

Fire Research Report

Adolescent Firesetting: a NZ case-controlled study of risk factors for adolescent firesetters

**Psychology Department
University of Auckland**

2004

This study explores the personality patterns, coping responses, behaviour problems and family environments of adolescent males involved in firesetting. Fifty adolescent firesetters were compared with 33 adolescents with behaviour problems and 34 adolescents without behaviour problems.

The current study found firesetting to more commonly occur in younger adolescents, while in the company of others and to be motivated by boredom or excitement. Solitary firesetters reported greater social difficulties, more thought problems and firesetting of greater concern.

Firesetting appeared to be linked to diagnoses of ADHD and Conduct Disorder. The firesetting group was similar to the behavioural group, with both having more pathological personality patterns, more behaviour problems and more dysfunctional family environments, compared to the control group. The repetitive firesetting group had more pathological personality patterns compared to the single incident group, but did not differ on other measures.

The findings in this research suggest a need to consider the following variables in assessing adolescent firesetting. The influence of the peer group, differentiation of the solitary firesetting, diagnoses of ADHD and Conduct Disorder, motivations, historical fire-related behaviours and their emotional response to their firesetting. Recommendations related to these areas of assessment are discussed.

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Adolescent firesetting

A New Zealand case-controlled study of risk factors for adolescent firesetting

Summary report

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2004

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Abstract

The current study explores the personality patterns, coping responses, behaviour problems and family environments of adolescent males involved in firesetting. Fifty adolescent firesetters were compared with 33 adolescents with behaviour problems and 34 adolescents without behaviour problems.

The current study found firesetting to more commonly occur in younger adolescents, while in the company of others and to be motivated by boredom or excitement. Solitary firesetters reported greater social difficulties, more thought problems and firesetting of greater concern. Firesetting appeared to be linked to diagnoses of ADHD and Conduct Disorder.

The firesetting group was similar to the behavioural group, with both having more pathological personality patterns, more behaviour problems and more dysfunctional family environments, compared to the control group. The firesetting and behavioural groups only differed in that the firesetting group reported more deviant patterns of behaviour, supporting a non-significant trend of greater behaviour problems observed by parents/caregivers.

The repetitive firesetting group had more pathological personality patterns compared to the single incident group, but did not differ on other measures. The single incident group appeared to have personality patterns that fell between those of the behavioural group and the control group, however some of their behaviours were worse than those of the behavioural group.

The variables of early and frequent matchplay, low hypochondria, low somatic complaints, greater deviation, lower rates of bullying and low moral/religious discussion in family environment, differentiated the firesetting group from the behavioural group. The variables of frequent matchplay, positive feelings after the fire, not being scared after fire, having a fire get out of control and low conflict with siblings, were variables that differentiated the repetitive firesetting group from the single incident groups.

The findings in this research suggest a need to consider the following variables in assessing adolescent firesetting. The influence of the peer group, differentiation of the solitary firesetting, diagnoses of ADHD and Conduct Disorder, motivations, historical fire-related behaviours and their emotional response to their firesetting. Recommendations related to these areas of assessment are discussed.

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INTRODUCTION

Firesetting generates a great deal of interest in the community and media. This is not surprising given the significance of fire and its destructive potential. Research on adolescent firesetting is relatively sparse, which is surprising given that in the United States around half of all those arrests for arson are under the age of 18. Most recent research has occurred in the United States and the majority of this has focused on children. There is a clear need to more fully understand firesetting and its development. The present study examines adolescent firesetting within a New Zealand Context, with a focus on the following aims:

1. To explore the difference between adolescents involved in firesetting, adolescents with behavioural problems and adolescents without problems;
2. To explore differences between those involved in a single incident of firesetting and those that engage in repetitive firesetting; and
3. To identify factors that can be used to differentiate between those involved in firesetting and those involved in repetitive firesetting.

Summary report

This report is a summary of a full report prepared for the New Zealand Fire Service Contestable Research Fund. It includes a summary of the literature review, methodology, results and discussion covered in the full report. For more detailed information we would refer the reader to that report.

LITERATURE REVIEW

The following literature review will cover proposed definitions and subtypes of firesetting, the prevalence of firesetting, the application of psychological theories, characteristics of the firesetters, and the issue of recidivism.

Terminology

The terminology and behavioural descriptions of firesetting have varied, leading to inconsistencies in literature and research. In recent times, theorists have segregated fire-related behaviours into three stages: fire-interest, fireplay and firesetting (Gaynor, 1996). These terms are thought to reflect a developmental progression of increased fire related activity (Gaynor, 1996), Table 1 presents behaviours most commonly associated with each of these three ‘stages’ plus a more severe form of firesetting, often called pathological firesetting.

Table 1: Terminology

Descriptor	Fire Interest	Fireplay	Firesetting	Pathological Firesetting
	General interest in fire	Experimentation or use of fire	Intentional setting of fire	Serious repetitive firesetting
Alternative Label		Curiosity, experimental		Severe firesetting
Behaviours	<ul style="list-style-type: none"> • Talking about fire • Playing with fire related toys • Asking about fire 	<ul style="list-style-type: none"> • Experimenting with matches and fire • Curiosity and accidental fires 	<ul style="list-style-type: none"> • Term can range from any incident where a fire is set, to deliberate and repetitive 	<ul style="list-style-type: none"> • Repetitive and persistent pattern of firesetting
Differentiating Behaviours (Gaynor & Hatcher, 1987; Gaynor, 2000)		<ul style="list-style-type: none"> • Single Incident • Unplanned • Use of available materials • Own property • Rubbish • Attempt to put out, go for help • Motivated by curiosity • Accidental 	<ul style="list-style-type: none"> • Recurrent history • Planned • Flammable materials used • Targetting other peoples property • Stay and watch or run away • Purposeful motivation • Conscious 	<ul style="list-style-type: none"> • Repetitive, persistent history – over 6 months • Planned • Seeking out combustibile material • Malicious mischief, watching it burn, revenge, profit, harming others • Targeting others • No voluntary admission

Pyromania

The term pyromania has a long history, but its modern use is as a psychiatric diagnosis, referenced in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR) of the American Psychiatric Association (APA, 2000). Pyromania is defined as “multiple episodes of

deliberate and purposeful fire setting... tension or affective arousal before setting a fire... fascination with, interest in, curiosity about, or attraction to fire and its situational contexts (e.g. paraphernalia, uses, consequences)... pleasure, gratification, or a release of tension when setting the fire, witnessing its effect, or participating in its aftermath” (APA, 2000, p. 669). The DSM-IV-TR excludes firesetting engaged in for monetary gain, political expression, expression of anger, intoxication or other such things. It also excludes firesetting that is better accounted for by Conduct Disorder, a manic episode or an antisocial personality disorder (APA, 2000).

Although the term Pyromania has had a long history of use, in more recent times it has lost favour. The clinical and experimental evidence for it as a disorder are not strongly supported (Kolko, 1989b), it is actually extremely rare (Geller, 1992a), and its application to children is questionable (Kolko, 1989). In practice its use appears to be a rarity, with the diagnosis of Conduct Disorder dominating (Kolko & Kazdin, 1986).

Arson

The term arson is a forensic-legal classification (Gaynor & Hatcher, 1987), therefore the legal parameters of adult arson need to be applied to use the classification. Generally the key criteria necessary to define firesetting as arson are wilful and malicious motive and intent (Gaynor & Hatcher, 1987; Ritchie & Huff, 1999).

