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Change in family and peer adverse life circumstances in relation to juvenile firesetting

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CHANGE IN FAMILY AND PEER ADVERSE LIFE CIRCUMSTANCES IN RELATION TO JUVENILE FIRESETTING

BY

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ABSTRACT

CHANGE IN FAMILY AND PEER ADVERSE LIFE CIRCUMSTANCES IN RELATION TO JUVENILE FIRESETTING

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Juvenile firesetting is a major problem causing millions of dollars worth of damage each year, and yet there is very little know about it. In order to address this lack of knowledge the present study examined the relationship between adverse life events and juvenile firesetting behavior. This relationship was examined using a sample of students from 17 public and 10 private schools in Southern Australia (2105 males, 1629 females).Data were collected from the students during grade 8 (mean age of 13) using the Youth Assessment Checklist, and again during grades 9 and 10.

Adverse life events were found to be associated with increased juvenile firesetting behavior. Family related adverse life events were found to have the strongest association with increased juvenile firesetting behavior. Additionally, under very limited circumstances anxiety was found to mediate the effect of the relationship between adverse life events and juvenile firesetting behavior.

INTRODUCTION

Juvenile firesetting has received limited attention in empirical research, but is a very significant problem. In 2004 there were over 63,000 reported incidents of arson in the United States, with the average monetary loss being $12,017. Approximately 50 percent of these incidents were caused by people under the age of 18 (Department of Justice: Federal Bureau of Investigations, 2004). In addition to property damage, there were hundreds of deaths and thousands of injuries related to those fires (Glancy, Spiers, Pitt, & Dvoskin, 2003). For such a widespread problem, there is not as significant a body of literature on juvenile firesetting as one would expect.

One area where the literature is lacking is on the role that family and peers may play in influencing juveniles to engage in or refrain from firesetting behavior. There have been a limited number of studies that have investigated family and peer factors, however, the existing studies have focused on single points in time (Becker, Stuewig, Bloomington, & McCloskey, 2004; Chen, Arria, & Anthony, 2003; Pollinger, Samuels, & Stadolnik, 2005; Showers, & Pickrell, 1987; Swaffer, & Hollin, 1995). Data collected at one period in time may allow one to say that a certain family or peer variable is associated with firesetting behavior. However, multiple points of data collection may enable one to not only state that the presence or absence of a family or peer variable is associated with firesetting behavior, but also the temporal order of the relationship. Determining the

temporal order of events is required if one hopes to be able to state that a change in one variable caused a change in another instead of simply stating that a relationship exists between two variables.

If support can be found for changes in family or peer factors being associated with juvenile firesetting, it may be possible to better predict which juveniles are likely to engage in firesetting behaviors. In addition to better predicting firesetting behavior, knowledge of these factors may assist in the creation of targeted programs to help prevent juvenile firesetting, and better programs to treat juveniles engaged in firesetting behavior.

CHAPTER I

PREVIOUS RESEARCH

Juvenile Firesetting and Conduct Disorder

In a review of the existing literature related to juvenile firesetting, Glancy, Spiers, Pitt, and Dvoskin (2003) found that conduct disorder is the most commonly cited diagnosis of juveniles who engage in firesetting behavior. Additionally, Glancy et al. suggest juvenile firesetters have symptoms that are more extreme than the symptoms of non-firesetting juveniles diagnosed with conduct disorder.

Glancy et al. (2003) performed a tally of studies citing firesetters with diagnoses of conduct disorder, so their conclusions must be evaluated with caution. Although no true analyses were performed, their work provides an excellent starting point to examine correlates of juvenile firesetting behavior.

Kelso and Stewart (1986) found that conduct disorder was associated with firesetting behavior, and that juveniles with a serious form of aggressive conduct disorder were more likely to have engaged in firesetting behavior. The study initially included 104 boys from a clinical population, 53 of which received a diagnosis of conduct disorder. The 53 boys diagnosed with conduct disorder were evaluated again after a two year period, with 29 boys showing no improvement of their symptoms of conduct disorder. In this case it was found that the unimproved group presented more firesetting behavior at the initial evaluation

than the boys not diagnosed with conduct disorder, and more firesetting behavior at the follow-up evaluation than the improved group.

The Kelso and Stewart (1986) study included two methodological issues that may cause a problem with the generalizability of the results. First, the study selected participants from a clinical sample. There may be something inherently different about juveniles who have been diagnosed and received treatment for conduct disorder and or specifically firesetting behavior. Second, females were excluded from the study. Therefore, any conclusions drawn from their results may only be applied to a select group males.

In a study by Sakheim and Osborne (1991) an attempt was made to distinguish between the characteristics of high and low risk juvenile firesetters. This study included 50 children in residential care facilities. Half of the children were considered minor firesetters, while the other half were considered major firesetters. Group designations were based on the number of fires set, whether fires were set intentionally, and if so, the purpose of the fire. The study concluded that there were ten variables which distinguish juveniles who are the most at risk for engaging in firesetting behavior. Some of the variables included by Sakheim and Osborne were "Feelings of impotent rage at insults or humiliations inflicted by peers or adults, resulting in a narcissistic injury and retaliatory wishes", "Poor judgment in social situations", "Usually impulsive, with poor self-control", and "A psychiatric diagnosis of aggressive conduct disorder".

The above variables have the potential to be very useful when attempting to determine if a juvenile is at risk for engaging in firesetting behavior and should

participate in a prevention program. However, the above variables were developed using a small clinical sample, and all participants exhibited at least a minimal level of firesetting behavior. Because of these factors it questionable whether the above variables can truly be generalized to juveniles outside of a clinical population.

Rates of Juvenile Firesetting

Jacobson (1985) collected data from the records of 104 juvenile firesetters that were part of a larger population of 4242 juveniles referred to a London Clinic between 1973 and 1981. The firesetters were designated as either having been referred primarily for firesetting behavior or for antisocial/aggressive behavior. It was found that a 5.1 to 1 male to female ratio existed for the peak firesetting ages of 8 and 13. The ratio was 14.25 males to 1 female for the younger juveniles (age 8), while for the older juveniles (age 13) the ratio was 2.3 males to 1 female. It was also found that the younger juveniles set fires mainly at or around home while older juveniles set fires more at school or to external property. Jacobson concluded that it is best to separate juvenile firesetters into groups by age and the reason for the referral in order to determine the best course of treatment. The finding of greatest interest for the present study is the extreme difference in firesetting rates for males and females.

The above study is limited in generalizability by both the location and date of the study. The study was conducted in the United Kingdom, and therefore is not necessarily representative of populations from other countries. Additionally, the study included data that was obtained between 25 and 33 years ago. This

means that the above study included juveniles from an entirely different generation than the current study, and the results may not apply to the generation included in the current study.

Perrin-Wallqvist and Norlander (2003) interviewed 50 males (age 18) that were randomly selected when reporting for mandatory military service in Sweden. A convenience sample of 45 females (ages 18 to 19) were also selected from various recreation areas in Sweden. Perrin-Wallqvist and Norlander conducted structured interviews where participants were asked to describe any times when they engaged in firesetting behaviors (both fire play and malicious acts were included), and then to describe characteristics of the event (location, size, emotions at the time, purpose, and consequences). Based on the interviews approximately 70 percent of the males engaged in firesetting behavior before the age of 15, while 44 percent of females reported engaging in firesetting behavior. Of the 44 percent of females that reported firesetting behavior approximately 9 percent stopped by the age of 16, and 35 percent reported having recently engaged in firesetting behavior (age 18 to 19). It was also reported that the most common reasons for engaging in firesetting behavior were different for each sex. Males were reported to have engaged in firesetting behaviors out of the desire to see things burn, while females were reported to have done so out of boredom.

There are two important aspects of this study. The first is that the participants were from a normal population while many studies related to juvenile firesetting include participants from clinical populations, and the second is the

high rate of firesetting behavior that was found (Jacobson, 1985; Kazdin, & Kolko, 1986; Kelso, & Stewart, 1986; Sakheim, & Osborne, 1991). Because a normal population was used, generalizability should be greater than the studies utilizing clinical samples. However, one issue with the generalizability is that the sample was collected in Sweden. The present study is using a sample from Australia, and it is unknown whether the findings of the above study can be generalized to an Australian sample. While remaining aware that the results of the above study will not generalize perfectly to an Australian population, it appears that the rates of firesetting described in the present study were in no way unusually high. However, the above study employed a very broad definition of firesetting behavior, which may explain some of the difference in the firesetting rates of the above study and the present study.

Family Factors and Juvenile Firesetting

One of the first studies to investigate family factors and their relation to juvenile firesetting was by Kazdin and Kolko (1986). This study found that parents of juvenile firesetters exhibited greater psychopathology than parents of non-firesetters, especially depression. It was also shown that firesetters were more likely to be from a single parent home than non-firesetters.

While Kazdin and Kolko's (1986) study was one of the first to investigate family risk factors of juvenile firesetting, it looks at a very limited number of factors. One additional problem with this study was the sample used. Only 27 firesetters and 27 non-firesetters were included, and all of the children were inpatients at a psychiatric facility. Because the sample in this study was relatively

small and from a clinical population, the generalizability of this study may be compromised.

Showers and Pickrell (1987) conducted a study in an attempt to corroborate the results found in previous studies on juvenile firesetting. This study contains a section where several family factors and their relation to juvenile firesetting are analyzed. Firesetters were more likely than non-firesetters to be from homes where their parents had never been married. In addition, fathers of firesetters were more likely than fathers of nonfiresetters to have a history of drug and or alcohol abuse. Mothers of male firesetters were found to be more likely to have a history of drug and or alcohol abuse than mothers of male non-firesetters. This study found no difference between firesetters and non-firesetters in the prevalence of sexual abuse; however, it was found that firesetters are significantly more likely to have experienced emotional neglect and or physical abuse than non-firesetters.

The Showers and Pickrell (1987) study looked at many factors related to juvenile firesetting using 186 firesetters with 165 age and sex matched controls, but as with Kazdin and Kolko (1986), all of the participants were from a clinical sample. Even with the increased sample size, this study may not be generalizable to a non-clinical population.

Because the two studies reviewed above are lacking in generalizability due to the use of a clinical sample, the present study included a large non-clinical sample. It is hoped that this will allow the conclusions to be generalized to a larger population of juveniles.

Becker, Stuewig, Bloomington, and McCloskey (2004) determined that certain family factors increase the likelihood that a juvenile will engage in firesetting and animal cruelty. This study looked at factors such as paternal drinking, paternal pet abuse, exposure to marital violence, and harsh parenting (maternal and/or paternal). Of the above factors, paternal drinking and paternal pet abuse were found to be related to firesetting behavior.

The above study includes data collected from mothers and their children (no fathers were included in the sample), who were contacted three times over a ten year period. The study also looked at court records for all of the participants at the end of the ten year period to determine if the participants had engaged in any criminal acts, such as arson, but had not reported it during one of the sampling periods.

Using the Child Behavior Checklist and the Youth Self Report survey, Pollinger, Samuels, and Stadolnik (2005) collected data from seventeen juvenile firesetters in a residential treatment facility, and thirty juvenile firesetters receiving treatment as outpatients. This was done in order to investigate whether specific personality or behavioral characteristics exist which may be used to determine whether a juvenile would be better served in a residential treatment facility or as an outpatient. Juvenile firesetters in residential treatment facilities were more likely to be from a single parent home, they exhibited a greater number of serious behavioral problems (based on parental reports), and were rated as more aggressive. However, there was no significant difference in firesetting behaviors between the residential treatment group and the outpatient group.

One of the few issues with the generalizability of the above study is that it only included juvenile firesetters who were currently receiving some form of treatment. It is possible that juvenile firesetters who have not yet been detected, and are therefore not receiving any form of treatment could differ significantly in firesetting characteristics and or the other characteristics examined in the above study. The above study briefly describes an association between being a firesetter in a residential treatment facility and being from a single parent family. Pollinger et al., (2005) also describe how juveniles in the residential treatment facility exhibit a greater level of behavioral problems and aggression. Based on this it appears that a single parent home may play a role in a variety of negative behaviors. While it was not reported whether a single parent household was directly associated with any differences in firesetting behavior, the present study included a single parent home as a stressful life event.

Kolko and Kazdin (1990) collected data from 477 children in order to examine the relationship between parents and children who are firesetters, children who engage in matchplay, and non-firesetters. One hundred ninety-eight of the children were firesetters, 40 engaged in matchplay, and 239 were from a control group of non-firesetters. Firesetting and matchplay were detected with the Firesetting History Screen, and the parent child relationship was measured with the Hopkins Symptom Checklist, the Parenting Behavior Inventory, Child Rearing Practices, the Dyadic Adjustment Scale, the Family Environment Scale, the Home Environment Questionnaire, the Children's Life Events Inventory, the Children's Report of Parenting Behavior Inventory, and the Interview for

Antisocial Behavior. Based on the above measures Kolko and Kazdin reported that parents of firesetters exhibited greater levels of personal and marital problems, family dysfunction, and parenting difficulties. Parents of firesetters were also reported to have lower ratings of child acceptance, and to be less child centered. Lastly, parents of firesetters reported lower levels of family affiliation, discipline and monitoring.

The largest problem with the above study was that the designation of a juvenile into the firesetter, matchplay, or nonfiresetter category relied on reports from the parent and child. In order to be a nonfiresetter, both the parent and child had to report that no firesetting or matchplay had occurred, while a report from either the parent or child was enough to assign a child to the firesetting or matchplay group. There was no report of attempts to corroborate the child and parent reports that led to the group assignment. Also, Kolko and Kazdin (1990) did not attempt to establish the temporal order of whether firesetting leads to poor parent child relationships and family dysfunction or poor relationships and family dysfunction leading to firesetting behavior.

Building upon the work done by Kolko and Kazdin (1990), the present study has looked at a group of juveniles during three waves of data collection. This enables the present study to tentatively state the direction of the relationship between the adverse life event variables and juvenile firesetting.

Peer Factors and Juvenile Firesetting

Swaffer and Hollin (1995) conducted semi-structured interviews with seventeen juveniles (14 males and 3 females) residing at the Youth Treatment

Services center in the United Kingdom. Each of the juveniles had been formally charged with at least one firesetting offense. Based on the interviews, Swaffer and Hollin were able to create six categories to describe the reasons given by the juveniles for starting fires. These categories included revenge, crime concealment, self-injury, peer group pressure, denial/accidental, and fascination.

The greatest limitation in this study was the size of the sample. There were only seventeen juveniles included, and Swaffer and Hollin (1995) found six different categories of reasons for engaging in firesetting behavior. Five juveniles were classified under the revenge category, one was classified under the fascination category, and three were classified under each of the remaining categories (one juvenile was classified under two categories, revenge and crime concealment, based on his description of the incident). It may be that additional categories would be found with a larger and more geographically diverse sample. Additionally, with only three females in the sample it is impossible to say whether all six of the categories can be applied to both males and females.

