineer reported that approximately 344 children and adolescents self-reported firesetting in the Factor Analysis Data Set, roughly 13.5% of respondents. (D. Walter, personal communication, September 20, 2010) Due to this relatively low percentage of self-reported firesetting in the National Survey Data Set, the Factor Analysis Data Set was selected for the primary research questions, investigating the relationship of school performance, academic functioning, attention problems, and ADHD. The National Survey Data Set was used to investigate national prevalence of self-reported juvenile firesetting and characteristics in a large national sample.

The data sets were obtained directly from ASEBA however the initial data was only raw responses, no Scale Scores and cases did not have unique identifiers. Four separate data sets were received; Factor Analysis Youth Self-Report responses, Factor Analysis CBCL responses, National Survey Youth Self-Report responses and the National Survey CBCL responses.

The first problem that was addressed was the formatting of each of the four data sets to generate the scale scores. The research consultant with ASEBA indicated that syntax computer programming would be needed to ultimately generate the Scale scores necessary for this study. An SPSS specialist was consulted and was able to generate the .dat files that ASEBA needed to create output files that then were processed through the ASEBA A2S software. Adaptive Scale scores could not be generated by the ASEBA

research consultant. ASEBA indicated that the Adaptive and Competency data was unavailable from the Research Center for Children, Youth and Families. (M. Ivanova, personal communication, September 14, 2012)

Generating unique identifiers was also necessary to match YSR cases with their corresponding CBCL responses. The data sets that this author received had duplicate case numbers. The SPSS consultant initially matched cases on demographics and response dates. He then generated new i.d. numbers so that the files could be merged. Cases were excluded if demographics that would enable identification were missing and if the Youth Self-Report could not be matched with a parent/guardian case. The Factor Analysis dataset yielded 975 matched cases (N=975) with responses from the youth and the caregiver/guardian. The National Survey merged dataset consists of 1161 matched cases (N=1161).

Variables
Dependent variable:

Firesetting (fire) All research questions address fire setting so item #72 (I set fires) served as the dependent variable. Firesetting was recoded to a dichotomous variable for several reasons. The scoring scale of this question hints at the severity of firesetting but does not give parameters; therefore a score of 2 for one juvenile may not be as severe as a 2 rating for another juvenile. More importantly, it is this author's opinion that any incident of fire setting can have severe consequences so the distinction between "somewhat or sometimes true" and "very true or often true" are less important. Children were coded as firesetters if they reported it is "somewhat" or "often" true that "I set fires." Children were only be coded as non-firesetters if they responded "0", that they

do not set fires. As expected, the majority of children and parents reported no firesetting behavior (N=852 and N=887 respectively) in the Factor Analysis dataset. Also as expected, children and youth self-reported more firesetting than their guardian/caregiver. Of the remaining 123 children who did report setting fires, only 32 reported that the "I set fires" statement was "very true" of them. After recoding, over 12% of the respondents reported some level of firesetting behavior (N=123).

Add National Survey data information

Independent Variables:

The predictor variables include demographic information and selected ASEBA Syndrome, DSM and created scales representing academic competence and attitude toward school.

Demographic. Demographic information includes age, gender (*gender)* and ethnicity (*ethnic)* variables. The National Survey and Factor Analysis Data Sets were reported to have fairly equal distribution by gender. For the Factor Analysis sample, 40.6% were female and 59.4% were male. (N= 396 and N= 579 respectively). Gender was recoded with 0 to represent females and 1 representing males. Insert National Survey data. The initial ethnicity variable consisted of 7 groups. This variable was recoded as (RaceRC) with 3 groups; Caucasian, African-American and other (N= 381, N=164 and N=301).

Internalizing Problems. The Internalizing Problems T-score (*internal)* will be utilized for research question 3. The Internalizing grouping "mainly reflects problems within the self, such as anxiety, depression, somatic complaints without known medical cause, and withdrawal from social contacts." (Achenbach & Rescorla, 2001, p. 93)

Externalizing Problems. The Externalizing Problems T-score (*external)* will be used for research question 3 as well. The Externalizing group of questions represents "conflicts with other people" and expectations for children's behavior. (Achenbach & Rescorla, 2001, p. 93)

Total Problems. The Total Problems T-score (*totalprob)* represents the child's score on all the problem items. This scale score will also be used for question 3.

