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**To cite this article:** Emma R. Barrowcliffe & Theresa A. Gannon (2015): Comparing the psychological characteristics of un-apprehended firesetters and non-firesetters living in the UK, Psychology, Crime & Law, DOI: [10.1080/1068316X.2015.1111365](https://doi.org/10.1080/1068316X.2015.1111365)

**To link to this article:** <http://dx.doi.org/10.1080/1068316X.2015.1111365>



Accepted author version posted online: 22 Oct 2015.  
Published online: 20 Nov 2015.



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# Comparing the psychological characteristics of un-apprehended firesetters and non-firesetters living in the UK

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## ABSTRACT

Deliberate firesetting research predominantly focuses on apprehended populations. In contrast, this paper focuses on the prevalence and characteristics of un-apprehended firesetters living in the UK. Social media was utilized to recruit 232 participants for an online questionnaire. Two hundred and twenty-five people answered a question relating to deliberate firesetting. Forty participants (17.78%) indicated that they had ignited a deliberate fire and were classified as un-apprehended firesetters. Firesetting was most common in childhood and adolescence. Relative to non-firesetters, un-apprehended deliberate firesetters were more likely to report; a diagnoses of a psychiatric illness, a diagnosis of a behavioural problem, having been suspended from school, a history of suicide attempts, experimenting with fire before the age of 10 years old, and having a family member who also ignited a deliberate fire. Un-apprehended firesetters also scored significantly higher compared to non-firesetters on the *Fire Setting Scale* and the *Fire Proclivity Scale* [Gannon, T. A., & Barrowcliffe, E. R. (2012). Firesetting in the general population: The development and validation of the Fire Setting and Fire Proclivity Scales. *Legal and Criminological Psychology*, 17(1), 105–122], the *Fire Interest Rating Scale* [Murphy, G. H., & Clare, I. C. H. (1996). Analysis of motivation in people with mild learning disabilities (mental handicap) who set fires. *Psychology, Crime & Law*, 2(3), 153–164], the *Novaco Anger Scale and Provocation Inventory* [Novaco, R. W. (2003). *The Novaco Anger Scale and Provocation Inventory*: NAS-PI. Los Angeles, CA: Western Psychological Services], the *Boredom Proneness Scale – Short Form* [Vodanovich, S. J., Wallace, J. C., & Kass, S. J. (2005). A confirmatory approach to the factor structure of the Boredom Proneness Scale: Evidence for a two-factor short form. *Journal of Personality Assessment*, 85(3), 295–303], and the *Measure of Criminal Attitudes and Associates Scale* [Mills, J. F., & Kroner, D. G. (1999). *Measures of criminal attitudes and associates: User guide*. Unpublished instrument and user guide].

## ARTICLE HISTORY

Received 22 June 2015  
Accepted 13 October 2015

## KEYWORDS

Arson; firesetter; deliberate firesetting; adolescent; un-apprehended

In Great Britain, 23,662 deliberate fires were ignited between April 2012 and March 2013 which resulted in 56 deaths and 1225 non-fatal injuries (Department for Local

Communities and Local Government, 2014). Arson is a legal term which refers to fires that are deliberately ignited with the intent to destroy property (Kolko, 2002; Williams, 2005). However, the term arson is restrictive and varies across jurisdictions (Gannon & Pina, 2010). Therefore in this paper the term firesetting is used to refer to all acts of deliberate ignition, which may not have been legally recorded as arson. The term firesetter refers to the perpetrator of the deliberate ignition.

Deliberate firesetting was estimated to cost the UK approximately £2.3 billion in 2008 (Department for Communities and Local Government, 2011). However, relative to other crimes arson has the poorest detection rate in England and Wales (Smith, Taylor, & Elkin, 2013). For example, out of 19,306 arson offences reported in 2013, only 2316 (or 12%) resulted in official police detection (Smith et al., 2013), and 1503 people were proceeded against in court (adult males = 934, adult females = 265; adolescent males = 253, adolescent females = 38<sup>1</sup>; Justice Statistics Analytical Services, 2015). Of these a total of 76% of the adults and 72% of the adolescents were found guilty. Therefore it is apparent and problematic that the vast majority of arson perpetrators remain un-apprehended. In order to manage the behaviour of deliberate firesetters it is essential to have a comprehensive understanding of their characteristics (Doley, 2003). Unfortunately, however, compared to other types of offending firesetting is one of the least understood behaviours (Davis & Lauber, 1999; Dickens, Sugarman, & Gannon, 2012). To date a small amount of firesetting research has tended to focus on apprehended populations such as children and adolescents (Fessler, 2006; Kazdin & Kolko, 1986; Root, MacKay, Henderson, Del Bove, & Warling, 2008), prisoners (Gannon et al., 2013; O'Sullivan & Kelleher, 1987; Sapsford, Banks, & Smith, 1978), and psychiatric patients (Gannon & Pina, 2010; O'Sullivan & Kelleher, 1987; Räsänen, Hakko, & Väisänen, 1995; Tennent, McQuaid, Loughnane, & Hands, 1971; Tyler & Gannon, 2012).

These apprehended firesetters share common characteristics. For example both adolescent and adult apprehended firesetters tend to be Caucasian (Gannon, 2010; Koson & Dvoskin, 1982) and male (Bradford, 1982; Muller, 2008; Pettitway, 1987; Räsänen et al., 1995; Rautaheimo, 1989). Apprehended firesetters are characterized by poor developmental experiences such as victimization or abuse during childhood (Gannon, 2010; Noblett & Nelson, 2001; Saunders & Awad, 1991), separation from parents (Macht & Mack, 1968; Saunders & Awad, 1991; Tennent et al., 1971), poor education (Harmon, Rosner, & Wiederlight, 1985; Lewis & Yarnell, 1951; Rautaheimo, 1989), and low IQ (Bradford, 1982; Harmon et al., 1985; Lewis & Yarnell, 1951; Rautaheimo, 1989). Many apprehended firesetters also tend to have mental health issues (Räsänen et al., 1995; Tyler & Gannon, 2012) and substance abuse problems (Jayaraman & Frazer, 2006). In addition, apprehended firesetters have a tendency to ignite fires close to home (Bradford, 1982; Rautaheimo, 1989; Wachi et al., 2007).

The list of motivations underpinning firesetting is comprehensive. For example apprehended firesetters report igniting fires as a result of peer pressure (Molnar, Keitner, & Harwood, 1984; Swaffer & Hollin, 1995), as a form of communication (Geller, 1992), for vandalism or to create excitement (Gannon & Pina, 2010; Icove & Estep, 1987; Inciardi, 1970), and in order to conceal another crime (Dennet, 1980). Other inclinations include self-protection (Tyler et al., 2014), political motivation (e.g. terrorist attacks, riots; Prins, 1994), and self-injury or suicide (Jayaraman & Frazer, 2006; McKerracher & Dacre, 1966; Noblett & Nelson, 2001; O'Sullivan & Kelleher, 1987; Swaffer & Hollin, 1995). However,

the predominant motivation behind both adolescent and adult firesetting is revenge (Gannon, Ó Ciardha, Doley, & Alleyne, 2012; Koson & Dvoskin, 1982; Lewis & Yarnell, 1951; O'Sullivan & Kelleher, 1987; Rix, 1994; Swaffer & Hollin, 1995).

Although apprehended firesetters share similar characteristics, evidence suggests that firesetters are a unique offending population. Gannon et al. (2013) found that male adult apprehended firesetters could be differentiated from other offenders on fire-related factors (i.e. more identification with fire, interest in everyday and serious fires, attitudes aimed at legitimizing firesetting as 'normal', and less perceived fire safety knowledge), emotional/self-regulation factors (i.e. firesetters report significantly more anger-related cognitions, physiological arousal to anger, and are more susceptible to provocation), and self-concept factors (i.e. firesetters had lower levels of self-esteem). Gannon et al. (2013) conclude that relative to other non-firesetting offenders, firesetters incarcerated in prisons are a special group of offenders who hold unique psychological characteristics.

The vast majority of research has almost exclusively concentrated on the characteristics of apprehended firesetters with little consideration for the prevalence and psychological characteristics of firesetters who remain un-apprehended. It is therefore inappropriate to generalize these findings to all firesetting populations. Relatively little is known about firesetters who manage to evade detection and to our knowledge there are only a few studies concerned with un-apprehended firesetters. The first of these studies was not specifically designed to assess firesetting but instead utilized nationally representative data from a National Epidemiologic Survey on Alcohol and Related Conditions in the USA (NESARC; Blanco et al., 2010; Vaughn et al., 2010). Participants were interviewed face to face, and those who responded positively to the question 'in your entire life, did you ever start a fire on purpose to destroy someone else's property or just to see it burn?' were classified as firesetters (1–1.13%; Blanco et al., 2010; Vaughn et al., 2010). The majority of firesetting behaviour was reported to occur during adolescence (i.e.  $\leq 15$  years; Blanco et al., 2010).

The participants classified as firesetters ( $n = 407$ ) in the NESARC study were compared to the non-firesetters ( $n = 41,552$ ). Results indicated that being male, born in the USA, increased engagement in antisocial behaviour (e.g. destroying property), having a high annual income ( $> \$70,000$ ), and never having married were risk factors for firesetting behaviour (Blanco et al., 2010; Vaughn et al., 2010). Firesetting was also associated with having a Diagnostic and Statistical Manual of Mental Disorders 4th edition diagnosis of antisocial personality disorder, drug dependence, bipolar disorder, and pathological gambling (Blanco et al., 2010).

However, the NESARC study had a number of limitations. For example, respondents were interviewed face to face which may have resulted in a reluctance to answer the firesetting question truthfully for fear of reprisals (Dickens et al., 2012; Gannon & Barrowcliffe, 2012). Dickens et al. (2012) also note that the single question assessing firesetting behaviour is extremely vague. For example the section of the question, 'on purpose to destroy someone else's property or just to see it burn' may have resulted in an over representation of firesetting as some respondents may have misidentified experimentation with fire (just to see it burn) as meeting the criteria for starting a fire. Furthermore, information relating to the types of fires ignited, the severity of the fire, whether the respondent was ever formally apprehended or received any therapy for their firesetting are lacking.