The study is of interest because peer group pressure was found to be one of the reasons given to justify engaging in firesetting behavior. School age children spend a large part of the day at school surrounded by peers. It may be important to determine how great of an influence peers can have on a juvenile in terms of firesetting behavior. To further establish whether peer factors play a significant role in influencing juvenile firesetting behavior, the present study included a peer related adverse life events scale.

Chen, Arria, and Anthony (2003) analyzed data that were collected as part of the National Household Survey on Drug Abuse (NHSDA) in order to determine if being aggressive, shy, or rejected by peers was associated with juvenile firesetting behavior. It was found that juveniles who were deemed both aggressive and shy were more likely to have engaged in firesetting behavior than youths who were not deemed to be either aggressive or shy. It was also found that juveniles who were aggressive but not shy were more likely to have engaged in firesetting behavior, while juveniles who were shy but not aggressive were not more likely to have engaged in firesetting behavior. Also, it was found that juveniles reporting greater feelings of peer rejection were more likely to engage in firesetting behavior. Lastly, a strong association was found with firesetting behavior for juveniles who were aggressive, shy, and rejected by peers.

The above study included a large and diverse sample; therefore the results may presumably be generalized to the larger population. The limitations of the study include the lack of longitudinal data, and descriptions of how various variables were measured. Chen et al., (2003) stated that they were unable to make any conclusions about the temporal order of the relationships examined in the study. It was also stated that because the study employed archival data, certain variables (e.g., firesetting, shyness, and aggression) were not measured in the best way possible for the study described above.

The study suggests that the influence of peers may play a major role in determining whether a juvenile will engage in firesetting behavior. The present study has expanded upon the work of Chen et al., (2003) by including

longitudinal data in the form of a peer related adverse life events scale in hopes of providing additional support for the relationship between peer related factors and juvenile firesetting.

Stress Research

Pearlin (1989) provides an overview of stress research. For the purpose of the present study, only Pearlin's comments on life events as stressors have been evaluated. Pearlin first states that a major problem with a great deal of the research using life events to measure stress is that it relies on the assumption that all change is stressful. Second, Pearlin states that many of the scales used to detect stressful life events rely on measuring a single event which may only be part of an ongoing problem. Specific examples include the foreclosure of one's home, and being sentenced to a term in prison; both events likely indicate that there was a preexisting problem which brought about the event used as an indicator of stress. This calls into question previous research with conclusions related to the effect of stress on health because it is unknown whether it was the measured event or the preexisting problem or condition which had an impact on a given subject's health. Lastly, Pearlin states that in order to correct the problems described above, one must take into account a number of demographic variables including SES, age, gender, race, and ethnicity. The purpose of taking these variables into account is to ensure that the measure of stress used in a study is actually measuring discrete events that are stressful to the population included in the study.

The present study has attempted to take into account the problems mentioned by Pearlin (1989). Data were collected at three time periods and the change from Time 1 to Time 2, and Time 2 to Time 3 was examined for a number of variables to determine if a stressful event had occurred. The included events were ones that at face value appeared to be stressful for one who experienced them.

Shors (2006) conducted an extensive review of the literature on stress as it is related to learning, and presented two ways that stress may affect the way an individual learns. The first possible result of stress is to enhance the learning of new material, while the second possible result of stress is to hinder the retrieval/production of previously learned material. Shors also states that there is a major problem with much of the existing research on stress as it is related to learning. Virtually all of the studies include only adult males, but the outcome of stress can vary greatly based on the gender or age of an individual.

This article has been described to briefly summarize the leading views on how stress may impact learning. It has also been presented to bring attention to a statement by Shors (2006) that the majority of studies on stress as it relates to learning are conducted using adult males. This is important because the findings of studies using adult males do not address juvenile males or females of any age.

Stress and Internalizing/Externalizing Behaviors

Malone et al., (2004) conducted a longitudinal study on a group of 365 children to determine the effect of divorce on eternalizing behaviors. The study

began when the children entered kindergarten, and at the time the parents of all the children were married. Malone et al., report that many previous studies have found children with divorced parents to exhibit a greater number of behavioral problems than children from intact families (Amato, 2001; Amato, & Keith, 1991). To improve upon the existing literature Malone et al., took into account the age of each child when the divorce occurred, and the gender of each child. For females, there was no difference in externalizing behaviors that did not fit with normal growth and development patterns. For males, if the divorce occurred during elementary school, there was an increase in externalizing behaviors during the year of the divorce, and a greater number of behavioral problems during subsequent years. However, if the divorce occurred during middle school, then males were found to have an increase in externalizing behaviors during the year of the divorce, and a decrease to below normal levels during subsequent years.

These results are provocative. However, it is unknown how closely those findings will apply to firesetting behavior. The study focused on children that were in elementary school and middle school, while the present study involves children that were in their final year of middle school and first two years of high school. An additional problem with the generalizability of Malone et al., (2004) is that the sample was collected from just two towns in Tennessee and one town in Indiana. It is quite possible that these results lack in generalizability to the rest of the United States, let alone to Australia where the sample for the present study was collected.

Malone et al., (2004) presented parental divorce as a factor which may play a significant role in the level of internalizing/externalizing behavior exhibited by a juvenile. Because divorce was shown to have such a large affect, the present study has included parental marital status as part of the family related adverse life events scale. The present study includes longitudinal data, so not only was parental marital status available, it was possible to determine whether the divorce had occurred before or during the study. This allows the present study to determine if change in the number of family related adverse life events experienced by a juvenile, such as divorce, is related to juvenile firesetting behavior.

Galambos, Barker, and Almeida (2003) examined the role that parents play in the level of internalizing and externalizing behaviors exhibited by their children. Galambos et al., collected data from 109 white two parent families over the course of three and a half years. In addition to being two parent families, both parents had to be employed in order to be included in the study. The child and each parent were required to complete measures related to parenting (completed by both parents), deviant peers (completed by the child), externalizing problems (completed by the child), and internalizing problems (completed by the child). Galambos et al., found that when parents reported high levels of both psychological and behavioral control over their child it was associated with increased externalizing behavior by the child. This may be caused by children who are already high in externalizing behavior requiring more attempts at control by parents. Also, the level of behavioral control acted a predictor of externalizing

behavior even when accounting for the influence of deviant peers. Lastly, it was expected that psychological control would be associated with internalizing behaviors, but no significant relationship was found.

The greatest threat to the validity of this study was the sample used by Galambos et al., (2003). The sample was relatively small, completely homogenous in terms of race, and excluded any family that did not include two employed parents. While this is likely to be representative of some geographical areas, it is in no way representative of the population as a whole. Because of this the results are of limited applicability to the present study. However, it does indicate that parents may play a major in the presence of externalizing behaviors in juveniles. Galambos et al., found this influence to be significant even when taking into account peer influence, which provides support for the second hypothesis described below. In order to avoid a major limitation encountered by Galambos et al., the present study has included a large sample that is relatively representative of the population from the area where it was collected.

Stressful Events and Psychological Stress

Kessler (1997) conducted an extensive review of the existing literature related to stressful life events and its relationship to depression. Kessler reported that measures of stressful events have been found to successfully predict depression in individuals. It was also reported that in some cases it is the stressful events which may have brought about the depression, while in others the depression may have brought about the stressful events. Additionally, it was reported that stressful events may have a stronger or weaker influence on one

depending on various personal characteristics and environmental factors. Some of the factors mentioned include access to social support, intellectual capabilities, coping strategies, and interpersonal skills.

For the present study, one of the most important products of Kessler's (1997) review is that it describes stressful events as having an impact on depression. The present study employed anxiety as a proxy for psychological stress; however, depression may have also been a suitable proxy if appropriate data had been available. Another important aspect of Kessler's review is the description of factors which may play a role in how greatly one is influenced by various stressful events. Kessler described various factors which may reduce the impact of a stress if one or more is present. The present study has included similar factors, but has approached it from the perspective that the absence of one or more factors may either increase the impact of stress, or be inherently stressful. Following this logic a stressful life event scale was created which included the absence of positive factors as stressors. The creation of the scale and the method to score it are described below.

Olsson, Nordström, Arinell, and Von Knorring (1999) describe results similar to the conclusions drawn by Kessler (1997). A group of 2300 Swedish students were given two measures of depression and one measure of stressful life events. Olsson et al., found that students who had experienced a greater number of stressful life events were more likely to have been diagnosed with depressive disorder than those with fewer stressful life events.

Once again a study has been presented where depression was used as a measure of psychological stress. While this does not correspond exactly with the measure used in the present study, it does show that stressful events may impact the level of psychological stress that one has experienced.

Kollar (1961) conducted an extensive review of existing literature related to the symptoms of stress. After reviewing multiple models Kollar concluded that the models could be consolidated into one showing stress producing anxiety, which then produced physical symptoms and or psychological disorders. Kollar continued to review the various ways in which stress may manifest, however, for the purpose of the current study the most important aspect presented by Kollar is the relationship between anxiety and stress.

Kollar (1961) provides some support for this; however, the study is over forty years old and may not apply to the generation of juveniles included in the present study. One additional issue is that Kollar relied upon his professional judgment as to what aspects of the models being examined were important in relation to stress without performing any statistical analyses. While such analyses would have strengthened Kollar's position, enough evidence was provided to establish the merit of conducting future research related to the proposed model. Support for the link between anxiety and stress is important to the present study because a measure of anxiety was employed as a proxy for the level of psychological stress the juveniles in the study had experienced. The model presented by Kollar established precedent for relating anxiety to psychological stress.

CHAPTER II

HYPOTHESES

This study investigated whether adverse changes in family and peer relationships are involved with an increase in juvenile firesetting behavior. It was hypothesized that adverse changes in life circumstances are associated with a greater prevalence of firesetting behavior. It was further hypothesized that adverse changes in family relationships have a greater effect on firesetting behavior than adverse changes in peer relationships. Finally it was hypothesized that anxiety as a proxy for psychological stress partially mediates the relationship between adverse changes and firesetting behavior.

CHAPTER III

METHODS

Definitions

The term "adverse life event" was used in the present study to refer to an event which was viewed as resulting in increased social stress for the juvenile who experienced the event. This term was used in place of the more commonly used terms "stressful events" and "social stressors" to ensure that it did not become confused with psychological stress.

Sample

This study utilized data collected as part of the Early Detection of Emotional Disorders program (EDED) in South Australia. Permission was obtained from 17 public and 10 private schools in South Australia to distribute the Youth Assessment Checklist (YAC) to students in grade 8 (approximately 13 years old). Schools ranged from rural to suburban, and were in the lower to upper middle socioeconomic areas of South Australia. Parental permission was obtained and surveys were distributed to students by their teachers. Participation in the study was voluntary, and a group debriefing session followed the administration of the survey. Counselors were made available to any student showing signs of distress. The students were re-surveyed in grades 9 and 10 using the same procedures each time the YAC was administered (Martin, Bergen, Richardson, Roeger, & Allison, 2004).

The participants all fell within a narrow range of ages (approximately age 13 to age 15). Therefore the results of the present study may not be generalizable to juveniles at any other stage of development. This is important to note because the type and frequency of firesetting behavior has been found to vary depending on the age of the juvenile (Jacobson, 1985).

In grade 8 there were 2596 students (1442 male and 1154 female) who completed the survey. In grade 9 there were 2475 students (1369 males and 1106 females) who completed the survey. In grade 10 there were 2290 students (1315 males and 975 females) who completed the survey. After taking into account students who transferred to/from different districts, left school, or were absent during one or more of the days when the YAC was administered there were 3734 students (2105 males and 1629 females) to have completed the survey at least once.

During all three years of data collection an overwhelming majority of the students (85 to 90 percent) reported having been born in Australia, not being of Aboriginal descent, and speaking English as their primary language at home.

Measures

Independent Variables

General adverse life events sub-scale. These items were measured at Time 1 and then change was measured from Time 1 to Time 2 and Time 2 to Time 3.

- Over all subjects together how would you rate your academic performance: ( ) failing ( ) below average ( ) average ( ) above average {Scoring: Students in the lowest 20 percent were scored as 1}
- Within the last year have you had: a serious physical illness? ( ) yes ( ) no {Scoring: Yes was scored as 1}
- Within the past year have you had: a friend or family member who attempted suicide? ( ) yes ( ) no {Scoring: Yes was scored as 1}
- Within the past year have you had: a friend or family member who died as a result of suicide? ( ) yes ( ) no {Scoring: Yes was scored as 1}
- Have you ever been physically abused, bullied or beaten up? ( ) yes, ( ) no If 'yes' was this by: ( ) a friend, ( ) a family member, ( ) someone else known to you, ( ) a stranger {Scoring: Yes was scored as 1 for time it first appeared if the abuse was by a stranger or someone else known to them. After that the item could no longer be used for that participant because it asks "ever".}
- Have you ever been sexually abused? ( ) yes, ( ) no
  If 'yes' was this by: ( ) a friend, ( ) a family member, ( ) someone else known to you, ( ) a stranger {Scoring: Yes was scored as 1 for time it first appeared if the abuse was by a stranger or someone else known to them. After that the item could no longer be used for that participant because it asks "ever".}

Family related adverse life events sub-scale. These items were measured at Time 1 and then change was measured from Time 1 to Time 2 and Time 2 to Time 3.