Academic Performance. The YSR does not "request yes-or-no reports of remedial services, grade repetition, and other school problems" so "the mean of self-ratings of performance in academic subjects is scored separately as *Academic Performance"* (Achenbach & Rescorla, 2001, p.73). This scale (*acadperf)* will be utilized for hypothesis 1.

Attention Problems. The Attention Problem scale (*attention)* consists of items such as "fails to finish," "Can't sit still," and "poor school work." The T-score for this scale will be utilized for question 2 to look at attentional problems that related to school functioning and may also contribute to firesetting.

Attention Deficit/Hyperactivity Problems. This scale (*adhd)* consists of items that are consistent with a DSM diagnosis of Attention Deficit Disorder or Attention Deficit Hyperactivity Disorder. High scores on this scale are suggestive of either ADD or ADHD. The T-score will be used for question 2.

Chapter III: Procedures & Analyses

Procedures

Procedures for this study will begin with the acquisition of the National Survey

Dataset and Factor Analysis Data set from ASEBA. These data sets are available for

purchase and use and have already been de-identified. As mentioned previously, the

dependent variable #72 (I set Fires) will be recoded 1 or 0. Descriptive and missing data

will be recoded dependent upon the format of the initial dat. Gender will be recoded as a

dummy variable. Once the data set is complete, various descriptive statistics, correlations

and graphs will be analyzed to assure that the data meets statistical assumptions for

further analyses.

Analysis 1

The first question will investigate if any academic performance (ACADPERF)

differences exit between firesetters and non-firesetters and if there are any differences

across disciplines. (ENGLISH, HISTORY, MATH AND SCIENCE). A logistic

regression analysis will be conducted to evaluate differences. The dependent

dichotomous variable of firesetting (FIRE) will be used as the dependent variable. The

predictor variables will be age (AGE), gender (GENDER), ethnicity (ETHNIC), and

academic performance (ACADPERF).The same dependent variable will be used and the

predictor variables of age (AGE), gender (GENDER), ethnicity (ETHNIC), and academic

performance (ACADPERF) as controls and school competence (SCHOOL) will be

entered in the second step.

Analysis 2

The second research question will address the relationship between a child's firesetting behavior and attention problems. A logistic regression will be used to determine if attention problems are predictive of a child's involvement with fire. The dependent variable will be firesetting (FIRE) and the predictor variables of age (AGE), gender (GENDER) and ethnicity (ETHNIC) will be utilized along with the T-score from the Attention Problems scale (ATTENTION). A second regression will be run using these predictor variables and the ADHD scale (ADHD). The ADHD scale is a measure of clinical level ADHD symptoms.

Analysis 3
Question 3 is related to the prevalence of firesetting in a large national data set and hypothesis 3 and 4. Initially descriptive analyses will be run to determine the number of children reporting fire play/firesetting, and the distribution by gender, ethnicity and age.

Additional analyses will be run to examine the characteristics that correlate with reports of firesetting and fireplay (FIRE). A point-biserial correlation will be used given the different types of variables being examined and that the main interest variable is dichotomous. Included variables will be gender (GENDER), ethnicity (ETHNIC), age (AGE), Internalizing problems (INTERNAL), Externalizing (EXTERNAL), Total Problems (TOTAL), Academic Performance (ACADPERF), Attention problems (ATTENTION), and Attention Deficit/Hyperactivity Disorder (ADHD).