Typologies of firesetting

In addition to the above, there have been attempts made to establish descriptive subgroups of firesetters. These subgroups, often called typologies, have been based on a range of factors. Sometimes characteristics of the populations, such as: age, adolescent, gender, psychiatric diagnoses or legal status; sometimes fire specific details, such as wild-grass firesetters. But more often they have been related to the person’s motivation for setting the fire (Vreeland & Waller, 1979).

The development of typologies is complex and not without its pitfalls. The typologies themselves have also been said to create artificial demarcations, imposing unrelated factors on their schemas, such as gender or group versus solitary (Geller, 1992a). Some typologies are based on the firesetter and not the firesetting, while an individual may initially set fires for different reasons (Geller, 1992a). Despite the difficulties inherent in typologies, theorists have persisted in their use.

A more full description of the typologies suggested by Lewis and Yarnell (1951), Inciardi (1970), Vreeland and Levin (1980), Geller (1992a), Barker (1994), Wooden and Berkey (1984), and Fineman (1995) are described in the full report. However, according to Kolko (1999), the most common subgroups used to classify children and adolescents are:

1. Curiosity. These are usually younger children with little understanding of the consequences. The fire serves the function of their need to see the flame, or the change in objects caused by the flame. There is no intent to cause harm. Hyperactivity and attentional problems may be present (Fineman, 1995).
2. Pathological firesetters. See Table 1.
3. Delinquent firesetters. This includes the antisocial type for adults, the fire for profit type and covers another crime type. Fineman (1995) describes these individuals as involved in vandalism and hate crimes, and displaying little empathy. There are other personality and behavioural problems that usually accompany the firesetting
4. Crisis or “cry for help” firesetters. Fineman (1995) describes this as the conscious or subconscious drawing of attention to intrapersonal dysfunction. He includes the fire-fighters who set fires and would-be heroes in this subgroup, as these individuals set fires to draw attention to themselves in order to be seen as discovering or putting out the fire
5. Severely disturbed firesetters. This subgroup included those with significant paranoid and psychotic features. This includes those identified as self-harming, and those who are sensory reinforced by the fire. Those that would meet the DSM-IV-TR (APA, 2000) criteria for Pyromania would be seen as belonging to this sensory reinforcement group.

Prevalence

The prevalence of adolescent firesetting in the community is difficult to establish. A number of studies have reported on prevalence rates but have been limited by methodology, age range, and the use of clinical populations. This section will cover firesetting prevalence studies from the community, clinical settings and forensic data.

Prevalence in the community

Few studies specifically examine firesetting behaviour in the community, and the most comprehensive of these are focussed on children. Fire-interest in children has been found to be

'universal' (Kafry, 1980). Fireplay has been found to vary with age, increasing until age 12, with average rates of 38% (Grolnick et al., 1990) and 45%, and 23% engaged in recent fireplay. Kafry (1980) found 21% of 5 to 9 year old children had at some point in their life set a fire. A recent study by Martin et al. (2004) found that at age 13 at least 10.6% of boys and 3% of girls report "setting a fire in public for fun".

Prevalence in clinical populations

Prevalence rates of firesetting behaviours are higher in clinical populations than community samples. Inpatient prevalence rates vary from 14.3% (Stewart & Culver, 1982) to 34.6% (Kolko & Kazdin, 1988b). Outpatient studies have reported prevalence rates varying from 2.3% (Vandersall & Wiener, 1970) to 19.4% (Kolko & Kazdin, 1988b). Given that earlier studies suffered from retrospective design faults and more restricted means of defining and identifying firesetters, the more recent and higher prevalence rates are likely to be more accurate.

Prevalence in forensic populations

According to Bradish (1999) the FBI crime index data showed that between 1986 and 1994 children and adolescents accounted for between 40 and 55% of arrests for arson. Kolko (1999) reports that, according to FBI crime statistics, arson has the highest percentage of child and adolescent involvement of any serious offence. As high as these figures are, the actual involvement of children and adolescents in arson may be distorted. Grolnick et al. (1990) point out that few children are charged or arrested for arson, leaving experts estimating that they are likely to account for a larger number of fires.

Theoretical models

The application of psychological theory to firesetting can be seen to develop through three main eras. The first of these was the psychoanalytical era, followed by behaviourism and social learning theories, and more recently the development of multi-variable models.

Psychoanalytical theories

Psychoanalytical theory had a large impact on the study of firesetting. Vreeland and Waller (1979) believed this was due to the domination of psychoanalytic theory at the time of the initial proposals of theories related to and that psychoanalytic theory drew heavily from myths and symbols, for which fire is often used. Fire was often seen as symbolic of sexual activity and sexual repression (Raines & Foy, 1994) and this relationship became emphasised in early cases of firesetting. In 1932 Freud wrote the paper "The acquisition of power over fire" (Freud, 1932),

in which he interpreted the myth of Prometheus, relating it to psychoanalytic theory and firesetting behaviour. His interpretation of this myth established a link between sexual desire, urination and fire extinction and preservation. Fire is seen as an expression of strong libinal and phallic-urethral drives (Gaynor & Hatcher, 1987) and sexual feelings were seen as the primary drive for the ignition and then extinction of fire. This interpretation led to the establishment of sexual forces as the underlying motive associated with the ignition and extinguishing of fire (Gaynor & Hatcher, 1987). Researchers supported these interpretations at the time (Lewis & Yarnell, 1951; Yarnell, 1940), and recent research using psychoanalytic interpretations (Sakheim & Osborn, 1999).

Others have argued against this interpretation. Gold (1962) argued that sexual frustration was common and firesetting was not. Vreeland and Waller (1979) suggested that firesetting and sexual dysfunction were perhaps linked more as a group of antisocial behavioural problems. These behavioural problems are perhaps linked through a lack of self-control, self-confidence and social skills. Qunisey, Chaplin and Upfold (1989), measured penile arousal to a variety of firesetting themes, and found no difference between those with histories of firesetting and a control group.

Behavioural and social learning theories

The development of social learning theory shifted the focus towards the environment, and the roles that family and peers played in the firesetting (Gaynor, 1996). Recent research with families of children who have been involved in firesetting, has revealed a lack of supervision and discipline, greater personal and marital distress, and greater overall parental psychopathology (Kolko & Kazdin, 1990). These findings suggest that the behaviours of the families of firesetters are similar to those of other anti-social children (Loeber & Dishion, 1983).

The principle of the social learning theory has been applied to firesetting through theories of reinforcement and modelling of behaviour, the theory of expressed anger (McKerracher & Dacre, 1966; Vreeland & Waller, 1979), the development of delinquent behaviour (Patterson, 1980) and in multi-variant models (Fineman, 1980; Jackson et al., 1987; Kolko & Kazdin, 1986).

Reinforcement: Fire is believed to have powerful reinforcement properties. Vreeland and Levin (1980) pointed out that firesetting behaviour can be intrinsically rewarding in itself and immediately rewarding in the response of others. There is the sensory stimulation of the sirens, the commotion and excitement of the crowds and the fire service. There is also the praise and recognition inherent in reporting a fire.

Modelling: Social learning theory holds that behaviours are selectively reinforced, due to environmental consequences. The consequences of the behaviour do not need to be directly experienced; they can be learned through vicarious observation. It has been suggested that exposure to models involved with lighting fires can influence firesetting. Studies have reported links between childhood firesetting and family members involvement in sanctioned and unsanctioned firesetting (Jacobson, 1985a; Kolko & Kazdin, 1989a; Macht & Mack, 1968). Gaynor (1996) also highlights the increased occurrence of group firesetting in adolescents.