- Are your natural/biological parents married and living together? ( ) yes, ( ) no. If 'no', for what reason? ( ) never married, ( ) never lived together, ( ) they have separated, ( ) they are divorced, ( ) one has died, ( ) both have died, ( ) other circumstances, ( ) parents unknown {Scoring: No was scored as 1 at Time 1, and change from yes to no at Time 2 or Time 3 was scored as 1.}
- Who do you live with? ( ) two natural/biological parents, ( ) two adoptive parents, ( ) mother & stepfather/other, ( ) father & stepmother/other, ( ) mother alone, ( ) father alone, ( ) relative/s, ( ) foster parent/s, ( ) living in institution, ( ) living independently, ( ) other – please specify (line given for response) {Scoring: Anything other than natural/biological or two adoptive was scored as 1}
- Do your parents (that is biological, adopted, step or foster parents) work? ( ) full time, ( ) part time, ( ) does not work, ( ) studying, ( ) don't know (juveniles answered this question about both mother and father separately) {Scoring: At Time 1 does not work was scored as 1. At times two and three change to does not work was scored as 1}
- How close is your family ( ) a very close family, ( ) a close family, ( ) a family that does not relate very well, ( ) nothing more than a group of

people living under the same roof {Scoring: The lowest 20 percent were scored as 1.}

- How often do family members use touch to communicate with you in a pleasant or good way. (examples of pleasant touch communication are a hug, a pat on the arm or back, etc) ( ) 5 or more times daily, ( ) 3 or 4 times daily, ( ) once or twice daily, ( ) one to six times per week, ( ) one to three times per month, ( ) one to eleven times per year, ( ) never {Scoring: The lowest 20 percent were scored as 1.}
- How often do family members use touch to communicate with you in an unpleasant or bad way. (examples of unpleasant touch communication are being hit, punched or slapped, etc) ( ) 5 or more times daily, ( ) 3 or 4 times daily, ( ) once or twice daily, ( ) one to six times per week, ( ) one to three times per month, ( ) one to eleven times per year, ( ) never {Scoring: The highest 20 percent were scored as 1.}
- See appendix A for the FAD-GF and IRQ items {Scoring: The highest 20 percent were scored as 1 for the FAD-GF, the lowest 20 percent were scored as 1 for the care subscale of the IRQ, the highest 20 percent were scored 1 for the criticism subscale of the IRQ, and the highest 20 percent were scored as 1 for the overprotection subscale of the IRQ}.
- Within the past year have you had: a family member who died as a result of illness or accident? ( ) yes ( ) no {Scoring: Yes was scored as 1}

- Have you ever seen people verbally abused in your home? ( ) yes ( ) no {Scoring: Yes was scored as 1 for time it first appeared. After that the item could no longer be used for that participant because it asks "ever"}
- Have you ever seen physical abuse or violence in your home? ( ) yes ( ) no {Scoring: Yes was scored as 1 for time it first appeared. After that the item could no longer be used for that participant because it asks "ever"}
- Have you ever been physically abused, bullied or beaten up? ( ) yes, ( ) no If 'yes' was this by: ( ) a friend, ( ) a family member, ( ) someone else known to you, ( ) a stranger {Scoring: Yes was scored as 1 for time it first appeared if the abuse was by a family member. After that the item could no longer be used for that participant because it asks "ever".}
- Have you ever been sexually abused? ( ) yes, ( ) no
  If 'yes' was this by: ( ) a friend, ( ) a family member, ( ) someone else known to you, ( ) a stranger {Scoring: Yes was scored as 1 for time it first appeared if the abuse was by a family member. After that the item could no longer be used for that participant because it asks "ever".}

Peer related adverse life events sub-scale. These items were measured at Time 1 and then change was measured from Time 1 to Time 2 and Time 2 to Time 3.

- About how many close friends do you have? ( ) none, ( ) one, ( ) two or three, ( ) four or more {Scoring: The lowest 20 percent were scored as 1.}

- About how many times a week do you do things with them? ( ) less than once, ( ) once or twice, ( ) three or more {Scoring: The lowest 20 percent were scored as 1.}
- How often do your friends use touch to communicate with you in a pleasant or good way? ( ) 6 or more times daily, ( ) 3 or 4 times daily, ( ) once or twice daily, ( ) one to six times per week, ( ) one to three times per month, ( ) one to eleven times per year, ( ) never {Scoring: The lowest 20 percent were scored as 1.}
- How often do your friends use touch to communicate with you in an unpleasant or bad way? ( ) 5 or more times daily, ( ) 3 or 4 times daily, ( ) once or twice daily, ( ) one to six times per week, ( ) one to three times per month, ( ) one to eleven times per year, ( ) never {Scoring: The highest 20 percent were scored as 1.}
- Within the past year have you had: a friend who died as a result of illness or accident? ( ) yes ( ) no {Scoring: Yes was scored as 1}
- Have you ever been physically abused, bullied or beaten up? ( ) yes, ( ) no
  If 'yes' was this by: ( ) a friend, ( ) a family member, ( ) someone else known to you, ( ) a stranger {Scoring: Yes was scored as 1 for time it first appeared if the abuse was by a friend. After that the item could no longer be used for that participant because it asks "ever".}
- Have you ever been sexually abused? ( ) yes, ( ) no
  If 'yes' was this by: ( ) a friend, ( ) a family member, ( ) someone else known to you, ( ) a stranger {Scoring: Yes was scored as 1 for time it first

appeared if the abuse was by a friend. After that the item could no longer be used for that participant because it asks "ever".}

Scale Scoring Procedures

The general adverse life event items, family related adverse life event items, and peer related adverse life event items were all coded as dichotomous variables with one being the more negative life circumstance, and zero being the more positive circumstance. The scores for the individual items on each sub-scale were then summed for each participant to get three adverse life event sub-scores from Time 1, Time 2, and Time 3. Summing the scores from the three sub-scales then provides a total adverse life event score for each participant at Time 1, Time 2 and, Time 3.

Intervening Variables

Anxiety as a proxy for psychological stress. These items were measured at Time 1 and then change was measured from Time 1 to Time 2 and Time 2 to Time 3.

These anxiety items were all answered as either rarely or none of the time (<1 day), some or little of the time (1-2 days), occasionally or a moderate amount of the time (3-4 days), or most of the time (5-7 days) to determine how many times during the past week each of the following had occurred:

- I felt tense or wound up,
- I get a sort of frightened feeling as if something awful is going to happen,
- Worrying thoughts go through my mind,
- I can sit at ease and feel relaxed, {Reverse scored}

- I get a sort of frightened feeling, like butterflies in my stomach,
- I feel sort of restless as if I have to be on the move,
- I get sudden feelings of panic,
- I have got so panicky I thought I was going to die,
- I have fears about specific things or situations

The items were scored as 0 for (<1 day), 1 for (1-2 days), 2 for (3-4 days), and 3 for (5-7 days) unless it is noted that an item was reverse scored. In that case items were scored as 3 for (<1 day), 2 for (1-2 days), 1 for (3-4 days), and 0 for (5-7 days). The items were then summed and the highest 20 percent of scores were coded as 1. The same scoring procedure was followed at all three time periods.

Dependent Variables

Firesetting. Firesetting was detected through the use of a single dichotomous item based on the DSM-IV criteria for conduct disorder: "I have set fire to things in public places just for fun". Responses were coded as 1 for yes and 0 for no. Because the item was phrased in such a way that a juvenile could interpret it as having ever engaged in firesetting, or only having done so recently, any juvenile answering yes for one administration of the questionnaire was considered a firesetter regardless of how the juvenile answers the item on subsequent administrations of the questionnaire. This was done to ensure that only new cases of firesetting were included in the analyses.

Data Analysis

The data were analyzed using a series of logistic regressions. The first set was used to determine if a relationship exists between negative life circumstances and juvenile firesetting behavior. The second set was used to determine whether anxiety as a proxy for psychological stress plays a mediating role in the relationship.

CHAPTER IV

RESULTS

Descriptive Statistics

Table 1: Juvenile firesetting by gender			
	Percent firesetters		
	Time 1	Time 2	Time 3
Males	11.2% (n=1365)	5.8% (n=1311)	3.8% (n=1354)
Females	3.16% (n=1106)	2.1% (n=1054)	2.1% (n=969)
Total	7.6% (n=2471)	4.14% (n=2365)	3.1% (n=2323)

Table 1 presents the new cases of juvenile firesetting by males and females found at each time period. Time 1 had many more firesetters than Time 2 and Time 3; which was due to the way that the firesetting item needed to be scored. As described above, the item used to detect firesetting did not specify when the firesetting incident occurred. Because of this, any juvenile answering that he or she had engaged in firesetting behavior had to be considered a firesetter for all subsequent time periods. Therefore Time 1 can be considered a report of any firesetting behavior the juveniles in the sample engaged in prior to the first data collection period. Time 2 is showing firesetting engaged in between the first data collection period and the second, while Time 3 is showing firesetting engaged in between the second data collection period and the third. At all three time periods firesetting by males was much more common than firesetting by

females, which is consistent with the findings of previous studies (Jacobson, 1985; Perrin-Wallqvist, & Norlander, 2003).

Table 2:
Anxiety by gender

	Percent high anxiety		
	Time 1	Time 2	Time 3
Males	11.6% (n=1442)	12.63% (n=1369)	11.7% (n=1315)
Females	17.8% (n=1154)	20.7% (n=1106)	20% (n=975)
Total	14.32% (n=2596)	16.24% (n=2475)	15.24% (n=2290)

Table 2 presents the number of males and females that were designated as high anxiety during each of the three time periods. During all three time periods more females than males were found to be high in anxiety. This may be due to females either experiencing more anxiety than males, or being more willing to report their experiences than males.

Table 3:
General adverse life events by gender

	Time 1			Time 2			Time 3		
	Males	Females	Total	Males	Females	Total	Males	Females	Total
	n= 1315	n= 1061	n= 2376	n= 1254	n= 1021	n= 2275	n= 1196	n= 889	n= 2085
Mean	0.59	0.43	0.52	0.53	0.41	0.48	0.42	0.39	0.44
0	56.7%	67.9%	61.7%	62.4%	71.1%	66.3%	64.9%	71.4%	67.7%
1	31.6%	24.2%	28.3%	25.9%	19.9%	23.2%	25.8%	20.0%	23.3%
2	8.4%	5.8%	7.2%	8.9%	7.0%	8.0%	6.5%	6.6%	6.6%
3	2.6%	1.5%	2.1%	2.0%	1.2%	1.6%	2.3%	1.8%	2.1%
4	0.5%	0.6%	0.5%	0.7%	0.5%	0.6%	0.5%	0.1%	0.3%
5	0.1%	0.0%	<0.01%	0.1%	0.3%	0.2%	0.0%	0.0%	0.0%
6	0.1%	0.0%	<0.01%	0.0%	0.1%	<0.01%	0.0%	0.0%	0.0%

Table 3 presents scores for males and females on the general adverse life event scale. The scores for Time 1 reflect general adverse life events that occurred prior to the first administration of the YAC. The Time 2 scores reflect general adverse life event changes that occurred between the first and second administration of the YAC. The Time 3 scores reflect general adverse life event

changes that occurred between the second and third administration of the YAC. For example, at Time 2 25.9 percent of males reported one general adverse life event. This means that those males each experienced one of the general adverse life events described in the measures section between the Time 1 and the Time 2 data collection periods. At Time 3 25.8 percent of males reported one general adverse life event, which means those males each experienced an adverse event between the Time 2 and Time 3 data collection periods. After taking into account the decrease in the number of juveniles who completed the YAC from Time 1 to Time 2 and from Time 2 to Time 3, the scores are relatively consistent over the course of the three time periods with the majority of juveniles scoring either zero or one. However, at all three time periods males reported a greater number of general adverse life events compared to females.

Figure 1:
Proportion of juvenile firesetters by number of general adverse life events at Time 1

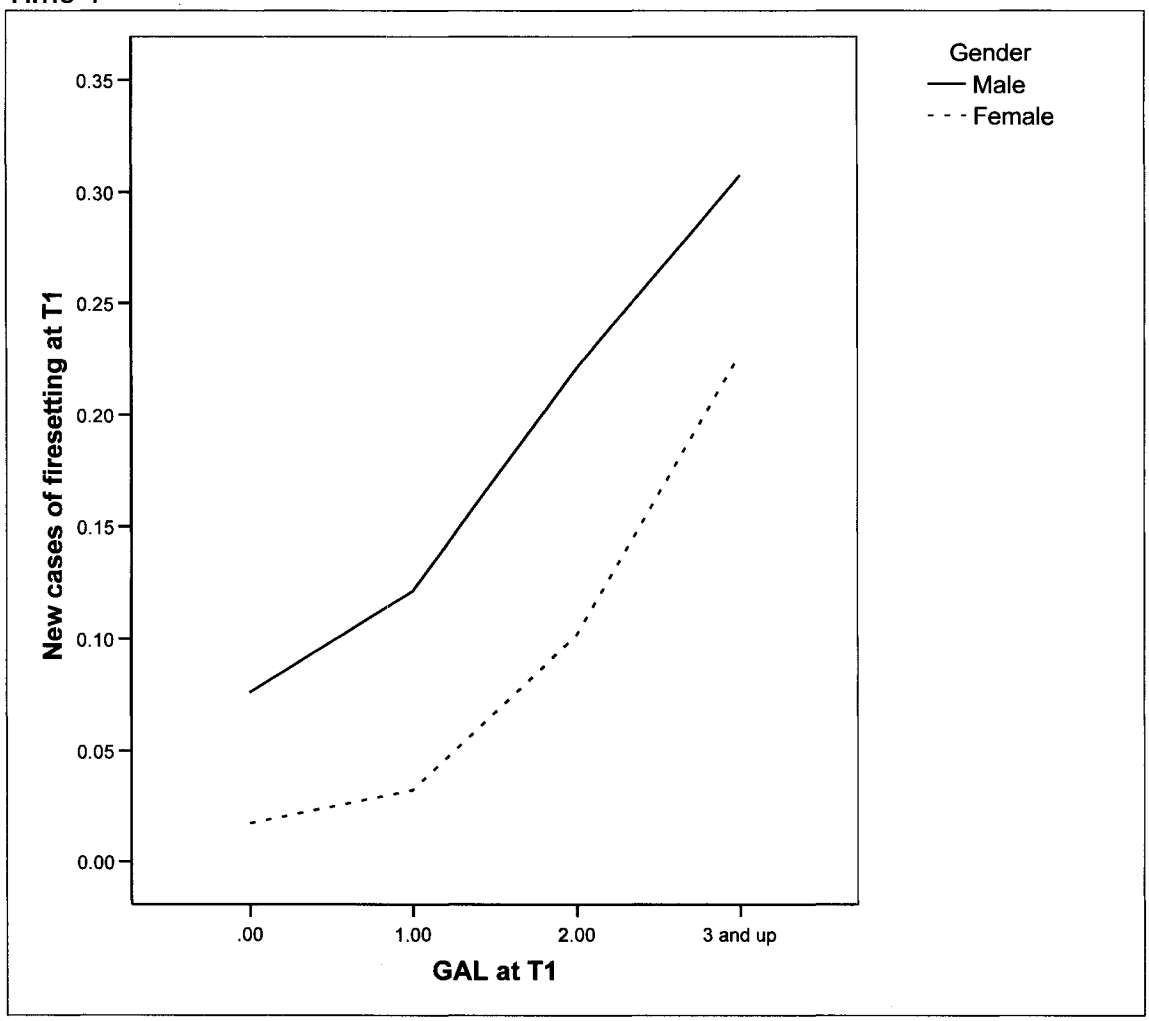


Figure 2:
Proportion of juvenile firesetters by number of general adverse life events at Time 2