Gannon and Barrowcliffe (2012) and Barrowcliffe and Gannon (2015) have recently conducted research assessing the prevalence and characteristics of un-apprehended

firesetters living in the UK. In both studies adult participants were provided with very specific criteria regarding the types of firesetting the researchers were interested in. Participants were directed to only disclose information relating to fires deliberately ignited as a result of boredom, or to create excitement, fires set as a result of peer pressure, to express feelings, as an act of vandalism, revenge or to conceal another crime. Participants were directed not to report fires set before the age of 10 years,<sup>2</sup> ignited accidentally, or as part of organized events such as bonfires.

Participants in both studies who indicated they had ignited a deliberate fire were then asked to report detailed information about the fire, for example the motive behind ignition, the number of ignition points, and the paraphernalia used. Participants also completed scales designed to specifically measure fire interest and antisocial behaviour. The *Fire Setting Scale* (FSS) comprises two subscales measuring fire interest and antisocial behaviour. The *Fire Proclivity Scale* (FPS) contains six hypothetical firesetting scenarios (with varying degrees of severity) designed to measure firesetting proneness or proclivity. The FPS requires participants to imagine themselves as the perpetrator in each of the firesetting scenarios, and rate their likelihood of *fire fascination*, *behavioural propensity* to act similarly, *arousal*, and *general antisocialism* in relation to each scenario.

In the first study conducted by Gannon and Barrowcliffe (2012), 168 participants (109 females) met with the researchers to complete the research, and placed their responses in an unlabelled envelope to protect anonymity. Of the 168 participants, 11% ( $n = 18$ ) were classified as deliberate firesetters, and none reported having been apprehended for firesetting. The majority of the firesetters (89%,  $n = 16$ ) indicated they had ignited their fire(s) during adolescence due to boredom, peer pressure, to express feelings, or for excitement. Firesetters and non-firesetters were similar in terms of socio-demographic and historical variables (e.g. age, number of siblings, from single parent households). However, firesetters self-reported significantly more diagnoses of behavioural problems or convictions for a vandalism-related offence(s).

Gannon and Barrowcliffe (2012) found that relative to non-firesetters, firesetters scored significantly higher on factors relating to antisocial behaviour on the FSS. In addition, the firesetters self-reported significantly higher levels of *fire fascination*, *behavioural propensity*, and *arousal* on the FPS. However, this research can be improved. For example, the participants were predominantly female university students, and aspects such as identification with fire, and attitudes towards fire were not measured.

More recently, Barrowcliffe and Gannon (2015) included additional measures in a study conducted with a more representative sample of the UK population. Barrowcliffe and Gannon (2015) randomly selected 10% of households from a high firesetting prevalence community within Kent, UK ( $n = 5568$ ), and hand delivered letters explaining the firesetting research. Participants accessed an online questionnaire and answered demographic questions, self-reported their own deliberate firesetting, and completed five questionnaires; the FSS, and the FPS (Gannon & Barrowcliffe, 2012), the *Balanced Inventory of Desirable Responding* (BIDR version 6; Paulhus, 1984, 1988), the *Fire Identification Scale* (Gannon, Ó Ciardha, & Barnoux, 2011), and the *Fire Attitude Scale* (FAS; Muckley, 1997). The questionnaire was completed by 133 participants but 157 participants answered the firesetting question (2.8% partial, and 2.4% complete response rate, respectively; male  $n = 78$ , 49.7%; female  $n = 79$ , 50.3%), and 18 participants (11.5%; male  $n = 11$ , 61.1%; female  $n = 7$ , 38.9%) were classified as deliberate firesetters. Relative to the non-firesetters,

significantly more firesetters self-disclosed a family history of firesetting, reported a history of self-harm, and had a father with a psychiatric illness. Firesetters also scored significantly higher on the FSS, the FPS, the Identification with Fire Scale, and the FAS compared to the non-firesetters.

The format of the current study is similar to that of Barrowcliffe and Gannon (2015). Participants completed an online questionnaire relating to firesetting, and as fascination with fire (Barrowcliffe & Gannon, 2015; Gannon & Barrowcliffe, 2012; Rautaheimo, 1989), anti-social behaviour (Barrowcliffe & Gannon, 2015; Dolan, McEwan, Doley, & Fritzson, 2011; Gannon & Barrowcliffe, 2012), and fire interest have been found to play a role in both adult (Barnoux, Gannon, & Ó Ciardha, 2015; Barrowcliffe & Gannon, 2015; Ó Ciardha & Gannon, 2012) and adolescent firesetting (MacKay et al., 2006; Watt, Geritz, Hasan, Harden, & Doley, 2015) measures associated with these traits were again included. However, research examining other psychological characteristics associated with apprehended firesetters such as anger (Gannon et al., 2013; Rix, 1994), a lack of assertiveness, loneliness, social isolation (Hurley & Monahan, 1969; Inciardi, 1970; Jackson, Glass, & Hope, 1987; Noblett & Nelson, 2001; Rice & Chaplin, 1979), and boredom (Perrin-Wallqvist, Archer, & Norlander, 2004; Sapp, Huff, Gary, & Icove, 1999) have not been assessed in un-apprehended firesetting populations. Therefore demographic information in combination with additional scales examining the aforementioned psychological characteristics will be examined with the aim of discriminating un-apprehended deliberate firesetters and non-firesetters.

## Method

### Participants

Participants were recruited through social media, and snow balling techniques. Two hundred and thirty-two people accessed an online questionnaire relating to firesetting. Of these 204 completed the questionnaire in full resulting in an 87.93% completion rate. Two hundred and twenty-five people (37 males, 188 females) answered the question relating to deliberate firesetting with an average age of 25.12 years (range 18–69 years). The majority of these participants indicated they were White ( $n = 175$ , 77.78%), of these 75.43% ( $n = 132$ ) identified themselves as White British, and 24.57% ( $n = 43$ ) White other. The majority of the participants were educated, only 3.11% ( $n = 7$ ) indicated they held no qualifications, and 6.22% ( $n = 14$ ) held only General Certificate of Secondary Education. The majority of participants had gained A level qualifications (or foreign equivalent;  $n = 172$ ; 76.44%) or a degree or higher ( $n = 30$ ; 13.33%). Participants email addresses were entered into a prize draw to win Amazon vouchers.

### The measures

The online questionnaire contained three main sections a *demographic and background section*, *firesetting disclosure*, and numerous scales examining attitudes to fires, and *personality variables*: the *demographic and background section* contained questions relating to gender, number of siblings, family background, psychiatric history, education level, and family background (e.g. parental psychiatric history, witnessing domestic violence,

family finances, and family history of firesetting). In the *firesetting disclosure* section participants indicated whether they had ever ignited a fire to *annoy other people, to relieve boredom, to create excitement, for insurance purposes, as a result of peer pressure, or to get rid of evidence*. Fires set before the age of 10, ignited accidentally, or set as part of an organized event (i.e. a bonfire) were to be excluded. Participants who indicated they had ignited a deliberate fire answered additional questions (e.g. forced choice questions) examining number of deliberate fires ignited, age at first and most recent firesetting incident, formal apprehension or therapy relating to their firesetting, factors precipitating the firesetting (i.e. intoxication, planning), modus operandi (i.e. the use of accelerants, ignition points, distance of the fire from home), motivations, and targets of the deliberate firesetting, and response to the firesetting (i.e. attempts to extinguish the fire).

The final section of the questionnaire included various scales assessing fire interest and behaviour (e.g. antisocial behaviour, boredom proneness, assertiveness, and anger) which are presented in detail below. The scales were presented in a randomized order. The internal reliability as are reported in accordance with George and Mallery's (2003) criteria:  $\geq .90$  excellent,  $\geq .80$  good,  $\geq .70$  acceptable, and  $\geq .60$  questionable.

### **The fire-related scales**

There were five fire-related scales: the FSS and the FPS (Gannon & Barrowcliffe, 2012), the *Identification with Fire Questionnaire* (Gannon et al., 2011), the FAS (Muckley, 1997), and the *Fire Interest Rating Scale* (Murphy & Clare, 1996).

#### **The Fire Setting Scale**

The 20-item FSS developed by Gannon and Barrowcliffe (2012) comprises two subscales each containing 10 items measuring *AntiSocial Behaviour* (e.g. 'I am a rule breaker') and *Fire Interest* (e.g. 'I get excited thinking about fire'). The items are rated using a 7-point Likert scale (1 = *not at all like me*, 7 = *very strongly like me*). In a recent study, Barrowcliffe and Gannon (2015) noted that the internal consistency ranged from acceptable to excellent (overall  $\alpha = .90$ , *AntiSocial Behaviour*  $\alpha = .72$ , *Fire Interest*  $\alpha = .92$ ). See Appendix 1 for the full version of the FSS. In the current study the internal consistency was also high (overall  $\alpha = .91$ , *AntiSocial Behaviour*  $\alpha = .85$ , *Fire Interest*  $\alpha = .92$ ).