Indirect expression of anger: The theory that firesetting may represent an indirect expression of anger was proposed by McKerracher and Dacre (1966). This was supported through a social learning and behaviour perspective as an avoidance mechanism for someone who lacks confidence and has had adverse social experiences. It is argued that firesetting is a means by which the person is able to gain mastery and control in an environment that is hostile and unrewarding. Firesetting is a behaviour that can be used in aggression, while not directly confronting the victim (Vreeland & Levin, 1980). This theory is supported by evidence that those involved in firesetting have poor coping skills (Schiller & Jacobson, 1984), are shy and unassertive (Rice & Chaplin, 1979), have higher levels of aggression and more covert aggressive behaviour (Kolko & Kazdin, 1991a)

Chain of delinquent behaviour: Patterson, Forgatch, Yoerger and Stoolmiller (1998) proposed that difficulties begin in the family, resulting in poor social skill development, whereby the child elicits negative reactions from school and peers, leading to further social deviance. Patterson et al. (1998) referred to this as the drift towards marginal adjustment as adults. There appears to be a degree of support for firesetting to be seen as just one of a group of delinquent behaviours. Firesetting has long been found to co-occur with a range of antisocial behaviours (Lewis & Yarnell, 1951; Kolko, 1985; Kolko & Kazdin, 1991a).

Multi-variable models

After the influence of the social learning theories, researchers and theorists begun to develop models based on multiple factors to explain and predict firesetting behaviour. Three main contributions were made to the literature: Fineman's (1980) dynamic-behavioural model, Jackson et al.'s (1987) functional analysis model, and finally Kolko and Kazdin's (1986) tentative risk model. The models overlap in that they draw from groupings of similar variables and are based on the behavioural framework of antecedents, behaviour and consequences.

Fineman (1980) proposed the dynamic-behavioural formulation of firesetting including independent variables that could be used to predict firesetting behaviour. He suggested that firesetting results from an interaction between historic factors, historic contingencies regarding fire, and immediate events. This model, further refined in Fineman (1995) is as follows:

Historical factors predispose a child to antisocial behaviours. These factors also include poor supervision, lack of fire safety education, difficulties in education and possibly learning difficulties. They can also include difficulties in peer relationships and an inability to express themselves effectively, including a difficulty expressing anger. Historical contingencies, such as modelling, responses to firesetting, and supervision, may teach and reinforce playing with fire. Firesetting is usually preceded by a crisis or trauma. This event was hypothesised to increase impulsiveness and reduce the ability of an individual to deal with stress. After the fire has been set, there are factors that reinforce the behaviour. Fineman (1995) suggested that firesetting can be externally reinforced by external rewards, such as money, or internally-cognitively reinforced, by factors such as peer attention.

Three psychological determinants have been incorporated into this model (Gaynor, 1996), including: (1) Personality and individual characteristics: These include demographic, physical, emotional, motivational and psychiatric variables, (2) Family and social circumstances: including family, peer and social variables, and (3) Immediate environmental conditions or events occurring immediately prior to, during and after the firesetting (Fineman, 1995).

Characteristics of the adolescent firesetter

There has been a long history of interest in the characteristic of a firesetter, this section will report on the individual and environmental factors believed to be linked to firesetting.

Gender

The gender distribution of firesetters appears to be overwhelmingly male (Kolko, 1985). In clinical settings, the male dominance ranges from 82% to 88% (Jacobson; 1985a; Kolko, 1985; Kolko & Kazdin, 1991a; Showers & Pickrell, 1987). This dominance is also seen in a 9:1 ratio of males caught for arson (Kolko, 1985), and 89% to 97% of males seen in fire service intervention programmes (Adler et al., 1994; Kolko, 1988; NZFS, 2000).

Age

Firesetting occurs across the age span, however over the last 30 years research has tended to focus on the firesetting of children (Geller, 1992a). Deliberately set fires are more often seen in youths. There is some support that firesetting is more common at ages of 7-8 and 12-13 (Jacobson, 1985a). Firesetting has been found to begin as young as 2 to 3 years (Nurcombe, 1964), and interest in fire has been found to be universal (Kafry, 1980).

Adolescence

The study of adolescent firesetting has been far less frequent and systematic compared to the study of childhood firesetting (Gaynor, 1996). Adolescents are sometimes included in studies dominated by younger children (e.g. Jacobson, 1985a) or included in studies dominated by adult firesetters (e.g. Barnett & Spitzer, 1997; Ritchie & Huff, 1999). There is little research that has looked at the characteristic difference of adolescents compared to younger firesetters. However, there have been claims that these two groups have differing characteristics. Yarnell (1940) believed that children set fire more often at, or near, their homes, that children responded to the fire with fear, and tried to put it out or seek help, while adolescents wanted to see the fire burn and enjoyed the excitement. The motivations of children are more often believed to be curiosity and experimentation (Fineman, 1980). Adolescents are believed to set more fires than children (Lewis & Yarnell, 1951) and set fires more often in groups (Gaynor, 1996). Adolescents are also believed to have higher levels of recidivism (Stewart & Culver, 1982).

Socio-economic status

Controlled studies have found no difference between the socio-economic groups of firesetting families and those of other youths in clinical populations (Jacobson, 1985; Kolko & Kazdin, 1990) or community populations (Kolko & Kazdin, 1990).

Intelligence and education

Those involved in firesetting have not been found to differ on assessments of intelligence, when compared to others within clinical settings. However there is some support for more disrupted academic histories. This has been attributed to involvement in more disruptive behaviour (Kaufman et al., 1961; Kolko, 1985; Kuhnley, 1982; Ritvo et al., 1983; Sakhiem & Osborn, 1991; Showers & Pickrell, 1987).

Psychiatric diagnosis

Studies of child and adolescent firesetting have more frequently been focussed on the diagnoses of Conduct Disorder, and to a lesser extent Attention Deficit/Hyperactivity Disorder and Adjustment Disorder (Geller, 1992a).

Samples from inpatient and outpatient clinics have consistently found that those involved in firesetting are more likely to meet the criteria of Conduct Disorder, than control groups (Heath et al., 1985; Jacobson, 1985a; Kolko & Kazdin, 1986; Kuhnley et al., 1982; Moore et al., 1996; Sakheim & Osborn, 1999; Showers & Pikrell, 1987; Stewart & Culver, 1982). In his review of the literature, Geller (1992a) noted that attentional disorders were often applied to firesetters, however the actual number of these diagnoses varies and has often been found to be no higher than the rate within the non-firesetting comparison groups. The rates of ADHD among firesetters seen in clinical setting have ranged from 0 to 20% (Heath et al., 1985; Kuhnley et al., 1982; Jacobson, 1985a ; Showers & Pickrell, 1987; Stewart & Culver, 1982).

Behaviour

Those involved with firesetting have been described as restless, impulsive, mischievous, defiant, energetic, adventurous, exhibitionistic, aggressive and impulsive (Gaynor & Hatcher, 1987; Kafry, 1980). Firesetters are seldom referred to treatment agencies specifically for their firesetting; rather they are referred for a range of other behavioural problems (Heath et al., 1983). The behavioural problems associated with firesetting are generally conduct related. Controlled studies have found that those involved in firesetting tend to score more highly on measures of externalised behavioural problems, such as delinquency, cruelty, aggression, hyperactivity, covert behaviours, impulsivity, emotionality and hostility (Kolko & Kazdin, 1985; 1991a). Recent studies have found firesetting to be associated with the more severe end of the Conduct Disorder continuum (Forehand et al., 1991). Stickle and Blechman (2002) believed this was consistent with a pattern of early onset Conduct Disorder, characterised by onset of anti-social behaviour at an early age, more aggressive and more varied anti-social behaviour.