Summary and Limitations

The use of the ASEBA Factor Analysis data set to investigate juvenile firesetting has many strengths and several limitations. The size of the data set and the national

population are unique compared to other studies on juvenile firesetting. Children are represented from 40 states and two other countries. This helps negate any effects of cultural or regional differences that may contribute to firesetting. This is an important consideration because it has been found that children's involvement with fire is related to culture and exposure to fire use. (Fessler, 2006) Additionally, in many smaller samples, the number of children endorsing firesetting is also small. Small sample sizes and few children in the target group can lead to problems in recognizing if there is a significant difference between the groups and obtaining adequate power. If the sample is too small it can influence the power and lead to Type II errors. In the case of these research questions, a Type II error could lead to declaring that there were no differences between children who set fires and those who do not. An additional benefit of this data set is the comprehensive nature of the YSR and CBCL surveys. The Syndrome and Competence Scales cover a wide range of behaviors, thoughts and emotions that can be experienced by a child. Very few surveys include this much information about a child's functioning and include a question about firesetting behavior.

The limitations of this study would be similar to other studies on juvenile firesetting. First, the Factor Analysis Data Set consists of children from inpatient and outpatient mental health facilities: therefore the sample is not entirely representative of a normal population. It should be noted that the referred cases are identified as such because they received psychological services, special education services, or substance abuse treatment within the past 12 months, not necessarily because they had high scores or significant pathology. Regardless, the effects of this population on the findings still must be considered when generalizing the results.

The usage of one item as the measure of firesetting could also be considered a limitation. A child's interpretation of "I set fires" may not include match play or fire play when items or objects were not burned. If the YSR and CBCL consisted of several items to investigate fire interest, fire play and firesetting it is possible that more children would be found to fall into the firesetter group. Additional items such as these would allow more detailed analysis as children could be classified into multiple groups based on their types of involvement or the number of fire items endorsed. Use of the dichotomous dependent variable (firesetter or non-firesetter) restricts the type of data analysis that can be performed.

The results of this study will help further define risk factors and identify relationships between firesetting, academic functioning and attention. Identification of these risk factors can help practitioners, teachers and parents target groups for prevention programs and also guide intervention development. The focus on school functioning and academic performance will assist in filling the gaps in the research. Children spend the majority of their day in the school environment. Providing teachers with an "at-risk" profile related specifically to firesetting behavior could increase identification of children who need services.

References

Achenbach, T. M., & Rescorla, L. A. (2001). *Manual for the ASEBA School-Age Forms & Profiles*. Burlington: University of Vermont, Research Center for Children, Youth, & Families.

Achenbach, T., & Rescorla, L. (2001). *Manual for the ASEBA School-Age Forms and Profiles*. Burlington, VT: Unviersity of Vermont, Research Center for Children, Youth & Families.

Achenbach, T., & Rescorla, L. (2001). *Manual for the ASEBA School-Age Forms and Profiles*. Burlington, VT: University of Vermont, Research Center for Children, Youth & Families.

Becker, K., Stuewig, J., Herrera, V., & McCloskey, L. (2004). A Study of firesetting and animal cruelty in children: family influences and adolescent outcomes. *Journal of the American Academy of Child and Adolescent Psychiatry, 43*(7), 905-912.

Cheny, K. (2010, October 5). *Social Learning Theory: An overview of Bandura's social learning theory*. Retrieved October 5, 2010, from www.psychology.about.com/od/developmentalpsychology/a/sociallearning.htm

Cole, R., Grolnick, W., & Schwartzman, P. (1993). Fire Setting. In *Handbook of Prescriptive Treatments for children and Adolescents* (pp. 332-346). .

Dadds, M., & Fraser, J. (2006). Fire interest, fire setting and psychopathology in Australian Children: a normative study. *Australian and New Zealand Journal of Psychiatry, 40*, 581-586.

Del Bove, G., Caprara, G., Pastorelli, C., & Paciello, M. (2008). Juvenile firesetting in

    Italy: relationship to aggression, psychopathology, personality, self-efficacy and

    school functioning. *European Child & Adolescent Psychiatry, 17*, 235-244.

DiMillo, J. (2002). Screening and Triage Tools. In D. Kolko (Ed.), *Handbook on*

    Firesetting in Children and Youth (pp. 141-159). San Diego, CA: Academic

    Press.

Epps, K., & Hollin, C. (2000). Understanding and Treating Adolescent Firesetters. In

    Gwyneth. Boswell (Ed.), *Violent children and adolescents: Asking the question*

    why (pp. 36-55). Philadelphia: Whurr Publisher.