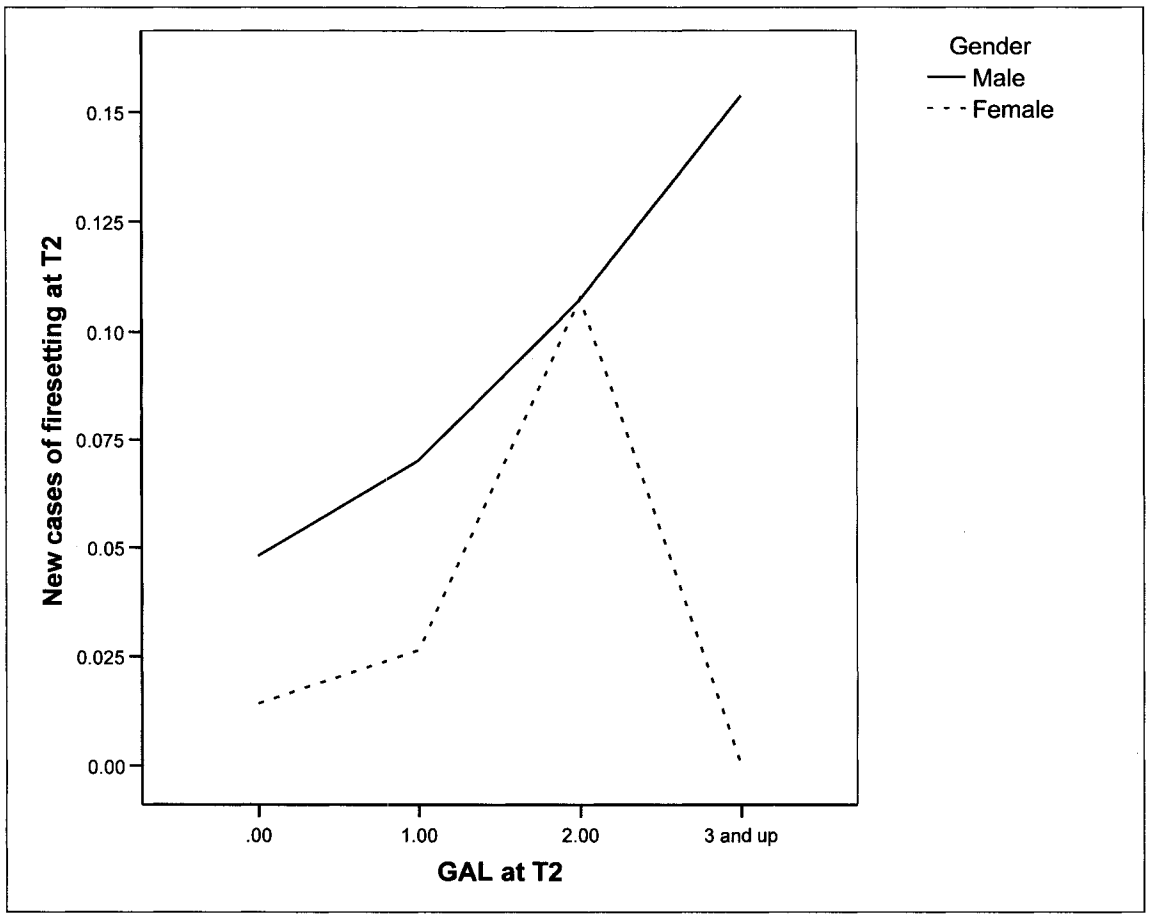
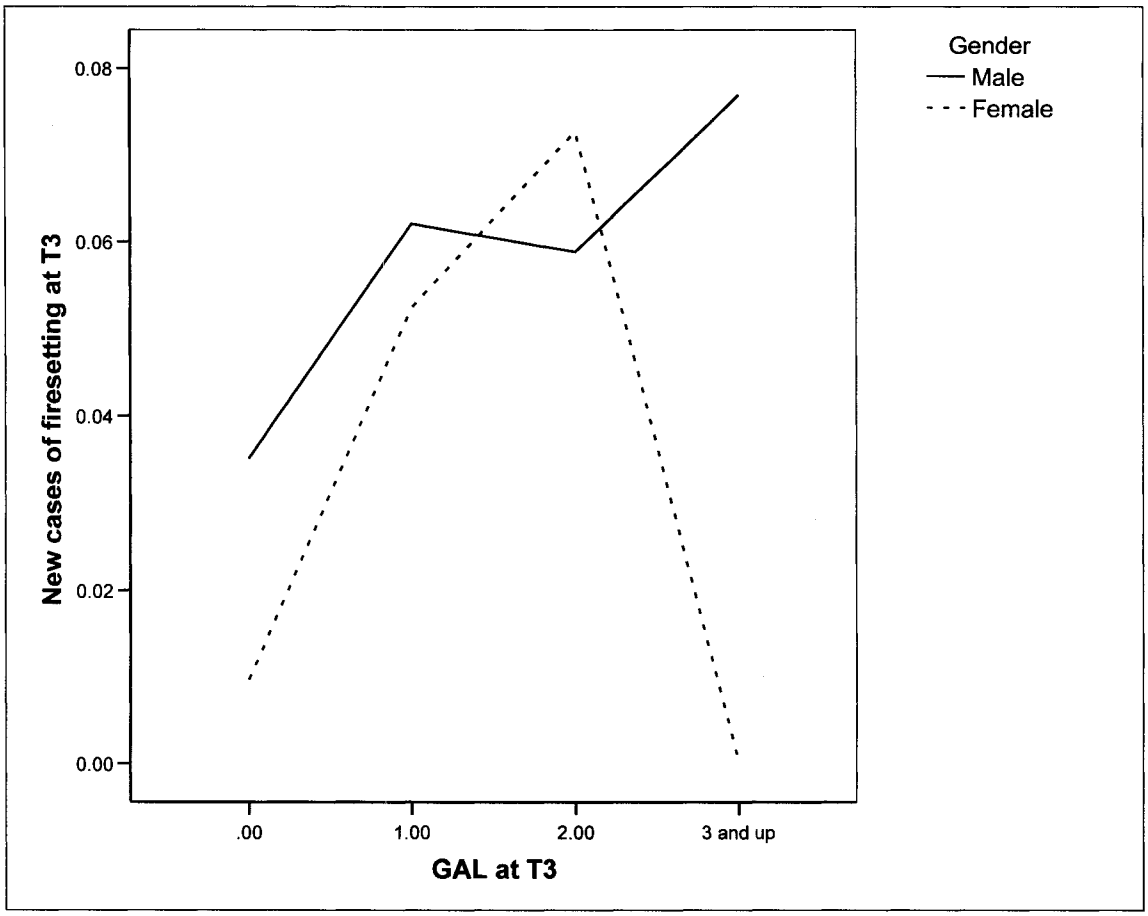


Figure 3:
Proportion of juvenile firesetters by number of general adverse life events at Time 3



Figures 1 through 3 illustrate the rate of firesetting based on the score received on the general adverse life event scale for males and females during each of the three time periods. The graphs show generally positive linear relationships between general adverse life events and juvenile firesetting at all three time periods. The sharp decrease seen in firesetting for females scoring three and up at times two and three is likely due to the relatively small number of females in that group (21 at Time 2 and 17 a Time 3). With so few females in the group it is possible that this large decrease is just a random fluctuation. This

decrease may also be evidence that the relationship between general adverse life events and juvenile firesetting is weaker for females than it is for males.

Table 4:
Family related adverse life events by gender

	Time 1			Time 2			Time 3		
	Males	Females	Total	Males	Females	Total	Males	Females	Total
	n= 1169	n= 973	n= 2142	n= 827	n= 698	n= 1525	n= 802	n= 598	n= 1400
Mean	3.14	3.17	3.15	2.20	1.99	2.11	1.99	1.96	1.97
0	17.4%	21.5%	19.2%	29.9%	35.5%	32.5%	31.9%	36.0%	33.6%
1	18.6%	16.6%	17.7%	22.2%	20.8%	21.6%	25.3%	22.7%	24.2%
2	19.8%	17.6%	17.1%	13.9%	15.5%	14.6%	13.3%	13.4%	13.3%
3	11.9%	10.5%	11.3%	9.6%	7.9%	8.8%	10.5%	7.7%	9.3%
4	8.6%	8.3%	8.5%	8.6%	5.3%	7.1%	5.9%	6.0%	5.9%
5	7.8%	5.2%	6.6%	4.4%	4.9%	4.6%	3.5%	3.8%	3.6%
6	5.9%	3.1%	4.6%	3.9%	3.7%	3.8%	2.7%	4.2%	3.4%
7	4.0%	4.6%	4.3%	2.7%	2.0%	2.4%	2.4%	1.7%	2.1%
8	2.7%	4.4%	3.5%	2.5%	1.3%	2.0%	1.9%	1.5%	1.7%
9	2.4%	2.5%	2.4%	1.1%	1.6%	1.3%	1.2%	1.2%	1.2%
10	1.4%	1.6%	1.5%	1.2%	0.6%	0.9%	0.7%	0.5%	0.6%
11	1.3%	1.5%	1.4%	0.1%	0.6%	0.3%	0.2%	0.8%	0.5%
12	0.7%	0.9%	0.8%	0.0%	0.3%	0.1%	0.2%	0.3%	0.3%
13	0.4%	0.7%	0.6%	0.0%	0.1%	0.1%	0.0%	0.2%	0.1%
14	0.2%	0.5%	0.3%	0.0%	0.0%	0.0%	0.1%	0.0%	0.1%
15	0.1%	0.3%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
16	0.1%	0.0%	<0.01%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Table 4 presents the scores for males and females on the family related adverse life event scale. The scores for Time 1 reflect family related adverse life events that occurred prior to the first administration of the YAC. The Time 2 scores reflect family related adverse life event changes that occurred between the first and second administration of the YAC. The Time 3 scores reflect family related adverse life event changes that occurred between the second and third administration of the YAC. For example, at Time 2 22.2 percent of males reported one family related adverse life event. This means that those males each experienced one of the family related adverse life events described in the measures section between the Time 1 and the Time 2 data collection periods. At Time 3 25.3 percent of males reported one family related adverse life event,

which means those males each experienced an adverse event between the Time 2 and Time 3 data collection periods. At Time 1 there were fewer juveniles with very low scores than at Time 2 and Time 3. This was likely caused by the item asking whether a juvenile's parents are divorced/separated because Time 1 shows divorces/separations that occurred prior to the first data collection period. Time 2 shows divorces/separations that occurred between the first data collection period and the second, while Time 3 shows divorces/separations that occurred between the second data collection period and the third. Therefore Time 1 is capturing divorces/separations that occurred over a much longer period of time than either Time 2 or Time 3. Otherwise, after taking into account the decrease in the number of juveniles who completed the YAC from Time 1 to Time 2 and from Time 2 to Time 3, the scores are relatively consistent over the course of the three time periods. At Time 1 females reported a slightly greater number of family related adverse life events than males, while at Time 2 and Time 3 males reported a greater number of adverse life events than females.

Figure 4:
Proportion of juvenile firesetters by number of family related adverse life events at Time 1

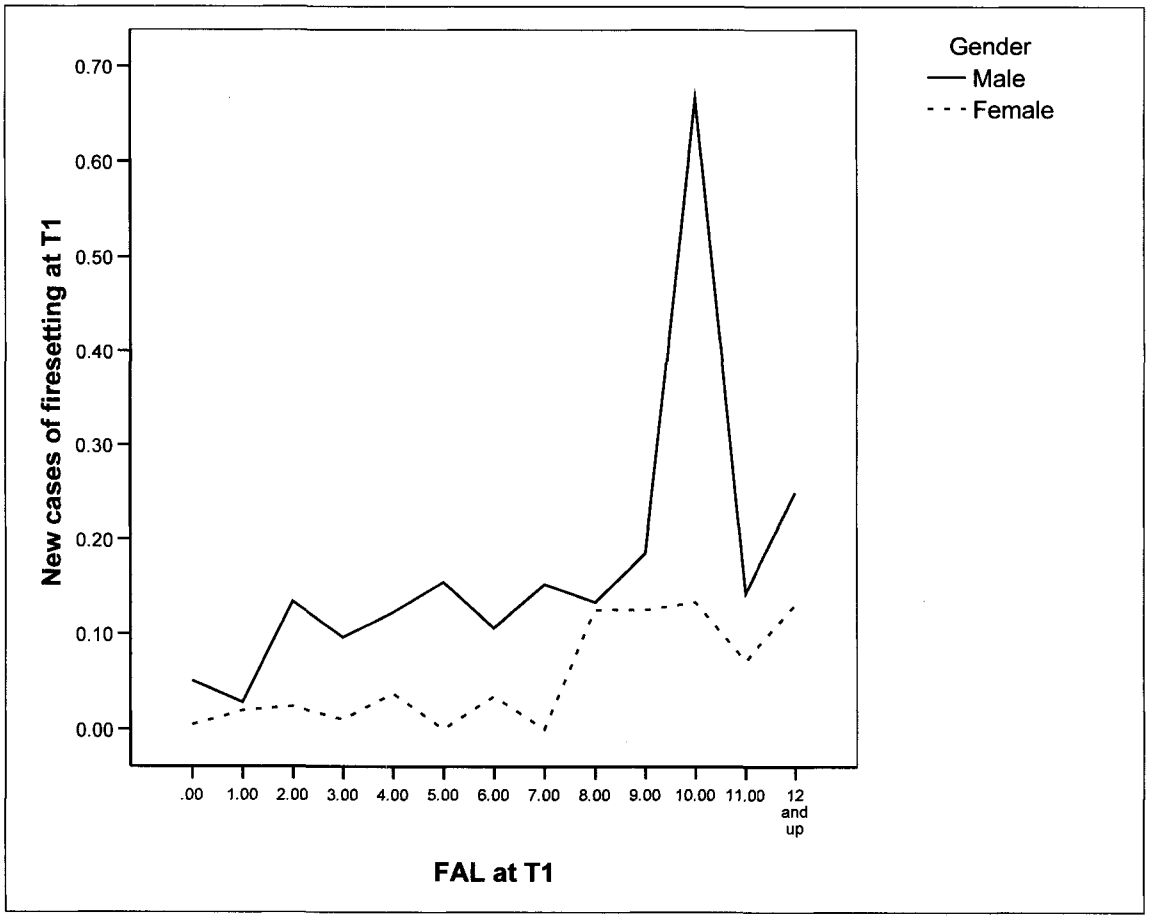


Figure 5:
Proportion of juvenile firesetters by number of family related adverse life events at Time 2