#### **The Fire Proclivity Scale**

The FPS also designed by Gannon and Barrowcliffe (2012) provides an indication of an individual's propensity to engage in deliberate firesetting. Participants are requested to imagine themselves as the firesetting protagonist in six hypothetical firesetting vignettes which vary in severity. Using a 5-point Likert scale participants responded to four questions measuring: (1) *fascination* with the fire described in the scenario (1 = *not at all fascinated* to 5 = *very strongly fascinated*), (2) behavioural propensity to act similarly (1 = *would definitely not have done the same* to 5 = *would definitely have done the same*), (3) general arousal to the fire described in the scenario (1 = *would not enjoy [watching it] at all* to 5 = *would greatly enjoy [watching] it*), and (4) general antisocialism (1 = *would not enjoy [watching others' reaction] at all* to 5 = *would greatly enjoy [watching others' reaction]*). The internal consistency of the FPS has previously been found to be acceptable (overall  $\alpha = .93$ , fire fascination  $\alpha = .86$ , behavioural propensity  $\alpha = .66$ , fire arousal  $\alpha = .81$ , and



general antisocialism  $\alpha = .76$ ; Barrowcliffe & Gannon, 2015). The internal consistency of the FPS was similar in the current study (overall  $\alpha = .82$ , fire fascination  $\alpha = .71$ , behavioural propensity  $\alpha = .81$ , fire arousal  $\alpha = .81$ , and general antisocialism  $\alpha = .93$ ). See Appendix 2 for the full version of the FPS.

### ***The Identification with Fire Scale***

The Identification with Fire Scale is a 10-item scale used to measure level of identification with fire (Gannon et al., 2011). Items such as 'fire is almost part of my personality' are rated using a 5-point Likert scale (1 = *strong disagreement*, 5 = *strong agreement*). Acceptable internal consistency ( $\alpha = .71$ ) was found in a previous study by Barrowcliffe and Gannon (2015), but was questionable in the current study ( $\alpha = .66$ ).

### ***The Fire Attitude Scale***

The FAS (Muckley, 1997) measures attitudes and beliefs about firesetting. Items such as 'the best thing about fire is watching it spread' are rated using a 5-point Likert scale (1 = *strong disagreement*, 5 = *strong agreement*). Barrowcliffe and Gannon (2015) have previously reported questionable internal consistency ( $\alpha = .64$ ). Slightly higher internal consistency was noted in the current study ( $\alpha = .71$ ).

### ***The Fire Interest Rating Scale***

The Fire Interest Rating Scale (Murphy & Clare, 1996) contains 14 statements (e.g. 'striking a match to set fire to a building') rated on a 7-point Likert scale (1 = *extremely upsetting or frightening*, 4 = *OK and it does not bother you*, 7 = *exciting, fun, or lovely*).  $\alpha$  information from previous research is not available for The Fire Interest Rating Scale but the internal consistency  $\alpha$  was noted to be .82 in the current study.

## ***Personality-related scales***

### ***The Novaco Anger Scale and Provocation Inventory***

The Novaco Anger Scale and Provocation Inventory (NAS-PI; Novaco, 2003) contains 60 items assessing four separate aspects associated with how anger is experienced; anger cognitions (COG) 'once something makes me angry, I keep thinking about it',<sup>3</sup> arousal (ARO) 'When I get angry I stay angry for hours', behavioural elements of anger (BEH) 'my temper is quick and hot', and anger regulation (REG) 'If I feel myself getting angry, I can calm myself down'. Items are rated on a 3-point Likert scale (*never, sometimes, always*). The PI aspect of the NAS-PI contains 25 items associated with an individual's ability to tolerate provocation. Items (e.g. 'someone else gets credit for work that you did', and 'people who think they are better than you') are responded to using a 4-point Likert scale (1 = *not at all angry*, 4 = *very angry*).

The total scale and subscales have previously been found to have acceptable to excellent internal consistency when tested with a community sample (overall  $\alpha = .92$ , COG  $\alpha = .78$ , ARO  $\alpha = .82$ , BEH  $\alpha = .82$ , PI  $\alpha = .92$ ; Jones, Thomas-Peter, & Trout, 1999), and REG appears to exhibit acceptable reliability ( $\alpha = .74$ ) with a standardized sample (Novaco, 2003). In the current study the NAS scale demonstrated slightly higher internal consistency, overall  $\alpha = .92$ , COG  $\alpha = .81$ , ARO  $\alpha = .87$ , BEH  $\alpha = .90$ , REG  $\alpha = .95$ , and PI  $\alpha = .95$ .



### ***The Revised University of California Los Angeles (UCLA) Loneliness Scale***

The UCLA (Russell, Peplau, & Cutrona, 1980) is a 20-item self-report measure designed to measure social competence. Items such as 'I lack companionship' are responded to using a 4-point Likert scale (1 = *never*, 4 = *often*). A reliability generalization study reported the mean internal reliability coefficient  $\alpha$  to be .87 (Vassar & Crosby, 2008). Similar psychometric properties were noted in the current study,  $\alpha = .93$ .

### ***The Simple Rathus Assertiveness Schedule – Short Form***

The Simple Rathus Assertiveness Schedule – Short Form (Jenerette & Dixon, 2010) consists of 19 items (e.g. 'I am quick to say what I think') rated on a 6-point Likert scale (1 = *very much unlike me*, 6 = *very much like me*). Jenerette and Dixon (2010) reported that their scale had good reliability ( $\alpha = .81$ ), this was also evident in the current study ( $\alpha = .82$ ).

### ***Nowicki Strickland Locus of Control***

The Nowicki Strickland Locus of Control (Nowicki, 1976) scale measures how much a participant feels they are in control of the events around them. The 40 items in the scale (e.g. 'Are some people just born lucky') are responded to with either a *yes* or *no* answer. The scale has been noted to have levels of internal consistency ranging between  $\alpha = .66$  and  $\alpha = .75$  (Duke & Nowicki, 1973), and similarly the internal consistency in the current study ( $\alpha = .69$ ) falls within this range.

### ***Boredom Proneness Scale – Short Form***

The Boredom Proneness Scale – Short Form (Vodanovich, Wallace, & Kass, 2005) contains 12 items measuring internal (e.g. 'I find it easy to entertain myself') and external (e.g. 'It seems that the same things are on television or the movies all the time; it's getting old') factors relating to boredom. The items are measured using a 7-point Likert scale (1 = *strongly disagree*, 7 = *strongly agree*). The short form has been noted to have acceptable reliability ( $\alpha = .70$ ; Hopley & Nicki, 2010), and  $\alpha = .73$  in the current study.

### ***Measure of Criminal Attitudes and Associates – Part B***

The *Measure of Criminal Attitudes and Associates* (M-CAA-Part B; Mills & Kroner, 1999) is a 46-item scale (*agree/disagree*) which measures attitudes towards violence (e.g. 'Sometimes you have to fight to keep your self-respect'), entitlement (e.g. 'It is wrong for a lack of money to stop you from getting things'), antisocial intent (e.g. 'Rules will not stop me from doing what I want'), and associates (e.g. 'I have committed a crime with friends'). The psychometric properties of the M-CAA-Part B have previously been reported to range between acceptable and good (Part B total  $\alpha = .75$ , violence  $\alpha = .80$ , antisocial index  $\alpha = .72$ , and associates  $\alpha = .82$ ) with the exception of entitlement ( $\alpha = .63$ ; Mills, Kroner, & Forth, 2002). In the current study the reliability  $\alpha$  was .81 for the complete M-CAA-Part B (violence  $\alpha = .76$ , entitlement  $\alpha = .72$ , antisocial index  $\alpha = .41$ , and antisocial associates  $\alpha = .01$ ). The negligible  $\alpha$  for the antisocial associates may be as a result of only a small minority of participants ( $n = 5$ , 2.2%) having ever been arrested.

## Impression Management

### *Balanced Inventory of Desirable Responding*

The BIDR (Paulhus, 1984, 1988) is in total a 40-item scale. The Impression Management (IM) section makes up half of the scale where items (e.g. 'I never swear') are rated on a 5-point Likert scale (1 = *not true*, 5 = *very true*). The BIDR IM scale has good internal consistency ( $\alpha$  ranging from .75 to .86; Paulhus, 1988). In a community sample internal consistency was noted to be  $\alpha = .83$  (Barrowcliffe & Gannon, 2015). However in the current community sample the  $\alpha$  was noted to be lower ( $\alpha = .66$ ).

## Procedure

The research was ethically approved by the University's Research Ethics Committee (Ref 20142842). Participants completed the online questionnaire in their own time. To encourage participation, participants' email addresses were entered into a prize draw to win Amazon vouchers. Participants viewed an information sheet before the start of the study, and were informed that continuing with the study indicated consent. Participants were requested not to disclose any personally identifying information about themselves or any fires they may have started. In order to ensure anonymity IP addresses were not recorded. At the end of the questionnaire participants were thanked, and a written debrief appeared explaining the purpose of the research, and reiterating that the information provided would remain anonymous.

## Results

### *Firesetting prevalence and features*

Forty participants (17.78%) indicated that they had ignited a deliberate fire but had not been formally apprehended for their actions. The majority of these firesetters reported that they were White British ( $n = 26$ , 65%), and all held a formal qualification (e.g. A levels or higher). Overall the majority of the firesetters were female ( $n = 25$ , 62.5%). Of the 37 males and 188 females who participated 40.54% ( $n = 15$ ) of males and 13.31% ( $n = 25$ ) of females were classified as firesetters. Key demographics can be found in Table 1.

Firesetters self-reported igniting their most recent fire between the ages of 10 and 37 years (median age 16 years). The majority (85%,  $n = 34$ ) of firesetters reported igniting their most recent fire between 10 and 18 years of age, and only 15% ( $n = 6$ ) igniting fires during adulthood (range 20–37 years). Only one firesetter (2.5%) ignited their first fire in adulthood.