Personality factors

In a controlled study comparing those with firesetting histories to other inpatient adolescents, Moore, Thompson-Pope and Whited (1996) found the firesetting group had a range of more pathological scores. These indicated heightened symptoms and pathology associated with conduct problems, and more feelings of distress, alienation, thought disorder and poorer reality testing.

Sexuality

Since the influential work of the early psychoanalytic theorists, issues regarding sexuality have persistently surfaced in regard to firesetting. While early studies and case reports supported this assumption, these have recently been criticised due to lack of subject numbers, lack of control groups and a heavy reliance on clinical impressions (Gaynor, 1996). In addition, as

psychoanalytic theory has given way to social learning theory, the interest in sexuality has waned. Those that have persisted in the use of psychoanalytic techniques have continued to link sexual issues to firesetting (Sakheim & Osborn, 1986; 1994; 1999).

Enuresis

As with sexuality, early psychoanalytic work (Freud, 1932) linked firesetting to urethral-erotic development, this extended to enuresis. Early literature revealed a mixture of support and contradiction of this relationship (Kolko, 1985). More recently controlled studies have failed to find support for a relationship between enuresis and firesetting (Heath et al., 1983, Jacobson, 1985; Ritvo et al., 1983).

The pathognomic triad

The triad of enuresis, firesetting and cruelty to animals has been linked to aggression in adults and homicide (Hellman & Blackman, 1966; MacDonald, 1969; Wax & Haddox, 1974). Studies looking at the co-occurrence of these behaviours in firesetting have failed to find a link (Heath et al., 1983; Ritvo et al., 1983). There appears to be no recent studies that have specifically examined the occurrence of these behaviours in relationship to aggression, violence or homicide.

Environmental factors

The role of the family environment has long been considered important in understanding firesetting (Lewis & Yarnell, 1951). However not until the development of social learning theories and multi-variant models, have these factors been more systematically considered.

Family: Issues related to the family structure of firesetting children and adolescents have been raised by a number of authors. Authors have reported a high number of firesetters coming from single parent homes (Gruber et al., 1981; Lewis & Yarnell, 1951; Nurcombe, 1964; Stewart & Culvier, 1982), not being parented by their mother (Ritvo et al., 1983) and coming from larger families (Heath et al., 1983). But more recent controlled studies have found many of these factors are no different than non-firesetting children with other delinquent problems (Heath et al., 1983; Kolko & Kazdin, 1989, 1990, 1991; Kuhnley et al., 1982; Showers & Pickrell, 1987). It has also been reported that firesetting was related to frequent and prolonged parental absences (Kolko, 1985; Macht & Mack, 1968) and the firesetters separation from their parents (Gruber et al., 1981). However, a controlled study has failed to support these claims (Kolko & Kazdin, 1990). A number of authors have also raised the possibilities that firesetters are more often placed outside the family home (Kolko, 1985), have more residential placements than other delinquent children (Ritvo et al., 1983) and are more likely to be adopted (Kuhnley et al., 1982).

Kolko's (1985) review revealed that many studies reported negative home environments, including: parental distance and isolation (Koret, 1973), overprotective mothers (Siegelman & Folkman, 1971), physical abuse (Gruber et al., 1981), exposure to family violence (Ritvo et al., 1983), marital discord (Bumpass et al., 1983) and threats of imminent divorce (Strachan, 1981). Kolko and Kazdin (1986; 1990; 1992) conducted a series of controlled studies exploring the family environments of childhood firesetters. They found significantly more marital dysfunction and less marital satisfaction, cohesion, and affectionate expressions in the firesetting group. Parents also reported less monitoring and discipline and lower family affiliation. These findings led Kolko and Kazdin (1990) to conclude that the parents of firesetters had restricted involvement and management of their children, which is similar to findings from studies of anti-social and aggressive children (Loeber & Dishion, 1984).

The pathology of parents is believed to be an influential factor in the family atmosphere and ability of parents to parent (Kolko & Kazdin, 1986). Kolko and Kazdin (1986; 1990; 1992) found a relationship between firesetting and parental pathology. Mothers of firesetters scored more highly on a measure of depression than mothers of non-firesetters (Kolko & Kazdin, 1986). Parents of firesetters reported greater overall levels of personal and marital distress, and higher overall levels of pathology (Kolko & Kazdin, 1990). Kolko and Kazdin (1990) did, however, point out that their findings did not imply causality. Another possible explanation is that the disturbances to the relationship are due to the heightened level of antisocial behaviour associated with firesetting (Kolko & Kazdin, 1986; 1991).

Peer group: The role of the peer group has received little attention in research on firesetting. Firesetting often occurs as a group behaviour in youths. Figures have ranged from 33% to 54% (Heath et al., 1983; Kolko & Kazdin, 1994; Showers & Pickrell, 1987). It is believed that older youths are more likely to set fires in groups (Stewart & Culver, 1982).

This phenomenon has led a number of authors to speculate on the relationship between peer groups and firesetting. Jackson, Glass and Hope (1987) suggested that a transition from group firesetting to solitary firesetter might differentiate a pathological firesetter. Unfortunately they possessed no empirical support for this claim. Gaynor (1996) supposed, based on clinical case files, that the peer group may support, condone, and offer reinforcement for firesetting behaviour. She also suggested that the peer group may offer a degree of attention and recognition for members.

Recidivism

Only a small number of studies have explored recidivism and these have yielded disparate results. Fire service intervention programmes have reported recidivist rates ranging from 1.4% to 6.3% (Kolko, 1988). While this data is impressively low, no information was included on data ranges, standard deviations or methodology. This makes it difficult to assess the validity of the results, particularly as published studies report considerably higher recidivism rates.

Studies reporting recidivism rates have used different means of determining recidivism. Strachan (1981) reported 9% of those appearing before a social services hearing reappeared for firesetting within 5 years. Stewart and Culver (1982) conducted follow-up of inpatients with firesetting identified as a behavioural problem, they found 23% had set fires since discharge. Kolko and Kazdin (1992; 2001) conducted two prospective studies of recidivism and found as many as 59% had set additional fires at a 2-year follow-up. This was compared with a control group in which 26% begun setting fires in this period.

Recidivism has been found to be associated with being younger, having more antisocial behaviours, being less compliant, and having a larger number of behavioural and emotional problems (Stewart & Culver, 1982).

Kolko and Kazdin (1992) found parents reported that the firesetter had greater levels of hostility and carelessness. The parents acknowledged lax discipline, greater family conflict and exposure to stressful events within the last year. On measures of family atmosphere the families of recidivists reported greater conflict and less organisation. In their 2001 follow-up, Kolko et al. (2001) found different results. The parental and family factors were not found to be predictive of recidivism. They found recidivism related to being male, African-American, involved with firesetting at intake, having complaints made about their fire related behaviours, having parents that used psychological control, having positive family relationships and high measures of covert antisocial behaviour was predictive of recidivism, having a history of matchplay and involvement in fire-related acts.

Rationale for the current study

Very little research exists on adolescent firesetting, while theories are extrapolated from studies that are dominated by children. Adolescents are believed to have different characteristics to children. Authors believed adolescents were less often motivated by curiosity (Fineman, 1980), set more fires (Lewis & Yarnell, 1951), set fires more often in groups (Gaynor, 1996) and had higher levels of recidivism (Stewart & Culver, 1982). Firesetting is thought to be associated with antisocial behavioural problems consistent with an extreme form of Conduct Disorder (Forehand et al., 1991). Those that engage in firesetting are believed to have more pathological personality patterns (Moore et al., 1996) and come from more dysfunctional family environments (Kolko & Kazdin, 1990). This research will explore these issues on a specifically adolescent population, with the inclusion of control groups of those with other behavioural problems and those without.