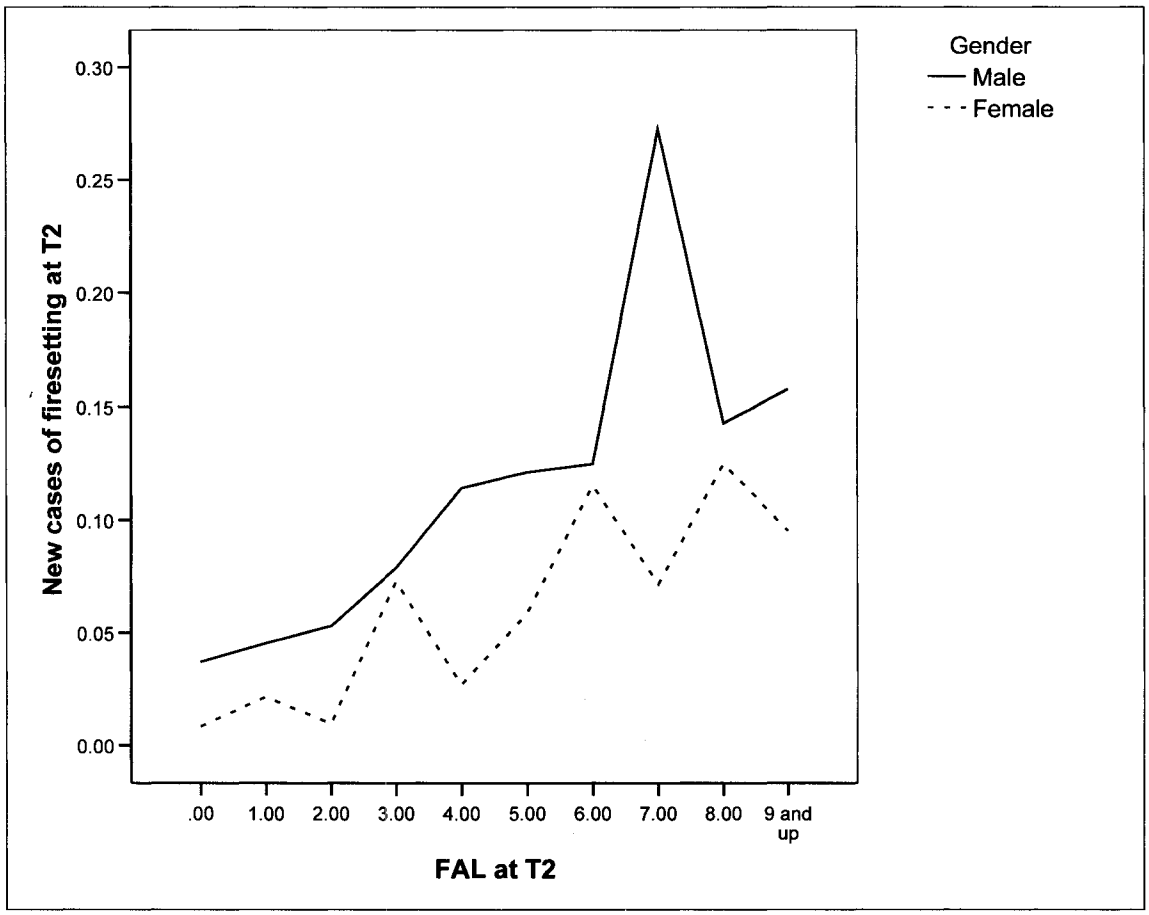
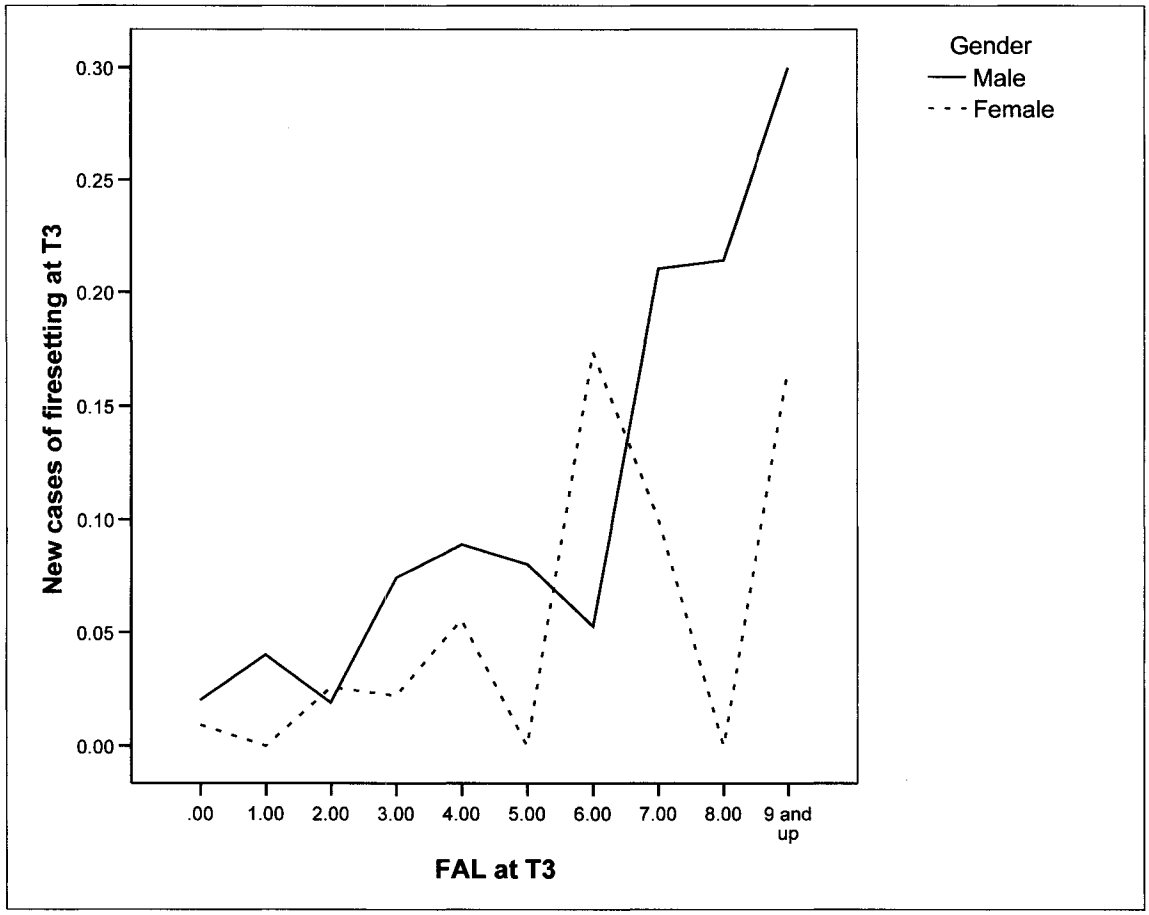


Figure 6:
Proportion of juvenile firesetters by number of family related adverse life events at Time 3



Figures 4 through 6 illustrate the rate of firesetting based on the score received on the family related adverse life event scale for males and females during each of the three time periods. The graphs for all three time periods present generally positive linear relationships between family related adverse life events and juvenile firesetting.

Table 5:
Peer related adverse life events by gender

	Time 1			Time 2			Time 3		
	Males	Females	Total	Males	Females	Total	Males	Females	Total
	n= 1332	n= 1079	n= 2411	n= 1234	n= 1021	n= 2255	n= 1191	n= 888	n= 2079
Mean	0.92	0.56	0.76	0.91	0.51	0.73	0.84	0.50	0.70
0	35.4%	56.3%	44.8%	32.7%	61.1%	45.5%	38.4%	60.1%	47.7%
1	43.1%	33.5%	38.8%	47.7%	30.2%	39.8%	43.7%	31.5%	38.5%
2	16.9%	8.6%	13.2%	16.7%	6.3%	12.0%	14.7%	6.4%	11.2%
3	3.8%	1.1%	2.6%	2.1%	2.0%	2.0%	2.3%	1.7%	2.0%
4	0.7%	0.4%	0.5%	0.5%	0.4%	0.4%	0.8%	0.2%	0.5%
5	0.2%	0.1%	0.1%	0.3%	0.1%	0.2%	0.2%	0.0%	0.1%

Table 5 presents scores for males and females on the peer related adverse life event scale. The scores for Time 1 reflect peer related adverse life events that occurred prior to the first administration of the YAC. The Time 2 scores reflect peer related adverse life event changes that occurred between the first and second administration of the YAC. The Time 3 scores reflect peer related adverse life event changes that occurred between the second and third administration of the YAC. For example, at Time 2 47.7 percent of males reported one peer related adverse life event. This means that those males each experienced one of the peer related adverse life events described in the measures section between the Time 1 and the Time 2 data collection periods. At Time 3 43.7 percent of males reported one peer related adverse life event, which means those males each experienced an adverse event between the Time 2 and Time 3 data collection periods. After taking into account the decrease in the number of juveniles who completed the YAC from Time 1 to Time 2 and from Time 2 to Time 3, the scores are relatively consistent over the course of the three time periods with the majority of juveniles scoring either zero or one. However, at

all three time periods males reported a greater number of peer related adverse life events than females.

Figure 7:
Proportion of juvenile firesetters by number of peer related adverse life events at Time 1

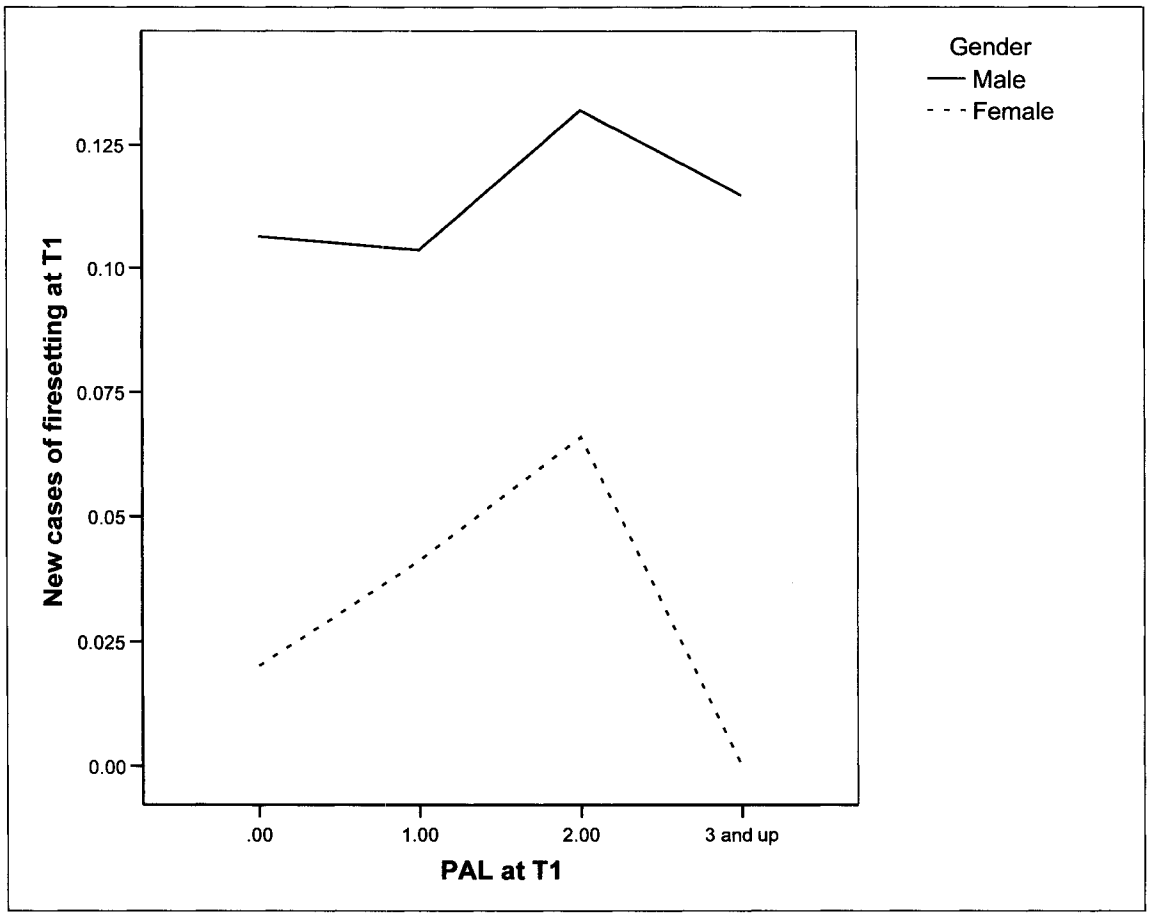


Figure 8:
Proportion of juvenile firesetters by number of peer related adverse life events at Time 2