Fifteen firesetters ignited only one deliberate fire (37.5%). However the majority of firesetters ignited multiple fires (see Table 2). None of the firesetters reported holding any convictions for arson but three firesetters reported holding convictions for either a violent crime, antisocial behaviour, or theft. None of the firesetters reported having received therapy for their firesetting behaviour. The majority of firesetters ( $n = 28$ , 70%) reported igniting a fire within one mile of their home (e.g. walking distance). One firesetter reported being under the influence of drugs, and five firesetters (12.5%) claimed to be

**Table 1.** Firesetters and non-firesetters historical characteristics and demographics.

Variable	Firesetters (N = 40) M (SD)	Non-firesetters (N = 185) M (SD)
<i>Demographics</i>		
Age	24.00 (9.00)	25.50 (12.73)
Siblings (number)	2.50 (1.20)	2.62 (1.12)
	Percentage yes (n)	Percentage yes (n)
Males	37.5 (15)	11.9 (22)
Females	62.5 (25)	88.1 (163)
White British	65.0 (26)	57.3 (106)
White Other	20.0 (8)	18.9 (35)
Formal qualifications	100 (40)	96.2 (178)
History of enuresis	7.5 (3)	4.3 (8)
Psychiatric illness diagnosis	32.5 (13)**	14.1 (26)
Physical disability diagnosis	5.0 (2)	1.6 (3)
Behavioural problem diagnosis	12.5 (5)**	0 (0)
Suspension from school	32.5 (13)**	4.3 (8)
Expulsion from school	10.0 (4)	3.2 (6)
History of suicide	17.5 (7)*	6.5 (12)
History of self-harm	35.0 (14)	21.6 (40)
Criminal convictions	7.5 (3)	1.1 (2)
Experimented with fire before the age of 10	57.5 (23)**	24.3 (45)
<i>Family background</i>		
Lack of money (i.e. sometimes not enough money for food)	25.0 (10)	14.6 (27)
Witnessed domestic violence	25.0 (10)	25.9 (48)
Mother diagnosed with a psychiatric illness	30 (12)	17.8 (33)
Father diagnosed with a psychiatric illness	12.5 (5)	10.3 (19)
A family member also ignited a deliberate fire	15 (6)**	3.2 (6)

Note:  $\chi^2$  with 95% confidence.

\* $p \leq .05$ .

\*\* $p \leq .01$ .

**Table 2.** Deliberate firesetting offence characteristics.

Offence characteristics	Percentage yes (n)
<i>Number of deliberate fires ignited</i>	
One	37.5 (15)
Two	27.5 (11)
Three	17.5 (7)
Four or more	17.5 (7)
<i>Ignition point and target</i>	
One ignition point	67.5 (27)
Multiple ignition points	32.5 (13)
Ignited countryside (e.g. grass/shrubbery)	27.5 (11)
Paper, books, or newspapers	25.0 (10)
Ignited a bin outside	22.5 (9)
Ignited a bin inside	12.5 (5)
Ignited clothing	12.5 (5)
Ignited a toilet roll dispenser	12.5 (5)
General rubbish	7.5 (3)
Furniture	5.0 (2)
Ignited an unoccupied car	2.5 (1)
Ignited an animal which was alive	2.5 (1)
Ignited a house knowing it was occupied	2.5 (1)
<i>Fires ignited alone or with accomplices</i>	
Ignited fire alone	27.5 (11)
Ignited fire with 1 other person	12.5 (5)
Ignited fire with 2 other people	20.0 (8)
Ignited fire with 3+ people	40.0 (16)

Note: Ignition targets do not add up to 100% due to multiple targets.

**Table 3.** The motivations behind deliberate firesetting.

Motivation	Percentage yes (n)
Curiosity or experimenting with fire	65.0 (26)
To create fun/excitement or alleviate boredom	67.5 (27)
Love fire	22.5 (9)
Dared or pranked	20.0 (8)
Vandalism	10.0 (4)
Going along with friends	5.0 (2)
Stressed or frustrated	5.0 (2)
Problems at home or school	2.5 (1)
Protecting themselves	2.5 (1)
Revenge	0
Insurance payout or financial gain	0
Covering up another crime/destroying evidence	0

Note: Motivations do not add up to the number of firesetters as many firesetters ( $n = 27$ ) indicated multiple motives.

under the influence of alcohol during ignition. The majority of firesetters ignited their fires with other people ( $n = 29$ , 72.5%). Table 2 contains further offence characteristics.

Participants were requested to list the motivations behind their firesetting (see Table 3). The majority of firesetters ( $n = 27$ , 67.5%) reported multiple motivations. The predominant motivations behind firesetting were experimentation and curiosity ( $n = 26$ , 65%), and to alleviate boredom or create excitement ( $n = 27$ , 67.5%). None of the firesetters were motivated by revenge, and nine firesetters (22.5%) stated they experienced a love of fire.

Just under a third of firesetters ignited grass, shrubbery or dry leaves ( $n = 11$ , 27.5%) and 10 firesetters (25%) ignited paper, books, or newspapers. Igniting waste paper baskets and bins inside ( $n = 5$ , 12.5%) and outside ( $n = 9$ , 22.5%) were also common targets (see Table 2). Although the majority of firesetters ( $n = 30$ , 75%) took part in extinguishing the fire, four firesetters (10%) indicated that the Fire Service extinguished their fires. In terms of preventative measure, 35% of firesetters ( $n = 14$ ) indicated that having better fire safety knowledge (e.g. being aware of the dangers, and increased knowledge of how fire develops) would have prevented them from firesetting but 45% ( $n = 18$ ) indicated that nothing would have prevented their firesetting. Of the participants who indicated that having better fire safety knowledge would have prevented them from firesetting seven ignited just one fire but the remaining seven firesetters ignited multiple fires (two fires [ $n = 3$ ], three fires [ $n = 2$ ], or four or more fires [ $n = 2$ ]).

**Firesetter and non-firesetter characteristic comparisons**

**Demographic and historical variables**

Univariate comparisons (see Table 1) revealed that firesetters and non-firesetters could not be significantly differentiated on the majority of demographic, or historical variables (e.g. age, number of siblings, history of enuresis, formal qualifications, physical disability, history of self-harm, criminal convictions, witnessing domestic violence, or parental psychiatric history).

Relative to non-firesetters, firesetters were more likely to report a diagnosis of a psychiatric illness,<sup>4</sup>  $\chi^2(1, n = 225) = 6.58, p \leq .01, \phi = .19$ , and a diagnosis of a behavioural disorder (e.g. Attention Deficit Hyperactivity Disorder (ADHD))  $\chi^2(1, n = 225) = 18.25, p < .01, \phi = .32$ . All of the firesetters with a behavioural disorder began firesetting in childhood

and adolescence (10–15 years of age) and ignited more than one fire (two fires  $n = 3$ , three fires  $n = 1$ , five or more fires  $n = 1$ ). Firesetters were also more likely to have experimented with fire before the age of 10 years  $\chi^2(1, n = 225) = 15.63, p < .01, \phi = .28$ , and to have been suspended from school  $\chi^2(1, n = 225) = 27.61, p < .01, \phi = .37$ . In addition relative to non-firesetters, firesetters reported having engaged in suicide attempts  $\chi^2(1, n = 225) = 3.83, p \leq .05, \phi = .15$ , and having a family member who had also ignited a deliberate fire  $\chi^2(1, n = 201) = 9.60, p < .01, \phi = .25$ .

### Questionnaire measures

The IM subscale of the BIDR significantly correlated with the FPS, the FAS, the NAS-PI, the Revised UCLA Loneliness Scale, and the M-CAA. However, for all of these scales the firesetters' scale scores did not significantly correlate with the IM subscale when computed separately for firesetters and non-firesetters.

Mean scale scores were calculated separately for the firesetters, and non-firesetters (see Table 4). Separate one-way between-groups multivariate analysis of variance (MANOVA) were conducted to establish any differences between firesetters and non-firesetters on the FSS, the FPS, the NAS, and the M-CAA. After checking assumptions for normality, linearity, outliers, multicollinearity, and homogeneity of variance–covariance the separate MANOVA analyses confirmed that firesetters scored significantly higher compared to

**Table 4.** Reliability and scale scores for self-reported deliberate firesetters and non-firesetters.

Scale	Cronbach $\alpha$	Firesetters		Non-firesetters		Scale range
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
FSS	.91	68.40***	(21.87)	50.70	(17.38)	20–140
Behavioural items	.85	33.10***	(11.43)	24.59	(8.89)	10–70
Fire Interest items	.92	35.30***	(13.76)	26.11	(12.25)	10–70
FPS	.82	56.43***	(18.49)	44.81	(13.03)	24–120
Fire Fascination	.71	16.55***	(6.16)	13.13	(4.56)	6–30
Behavioural Propensity	.81	13.85***	(4.87)	10.17	(3.15)	6–30
Fire Arousal	.81	16.00***	(5.73)	12.63	(4.25)	6–30
Antisociality	.93	10.03*	(3.49)	8.88	(3.16)	6–30
Identification with Fire Scale	.66	19.74	(5.73)	18.08	(4.23)	10–50
FAS	.71	53.28	(11.46)	52.00	(7.11)	20–100
The Fire Interest Rating Scale	.82	45.97**	(10.53)	40.59	(7.84)	14–98
NAS-PI T scores	.92	115.49***	(13.17)	105.84	(14.36)	
Cognition (COG)	.81	31.95***	(4.58)	28.67	(4.62)	20–80
Arousal (ARO)	.87	30.38**	(5.42)	27.52	(5.64)	21–80
Behavioural (BEH)	.90	28.13***	(6.25)	24.18	(5.80)	29–80
Regulation (REG)	.95	25.03	(3.87)	25.46	(3.52)	20–80
PI	.95	68.37*	(12.72)	62.71	(14.59)	20–79
The Revised UCLA Loneliness Scale	.93	42.06	(13.39)	37.51	(9.75)	20–80
The Simple Rathus Assertiveness Schedule – Short Form	.82	69.51	(14.06)	66.35	(12.22)	19–114
Nowicki Strickland Locus of Control	.69	14.74	(5.99)	13.34	(5.77)	0–40
Boredom Proneness Scale – Short Form	.73	44.42*	(10.02)	40.59	(7.51)	12–84
M-CAA	.81	19.95***	(7.21)	15.07	(5.41)	0–46
Violence	.76	4.72**	(3.32)	2.93	(2.20)	0–12
Entitlement	.72	5.72**	(3.16)	4.43	(2.61)	0–12
Antisocial	.41	5.51***	(1.73)	4.18	(1.71)	0–12
Associates	.01	4.00*	(1.50)	3.53	(1.23)	0–10
BIDR – IM	.66	54.21	(7.11)	59.85	(9.37)	20–100

\* $p < .05$ .