Faranda, D., Katsikas, S., Lim, N., & Fegley, V. (2007). The triad of juvenile firesetting,

    bedwetting, and cruelty to animals; establishing prevalence and comorbidity.

    American Journal of Forensic Psychology, 25(1), 51-69.

Fessler, D. (2006). A Burning Desire: Steps Toward an Evolutionary Psychology of Fire

    Learning. *Journal of Cognition and Culture, 6*(3/4), 429-451.

Fineman, K. (1980). Firesetting in children and adolescents. *Psychiatric Clinics of North*

    America, 3(3), 483-500.

Fineman, K. (1995). A model for the qualitative analysis of child and adult fire deviant

    behavior. *American Journal of Forensic Psychology, 13*(1), 31-61.

French, B. (2008). Efficacy of early intervention program with juvenile firesetter

    (Doctoral dissertation, George Fox University). *Dissertation Abstracts*.

Gannon, T., & Pina, A. (2010). Firesetting: Psychopathology, theory and treatment.

    Aggression and Violent Behavior, 15(1), 224-238.

Gaynor, J. (2002). *Juvenile Firesetter Intervention Handbook*. Emmitsburg, MA: United

    States Federal Emergency Management Agency.

Grolnick, W., Cole, R., Laurenitis, L. & Schwartzman, P. (1990). Playing with fire: a

    developmental assessment of children's fire understanding and experience.

    Journal of Clinical Child Psychology, 19(2), 128-135.

Hardesty, V., & Gayton, W. (2002). The problem of children and fire: An historical

    perspective. In *Handbook on Firesetting in Children and Youth* (pp. 1-13). San

    Diego, CA: Academic Press.

Health, G., Hardesty, V., Goldfine, P., & Walker, A. (1985). Diagnosis and Childhood

    Firesetting. *Journal of Clinical Psychology, 41*, 571-575.

Heath, G. A., Hardesty, V., Goldfine, P., & Walker, A. (1985). Diagnosis and childhood

    firesetting. *Journal of Clinical Psychology, 41*(4), 571-575.

Henderson, J., & MacKay, S. (2009). Retail availability of fire-starting materials and

    their misuse by children and adolescents. *Fire Safety Journal, 44*, 131-134.

Isom, M. (2010, September 30). *The Social Learning Theory*. Retrieved September 30,

    2010, from Florida State University Web site: www.criminology.fsu.edu/

    crimtheory/bandura.htm

Kafry, D. (1980, September). *Fire-Play and Fire-setting of young children*. Paper

    presented at the Annual convention of the American Psychological Association,

    Montreal, Quebec, Canada.

Kazdin, A., & Kolko, D. (1986). Parent psychopathology and family functioning among

    childhood firesetters. *Journal of Abnormal Child Psychology, 14*(2), 315-329.

Kolko, D. & Kazdin, A. (1989). Assessment of dimensions of childhood firesetting among patients and nonpatients; the Firesetting Risk Interview. *Journal of Abnormal Child Psychology, 17*(2), 157-176.

Kolko, D. & Kazdin, A. (1990). Matchplay and firesetting in children: relationship to parent, marital and family dysfunction. *Journal of Clinical Child Psychology, 19*, 229-238.

Kolko, D. & Kazdin, A. (1994). Children's description of their firesetting incidents: characteristics and relationship to recidivism. *Journal of the American Academy of Child and Adolescent Psychiatry, 33*(1), 114-122.

Kolko, D., & Kazdin, A. (1986). A Conceptualization of firesetting in children and adolescents. *Journal of Abnormal Child Psychology, 14*(1), 49-61.

Kolko, D., & Kazdin, A. (1991). Aggression and psychopathology. *Journal of Clinical Child Psychology, 20*(2), 191-201.

Kolko, D., & Kazdin, A. (1991). Motives of childhood firesetters: Firesetting characteristics and psychological correlates. *Journal of Child Psychology and Psychiatry, 32*(3), 535-550.