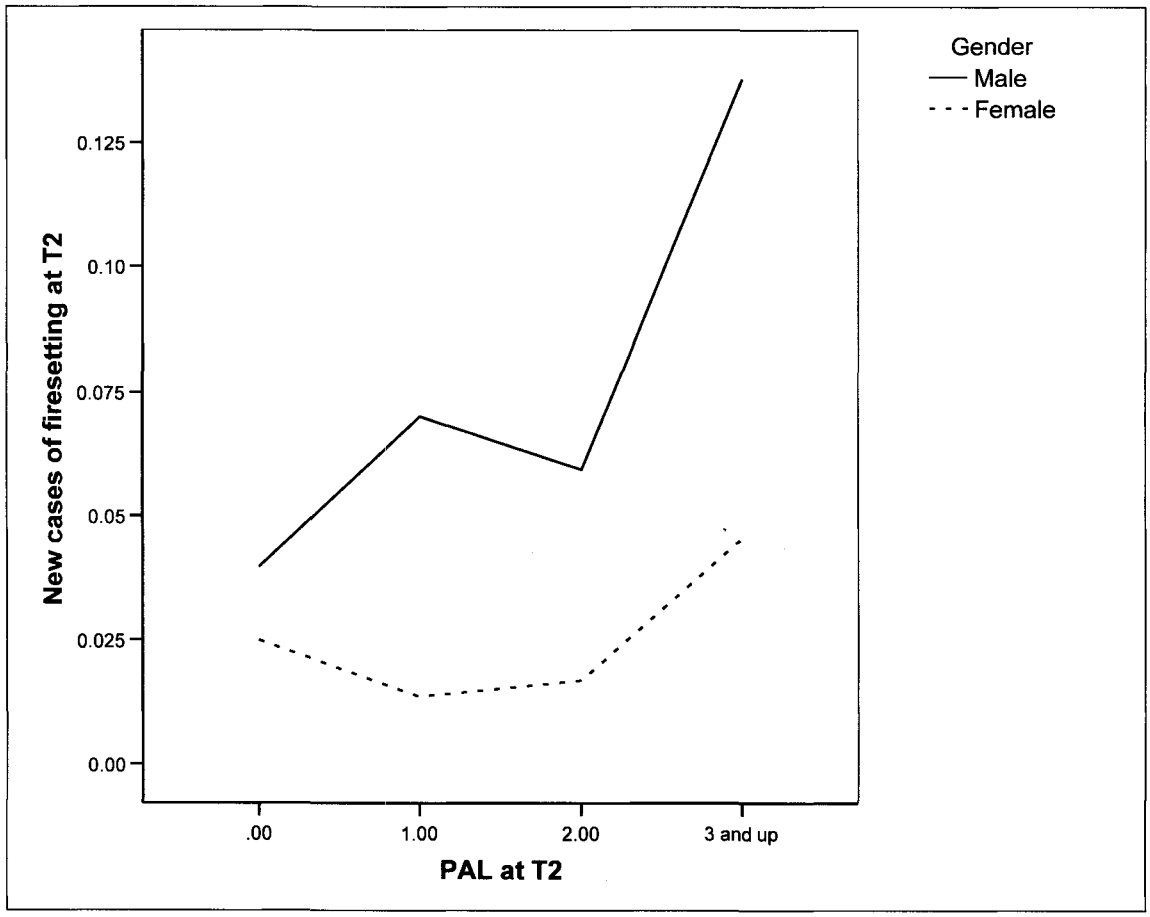
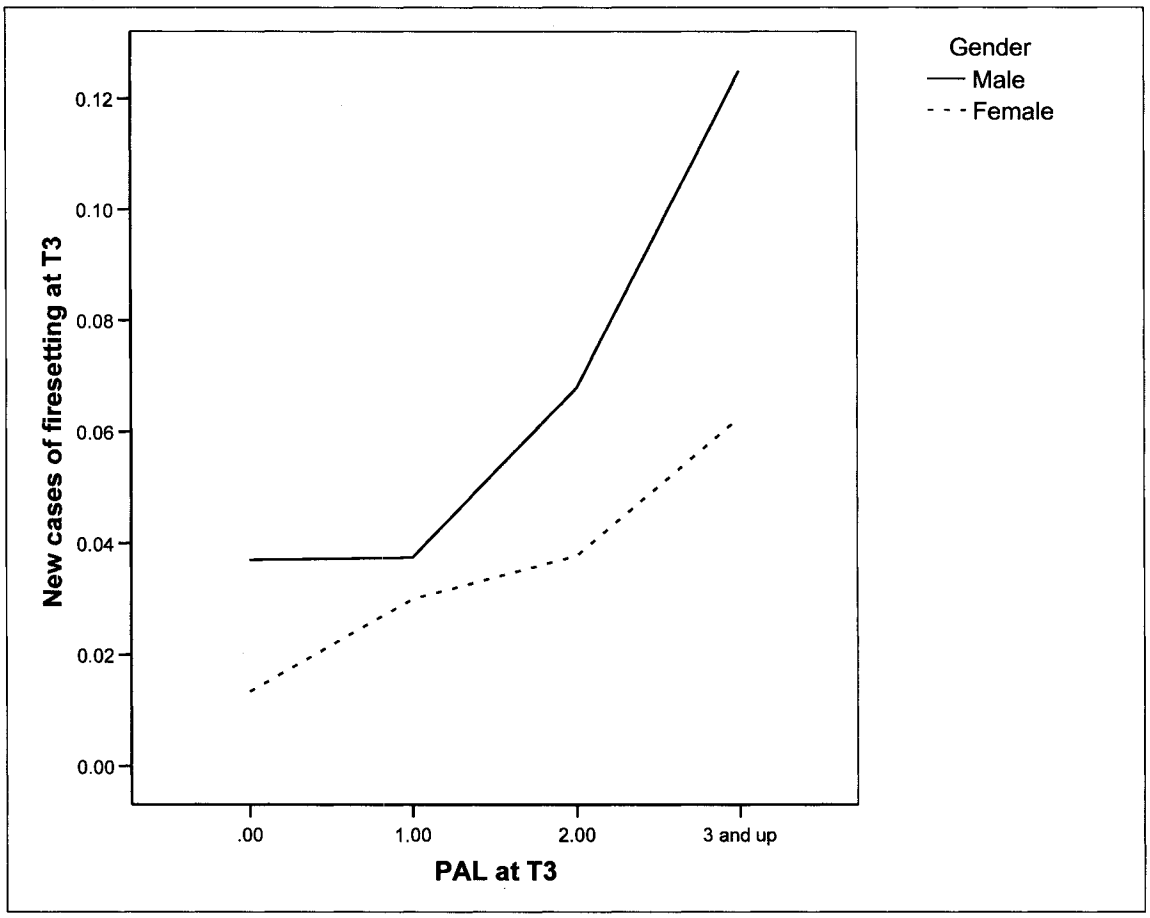


Figure 9:
Proportion of juvenile firesetters by number of peer related adverse life events at Time 3



Figures 7 through 9 illustrate the rate of firesetting based on the score received on the peer related adverse life event scale for males and females during each of the three time periods. The graphs show generally positive linear relationships between peer related adverse life events and juvenile firesetting at all three time periods. The sharp decrease at Time 1 for females is once again likely due to a very small number of females receiving scores of 3 or more (17 at Time 1). As with the general adverse life events scale, this decrease is likely just a random fluctuation, but may also be evidence that the relationship between

peer related adverse life events and juvenile firesetting is weaker for females than males.

Logistic Regression Analysis

Table 6: Relation between adverse life events and juvenile firesetting (Separate time periods for males and females combined)			
	Odds ratio for:		
Variable	Firesetting T1	Firesetting T2	Firesetting T3
Time 1			
GAL T1	1.57***	0.98	0.87
FAL T1	1.15***	1.08*	1.13**
PAL T1	0.96	0.84	1.11
Anxiety T1	1.08	1.99*	0.64
Gender	0.28***	0.33***	0.55*
Age (year of birth)	0.86	0.64*	1.98***
Time 2			
GAL T2		1.41*	1.03
FAL T2		1.20***	1.11
PAL T2		1.02	0.90
Anxiety T2		1.46	2.35*
Gender		0.41***	0.50*
Age		0.60**	1.91**
Time 3			
GAL T3			1.31
FAL T3			1.30***
PAL T3			1.45*
Anxiety T3			1.25
Gender			0.55
Age			1.52
*= significant at .05, **= significant at .01 ***= significant at .001 or better			

Table 6 presents the findings from the binary logistic regression with males and females combined using juvenile firesetting as the dependent variable. The Time 1 variable of general adverse life events was found to be associated with juvenile firesetting at Time 1. Therefore an increase of 1 point on the general adverse life event scale at Time 1 results in 1.57 times more firesetting behavior at Time 1 (57 percent more) when viewing males and females combined. Family related adverse life events and gender at Time 1 were also found to be associated with juvenile firesetting at Time 1. The Time 2

variables of general adverse life events, family related adverse life events, gender, and age were found to be associated with juvenile firesetting at Time 2. The Time 3 variables of family related adverse life events and peer related adverse life events were found to be associated with Time 3 juvenile firesetting. The Time 1 variables of family related adverse life events, gender, and age were also found to be predictors of juvenile firesetting at Time 2 and at Time 3. Anxiety at Time 1 was also found to be a predictor of juvenile firesetting at Time 2. The Time 2 variables of anxiety, gender, and age were found to be predictors of juvenile firesetting at Time 3.

Table 7:
Relation between adverse life events and juvenile firesetting
(Separate time periods for males and females separately)

	Odds ratio for:					
Variable	Firesetting T1		Firesetting T2		Firesetting T3	
	Male	Female	Male	Female	Male	Female
Time 1						
GAL T1	1.44***	1.90**	0.87	1.52	1.01	0.58
FAL T1	1.14***	1.18**	1.11*	0.97	1.12*	1.12
PAL T1	0.96	0.97	0.78	1.12	1.07	1.20
Anxiety T1	1.24	0.80	1.82	2.48	0.22*	2.01
Age	0.89	0.67	0.59**	0.97	2.22***	1.43
Time 2						
GAL T2			1.23	1.79*	1.06	1.06
FAL T2			1.16**	1.25**	1.13	1.07
PAL T2			1.12	0.68	0.79	1.38
Anxiety T2			1.56	1.22	1.81	3.66*
Age			0.56**	0.78	1.99*	1.86
Time 3						
GAL T3					1.27	1.36
FAL T3					1.28***	1.34***
PAL T3					1.47	1.33
Anxiety T3					0.93	2.26
Age					1.50	1.69

*= significant at .05, **= significant at .01 ***= significant at .001 or better

Table 7 presents the findings from the binary logistic regression with males and females examined separately using juvenile firesetting as the dependent variable. The Time 1 variable of general adverse life events was

found to be associated with juvenile firesetting for both males and females at Time 1. Therefore an increase of 1 point on the general adverse life event scale at Time 1 results in 1.44 times more firesetting behavior at Time 1 (44 percent more) for males and 1.90 times more firesetting behavior at Time 1 (90 percent more) for females. The variable of family related adverse life events at Time 1 was also found to be associated with juvenile firesetting at Time 1 for both males and females. The relationship between general adverse life events and juvenile firesetting was much stronger for females than males, and the relationship between family related adverse life events and juvenile firesetting was slightly stronger for females than males.

The Time 2 variable of family related adverse life events was found to be associated with juvenile firesetting at Time 2 for both males and females. The relationship was stronger for females than males. The Time 2 variable of age was found to be associated with juvenile firesetting at Time 2 for males, while the Time 2 variable of general adverse life events was found to be associated with juvenile firesetting at Time 2 for females.

The Time 3 variable of family related adverse life events was found to be associated with juvenile firesetting at Time 3 for both males and females. The relationship was slightly stronger for females than males.

The Time 1 variables of family related adverse life events and age were found to be predictors of juvenile firesetting at Time 2 and Time 3 for males. Anxiety at Time 1 was also found to be a predictor of juvenile firesetting at Time 3 for males. The Time 2 variable of age was found to be a predictor of juvenile

firesetting at Time 3 for males, while the Time 2 variable of anxiety was found to be a predictor of juvenile firesetting at Time 3 for females.

Path Analysis

A path analysis was performed in order to determine whether anxiety as a proxy for psychological stress played a mediating role in the relationship between adverse life events and juvenile firesetting. In addition to determining if anxiety mediated the relationship, this analysis was intended to determine to what extent anxiety mediated the relationship (i.e., partially mediated, or fully mediated).

Table 8:
Relation between adverse life events and anxiety
(Separate time periods for males and females combined)

	Odds ratio for:		
Variable	Anxiety T1	Anxiety T2	Anxiety T3
Time 1			
GAL T1	1.41***	1.34***	1.14
FAL T1	1.30***	1.10***	1.08***
PAL T1	1.40***	0.89	1.10
Gender	1.84***	1.78***	1.66***
Age	1.03	0.92	0.85
Time 2			
GAL T2		1.46***	1.13
FAL T2		1.32***	1.17***
PAL T2		1.34**	1.31*
Gender		2.37***	1.80***
Age		1.07	0.88
Time 3			
GAL T3			1.51***
FAL T3			1.30***
PAL T3			1.51***
Gender			2.03***
Age			0.86

*= significant at .05, **= significant at .01 ***= significant at .001 or better

Table 8 presents the findings from the binary logistic regression with males and females combined using anxiety as the dependent variable. The Time 1 variable of general adverse life events was found to be associated with anxiety at Time 1. Therefore an increase of 1 point on the general adverse life event scale at Time 1 results in 1.41 times more anxiety at Time 1 (41 percent more)

when viewing males and females combined. Family related adverse life events, peer related adverse life events, and gender at Time 1 were also found to be associated with anxiety at Time 1. The same variables at Time 2 and at Time 3 were found to be associated with anxiety at Time 2 and at Time 3 respectively. The Time 1 variables of family related adverse life events and gender were found to be predictors of anxiety at Time 2 and at Time 3, while the variable of general adverse life events at Time 1 was found to be a predictor of anxiety at Time 2. The Time 2 variables of family related adverse life events, peer related adverse life events, and gender were found to predictors of anxiety at Time 3.

Table 9:
Relation between adverse life events and anxiety
(Separate time periods for males and females separately)

	Odds ratio for:					
Variable	Anxiety T1		Anxiety T2		Anxiety T3	
	Male	Female	Male	Female	Male	Female
Time 1						
GAL T1	1.45***	1.40*	1.33*	1.34*	1.13	1.21
FAL T1	1.21***	1.36***	1.07*	1.12***	1.03	1.11***
PAL T1	1.33**	1.57***	0.93	0.85	1.03	1.17
Age	1.27	0.79	0.92	0.91	0.85	0.83
Time 2						
GAL T2			1.33*	1.64**	0.99	1.26
FAL T2			1.34***	1.31***	1.19***	1.15***
PAL T2			1.22	1.51**	1.26	1.37*
Age			1.10	1.05	0.92	0.81
Time 3						
GAL T3					1.39	1.74**
FAL T3					1.31***	1.29***
PAL T3					1.69***	1.43*
Age					0.92	0.76

*= significant at .05, **= significant at .01 ***= significant at .001 or better

Table 9 presents the findings from the binary logistic regression with males and females examined separately using anxiety as the dependent variable. The Time 1 variable of general adverse life events was found to be associated with anxiety for both males and females at Time 1. Therefore an

increase of 1 point on the general adverse life event scale at Time 1 results in 1.45 times more anxiety at Time 1 (45 percent more) for males and 1.40 times more anxiety at Time 1 (40 percent more) for females. Family related adverse life events and peer related adverse life events at Time 1 were also found to be associated with anxiety at Time 1 for males and females. The relationship between general adverse life events and anxiety was stronger for male than females, while the relationships between family related adverse life events, peer related adverse life events, and anxiety were stronger for females than males.

The Time 2 variables of general adverse life events and family related adverse life events were found to be associated with anxiety at Time 2 for males and females, while the Time 2 variable of peer related adverse life events was found to be associated with anxiety at Time 2 for females. The relationship between general adverse life events and anxiety was stronger for females than males, while the relationship between family related adverse life events and anxiety was slightly stronger for males than females.

The Time 3 variables of family related adverse life events and peer related adverse life events were found to be associated with anxiety at Time 3 for males and females, while the Time 3 variable of general adverse life events was found to be associated with anxiety at Time 3 for females. The relationship between family related adverse life events and anxiety was slightly stronger for males than females, while the relationship between peer related adverse life events and anxiety was much stronger for males than females.

The Time 1 variables of general adverse life events and family related life events were found to be predictors of anxiety at Time 2 for males and females. The relationships between both of these variables and anxiety were slightly stronger for females than males. The Time 1 variable of family related adverse life events was found to be a predictor of Time 3 anxiety for females. The Time 2 variable of family related adverse life events was found to be a predictor of anxiety at Time 3 for males and females, while the Time 2 variable of peer related adverse life events was found to be a predictor of anxiety at Time 3 for females. The relationship between family related adverse life events and anxiety was slightly stronger for males than females.