\*\* $p < .01$ .

\*\*\* $p < .001$ .

non-firesetters on the combined firesetting scale  $F(2,216) = 16.27, p < .01$ ; Wilks'  $\Lambda = .87$ ;  $\eta_p^2 = .13$ . When the results of the dependent variables were considered separately both of the subscales were also significant; Behavioural subscale  $F(1,217) = 26.79, p < .01$ ;  $\eta_p^2 = .11$ , Fire Interest subscale  $F(1,217) = 17.56, p < .01$ ;  $\eta_p^2 = .08$ . Similarly, the firesetters also scored significantly higher compared to the non-firesetters on the combined FPS  $F(4,215) = 10.24, p < .01$ ; Wilks'  $\Lambda = .84$ ;  $\eta_p^2 = .16$  and all of the subscales (Fascination  $F(1,218) = 16.06, p < .01$ ;  $\eta_p^2 = .07$ , Behavioural Propensity  $F(1,218) = 35.78, p < .01$ ;  $\eta_p^2 = .14$ , Arousal Index  $F(1,218) = 17.98, p < .01$ ;  $\eta_p^2 = .08$ , and Antisocial Index  $F(1,218) = 4.10, p < .05$ ;  $\eta_p^2 = .02$ ).

A separate MANOVA also showed that firesetters scored significantly higher on the combined NAS<sup>5</sup>  $F(5,195) = 3.53, p < .01$ ; Wilks'  $\Lambda = .92$ ;  $\eta_p^2 = .08$ , and the majority of its subscales (COG  $F(1,199) = 15.26, p < .01$ ;  $\eta_p^2 = .07$ , ARO  $F(1,199) = 9.33, p < .01$ ;  $\eta_p^2 = .05$ , BEH  $F(1,199) = 12.72, p < .01$ ;  $\eta_p^2 = .06$ , and PI  $F(1,199) = 5.61, p < .05$ ;  $\eta_p^2 = .03$ ). The subscale relating to the regulation of anger (REG) was not significant.

The MANOVA for the M-CAA-Part B revealed that relative to the non-firesetters the firesetters scored significantly higher on the combined subscales of the M-CAA-Part B,  $F(4,211) = 6.81, p < .01$ ; Wilks'  $\Lambda = .89$ ;  $\eta_p^2 = .11$ , and also scored significantly higher on its subscales (Violence  $F(1,214) = 17.13, p < .01$ ;  $\eta_p^2 = .07$ , Entitlement  $F(1,214) = 7.18, p < .01$ ;  $\eta_p^2 = .03$ , Antisocial Index  $F(1,214) = 19.26, p < .01$ ;  $\eta_p^2 = .08$ , and Associates  $F(1,214) = 4.37, p < .05$ ;  $\eta_p^2 = .02$ ).

Independent samples *t*-tests confirmed that firesetters scored significantly higher compared to non-firesetters on the Fire Interest Rating Scale  $t(47.71) = 3.02, p < .01, d = .87$  (two-tailed, mean difference = 5.39, 95% CI: 1.79, 8.98). Firesetters also scored significantly higher on the Boredom Proneness Scale  $t(46.96) = 2.22, p < .05, d = .65$  (two-tailed, mean difference = 3.83, 95% CI: 0.36, 7.30). There were no significant differences between the scores of firesetters and non-firesetters on the Identification with Fire Scale, the FAS, the Revised UCLA Loneliness Rating Scale, the Simple Rathus Assertiveness Scale, or the Nowicki Strickland Locus of Control Scale.

### *Classifying firesetters and non-firesetters*

A total of 12 variables differentiated the deliberate firesetters and the non-firesetters. Due to small sample sizes two separate logistic regressions were conducted, one to assess the static variables and one relating to the dynamic variables. There were six static variables; a diagnoses of a psychiatric illness, a diagnosis of a behavioural problem, suspension from school, history of suicide attempts, experimentation with fire before the age of 10 years, and having a family member who had also ignited a deliberate fire. However due to a small number of participants ( $n = 5$ ) reporting a diagnosis of a behavioural problem this variable was omitted from the analysis. The complete model was significant  $\chi^2(5, n = 201) = 41.81, p < .01$ , and therefore able to distinguish between the self-reported firesetters and non-firesetters. As a whole the model explained between 18.8% (Cox and Snell  $R^2$ ) and 33.0% (Nagelkerke  $R^2$ ) of the variance in firesetting status, and correctly classified 87.1% of cases overall.

Three independent variables, having been suspended from school, experimenting with fire before the age of 10 years, and having a family history of firesetting were statistically significant contributors to the model with odds ratios of 0.10, 0.32 and 0.23, respectively. Thus participants who had been suspended from school, experimented with fire before

**Table 5.** Logistic regression predicting firesetter status based on static variables.

	$\beta$	SE	Wald	df	$p$	Odds ratio	95% CI for odds ratio	
							Lower	Upper
Diagnosis of a psychiatric illness	−0.58	0.59	0.96	1	.33	0.56	0.18	1.78
Suspension from school	−2.35	0.58	16.40	1	<.001	0.10	0.03	0.30
History of suicide attempts	−0.66	0.74	0.81	1	.37	0.52	0.12	2.18
Experimented with fire before age 10	−1.15	0.47	5.93	1	.02	0.32	0.13	0.80
Family history of deliberate firesetting	−1.46	0.73	3.98	1	.05	0.23	0.06	0.98
Constant	3.24	1.03	10.05	1	<.001	25.8		

**Table 6.** Logistic regression predicting firesetter status based on dynamic variables.

	$\beta$	SE	Wald	df	$p$	Odds ratio	95% CI for odds ratio	
							Lower	Upper
FSS	0.03	0.02	2.96	1	.09	1.03	1.00	1.06
FPS	0.01	0.02	0.14	1	.71	1.01	0.97	1.05
Fire Interest Rating Scale	0.01	0.03	0.10	1	.76	1.01	0.96	1.06
NAS-PI (T scores)	0.01	0.01	2.45	1	.19	1.01	1.00	1.03
Boredom Proneness Scale	0.01	0.03	0.06	1	.81	1.01	0.95	1.06
M-CAA	0.05	0.04	1.77	1	.18	1.05	0.98	1.14
Constant	−8.16	2.06	15.70	1	.00	0.00		

age 10, or had a family member with a history of deliberate firesetting were more likely to be classified as deliberate firesetters (see [Table 5](#)).

In terms of the dynamic variables, firesetters and non-firesetters scored significantly differently on six scale measures: the FSS, the FPS, the Fire Interest Rating Scale, the NAS-PI, the Boredom Proneness Scale, and the M-CAA. The complete model was significant  $\chi^2$  (6,  $n = 200$ ) = 33.10,  $p < .01$ , and therefore able to distinguish between the self-reported firesetters and non-firesetters. As a whole the model explained between 15.3% (Cox and Snell  $R^2$ ), and 24.5% (Nagelkerke  $R^2$ ) of the variance in firesetting status, and correctly classified 83.5% of cases. However, none of the variables were individually statistically significant contributors to the model overall (see [Table 6](#)).

## Discussion

The current study extends the firesetting literature by examining the behaviour and personality characteristics of un-apprehended firesetters. A total of 17.78% of the participants were classified as deliberate firesetters. This prevalence rate is considerably higher than the prevalence rate of 1–1.13% in the USA study ([Blanco et al., 2010](#); [Vaughn et al., 2010](#)), and 11% ([Gannon & Barrowcliffe, 2012](#)), and 11.5% prevalence rates in UK community studies ([Barrowcliffe & Gannon, 2015](#)). One explanation for the increase in prevalence rate is as a result of the way in which participants were recruited. For example participants did not meet the researchers face to face but were instead recruited online and assured that their responses could not be traced back to them.

Igniting fires close to home is a feature associated with apprehended firesetters ([Bradford, 1982](#); [Rautaheimo, 1989](#); [Wachi et al., 2007](#)), and community firesetters in both this study, and that of [Barrowcliffe and Gannon \(2015\)](#). Apprehended firesetting populations



and the un-apprehended firesetters in this current study also share some similar characteristics. For example apprehended firesetters tend to have a history of self-harm and suicide (Jayaraman & Frazer, 2006; McKerracher & Dacre, 1966; Noblett & Nelson, 2001; O'Sullivan & Kelleher, 1987; Swaffer & Hollin, 1995). Similarly the community firesetters were also noted to have significantly more suicide attempts compared to the non-firesetters. In addition relative to non-firesetters, community firesetters reported significantly more diagnoses of psychiatric illness. However it is unclear when the diagnosis took place (e.g. before or after the firesetting) or if the firesetters were having symptoms at the time of ignition.

Firesetting offenders relative to other non-firesetting offenders have been found to be distinguishable based on fire-related factors such as fire interest, increased anger cognitions, and susceptibility to anger provocation (Gannon et al., 2013). Fire interest has been found to increase the likelihood of firesetting in both adults (Barnoux et al., 2015; Ó Ciardha & Gannon, 2012), and adolescents (MacKay et al., 2006; Watt et al., 2015). Similarly fascination with fire (Rautaheimo, 1989) and antisocial behaviour (Dolan et al., 2011) are also linked to firesetting behaviour. Although the current study with un-apprehended firesetters is not nationally representative, and is relatively small scale it offers an insight into the relevance of fire interest and fascination, anger cognitions, and antisocial behaviour as these factors significantly differentiated un-apprehended firesetters and non-firesetters. Un-apprehended firesetters in the current study held more positive attitudes towards fires such as interest around fire which is consistent with the literature relating to the implicit theories associated with adult apprehended firesetters (O'Ciardha & Gannon, 2012) and adolescent firesetters (Watt et al., 2015).