Kolko, D., Day, B., Bridge, J. & Kazdin, A. (2001). Two-year prediction of children's firesetting in clinically referred and nonreferred samples. *Journal of Child Psychology and Psychiatry and Allied Disciplines, 42*, 371-380.

Kolko, D., Herschell, A., & Scharf, D. (2006). Education and treatment for boys who set fires: specificity, moderators, and predictors of recidivism. *Journal of Emotional and Behavioral Disorder, 14*(4), 227-239.

Kolko, D., Kazdin, A. & Meyer, E. (1985). Aggression and psychopathology in

childhood firesetters: parent and child report. *Journal of Consulting and Clinical*

Psychology, 53(3), 377-385.

Kolko, D., Kazdin, A., & Meyer, E. (1985). Aggression and Psychopathology in

Childhood Firesetters: Parent and Child Report. *Journal of Consulting and*

Clinical Psychology, 53(3), 377-385.

Kolko, K. & Kazdin, A. (1991). Aggression and psychopathology in matchplaying and

firesetting children; a replication and extension. *Journal of Clinical Child*

Psychology, 20, 191-201.

Kosky, R., & Silburn, S. (1984). Children who light fires: A comparison between

firesetters and non-firesetters referred to a child psychiatric outpatient service.

Australian and New Zealand Journal of Psychiatry, 18, 251-255.

Lambie, I., McCardle, S., & Coleman, R. (2002). Where there's smoke there's fire;

firesetting behavior in children and adolescents. *New Zealand Journal of*

Psychology, 31(2), 73-78.

Lu, L., & Shara, N. (2007). Reliability analysis: calculate and compare intra-class

correlation coefficients (ICC) in SAS. In Retrieved July 4, 2011, from Northeas

SAS Users Group, Inc. Web site: http://www.nesug.org/proceedings/nesug07/sa/

sa13.pdf

MacKay, S., Henderson, J., Del Bove, G., Marton, P., Warling, D. & Root, C. (2006).

Fire interest and antisociality as risk factors in the severity and persistence of

juvenile firesetting. *Journal of the American Academy of Child and Adolescent*

Psychiatry, 45(9), 1077-1084.

MacKay, S., Henderson, J., Del Bove, G., Marton, P., Warling, D., & Root, C. (2006). Fire Interest and Antisociality as Risk Factors in the Severity and Persistence of Juvenile Firesetting. *Journal of the American Academy of Child and Adolescent Psychiatry, 45*(9), 1077-1084.

Martin, G., Bergen, H., Richardson, A., Roeger, L., & Allison, S. (2004). Correlates of firesetting in a community sample of young adolescent. *Australian and New Zealand Journal of Psychiatr, 38*, 148-154.

Moore, J., Thompson-Pope, S., & White, R. (1996). MMPI -A Profiles of Adolescent Boys With a History of Firesetting. *Journal of Personality Assessment, 67*(1), 116-126.

Moynihan, M., & Flesher, E. (1998). *Colorado Juvenile Firesetter Research and the Development of Child and Family Risk Surveys*. Boulder: University of Colorado.

Nadeau-Gaunce, L. (2001). Children who set fires (Doctoral dissertation, University of Alberta). *Dissertation Abstracts International, 62*(5-A).

National Center for School Safety. (1998). In R. Stephens (Ed.), *Checklist of Characteristics of Youth Who Have Caused School-Associated Violent Deaths*. Retrieved December 8, 2009, from www.schoolsafety.us Web site: http://www.schoolsafety.us/Checklist-of-Characteristics-of-Youth-Who-Have-Caused-School-Associated-Violent-Deaths-p-7.html

Perrin-Wallqvist, R., & Norlander, T. (2003). Firesetting and playing with fire during childhood and adolescence: Interview studies of 18-year-old male draftees and 18-19 year-old female pupils. *Legal and Criminal Psychology, 8*, 151-157.

Pierce, J., & Hardesty, V. (1997). Non-referral of psychopathological child firesetters to

    mental health services. *Journal of Clinical Psychology, 53*(4), 349-350.