Hypotheses

The main hypotheses of the current research is that, compared to the behavioural group and control group, the firesetting group would display more pathological personality patterns, have less effective coping skills and have greater externalised behavioural problems. The family environment of the firesetting group would not differ from that of the behavioural group, however both would be more dysfunctional than the control group. It is also hypothesised that, compared to a single incident firesetting group, a repetitive firesetting group would display more pathological personality patterns, have poorer coping skills, have greater behavioural problems, and a more dysfunctional family environment.

METHOD

This study was designed to compare a group of adolescent males who had been involved in firesetting with a group of adolescent males with behavioural problems and a group with no behavioural problems.

Participants

A total of 117 participants were used in the final analyses, after a refinement from 138 initially interviewed. All adolescent participants were male and aged 12 to 18 (inclusive).

Table 2: Demographic data from the three research groups

	Firesetting	Behavioural	Control
Research group (n)	50	33	34
Mean Age (<i>SD</i>)	14.52 (1.40)	14.36 (1.32)	14.15 (1.18)
Pakeha % (n)	88% (44)	76% (25)	94% (32)
Maori % (n)	10% (5)	24% (8)	6% (2)

Measures

Firesetting Research Questionnaire

The Firesetting Research Questionnaire (FRQ) was developed as part of this research project. The questionnaire was designed to gain information regarding basic demographics, current firesetting behaviour, historical firesetting behaviour, diagnostic information, behavioural problems and basic family difficulties.

Basic Personality Inventory (Jackson, 1996)

The Basic Personality Inventory (BPI) is a 240-item test designed to measure constructs of personality and psychopathology. It was developed to assess personality dimensions similar to those underlying the commonly used Minnesota Multiphasic Personality Inventory (MMPI). The instrument has 12 subscales of Hypochondriasis, Depression, Denial, Interpersonal Problems, Alienation, Persecutory Ideas, Anxiety, Thinking Disorder, Impulse Expression, Social Introversion, Self Depreciation and Deviation.

Coping Response Inventory for Youth (Moos, 1993)

The Coping Responses Inventory for Youth (CRI-Y) is a 48-item Likert-scale instrument that assesses eight different types of coping responses to stressful life events. The instrument has eight subscales of Logical Analysis, Positive Reappraisal, Seeking Guidance and Support, Problem Solving, Cognitive Avoidance, Acceptance or Resignation, Seeking Alternative Rewards and Emotional Discharge.

Child Behaviour Checklist (Achenbach & Edelbrock, 1983)

The Child Behaviour Checklist (CBCL - parent report) is a 118 item behavioural checklist completed by the parents of a child or adolescent. The scale is one part of a behavioural assessment package including a parallel self-report form and teacher-report form. It was designed for use with children and adolescents up to the age of 18. The instrument has: Three competence scales (Activities, Social and School); eight syndrome scales (Aggressive Behaviour, Attention Problems, Delinquent Behaviour, Social Problems, Somatic Complaints, Thought Problems, Anxious-Depressed and Withdrawn); and Internalising, Externalising and Total subscales.

Family Environment Scale (Moos & Moos, 1994)

The Family Environment Scale (FES) is a measure designed to assess family members' perceptions of their social environment. It is part of an overall package called the Social Climate Scales. The FES is comprised of ten subscales: Cohesion, Expressiveness, Conflict, Independence, Achievement Orientation, Intellectual-Cultural Orientation, Active-Recreational Orientation, Moral-Religious Emphasis, Organization and Control.

Procedure

The procedure used in the current study can be divided into the chronological steps of ethical approval, agency approval, sampling and interviewing.

Ethical approval

Ethical approval was granted from the University of Auckland Ethics Committee and the Auckland Ethics Committee of the Ministry of Health (Reference: 2000/273).

Agency approval

Participants were drawn from agencies involved with youths involved in firesetting, other behavioural and mental health problems. This included:

- New Zealand Fire Service Fire Awareness and Intervention Programmes (FAIP) in Auckland, Waikato, Northland, Christchurch and Palmerston North;
- SAFE Network, a community sexual offender programme in Auckland and Hamilton;
- STOP, a community sexual offender programme in Wellington and Christchurch;
- Te Poutama Arahi Rangatahi, a residential adolescent sexual offender programme in Christchurch;
- Youth Horizons Trust, a residential treatment programme for adolescents with a diagnosis of severe Conduct Disorder, in Auckland and Hamilton;
- Youthlink Trust, a residential programme for adolescents with behavioural problems;
- Dingwall Trust, a residential facility for youths with care and protection needs;
- Youth Alive, a community based programme for adolescents with behavioural problems;
- Private practice clinical psychologists from Auckland;
- Child, Adolescent and Family Mental Health Services throughout Auckland (Kari Centre, Marinoto North and Marinoto West); and
- Rutherford College, a secondary school in the West Auckland region.

Approval was also granted from the Department of Child, Youth and Family (CYF) Research Access Committee (RAC).

Sampling

Sampling occurred in three different ways. Firstly agencies identified adolescents with histories of firesetting behaviour. These individual were approached to be included in the study. Secondly an adolescent of matched age and ethnicity was identified from a similar agency to the firesetter. This was an adolescent with behavioural problems, but no history of firesetting. Thirdly adolescents matched on age and ethnicities were approached from a local high school. These were adolescents without behavioural problems.

Interviewing

After consent was gained, the adolescent and parent/caregiver were interviewed. The interview consisted of interviewing the adolescent and completing the Firesetting Research Questionnaire, Basic Personality Inventory and Coping Responses Inventory. Their parents/guardians were then interviewed, completing the parent section of the Firesetting Research Questionnaire, the Child Behaviour Checklist and the Family Environment Scale.

RESULTS

The following results are a brief summary of more detailed results included in the full report. In many cases the results of statistical tests are not included for brevity. For more detail please refer the full report.

Demographic characteristics of the sample

The three groups were successfully matched on age and ethnicity. Comparisons to the referral agencies indicated that the firesetting group was proportionately younger.

The firesetting and behaviour did not differ in terms of parenting, with 28% and 27% living with both parents, 22% and 30% living with a single parents. These groups differed significantly from the control group, where 74% lived with both parents and 11% with a single parent.

Adolescent firesetting group

This section provides a detailed account of the characteristics of the 50 participants in the adolescent firesetting group.

Age distribution

The majority of this group were aged between 13 and 15, with the most common age been 14.

Firesetting history

Most of the group had a history of matchplay (84%), with nearly half (46%) having engaged in firesetting in their childhood. A large proportion (76%) of the group had been involved in multiple firesetting.

Location

The majority of fires were set away from either home or school, with only 20% occurring at home and 12% at school.

Objects set alight

Table 3 shows the objects that had been set alight by the participants in the adolescent firesetting group.

Table 3: Objects reported to have been set on fire by the adolescent firesetting group

Item	n (50)	%	Item	n (50)	%
Small objects			Vegetation		
Paper	25	50%	Any vegetation	23	46%
Rubbish	15	30%	Grass	11	22%
Toys	3	6%	Bush/Trees	10	20%
Buildings			Wood	6	12%
Any structure	14	28%	Miscellaneous		
House	5	10%	Rubbish bins	7	14%
Garage/Shed/Barn	4	8%	Letterboxes	5	10%
School	4	8%	Vehicles	4	8%
Commercial building	3	6%	Curtains	2	4%
Public Toilet	4	8%	Accelerants		
Public Buildings (church, library, sports club)	3	6%	Accelerants	31	62%
			Explosives	2	4%

Group firesetting

Firesetting predominantly occurred in groups with 73% reporting group firesetting and 82% reporting a history of group firesetting.