Figure 10:
Relation of adverse life events at T1 to juvenile firesetting at T1

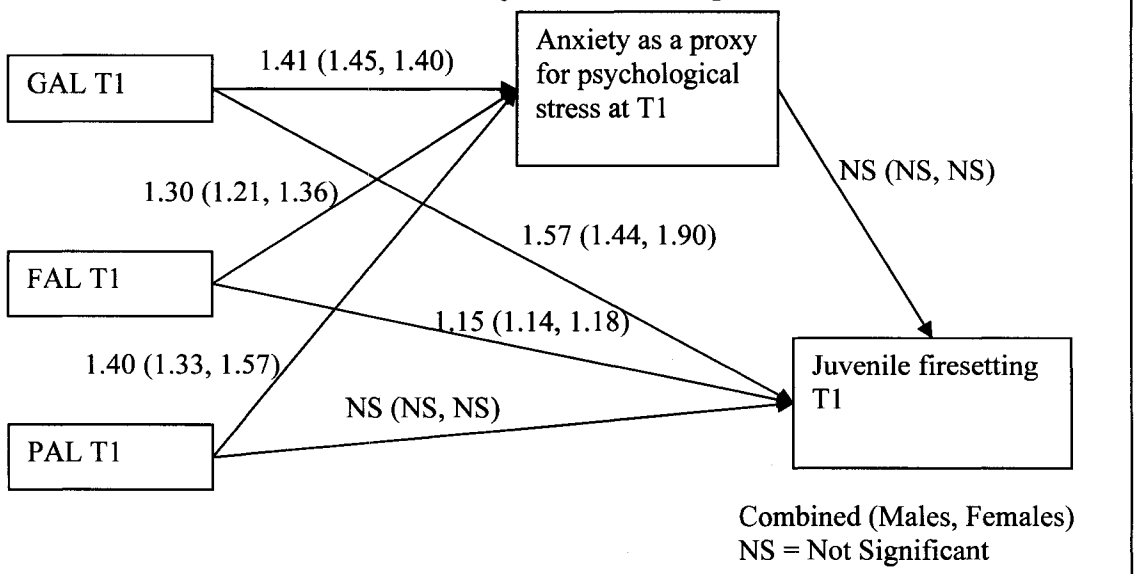


Figure 11:
Relation of adverse life events at T1 to juvenile firesetting at T2

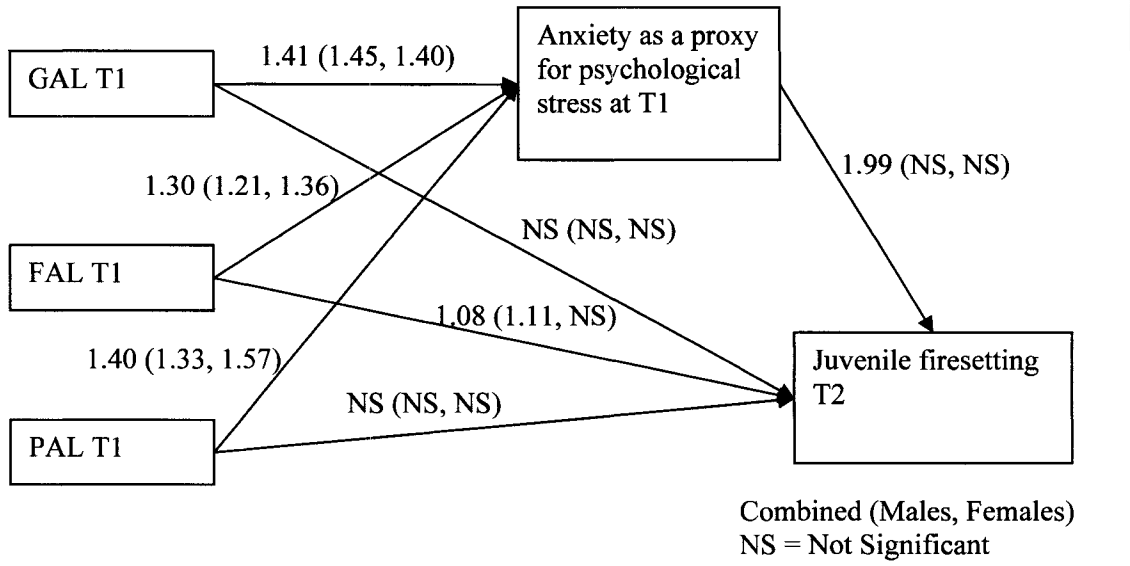


Figure 12:
Relation of adverse life events at T1 to juvenile firesetting at T3

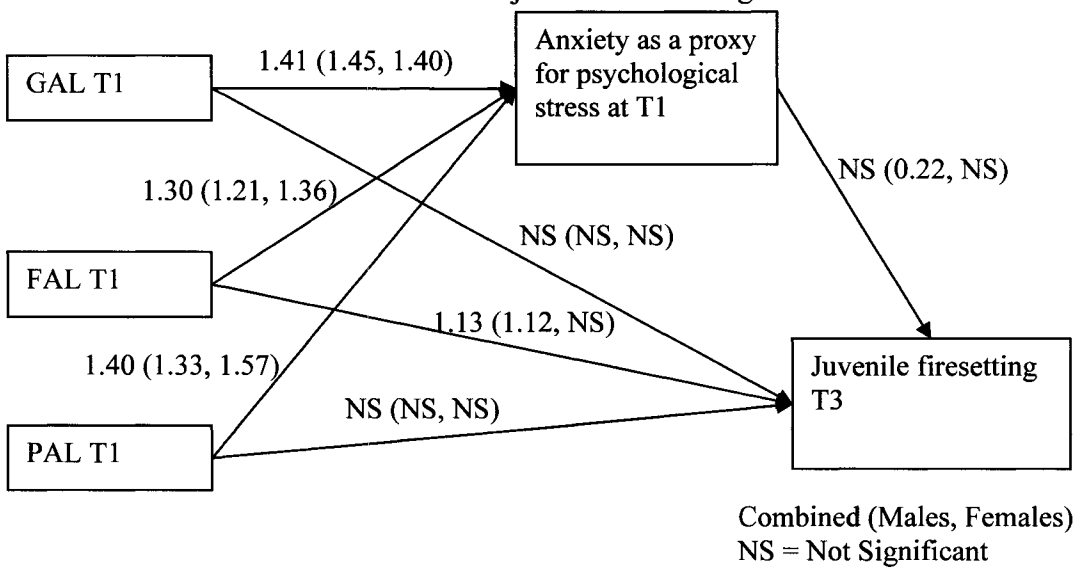


Figure 13:
Relation of change in adverse life events from T1-T2 to juvenile firesetting at T2

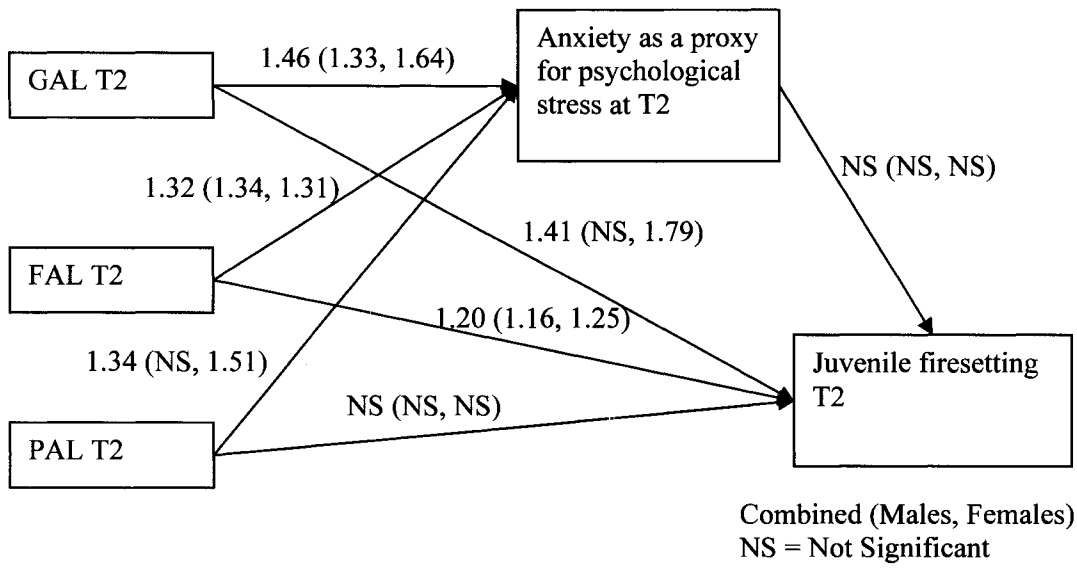


Figure 14:
Relation of change in adverse life events from T1-T2 to juvenile firesetting at T3

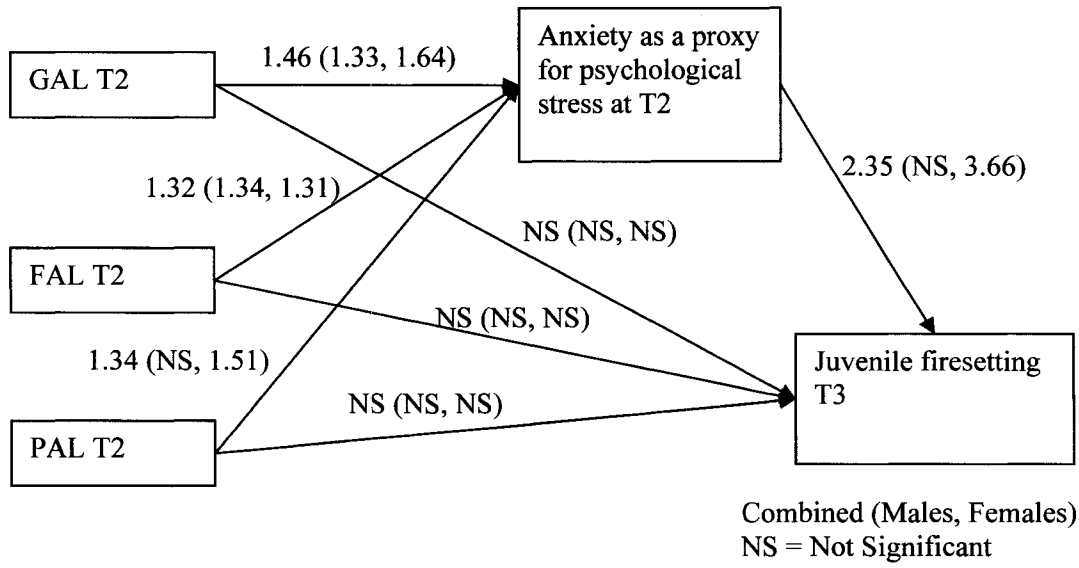
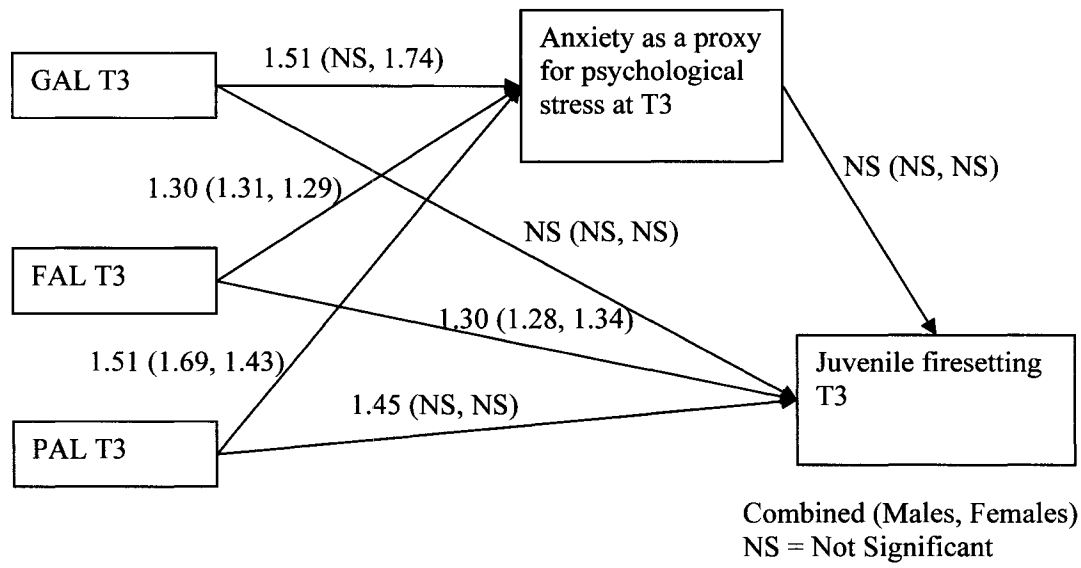


Figure 15:
Relation of change in adverse life events from T2-T3 to juvenile firesetting at T3



Time 1

Figures 10 through 12 present the findings related to the Time 1 adverse life event variables. Figure 10 shows that general adverse life events and family related adverse life events at Time 1 were related to an increased probability of juvenile firesetting and anxiety at Time 1. It also shows that peer related adverse life events at Time 1 were related to an increased probability of anxiety at Time 1. No relationship was found between anxiety at Time 1 and firesetting at Time 1. Therefore the relationship between adverse life events at Time 1 and juvenile firesetting at Time 1 was not mediated by anxiety at Time 1.

Figure 11 shows that general adverse life events and peer related adverse life events at Time 1 were related to an increased probability of anxiety at Time 1, while family related adverse life events at Time 1 were related to an increased probability of both anxiety at Time 1 and juvenile firesetting (for males and females together, and males alone) at Time 2. Additionally, anxiety at Time 1 was associated with an increased probability of juvenile firesetting at Time 2 for males and females combined. Therefore anxiety as a proxy for psychological stress at Time 1 partially mediated the effect of the relationship between the adverse life event variables for males and females combined at Time 1 and juvenile firesetting at Time 2. For example, an increase of 1 point on the family related adverse life event scale for males and females combined at Time 1 was associated with 1.30 times more anxiety at Time 1. In turn a 1 point increase in anxiety at Time 1 was associated with 1.99 times more juvenile firesetting at Time 2.

Figure 12 shows that general adverse life events and peer related adverse life events at Time 1 were related to an increased probability of anxiety at Time 1, while family related adverse life events at Time 1 were related to an increased probability of both anxiety at Time 1 and juvenile firesetting (for males and females together, and males alone) at Time 3. Additionally, anxiety at Time 1 was related to a decreased probability of juvenile firesetting at Time 3 for males.