Apprehended firesetters are noted to be unskilled, and have low IQ (Bradford, 1982; Harmon et al., 1985; Lewis & Yarnell, 1951; Rautaheimo, 1989). In contrast with the apprehended firesetting literature, but in line with the research associated with un-apprehended firesetters (Barrowcliffe & Gannon, 2015) all of the un-apprehended firesetters in the current study were educated, and held at least A-level (Advanced level) UK qualifications. However, it is acknowledged that the participant sample were generally educated with only seven participants (3.11%) holding no qualifications.

The majority of the firesetters (85%,  $n = 34$ ) in this community study reported igniting fires between the ages of 10–18 years. Similarly the majority of firesetters in the NESARC study (Blanco et al., 2010; Vaughn et al., 2010) and both the studies with UK un-apprehended firesetters (Barrowcliffe & Gannon, 2015; Gannon & Barrowcliffe, 2012) ignited fires during adolescence. However in contrast to the literature associated with apprehended adolescent and adult firesetters (Bradford, 1982; Muller, 2008; Pettiway, 1987; Räsänen et al., 1995; Rautaheimo, 1989) the majority of the firesetters in the current study were female ( $n = 25$ , 62.5%). Yet this is not surprising as significantly more females ( $n = 188$ , 83.56%) participated compared to males ( $n = 37$ , 16.44%). It is worth noting that 40.54% ( $n = 15$ ) of the male participants and 13.31% ( $n = 25$ ) of female participants indicated that they had ignited a fire which matched the criteria for deliberate firesetting.

Both male and female offenders in general (Andrews & Bonta, 2010; Andrews et al., 2012) and apprehended firesetters are noted to have substance abuse issues (Jayaraman & Frazer, 2006), and/or issues with alcohol (Bourget & Bradford, 1989; Rautaheimo, 1989). However none of Barrowcliffe and Gannon's (2015) un-apprehended firesetters cited that

alcohol or drugs played a role in their firesetting. Similarly in the current community study just one firesetter (2.5%) self-reported being under the influence of substances at the time of ignition, and five firesetters (12.5%) indicated they were slightly to moderately intoxicated at the time of ignition. As individuals under the influence are unlikely to be compos mentis enough to cover their tracks and evade detection, it is likely that alcohol and drug issues are over represented in the apprehended firesetting population.

The apprehended firesetting literature cites revenge as the predominant motivation behind firesetting (Lewis & Yarnell, 1951; O'Sullivan & Kelleher, 1987; Swaffer & Hollin, 1995). However revenge was not cited as a motivation in this study, or previous research with un-apprehended firesetters (Barrowcliffe & Gannon, 2015; Gannon & Barrowcliffe, 2012). Revenge fires are likely to target an individual or their property and it is therefore feasible to assume that they are larger more destructive fires which have an increased likelihood of coming to the attention of the authorities, and leading to apprehension. Instead curiosity, excitement and alleviating boredom were the most common motivations for the un-apprehended firesetters in the current study and previous un-apprehended firesetting research (Barrowcliffe & Gannon, 2015; Gannon & Barrowcliffe, 2012). Interestingly, in the current study, boredom was a motivation associated only with adolescent firesetters. For this reason encouraging adolescents to attend youth engagement programmes (e.g. after school activities and youth clubs) may help to alleviate boredom and prevent these individuals from deliberately igniting fires.

It is concerning that a reasonable percentage of the firesetters ignited fires inside buildings ( $n = 5$ , 12.5%). Similarly concerning is that although the majority of firesetters ( $n = 30$ , 75%) extinguished their fires, four firesetters (10%) indicated that the Fire Service intervened. Presumably the fires extinguished by the Fire Service were larger, and more destructive in nature. Worryingly 45% ( $n = 18$ ) of firesetters indicated that nothing would have prevented them from deliberately igniting a fire. However, some comfort can be found in the fact that 35% of firesetters ( $n = 14$ ), indicated that having better fire safety knowledge, such as being aware of the dangers of fire, and increased knowledge of how a fire develops would have prevented them from firesetting.

ADHD has been cited as a factor in firesetting, but the data are limited (see Dolan et al., 2011). For example, McCardle, Lambie, and Barker-Collo (2004) found that just over half (53%) of their adolescent male firesetters in New Zealand had a diagnosis of ADHD. However this information was obtained from parent/caregivers rather than relying on medical records. In contrast none of the un-apprehended firesetters in the Barrowcliffe and Gannon (2015) study self-reported a behavioural disorder diagnosis. In the current community research five (12.5%) of the firesetters self-reported a behavioural disorder and firesetting was predominantly associated with younger firesetters. For example the majority of firesetters who reported a diagnosis of a behavioural disorder ignited their first and last fires in childhood or adolescence (10–18 years of age), with just one firesetter igniting a fire at 20 years old. Interestingly firesetters diagnosed with a behavioural disorder ignited multiple fires which supports the idea that firesetting may be an advanced level of antisocial behaviour (Forehand, Wierson, Frame, Kempton, & Armistead, 1991) that warrants further research.

When comparing un-apprehended firesetters and non-firesetters previous community research has found that relative to non-firesetters, firesetters were significantly less likely to have experimented with fire before the age of 10 (Barrowcliffe & Gannon, 2015).

Barrowcliffe and Gannon (2015) suggested that firesetters may hold restricted experiences in manipulating fire as children which feeds into their motivation to misuse fire later on. However in contrast, in the current community sample firesetters were significantly more likely to have experimented with fire before 10 years of age. It is thought that fire interest is common in childhood but by the age of 10 the majority of children have a reasonable understanding of fire safety (Dolan et al., 2011). However, early firesetting in childhood is believed to be a significant predictor of subsequent fire involvement for both patients and non-patients (Kolko, 2001). Dolan et al. (2011) suggests that firesetting develops into a problematic issue for children who lack adequate supervision. The participants in the current study were not asked to comment on the supervision they received as a child but this may offer an explanation as to how their firesetting remained un-noticed. Clearly, it would be beneficial for future research to be conducted with larger samples to truly assess the effects of family background and childhood fire experiences on subsequent firesetting behaviour.

In line with previous community research (Barrowcliffe & Gannon, 2015) the current community firesetters were also more likely to have a family member who had ignited a deliberate fire. These findings further support theoretical models of firesetting suggesting that there is a social learning aspect associated with firesetting behaviour (see Gannon et al., 2012; Jackson et al., 1987).

As this research was conducted via social media the recruitment rate cannot be determined and therefore it is not possible to comment on any sample selection biases. However, it is acknowledged that the gender participation bias (high female to male participation rate) is a research limitation. Other researchers have also found that relative to males, high female participation rates are a common research problem (Sax, Gilmartin, Lee, & Hagedorn, 2008; Underwood, Kim, & Matier, 2000). In addition the findings of the current study are limited by self-report measures. It is also acknowledged that unintentional memory recollection failures may have occurred as the majority of un-apprehended firesetters (85%) were retrospectively commenting on their firesetting behaviour in adolescence. Future research concerned with un-apprehended firesetting should perhaps aim to recruit younger participants.

The factors which significantly differentiated the firesetters, and non-firesetters were entered into a logistic regression to gauge their ability to predict firesetting status. Two separate logistic regressions were conducted to assess the predictive ability of five static variables (a diagnoses of a psychiatric illness, suspension from school, history of suicide attempts, experimentation with fire before the age of 10 years old, and having a family member who has also ignited a deliberate fire), and six dynamic variables (the FSS, the FPS, the Fire Interest Rating Scale, the NAS-PI, the Boredom Proneness Scale, and the M-CAA). Only three static variables successfully predicted firesetting status (suspension from school, experimentation with fire before the age of 10 years old, and having a family member who has also ignited a deliberate fire). The current research warrants further investigation, but supports the findings that previous firesetting incidences are the best predictors of future firesetting in both child, adolescent, and adult firesetters (Edwards & Grace, 2014; Kennedy, Vale, Khan, & McAnaney, 2006; Kolko, 2001).

The literature associated with un-apprehended UK firesetters is limited. Relative to their apprehended counterparts, un-apprehended firesetters appear to be highly educated, and possess the ability to evade detection. Therefore it is inappropriate to apply all of the

research associated with apprehended firesetters to un-apprehended firesetters, instead it would be beneficial to conduct further research in this area. In particular it is interesting to note that some un-apprehended firesetters highlighted factors which they believe would have prevented them from firesetting (e.g. better fire education). Incorporating such programmes into educational curriculums is a step closer to reducing the incidences, injuries, and fatalities caused as a result of deliberate firesetting.

## Notes

1. Number of male and female firesetters does not add up to total number of cases proceeded against in court as in 10 adult cases and 3 juvenile cases the gender was unspecified.
2. In the UK the law assumes that children under the age of 10 are too young to understand the morality of their behaviour and therefore cannot receive a criminal conviction (Gov.UK, 2015).
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4. Psychiatric disorder included depression, schizophrenia, obsessive compulsive disorder, eating disorders and anxiety disorders.
5. Novaco *t*-score conversions were used in the analysis.

## Disclosure statement

No potential conflict of interest was reported by the authors.