Pollack-Nelson, C., Faranda, D., Porth, D. & Lim, N. (2006). Parents of preschool fire

    setters: perceptions of the child-play fire hazards. *International Journal of Injury*

    Control and Safety Promotion, 13(3), 171-177.

Pollinger, J., Samuels, L., & Stadolnick, R. (2005). A Comparative Study of the

    Behavioral, Personality and Fire History Characteristics of Residential and

    Outpatient Adolescents (ages 12-17) with Firesetting Behavior. *Adolescence,*

    40(158), 343-352.

Rasanen, P., Hirvenoja, R., Hakko, H., & Vaisanen, E. (1995). A portrait of the juvenile

    arsonist. *Forensic Science International, 73*, 41-47.

Rea, C. (n.d.). *ADD and Firesetting: The Connection*. Retrieved December 8, 2009, from

    www.sosfires.com Web site: http://sos.strateja-xl.com/professional-information/

    Articles/ADD_and_Firesetting.pdf

Ritvo, E., Shanok, S., & Lewis, D. (1983). Firesetting and nonfiresetting delinquents: A

    comparison of neuropsychiatric, psychoeducational, experiential, and behavioral

    characteristics. *Child Psychiatry and Human Development, 13*(4), 259-267.

Sakheim, G., & Osborn, E. (1999). Severe vs. non-severe firesetters revisited. *Child*

    Welfare, 78(4), 411-434.

Sakheim, G., Osborn, E., & Abrams, D. (1991). Toward a Clearer Differentiation of

    High-Risk and Low-Risk Fire-Setter. *Child Welfare, 70*(4), 489-503.

Sharp, A., Roe-Sepowitz, D., & Boberg, J. (2009). The Interaction between juvenile school fire setting and bullying: An Exploratory Study. *School Social Work Journal, 33*(2), 87-97.

Showers, J., & Pickrell, E. (1987). Child firesetters: A study of three populations. *Hospital and Community Psychiatry, 38*(5), 495-501.

Slavkin, M. (2001). Enuresis, firesetting, and cruelty to animals: does the ego triad show predictive validity? *Adolescence, 36*(143), 461-466.

Slavkin, M. (2004). Characteristics of Juvenile Firesetting across Childhood and Adolescence. *The Forensic Examiner, 13*(4), 6-18.

Stadolnik, R. (2000). *Drawn to the Flame: Assessment and Treatment of Juvenile Firesetting Behavior*. Sarasota, FL: Professional Resource Press.

Stickle, T., & Blechman, E. (2002). Aggression and Fire: Antisocial Behavior in Firesetting and Nonfiresetting Juvenile Offender. *Journal of Psychopathology and Behavioral Assessment, 24*(3), 177-193.

Swaffer, T., & Hollin, C. (1995). Adolescent firesetting: Why do they say they do it? *Journal of Adolescence, 18*, 619-623.

U.S Department of Homeland Security. (2007). School Fires. In *Topical Fire Research Series* (Volume 8, issue 1, pp. 1-6). Emmitsburg, MA: U.S. Fire Administration, National Fire Data Center.

U.S. Department of Justice. (2008, November). Juvenile Arrests 2006. In J. Robert Flores (Ed.), *Juvenile Justice Bulletin* (NCJ 221338, pp. 1-12). Retrieved November 17, 2009, from http://www.ncjrs.gov Web site: http://www.ncjrs.gov/pdffiles1/ojjdp/221338.pdf

U.S. Fire Administration. (2001, March). Child fire casualties. In *Topical Fire Research Series* (Volume 1, Issue 17). Retrieved November 17, 2009, from www.usfa.dhs.gov Web site: http://www.usfa.dhs.gov/downloads/pdf/tfrs/v1i17-508.pdf

United States Fire Administration/ National Fire Data Center. (2004). Fires ignited by lighters or matches. In *Topical Fire Research Series* (vol. 4, issue 1, pp. 1-6). Emmittsburg, Maryland.

Yarnell, H. (1940). Firesetting in Children. *American Journal of Orthopsychiatry, 10*, 272-287.