Group versus solitary firesetting: Those that set fires alone were found to be significantly different than those that set them in groups. These differences reflect a solitary firesetter as someone who has less social involvement, higher number of thought problems, their firesetting is more often motivated by anger and less by experimentation, they are not likely to be using drugs or alcohol at the time of the firesetting and less likely to be worried after they have set the fire. No differences were found in the variables that have been thought to be related to pathological firesetting.

*Motivation***Table 4: The reported motivation for firesetting**

Motivation	n (48)	%	Motivation	n (48)	%
Boredom	31	65%	Peer pressure	7	15%
Excitement	20	42%	Vandalism	5	10%
Experimenting	11	23%	Frustration	5	10%
Anger	11	23%	Revenge	3	6%
Fascination	8	17%	Concealing a crime	1	2%

Antecedent factors

Being angry or upset before setting the fire was acknowledged by 29% of the adolescent firesetting group, while 19% reported that they were in conflict with the owner of the object they burnt.

Following the firesetting

Approximately half the participants reported positive feelings following the fire and about half negative. Those with a negative experience reported feeling scared (26%), worried (19%), panicked (6%), sad (4%) and ashamed (2%). Those that had positive experiences reported feeling excited (26%), happy (13%), relaxed (9%) and fascinated (4%).

A little under half engaged in behaviours to reduce the risk of the fire (44%). This involved behaviours such as attempting to put the fire out or seeking help.

Diagnostic information

A little over half (53%) of those in the firesetting group had a diagnosis of ADHD, according to their parent/caregiver. Only 31% had a diagnosis of Conduct Disorder, 8% Oppositional Defiant Disorder and 14% had a developmental disorders.

Behavioural problems

The firesetting group was involved in a range of other behavioural problems. Among things the most highly rated were lying (86%), followed by stealing (80%), fighting (69%), vandalism (57%), Bullying (49%), Running away (43%), Cruelty (37%) and Burglaries (31%). The figure of sexual offending in this group was also high (45%), however likely to be due to the sampling from sexual offender treatment programmes. From the adolescent firesetting group, many had been involved with the Police (63%), and suspended, or expelled from school (71%).

Between group comparisons

Matchplay

The three groups varied significantly on the history of matchplay. Most (84%) of those in the firesetting group had engaged in matchplay, while a little over half (55%) of those in the behavioural group had. A quarter (25%) of the control group had engaged in matchplay.

Diagnoses

The firesetting group had significantly more participants with a diagnosis of ADHD (53%), compared to the behavioural group (29%), however they did not differ on the proportion with diagnoses of Conduct Disorder (31% and 26%).

Psychometric measures

One-way analyses of variance were conducted comparing the firesetting, behavioural and control group, these were followed up with Tukey's B tests. These results are summarised below.

Basic Personality Inventory: This test showed that both the firesetting and behavioural groups were significantly higher than the control group on the subscales of Hypochondria, Depression, Interpersonal Problems, Alienation, Persecutory Ideas and Thinking Disorders. The firesetting group, but not the behavioural group, was significantly higher than the control group on the subscales of Impulsive Expression, Self Depreciation and Deviation. All three groups were significantly different on the Deviation subscale, with the firesetting scoring highest, followed by the behavioural group and then control group.

Coping Response Inventory – Youth: This revealed that only the behavioural group scored significantly higher than the control group. The difference between the groups on the Positive Reappraisal subscale approached significance, with the control group having a higher mean than the other two groups.

Child Behaviour Checklist: The firesetting and behavioural groups were both found to have significantly more behavioural problems than the control group. There was no significant difference between the firesetting and behavioural group on the broad scales. The firesetting group was significantly poorer in terms of school performance compared to the behavioural group. Of the syndrome scales the firesetting group differed from the behavioural group only with more Attentional Problems.

Family Environment Scale: The firesetting group scored significantly lower than the control group on the subscales of Cohesion and Expressiveness, but that these scores were not significantly different from those of the behavioural group. On the subscales of Conflict and Independence the behavioural group scored significantly lower than the control group, but these scores were not significantly different than the firesetting group.

Comparisons between single incident and repetitive firesetting behaviour

One-way analyses of variance were conducted comparing the single incident and repetitive firesetting groups to the behavioural and control group, these were followed up with Tukey's B tests. These results are summarised below.

Basic Personality Inventory: The single incident firesetting group scored significantly lower than the repetitive firesetting group on subscales of Depression, Interpersonal Problems, Alienation and Deviation. The mean scores for the single incident firesetting group fell between the mean scores for the behavioural group and control group, however the scores were not found to be significantly different than either group. The repetitive firesetting group did not differ significantly from the behavioural group on 11 of the 12 subscales. Only on the subscale of Deviation did the repetitive firesetting group score significantly higher than the behavioural group.

Coping Response Inventory – Youth: No significant difference between the groups on any of the subscales.

Child Behaviour Checklist: The single incident firesetting group was not significantly different from the repetitive or behavioural groups in the competencies scales of Social or School, where all three groups performed significantly worse than the control group. Similar results were found with the broad scales of Total score, Internal scales and External scales. The repetitive firesetting group, single incident firesetting group and behavioural group were not significantly different from each other, but all performed significantly worse than the control group.

Family Environment Scale: The single incident group was not significantly different than the repeat firesetting group on any subscales. Nor was it any different than the behavioural group on any subscales. The single incident group was significantly lower than the control group on the subscale of Expressiveness.

Discriminating variables

A number of discriminant function analyses were conducted to determine the value that different variables had in being able to predict inclusion in the firesetting group. These analyses had two different aims. The first was the exploration of variables differentiating firesetting adolescents from other adolescents with behavioural problems. The second was to explore variables that could differentiate between those involved in single incident firesetting and those involved in repetitive firesetting.

Firesetting versus behavioural: The best predictive variables from the Firesetting Research Questionnaire (FRQ) were questions related to the involvement in matchplay. The more frequently an individual engaged in matchplay and the younger they began, the more likely there were to belong to the firesetting group. If considered alone, the age of onset and frequency of matchplay were only able to predict correct group classification in 66% of cases.

The discriminant function analysis using all variables was very successful in differentiating the groups, achieving correct classification in 96% of cases. This function suggested that a number of variables, across the measures, could be used to classify the groups. Again a history of high frequency and earlier onset of matchplay behaviour was a key predictive variable. The personality patterns of those involved in firesetting was also characterised by low concern about their own health. This was supported by lower reported somatic symptoms by their parents/caregivers. Their personality patterns were characterised by more pathological and unusual behaviour. They reported lower rates of being bullied, or of bullying others, and their family environment was characterised by a low emphasis on ethical or religious matters.

Single incident versus repetitive firesetting: A discriminant equation was produced using variables from the participant's firesetting incident. Four factors appeared to be important in differentiating repetitive firesetting from single incident firesetting. Repetitive firesetting was predicted by having a fire that got out of control, not being scared afterwards, being panicked afterwards and reporting overall positive feelings associated with the firesetting. These variables were reasonably good at differentiating the two groups, with an 83% correct classification.

The remaining variables from the FRQ were also considered for analysis. Similar to the previous section, discriminating between the firesetting and behavioural groups, the history of frequency of matchplay was significant. Additionally, the variable of low conflict with siblings was also found to be a significant variable. These variables were reasonable in being able to correctly classify 82% of cases.

The final discriminant function analysis used all variables and was successful in differentiating the groups in 92% of cases. The results of this suggest that the repetitive firesetter can be differentiated by greater beliefs that others are hostile and trying to make life difficult for them, early onset and frequent engagement in matchplay, less involvement in bullying, greater academic success, and greater use of cognitive avoidance when dealing with problems.