## References

- Andrews, D. A., & Bonta, J. (2010). *The psychology of criminal conduct* (5th ed.). New Providence, NJ: LexisNexis Matthew Bender.
- Andrews, D. A., Guzzo, L., Raynor, P., Rowe, R., Rettinger, L. J., Brews, A., & Wormith, J. S. (2012). Are the major risk/need factors predictive of both female and male reoffending? A test with the eight domains of the Level of Service/Case Management Inventory. *International Journal of Offender Therapy and Comparative Criminology*, 56, 113–133. doi:10.1177/0306624X10395716
- Barnoux, M., Gannon, T. A., & Ó Ciardha, C. (2015). A descriptive model of the offence chain for imprisoned adult male firesetters (descriptive model of adult male fi(descript)). *Legal and Criminological Psychology*, 20, 48–67. doi:10.1111/lcrp.12071
- Barrowcliffe, E. R., & Gannon, T. A. (2015). The characteristics of un-apprehended firesetters living in the UK community. *Psychology, Crime and Law*. doi:10.1080/1068316X.2015.1054385
- Blanco, C., Alegria, A. A., Petry, N. M., Grant, J., Simpson, H. B., Liu, S., ... Hasin, D. (2010). Prevalence and correlates of firesetting in the US: Results from the national epidemiologic survey on alcohol and related conditions (NESARC). *Journal of Clinical Psychiatry*, 71(9), 1218–1225. doi:10.4088/JCP.08m04812gry
- Bourget, D., & Bradford, J. M. W. (1989). Female arsonists: A clinical study. *Bulletin of the American Academy of Psychiatry and the Law*, 17(3), 293–300.
- Bradford, J. M. W. (1982). Arson: A clinical study. *Canadian Journal of Psychiatry*, 27, 188–193.
- Davis, J. A., & Lauber, K. M. (1999). Criminal behavioral assessment of arsonists, pyromaniacs, and multiple firesetters. *Journal of Contemporary Criminal Justice*, 15(3), 273–290. doi:10.1177/1043986299015003005
- Dennet, M. F. (1980). *Fire investigation*. Oxford: Pergamon Press.

- Department for Communities and Local Government. (2011). *The economic cost of fire: Estimates for 2008*. London: Crown Copyright.
- Department for Local Communities and Local Government. (2014). *Fire statistics: Great Britain April 2012 to March 2013*. London: Crown Copyright.
- Dickens, G. L., Sugarman, P. A., & Gannon, T. A. (Eds). (2012). *Firesetting and mental health, theory research and practice* (pp. 3–27). London: RCPsych.
- Dolan, M., McEwan, T. E., Doley, R., & Fritzon, K. (2011). Risk factors and risk assessment in Juvenile fire-setting. *Psychiatry, Psychology and Law*, 18(3), 378–394. doi:10.1080/13218719.2011.559154
- Doley, R. (2003). Making sense of arson through classification. *Psychiatry, Psychology and Law*, 102, 346–352. doi:10.1375/pplt.2003.10.2.346
- Duke, M. P., & Nowicki, S. (1973). Personality correlates of the Nowicki-Strickland locus of control scale for adults. *Psychological Reports*, 33, 267–270.
- Edwards, M. J., & Grace, R. C. (2014). The development of an actuarial model for arson recidivism. *Psychiatry, Psychology and Law*, 21(2), 218–230. doi:10.1080/13218719.2013.803277
- Fessler, D. T. (2006). A burning desire: Steps towards an evolutionary psychology of fire learning. *Journal of Cognition & Culture*, 6(3/4), 429–451. doi:10.1163/156853706778554986
- Forehand, R., Wierson, M., Frame, C. L., Kempton, T., & Armistead, L. (1991). Juvenile firesetting: A unique syndrome or an advanced level of antisocial behavior? *Behaviour Research and Therapy*, 29(2), 125–128. doi:10.1016/0005-7967(91)90040-A
- Gannon, T. A. (2010). Female arsonists: Key features, psychopathologies, and treatment needs. *Psychiatry*, 73(2), 173–189. doi:10.1521/psyc.2010.73.2.173.
- Gannon, T. A., & Barrowcliffe, E. R. (2012). Firesetting in the general population: The development and validation of the fire setting and fire proclivity scales. *Legal and Criminological Psychology*, 17(1), 105–122. doi:10.1348/135532510X523203
- Gannon, T. A., Ó Ciardha, C., & Barnoux, M. (2011). *The identification with fire questionnaire* (Unpublished manuscript). CORE-FP, School of Psychology, University of Kent, Canterbury, UK.
- Gannon, T. A., Ó Ciardha, C., Barnoux, M. F. L., Tyler, N., Mozova, K., & Alleyne, E. K. A. (2013). Male imprisoned firesetters have different characteristics than other imprisoned offenders and require specialist treatment. *Psychiatry: Interpersonal and Biological Processes*, 76, 349–364. doi:10.1521/psyc.2013.76.4.349
- Gannon, T. A., Ó Ciardha, C., Doley, R. M., & Alleyne, E. (2012). The multi-trajectory theory of adult fire-setting. *Aggression and Violent Behavior*, 17, 107–121. doi:10.1016/j.avb.2011.08.001
- Gannon, T. A., & Pina, A. (2010). Firesetting: Psychopathology, theory and treatment. *Aggression and Violent Behaviour*, 15, 224–238. doi:10.1016/j.avb.2010.01.001
- Geller, J. L. (1992). Communicative arson. *Hospital and Community Psychiatry*, 43, 76–77.
- George, D., & Mallery, P. (2003). *SPSS for windows step by step: A simple guide and reference*, 11.0 update (4th ed.). Boston, MA: Allyn & Bacon.
- Gov.UK. (2015). *What happens if a child under 10 breaks the law?* Retrieved from <https://www.gov.uk/child-under-10-breaks-law>
- Harmon, R. B., Rosner, R., & Wiederlight, M. (1985). Women and arson: A demographic study. *Journal of Forensic Sciences*, 30(2), 467–477.
- Hopley, A. A. B., & Nicki, R. M. (2010). Predictive factors of excessive online poker playing. *CyberPsychology, Behavior & Social Networking*, 13(4), 379–385. doi:10.1089/cyber.2009.0223
- Hurley, W., & Monahan, T. M. (1969). Arson: The criminal and the crime. *British Journal of Criminology*, 9(1), 4–21.
- Icove, D. J., & Estepp, M. H. (1987). *Motive-based offender profiles of arson and fire-related crimes*, FBI Law Enforcement Bulletin. Washington, DC: U.S. Department of Justice.
- Inciardi, J. (1970). The adult firesetter. *Criminology*, 8, 145–155.
- Jackson, H., Glass, C., & Hope, S. (1987). A functional analysis of recidivistic arson. *British Journal of Clinical Psychology*, 26, 175–185.
- Jayaraman, A., & Frazer, J. (2006). Arson: A growing inferno. *Medicine, Science and the Law*, 46(4), 295–300.
- Jenerette, C., & Dixon, J. (2010). Developing a short form of the simple Rathus assertiveness schedule using a sample of adults with sickle cell disease. *Journal of Transcultural Nursing*, 21(4), 314–324. doi:10.1177/1043659609360712

- Jones, J. P., Thomas-Peter, B. A., & Trout, A. (1999). Brief report. Normative data for the Novaco Anger Scale from a non-clinical sample and implications for clinical use. *British Journal of Clinical Psychology*, 38, 417–424.
- Justice Statistics Analytical Services – Ministry of Justice. (2015, May). *Information gained from a freedom of information act request to the ministry of justice*. London: Author (Ref: 237–15 Fol 97457).
- Kazdin, A. E., & Kolko, D. L. (1986). Parent psychopathology and family functioning among childhood firesetters. *Journal of Abnormal Child Psychology*, 14(2), 315–329.
- Kennedy, P., Vale, E., Khan, S., & McAnaney, A. (2006). Factors predicting recidivism in child and adolescent fire-setters: A systematic review of the literature. *The Journal of Forensic Psychiatry & Psychology*, 17, 151–164. doi:10.1080/1478994050044150
- Kolko, D. J. (2001). Efficacy of cognitive-behavioural treatment and fire safety education for firesetting children: Initial and follow-up outcomes. *Journal of Child Psychology and Psychiatry*, 42(3), 359–369.
- Kolko, D. J. (Ed.). (2002). *Handbook on firesetting in children and youth*. San Diego, CA: Academic Press.
- Koson, D. F., & Dvoskin, J. (1982). Arson: A diagnostic study. *Bulletin of American Academy of Psychiatry and the Law*, 10(1), 39–49.
- Lewis, M. D., & Yarnell, H. (1951). Pathological firesetting (pyromania). *Nervous and Mental Disease Monographs*, 82, 30–37.
- Macht, L. B., & Mack, J. E. (1968). The fire-setter syndrome. *Psychiatry*, 31, 277–288.
- MacKay, S., Henderson, J., Del Bove, G., Marton, P., Warling, D., & Root, C. (2006). Fire interest and anti-sociality as risk factors in the severity and persistence of juvenile firesetting. *Journal of the American Academy of Child and Adolescent Psychiatry*, 45(9), 1077–1084. doi:10.1097/01.chi.0000227881.50404.ca
- McCardle, S., Lambie, I., & Barker-Collo, S. (2004). *Adolescent firesetting: A New Zealand case-controlled study of risk factors for adolescent firesetting*. New Zealand Fire Service Commission Research Report Number 46.
- McKerracher, D., & Dacre, A. (1966). A study of arsonists in a special security hospital. *British Journal of Psychiatry*, 112, 1151–1154.
- Mills, J. F., & Kroner, D. G. (1999). *Measures of criminal attitudes and associates: User guide* (Unpublished instrument and user guide).
- Mills, J. F., Kroner, D. G., & Forth, A. E. (2002). Measures of Criminal Attitudes and Associates (MCAA): Development, factor structure, reliability, and validity. *Assessment*, 9(3), 240–253.
- Molnar, G., Keitner, L., & Harwood, B. T. (1984). A comparison of partner and solo arsonists. *Journal of Forensic Sciences*, 29(2), 574–583.
- Muckley, A. (1997). *Firesetting: Addressing offending behaviour. A resource and training manual*. Redcar and Cleveland: Redcar and Cleveland Psychological Service.
- Muller, D. A. (2008). Offending and reoffending patterns of arsonists and bushfire arsonists in New South Wales. Trends and issues in crime and criminal justice. *Australian Institute of Criminology*, 348, 1–6.
- Murphy, G. H., & Clare, I. C. H. (1996). Analysis of motivation in people with mild learning disabilities (mental handicap) who set fires. *Psychology, Crime & Law*, 2(3), 153–164. doi:10.1080/10683169608409774
- Noblett, S., & Nelson, B. (2001). A psychosocial approach to arson – A case controlled study of female offenders. *Medicine Science and the Law*, 41(4), 325–330.
- Novaco, R. W. (2003). *The Novaco Anger Scale and provocation inventory: NAS-PI*. Los Angeles, CA: Western Psychological Services.
- Nowicki, S., Jr. (1976). *Adult Nowicki-Strickland internal-external locus of control scale*. Test manual available from S. Nowicki, Jr., Department of Psychology, Emory University, Atlanta, GA 30322.
- Ó Ciardha, C., & Gannon, T. A. (2012). The implicit theories of firesetters: A preliminary conceptualization. *Aggression and Violent Behavior*, 17, 122–128. doi:10.1016/j.avb.2011.12.001
- O'Sullivan, G. H., & Kelleher, M. J. (1987). A study of firesetters in the South-West of Ireland. *British Journal of Psychiatry*, 151, 818–823. doi:10.1192/bjp.151.6.818
- Paulhus, D. L. (1984). Two-component models of socially desirable responding. *Journal of Personality and Social Psychology*, 46, 598–609. doi:10.1037/0022-3514.46.3.598