Time 2

Figures 13 and 14 present the findings related to the Time 2 adverse life event variables. Figure 13 shows that general adverse life events and family related adverse life events at Time 2 were related to an increased probability of anxiety Time 2. General adverse life events (for males and females combined and females alone) and family related adverse life events were also related to an increased probability of juvenile firesetting at Time 2. Peer related adverse life events at Time 2 were related to an increased probability of anxiety at Time 2 for males and females combined as well as females alone. No relationship was found between anxiety at Time 2 and firesetting at Time 2. Therefore the relationship between adverse life events at Time 2 and juvenile firesetting at Time 2 was not mediated by anxiety at Time 2.

Figure 14 shows that general adverse life events, family related adverse life events, and peer related adverse life events (for males and females combined and females alone) at Time 2 were related to an increased probability of anxiety at Time 2. No relationship was found between the adverse life event variables at Time 2 and juvenile firesetting at Time 3. However, anxiety at Time 2

was found to be related to an increased probability of juvenile firesetting at Time 3 for males and females combined as well as females alone. Therefore the relationship between the adverse life event variables at Time 2 and juvenile firesetting at Time 3 was fully mediated by anxiety at Time 2.

Time 3

Figure 15 presents the findings related to the Time 3 adverse life event variables. Figure 15 shows that general adverse life events (for males and females combined and females alone), family related adverse life events, and peer related adverse life events at Time 3 were related to an increased probability of anxiety at Time 3. Family related adverse life events and peer related adverse life events (for males and females combined) at Time 3 were related to an increased probability of juvenile firesetting at Time 3. No relationship was found between anxiety at Time 3 and firesetting at Time 3. Therefore the relationship between adverse life events at Time 3 and juvenile firesetting at Time 3 was not mediated by anxiety at Time 3.

CHAPTER V

DISCUSSION

Summary

The present study found support for each of the three hypotheses that were tested. The first hypothesis proposed that adverse life events are associated with a greater prevalence of juvenile firesetting behavior. This was supported for both males and females individually, and combined at each of the three time periods. However, this relationship was not found for all three adverse life event variables at all times. General adverse life events were associated with juvenile firesetting at Time 1 for males, females, and males and females combined. Then at Time 2 general adverse life events were only associated with juvenile firesetting for females. At Time 3 general adverse life events were no longer significantly associated with juvenile firesetting. While general adverse life events were not significantly associated with juvenile firesetting at Time 3, that is the only time when peer related adverse life events presented a significant association with juvenile firesetting (for males and females combined only). Family related adverse life events were found to be associated with juvenile firesetting at all three time periods for males, females, and males and females combined. In addition to being associated with juvenile firesetting, the Time 1 family related adverse life events were found to be predictive of Time 2 and Time 3 juvenile firesetting for males alone and males and females combined.

The findings related to hypothesis one found that family related adverse life events are strongly related to juvenile firesetting for juveniles in grades 8 through 10. It also appears that general adverse life events play a role earlier in life, but fade by grade 9 or 10. It may be that general adverse life events are overshadowed at that age by other factors such as peer related adverse life events.

The second hypothesis proposed that family related adverse events have a greater effect on juvenile firesetting behavior than peer related adverse events. As described above, peer related adverse life events were only associated with juvenile firesetting at one time, and only for males and females combined. Family related adverse life events were found to be associated with juvenile firesetting at all times, and the Time 1 family related adverse life events were predictive of Time 2 and Time 3 juvenile firesetting. Based on these findings the present study found family related adverse life events as having a greater effect on the firesetting behavior of juveniles in grades 8 through 10 than peer related adverse life events. A number of previous studies have also found strong relationships between family factors and juvenile firesetting which provides further support for the conclusion that family related adverse life events play a stronger role in juvenile firesetting behavior than peer related adverse life events (Becker, Stuewig, Bloomington, & McCloskey, 2004; Kazdin, & Kolko, 1986; Kolko, & Kazdin, 1990; Showers, & Pickrell, 1987).

The third and final hypothesis proposed that anxiety as a proxy for psychological stress partially mediates the relationship between adverse life

events and juvenile firesetting behavior. Limited support was found for this hypothesis under certain circumstances. Time 1 anxiety partially mediated the relationship between Time 1 adverse life events and Time 2 firesetting for males and females combined. Time 1 anxiety also partially mediated the relationship between Time 1 adverse life events and Time 3 firesetting for males alone and males and females combined. Additionally, it was found that Time 2 anxiety fully mediated the relationship between Time 2 adverse life events and Time 3 firesetting.

When anxiety did not play a mediating role (i.e., there was only a direct effect between the adverse life event variables and juvenile firesetting) it meant that the adverse life events were related to juvenile firesetting through some unknown process. Variables other than anxiety may be found to play a mediating role between adverse life events and juvenile firesetting. Evidence of this would then provide insight into the unknown processes relating these variables at times where anxiety was not found to play a mediating role.

While anxiety was not found to mediate the relationship between adverse life events and juvenile firesetting at all times, it did occur in a specific pattern. Mediation occurred in the years subsequent to when the anxiety variable was measured. That is to say that Time 1 anxiety mediated the relationship at Time 2 and at Time 3, and Time 2 anxiety mediated the relationship at Time 3. Because the relationship only appears under very specific circumstances, at this time it is best to refrain from stating whether or not anxiety as a proxy for psychological

stress mediates the relationship between adverse life events and juvenile firesetting.

Limitations

The greatest limitation of the present study was the need to employ archival data. When using archival data one is unable to choose what variables exist and how they were measured. Because of this, a study using archival data may be unable to examine all aspects that would have been included if a researcher collected his or her own data. However, the benefit of collecting one's own data is often outweighed by the tremendous expense of performing large scale data collection. In the present study this limitation is most prevalent in the item used to detect juvenile firesetting. As previously described, the item does not specify what is considered to be firesetting behavior, and it does not provide any characteristics of the firesetting incident. Additionally, the firesetting variable states "I have set fire to things in public places just for fun", which leaves a great deal open for interpretation by the juvenile completing the measure. One juvenile may have answered yes because he or she believed that starting a camp fire with parental permission falls under this, while another juvenile may have accidentally set his or her room on fire while engaging in fire play but answered no because it was not in a public place. The use of archival data also resulted in the lack of a measure for socioeconomic status in the present study. Lacking such a measure makes it impossible to determine if there were factors such as family income or parental education which may account for the findings in the present study. One final limitation of the present study was that the sample of

juveniles was collected in Southern Australia. Because of this the findings may not generalize to an American population. Even though an Australian population is not completely identical to an American population, many similarities exist including racial makeup, income, and language which may allow tentative generalizations to be made (Australia, 2006; United States, 2006).

Areas for Future Research

The information available on juvenile firesetters outside of a clinical population is very limited; therefore one of the first steps for future research would be to determine the actual frequency of firesetting in the United States (Putnam, & Kirkpatrick, 2005). In addition to determining the frequency of firesetting, it will also be important to find any characteristics which may identify juvenile firesetters in the general population. Collecting information related to how often juveniles set fires, where the fires were set, why the fires were set, and how the fires were set will allow juveniles to be grouped based on the severity of the firesetting they have engaged in. For example, groups could include accidental firesetting with little/much damage, fire play with little/much damage, intentional firesetting with little/much damage, etc.

After collecting data related to the frequency and types of firesetting behavior from a national sample it may be beneficial to replicate the present study using an American population. Improvements, such as the inclusion of a measure for socioeconomic status, items that are designed to collect richer information on firesetting behavior, and a better measure of psychological stress would be recommended to enhance the validity of the study. Lastly, it is

suggested that after improving upon the present study, the individual adverse life events should be examined to determine if certain events are more strongly associated with juvenile firesetting than others. This may lead to an additional method for detecting juveniles who are likely to engage in juvenile firesetting behavior in the future.

Conclusions

While several limitations existed in the present study, these do not significantly limit the benefit the above findings may provide. The support that has been provided for the existence of a relationship between adverse life events, especially family related adverse life events, and juvenile firesetting may allow for the development of new juvenile firesetting prevention programs. Because the strongest associations found between adverse life events and juvenile firesetting were from the family related adverse life events, it suggests that any new treatment program include not only the juvenile, but also his or her immediate family members when possible. In addition to the development of new treatment programs, the findings of the present study may be readily adapted to inform parents or guardians, teachers, and child care professionals of the types of adverse events which may lead to psychological stress and or juvenile firesetting behavior. Prior to implementing a new treatment program or distributing information related to adverse life events leading to psychological stress and/or juvenile firesetting, additional research should be performed to ensure that the findings of the present study can be replicated in other populations.

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APPENDICES

APPENDIX A

ADDITIONAL MEASURES

Table 10: McMaster Family Assessment Device: General Function Sub-Scale (FAD-GF)				
Here are a number of statements about families. Please read each statement carefully and decide how well it describes your own family. Try not to think about each statement too much – respond as quickly as you can.				
The numbers in parentheses are used for scoring and do not appear on the actual measure when administered.	Strongly Agree	Agree	Disagree	Strongly Disagree
Planning family activities is difficult because we misunderstand each other.	(4)	(3)	(2)	(1)
In times of trouble we can turn to each other for support.	(1)	(2)	(3)	(4)
We cannot talk to each other about the sadness we feel.	(4)	(3)	(2)	(1)
Individuals are accepted for what they are.	(1)	(2)	(3)	(4)
We avoid discussing our fears and concerns.	(4)	(3)	(2)	(1)
We can express feelings to each other.	(1)	(2)	(3)	(4)
There are lots of bad feelings in the family.	(4)	(3)	(2)	(1)
We feel accepted for what we are.	(1)	(2)	(3)	(4)
Making decisions is a problem for our family.	(4)	(3)	(2)	(1)
We are able to make decisions about how to solve problems.	(1)	(2)	(3)	(4)
We don't get along well together.	(4)	(3)	(2)	(1)
We confide in each other.	(1)	(2)	(3)	(4)

FAD-GF Scale Scoring

The mean is found for a juvenile's response to the 12 items on the FAD-GF providing a score between 1 and 4 for each participant.

Table 11:
Influential Relationships Questionnaire (IRQ)

Answer the following questions about your mother or female caregiver/father or male caregiver **(The scale is used once for each caregiver)**

The numbers in parentheses and sub-scale listing are used for scoring and do not appear on the actual measure when administered	Strongly Agree	Agree	Disagree	Strongly Disagree	**Sub-Scale**
Speaks to me in a warm and friendly voice.	(3)	(2)	(1)	(0)	Care
Does not help me as much as I need.	(0)	(1)	(2)	(3)	Care
Lets me do things I like doing.	(0)	(1)	(2)	(3)	Over Protective
Is cold toward me.	(0)	(1)	(2)	(3)	Care
Appears to understand my problems and worries.	(3)	(2)	(1)	(0)	Care
Is affectionate to me.	(3)	(2)	(1)	(0)	Care
Likes me to make my own decisions.	(0)	(1)	(2)	(3)	Over Protective
Does not want me to grow up.	(3)	(2)	(1)	(0)	Over Protective
Tries to control everything I do.	(3)	(2)	(1)	(0)	Over Protective
Invades my privacy.	(3)	(2)	(1)	(0)	Over Protective
Enjoys talking things over with me.	(3)	(2)	(1)	(0)	Care
Frequently smiles at me.	(3)	(2)	(1)	(0)	Care
Tends to baby me.	(3)	(2)	(1)	(0)	Over Protective
Does not seem to understand what I need or want.	(0)	(1)	(2)	(3)	Care
Lets me decide things for myself.	(0)	(1)	(2)	(3)	Over Protective
Makes me feel I'm not wanted.	(0)	(1)	(2)	(3)	Care
Can make me feel better when I am upset.	(3)	(2)	(1)	(0)	Care
Does not talk with me very much.	(0)	(1)	(2)	(3)	Care
Tries to make me dependent on her/him	(3)	(2)	(1)	(0)	Over Protective
Feels I cannot look after myself unless she/he is around.	(3)	(2)	(1)	(0)	Over Protective
Gives me as much freedom as I want.	(0)	(1)	(2)	(3)	Over Protective
Lets me go out as often as I want.	(0)	(1)	(2)	(3)	Over Protective
Is overprotective of me.	(3)	(2)	(1)	(0)	Over Protective
Does not praise me.	(0)	(1)	(2)	(3)	Care
Lets me dress in any way I please.	(0)	(1)	(2)	(3)	Over Protective
Often criticizes me.	(3)	(2)	(1)	(0)	Critical
Gets angry at me for no reason.	(3)	(2)	(1)	(0)	Critical
Does not often disapprove of my behavior.	(0)	(1)	(2)	(3)	Critical

Is not resentful of me.	(0)	(1)	(2)	(3)	Critical
Makes me feel rejected.	(3)	(2)	(1)	(0)	Critical
I don't often feel she/he dislikes me.	(0)	(1)	(2)	(3)	Critical
Talks about me in a way that hurts me.	(3)	(2)	(1)	(0)	Critical
Puts me down.	(3)	(2)	(1)	(0)	Critical
Does not make me nervous.	(0)	(1)	(2)	(3)	Critical
Does not pick on me when I am ill.	(0)	(1)	(2)	(3)	Critical
Points out my weaknesses rather than praising me.	(3)	(2)	(1)	(0)	Critical
Hardly ever says things which confuse me.	(0)	(1)	(2)	(3)	Critical

IRQ Scale Scoring

The items on the IRQ are summed separately for each subscale (care, over protection, critical). This provides three scores for each participant ranging from 0 to 36 for the care and critical subscales, and from 0 to 39 for the over protection subscale.

APPENDIX B

INSTITUTIONAL REVIEW BOARD APPROVAL NOTICE

UNIVERSITY of NEW HAMPSHIRE

April 24, 2006

Patrick Roberts
Justice Studies, Huddleston Hall
27 Bradley Street
Concord, NH 03301

IRB #: 3707
Study: Change in Family and Peer Life Circumstances Relative to Juvenile Fire Setting
Approval Date: 04/21/2006

The Institutional Review Board for the Protection of Human Subjects in Research (IRB) has reviewed and approved the protocol for your study as Exempt as described in Title 45, Code of Federal Regulations (CFR), Part 46, Subsection 101(b). Approval is granted to conduct your study as described in your protocol.

Researchers who conduct studies involving human subjects have responsibilities as outlined in the attached document, *Responsibilities of Directors of Research Studies Involving Human Subjects.* (This document is also available at http://www.unh.edu/osr/compliance/irb.html.) Please read this document carefully before commencing your work involving human subjects.

Upon completion of your study, please complete the enclosed pink Exempt Study Final Report form and return it to this office along with a report of your findings.

If you have questions or concerns about your study or this approval, please feel free to contact me at 603-862-2003 or Julie.simpson@unh.edu. Please refer to the IRB # above in all correspondence related to this study. The IRB wishes you success with your research.

For the IRB,

Julie F. Simpson
Manager

cc: File
Murray Straus