DISCUSSION

This section discusses the results, focusing on the between group differences and identified discriminating variables. The implications of these results are then discussed in terms of our understanding of adolescent firesetting. This is followed by recommendations, an acknowledgement of limitations and suggestions for future research.

Between group differences

The main hypotheses of this research were that those involved in firesetting would demonstrate more pathological personality patterns, have less effective coping strategies, have greater behavioural problems and come from more dysfunctional family environments, compared to those with other behavioural problems and a control group without behavioural problems. The firesetting group would then be divided into those that were involved in repetitive firesetting and single incident firesetters. It was believed that the repetitive firesetting group would be more pathological across measures compared to the control group, behavioural group and single incident firesetting group. The single incident firesetting group would be similar to the control group.

The results indicated that the firesetting group had more pathological personality patterns and greater behavioural problems compared to the control group. There appeared to also be some difference in the cohesiveness and expressiveness in the family environment, compared to the control group. No differences were noted in coping styles.

There appeared to be little difference between the personality patterns of the firesetting and behavioural group, except the scale of Deviation, indicating that the firesetting group had overall more deviant and unusually behaviour compared to the behavioural group. Although a trend appeared to show the firesetting group had greater behavioural problems, compared to the behavioural group, the only significant difference was the firesetting group performing more poorly at school. No difference was noted between the groups in terms of coping strategies or family environment.

The repetitive firesetting group had more pathological personality patterns and greater behavioural problems compared to the control group. There was no evidence of differing coping styles and little evidence of differing family environments. The repetitive firesetting group did not appear to differ from the behavioural group across most measures. However, they did differ

on the personality subscale of Deviation and there appeared to be a non-significant trend of having more behavioural problems.

The single incident firesetting group appeared to have personality patterns that fell between those of the behavioural group and the control group, but not be significantly different than either. However they did have more behavioural problems than the control group and were more similar to the behavioural group. On measures of Attentional Problems and Aggressive Behaviour they showed significantly more behavioural problems than the behavioural group. There appeared to be no difference between groups in terms of coping and some difference in the family environment compared to controls with less expressiveness.

The single incident group appeared to differ from the repetitive group only on measures of personality, with significantly less depression, less interpersonal problems, less alienation and less deviation. Otherwise there appears to be no difference in terms of behavioural problem, coping patterns or family environment.

Discriminating variables

These analyses had two different aims. The first was the exploration of variables differentiating firesetting adolescents from other adolescents with behavioural problems. The second was to explore variables that could differentiate between those involved in single incident firesetting and those involved in repetitive firesetting.

Firesetting versus behavioural: These results highlight the behavioural history of matchplay as a key indicator in identifying firesetting. These findings are consistent with the developmental model of firesetting behaviour suggested by Gaynor (1996) and the early life experiences suggested in the multi-variable model of Fineman (1980). Similar to the between group differences, reported in the previous section, those involved in firesetting displayed personality patterns with a higher involvement in more deviant behaviour. This is consistent with the findings of Stickle and Blechman (2002), who found that those involved in firesetting were often involved in a wider variety of antisocial acts compared to other antisocial youths. It is more difficult to explain the lower reported health problems, less observed somatic complaints, and home environments with less discussion of religious or moral issues.

Single incident versus repetitive firesetting: Variables that can be used to discriminant between single incident and repetitive firesetting highlight the importance of firesetting developmental behaviours such as early onset and frequent matchplay. The repetitive firesetter is also more likely to have a fire that got out of control. The firesetters emotional reaction to the fire is also

important in discriminating these two groups. Excluding the reaction of panic to an out of control fire, repetitive firesetters indicate positive feeling associated with firesetting, while single incident firesetter indicate being scared. Additional variables useful in discriminating the two groups are the perception that others are hostile, the engagement in cognitive avoidance in coping with problems and less bullying.

Implication of this research

The field of adolescent firesetting has received a great deal of attention over the years but comparatively little empirical research. This study is one of the first in New Zealand and one of the few focusing on firesetting among adolescents. The implications from the current study contribute to the understanding of the development of the firesetting across the age span, the repetitive nature of the firesetting, the role of group firesetting among adolescents, the role of attentional and hyperactive problems, motivations, how those involved in firesetting differ from other adolescents with behavioural problems and how single and repetitive firesetters differ. These implications will be summarised in the following section.

Age: Firesetting is a behaviour that has been more often studied in childhood. Previous age related studies have been limited to the 12 and 14 age range (Grolnick et al., 1990; Kafry, 1980) and those that have included adolescents suggest that firesetting in childhood peaks at the ages of 8 and 13. The results from the current study suggest that firesetting is still often occurring until the age of 15 years, after which there is a marked decline. This occurred despite sampling from agencies with higher median age ranges of clients, suggesting that firesetting is a behaviour that more commonly occurs in the young adolescent.

Repetitive behaviour: The current study found that those involved in firesetting had more often been involved in repetitive firesetting, with three quarters of the group setting more than one fire. This finding is slightly higher than childhood samples. Kolko and Kazdin (1988) found 52% of outpatient, and 72% of inpatient firesetters had been involved in repetitive firesetting. The results from the current study therefore suggest that repetitive firesetting may be more common among adolescents, than children.

Group firesetting: Gaynor (1996) suggested that firesetting amongst adolescents is more commonly a group behaviour. The results of the current study support this, 82% of the firesetting sample set fires in groups. Compared to between 33% and 54% of children (Heath et al., 1983; Kolko & Kazdin, 1994; Showers & Pickrell, 1987). This supports the ideas raised by Gaynor (1996) about the role that peer relationships play in condoning and reinforcing firesetting behaviour. There was also some evidence that those involved in solitary firesetting

have different characteristics to those involved in group firesetting. The solitary firesetters appear to have less social involvement in general, more thought problems, their firesetting is more often motivated by anger and they did not report worry about the fire after they set it. While these characteristics do not match the profile of a pathological firesetter, proposed by Gaynor and Hatcher (1987), they do indicate a concerning pattern of behaviour posing risk to others, and requiring intervention.

Attention Deficit/Hyperactivity Disorder: The role that attentional and hyperactivity problems play in firesetting has received less attention than Conduct Disorder in previous research. However ADHD appears to be more of an issue with the current study. Diagnoses of ADHD have been reportedly between 3% and 20% in previous studies (Jacobson, 1985a; Kuhnley et al., 1982; Showers & Pickrell, 1987; Stewart & Culver, 1982), while 53% of those in the current study had a diagnosis of ADHD. This is much higher than the behavioural group, where 30% had a diagnosis of ADHD. It is difficult to draw conclusions from this, however it may reflect firesetting being more of a problem behaviour among adolescents with ADHD, than children with ADHD. This is perhaps reflected in the predominant motivations being reported as boredom and excitement in the current study, consistent with theories of delay aversion and optimal stimulation related to ADHD.

Motivation: Motivation in the current study appeared to be predominantly (65%) around stimulation, however a smaller proportion (23%) reported motivation due to anger. This clearly reflected a subgroup whose firesetting was related to anger toward others, with the firesetting being triggered by an upsetting event and the fire targeting the person they were upset with. This is supportive of the model of misdirected anger described by McKerracher and Darce (1966) and Vreeland and Waller (1979). Similar to the characteristics of the solitary firesetter, this presentation is concerning with potential risk to others, suggesting a need to establish better strategies for dealing with anger and frustration.