- Paulhus, D. L. (1988). *Assessing self deception and impression management in self reports: The balanced inventory of desirable responding* (Unpublished manual). University of British Columbia, Vancouver.
- Perrin-Wallqvist, R., Archer, T., & Norlander, T. (2004). Adolescents' fire-setting awareness under boredom: Relation to personality variables. *Psychological Reports*, 94(3), 863–871.
- Pettitway, L. E. (1987). Arson for revenge: The role of environmental situation, age, sex, and race. *Journal of Quantitative Criminology*, 3(2), 169–184.
- Prins, H. (1994). *Fire-raising. Its motivation and management*. London: Routledge.
- Räsänen, P., Hakko, H., & Väisänen, E. (1995). The mental state of arsonists as determined by forensic psychiatric examinations. *The Bulletin of the American Academy of Psychiatry and the Law*, 23(4), 547–553.
- Rautaheimo, J. (1989). The making of an arsonist. *Fire Prevention*, 223, 30–34.
- Rice, M. E., & Chaplin, T. C. (1979). Social skills training for hospitalized male arsonists. *Journal of Behavior Therapy and Experimental Psychiatry*, 10(2), 105–108. doi:10.1016/0005-7916(79)90083-1
- Rix, K. J. B. (1994). A psychiatric study of adult arsonists. *Medicine Science and the Law*, 34(1), 21–34.
- Root, C., MacKay, S., Henderson, J., Del Bove, G., & Warling, D. (2008). The link between maltreatment and juvenile firesetting: Correlates and underlying mechanisms. *Child Abuse & Neglect*, 32, 161–176. doi:10.1016/j.chiabu.2007.07.004
- Russell, D., Peplau, L. A., & Cutrona, C. E. (1980). The revised UCLA loneliness scale: Concurrent and discriminant validity evidence. *Journal of Personality and Social Psychology*, 39(3), 472–480. doi:10.1037//0022-3514.39.3.472
- Sapp, A. D., Huff, T. G., Gary, G. P., & Icove, D. J. (1999). Serial arson and fire-related crime factors. In V. B. Van Hasselt & M. Hersen (Eds.), *Handbook of psychological approaches with violent offenders: Contemporary strategies and issues* (pp. 397–406). New York: Kluwer Academic/Plenum.
- Sapsford, R. J., Banks, C., & Smith, D. D. (1978). Arsonists in prison. *Medicine, Science and the Law*, 18(4), 247–254. doi:10.1177/002580247801800405
- Saunders, E. B., & Awad, G. A. (1991). Adolescent female firesetters. *Canadian Journal of Psychiatry*, 36(6), 401–404.
- Sax, L. J., Gilmartin, S. K., Lee, J. J., & Hagedorn, L. S. (2008). Using web surveys to reach community college students: An analysis of response rates and response bias. *Community College Journal of Research and Practice*, 32(9), 712–729. doi:10.1080/10668920802000423
- Smith, K., Taylor, P., & Elkin, M. (2013). *Crimes detected in England and Wales 2012/13* (2nd ed.). London: National Statistics.
- Swaffer, T., & Hollin, C. R. (1995). Adolescent firesetting: Why do they say they do it? *Journal of Adolescence*, 18, 619–623. doi:10.1006/jado.1995.1043
- Tennent, T. G., McQuaid, A., Loughnane, T., & Hands, A. J. (1971). Female arsonists. *British Journal of Psychiatry*, 119, 497–502.
- Tyler, N., & Gannon, T. A. (2012). Explanations of firesetting in mentally disordered offenders: A review of the literature. *Psychiatry*, 75(2), 150–166. doi:10.1521/psyc.2012.75.2.150
- Tyler, N., Gannon, T. A., Lockerbie, L., King, T., Dickens, G. L., & De Burca, C. (2014). A firesetting offence chain for mentally disordered offenders. *Criminal Justice and Behaviour*, 41(4), 512–530. doi:10.1177/0093854813510911
- Underwood, D., Kim, H., & Matier, M. (2000, May 21–24). *To mail or to web: Comparisons of survey response rates and respondent characteristics*. Paper presented at the 40th annual forum of the Association for Institutional Research, Cincinnati, OH.
- Vassar, M., & Crosby, J. W. (2008). A reliability generalization study of coefficient alpha for the UCLA loneliness scale. *Journal of Personality Assessment*, 90(6), 601–607.
- Vaughn, M. G., Fu, Q., Delisi, M., Wright, J. P., Beaver, K. M., Perron, B. E., & Howard, M. O. (2010). Prevalence and correlates of fire-setting in the United States: Results from the National Epidemiological survey on alcohol and related conditions. *Comprehensive Psychiatry*, 51, 217–223. doi:10.1016/j.comppsy.2009.06.002



- Vodanovich, S. J., Wallace, J. C., & Kass, S. J. (2005). A confirmatory approach to the factor structure of the Boredom Proneness Scale: Evidence for a two-factor short form. *Journal of Personality Assessment*, 85(3), 295–303. doi:10.1207/s15327752jpa8503\_05
- Wachi, T., Watanabe, K., Yokota, K., Suzuki, M., Hoshino, M., Sato, A., & Fujita, G. (2007). Offender and crime characteristics of female serial arsonists in Japan. *Journal of Investigative Psychology and Offender Profiling*, 4, 29–52. doi:10.1002/jip.57
- Watt, B. D., Geritz, K., Hasan, T., Harden, S., & Doley, R. (2015). Prevalence and correlates of firesetting behaviours among offending and non-offending youth. *Legal and Criminological Psychology*, 20, 19–36. doi:10.1111/lcrp.12062
- Williams, D. (2005). *Understanding the arsonist: From assessment to confession*. Tucson, AZ: Lawyers and Judges Publishing Company.

## Appendix 1. Items from the FSS

The following items were presented using a 7-point Likert scale (1 = not at all like me, 7 = very strongly like me).

### Fire Interest items

- I like to watch and feel fire
- I get excited thinking about fire
- I like watching fire
- I like watching fire being extinguished
- I like to feel the heat from fire
- I am fascinated by fire
- I have a strong interest in fire
- I am attracted to fire
- Fire equipment paraphernalia interests me
- I find fire intriguing

### Antisocial Behaviour items

- At school I would often truant
- I like to engage in acts that are dangerous
- I have a behavioural problem
- I have intended to cause harm with my behaviour
- I am a rule breaker
- I like to engage in acts that are exciting
- I like to wind people up
- I care what other people think of me
- I like to engage in acts to annoy other people
- I have physically threatened another person

## Appendix 2. FPS Vignettes

The following items were introduced with the next six questions involve reading a short story, and answering four questions relating to the story.

Billie is a 15-year-old who had spent the weekend being bored. Billie decided to go to the local wreck to see if anyone wanted to hang out. There were already a few people there just hanging around and chatting. One of them lit a cigarette. The sight of the flame shooting out of the lighter gave Billie an idea. Billie decided to set a rubbish bin alight. Billie lit a piece of rubbish and

dropped it into the bin. The rest of the rubbish burned and the bin began to melt whilst Billie and the group carried on chatting and hanging out.

Tony felt constrained by life, conforming to the rules and regulations of society but in the country Tony felt free and relaxed. Nature appealed to Tony because it is free and natural. One quiet Sunday evening Tony decided to light a twig on fire. Tony watched as the flames were also free to flicker and move as they pleased. From the burning twig, Tony then lit a pile of dried leaves and watched and listened as the leaves crackled in the flames.

Hillary had finished sorting through the paperwork and had accumulated a large pile of old papers. Hillary took the old papers to the bottom of the garden and put them in a pile. Hillary then lit the corners of a few of the papers at the bottom of the pile. Hillary stood back and watched as the flames slowly crept up the side of the stack of papers. Hillary watched as the flames danced about freely in the breeze engulfing the whole stack of papers until eventually the old pile of papers were reduced to a pile of ashes.

Jo and the other locals would often dare each other to play pranks on the adults in the street. The neighbourhood was fairly posh and most people lived in large gated properties with big gardens. Some people had electric gates whilst others had picket fences but most people had letter and newspaper boxes attached to either their fence or gate. One day whilst Jo was delivering papers it was agreed that when the paper was put into the newspaper box it would be set alight. So Jo lit the corner of the paper and put it into the newspaper box and then carried on with the rest of the paper round.

Terry had always had an interest in fire and became excited when thinking about fire. Often when alone either at work or at home Terry would light matches. Terry watched as the intensity and the colour of the flame changed as more of the match began to burn. As the flame began to die out but before totally extinguished Terry lit another match from the original flame. Terry was fascinated by the falling trail of ash left behind by the burning match and by the intensity of the heat from one little flame.

Sammy and the others in the group were very mischievous. They spent most of their weekends creating some sort of graffiti on the local bus station walls. One weekend they decided to reduce the problem of old bus tickets littering the floor by setting fire to them. This then progressed to lighting the corners of posters hanging on the walls and watching them crinkle up and fall off the walls creating little piles of ashes.