Difference to others with behavioural problems: It is clear that those involved in firesetting have more pathological personality patterns, greater behavioural problems and more dysfunctional family environments, compared to adolescents without behavioural problems. The difference between those involved in firesetting and those with behavioural problems is less clear. The results from the current study indicate that the personality patterns of these two groups are similar, with the only significant difference being that the firesetters are more involved in deviant and unusual behaviours. Previous research has found the behaviour of firesetters similar to a more advanced form of Conduct Disorder or antisocial behaviour, with more varied antisocial acts and greater aggression (Forehand et al., 1991; Kolko & Kazdin, 1991a; Martin et

al., 2004; Stickle & Blechman, 2002). The results from the current study support this, with a clear trend in the data, however this trend was not found to be statistically significant.

Variables used to discriminate firesetters from those with behavioural problems highlight the behavioural history of matchplay and involvement in more deviant behaviours. Additionally variables related to low concern about their own health, low reported somatic health complaints, lower rates of bullying, or being bullied, and home environments with less discussion of religious or moral issues.

Single incident and repetitive firesetting

In the current study the repetitive firesetting group did not appear to differ greatly from the behavioural group, however they appeared to have more deviant behavioural interests and display a non-significant trend towards more behavioural problems. The single incident firesetting group appears to have less pathological personality patterns compared to the repetitive firesetting group, with results falling between those of the behavioural group and the control group. However, their behaviour problems were similar to the repetitive firesetting group.

The variables that appeared important in discriminating between these groups were that repetitive firesetters reported positive feeling associated with the fire, while the single incident firesetters more often reported being scared. The repetitive firesetters were more likely to have set a fire that got out of control, engaged in more frequent matchplay, had lower conflict with siblings, less bullying and greater academic success. The repetitive groups personality patterns were characterised by more beliefs that others are hostile towards them. The repetitive group style of coping was less accepting of problems.

Recommendations arising from this research

The current research project was carried out with assistance from the New Zealand Fire Service's Fire Awareness and Intervention Programme. In particular the Auckland programme. After reflection on the findings of this research, a number of recommendations are outlined below. These recommendations are divided into those related to the clinical assessment of firesetters and those related to research.

Clinical assessment: The findings from the current research suggest that attention needs to be paid to the following areas when assessing the adolescent firesetter:

- Establish the role that the peer group plays in adolescent firesetting. Useful areas of questioning might include; who was involved in the firesetting, the firesetting history of

the others or the group as a whole, how others responded to the firesetting and how the response of their peers affected them. It may also be useful to find out the extent of the peer groups involvement in other antisocial behaviour.

- Solitary firesetting in adolescence may be an indication of concerning problems related to social isolation, thought problems and the motivation of anger. This may indicate the need for a more full assessment of the function of the firesetting, the individual's social and psychological functioning, potential targets of their firesetting and risk factors related to plans for firesetting.
- Assess historic fire-related behaviours. Early onset and frequent histories of involvement in fire-related behaviours are likely to be an indicator of more concerning firesetting.
- Assess the emotional response to firesetting. The person's emotional response to their firesetting appears to be important indicators of repetitive firesetting. It is important to assess the response to historic firesetting as well as the fire that brought them to the attention of the fire service.
- Identify motivation. The role of motivation is seen as important in identifying different typologies related to firesetting (Fineman, 1980). These imply different levels of concern and different interventions. Motivation related to revenge can be difficult to establish and requires more circumspect questioning. Useful directions for questioning would be who owned the items set alight and the history of their relationship to that person.
- Diagnostic issues. The current research, and previous findings, highlight the connection between firesetting and other behavioural problems. In particular there are links between firesetting, Conduct Disorder and ADHD. These different diagnoses suggest different interventions. It is therefore important that assessment of firesetting behaviour also includes screening for Conduct Disorder and ADHD. The Child Behaviour Checklist (Achenbach & Edelbrock, 1983) was used in the current research, and has been used by other fire service intervention programmes (DiMillo, 2002). However the Strengths and Difficulties Questionnaire (Goodman, 2001) might be more appropriate, given that it consists of only 25 questions and has been shown to have a high correlation with the Child Behaviour Checklist (Goodman & Scott, 1999).

Research: Outcome and recidivism data is very difficult to find throughout the literature on firesetting. Because of this, many of the theories related to risk factors and interventions programmes are not tested for utility or effectiveness. The New Zealand Fire Service is in a key position to spearhead the direction and quality of research in this area. They are also operating a programme to which a research component could usefully be added. To be able to achieve this the Fire Service needs to:

- Build research processes into the collection of data from the clients. For example this would include consent forms, information sheets and confidentiality statements that include sections on the use of data for research purposes and procedures for follow-up assessment of clients.
- Standardising questionnaires that are used across all regions. These questionnaires should be based as near as possible to internationally standardised questionnaires. The feasibility of using the Strengths and Difficulties by the Fire Service throughout New Zealand could be investigated.
- Standardise the administration of questionnaires. This means that the questionnaires should be used in a consistent way from client to client, requiring training and supervision of administration staff.
- Provide administrative resources and funding to build, support and maintain an ongoing research programme. This would need to include research and clinical supervision.
- Support and encourage the vital role that research needs to play in the development and provision of any programme at all stages. All personnel involved in the programme need to be aware of the importance of research, how their role is important to best research practice and how their role supports the inclusion of research in the programme. To achieve this it is likely that each staff member needs to see the outcomes of research and feel some sense of ownership related to the research.

Limitations of the research

The current research has a number of limitations. The first of these are the definitional difficulties related to firesetting. Throughout the literature different behaviour is defined as firesetting, having impact on the inclusion and exclusion criteria used for the research groups. The current research is also limited by a small sample size, difficulty getting parents/caregivers to complete their questionnaires, difficulty identifying firesetters, attempting to compare a broadly sampled group to research which is often focussed on very specific populations.

Future directions for research

While there is a great deal of interest in adolescent firesetting, the available research, particularly in New Zealand, is sparse. From the results of the current study the following areas warrant consideration as possible areas for future research.

- Past research has been dominated by studies from clinical and forensic populations. These make it difficult to determine the occurrence and development of the firesetting in the general population. It is therefore difficult to determine what is “normal” and what is uncommon. There is also a lack of data exploring firesetting across the age-span, with studies tending to focus on specific age groups. There is therefore a need for community

based studies that explore firesetting behaviour through the childhood and adolescent age span. It would also be useful for these studies to explore the description of fire-related behaviours, and how these behaviours develop over time.

- There are only a few studies that have explored recidivism, and these have ranged in results. There is a need to generate good data related to risk factors and recidivism following intervention programmes. This would make a useful component added to the New Zealand Fire Service's Fire Awareness and Intervention Programmes.
- A number of different systems have been used to categorise those involved in firesetting. These different categories are believed to be important in determining different levels of concern and different intervention strategies. It would be useful for research to explore the validity of the different motivations and typologies. These could usefully be compared in terms of the individual characteristics and their firesetting characteristics. An area of interest generated in the current research was difference between those setting fires motivated by boredom/excitement and those motivated by anger or aggression.
- Repetitive firesetting was used as an indication of more concerning firesetting in the current research, however it is likely that this criteria is not an accurate reflection of severe firesetting. Similar to motivations and typologies, there is a need to systematically test the factors believed to be associated with severe firesetting, and determining useful ways of applying these to research and assessment.
- The relationship between firesetting and ADHD was found to be more substantial in the current study than in previous research. This finding needs to be replicated to see if it is a particular problem of adolescent firesetting, or a form of sampling bias that occurred. Confirmation of this relationship has implications for our understanding of the factors associated with the development of firesetting behaviour and intervention.

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