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Male Imprisoned Firesetters Have Different Characteristics to Other Imprisoned Offenders
and Require Specialist Treatment

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Abstract

Objective: This study investigated whether a group of firesetters ($n = 68$) could be distinguished, psychologically, from a matched group of non-firesetting offenders ($n = 68$).

Method: Participants completed measures examining psychological variables relating to fire, emotional/ self-regulation, social competency, self-concept, boredom proneness, and impression management. Official prison records were also examined to record offending history and other offense-related variables. A series of MANOVAs were conducted with conceptually related measures identified as the dependent variables. Follow up discriminant function and clinical cut-off score analyses were also conducted to examine the best discriminating variables for firesetters. **Results:** Firesetters were clearly distinguishable, statistically, from non-firesetters on three groups of conceptually related measures relating to: fire, emotional/self-regulation, and self-concept. The most successful variables for the discrimination of firesetters determined via statistical and clinical significance testing were higher levels of anger-related cognition, interest in serious fires, and identification with fire and lower levels of perceived fire safety awareness, general self-esteem, and external locus of control. **Conclusions:** Firesetters appear to be a specialist group of offenders who hold unique psychological characteristics. Firesetters are likely to require specialist treatment to target these psychological needs as opposed to generic offending behavior programs.

Keywords: firesetting, arson, theory, assessment, treatment

Male Imprisoned Firesetters Have Different Characteristics to Other Imprisoned Offenders
and Require Specialist Treatment

Male arson and deliberate firesetting is a highly visible problem for consulting clinical professionals, yet is also one of the least understood of all adult offending behaviors (Davis & Lauber, 1999; Dickens, Sugarman, & Gannon, 2012). In law, 'arson' is a term used to refer to the intentional destruction of property using fire (Kolko, 2002; Williams, 2005). Although the exact definition of arson may vary across US states the following criteria are generally present: (i) there must be *intent*; (ii) the fire must have been set for unlawful purpose (e.g., to harm others); and (iii) the fire must damage property or belongings (Federal Bureau of Investigation; FBI, 2004; Hall, 2007; Kolko, 2002; Williams, 2005). 'Firesetting', on the other hand, is a broader term that refers to all deliberate acts of setting fire that may or may not have resulted in an official conviction for arson (Dickens & Sugarman, 2012; Gannon & Pina, 2010). Latest available statistics show that, in 2007, US fire departments reported 309,200 deliberate fires which were responsible for 1,450 casualties, 480 deaths, and \$1.3 billion costs in property damage (Hall, 2010). Although it is impossible to know exactly how many individuals are responsible for these acts, FBI figures show that over half of those arrested for arsonⁱ are adults and the majority male (FBI, 2011).

A particularly problematic aspect of the small amount of research literature conducted on firesetting has been the almost exclusive focus on psychiatric populations (Geller & Bertsch, 1985; Jackson, Hope, & Glass, 1987; Kelly, Goodwill, Keene, & Thrift, 2009; Rice & Harris, 1996; Ritchie & Huff, 1999) as well as confounded methodology and a lack of adequate control groups (Jackson et al., 1987; Ritchie & Huff, 1999; Rix, 1994; Swaffer, Haggett, & Oxley, 2001; Taylor, Thorne, Robertson, & Avery, 2002). Most recently, in a comprehensive review of the literature, Gannon and Pina (2010, p. 236) concluded that

adequately controlled research understanding adult firesetters' psychological characteristics or possible treatment needs was "urgent".

For consulting clinicians tasked with examining the research literature for guidance on adult male firesetting, the literature is unclear and seemingly contradictory. There appear to be two possibilities regarding firesetters' psychological characteristics: what we choose to term the generalist and specialist hypotheses. According to the *generalist hypothesis*, firesetters are not a unique category of offender distinct to other offenders (Hill et al., 1982; Ritchie & Huff, 1999; Soothill & Pope, 1973). In accordance with this hypothesis, firesetting may be conceptualized as one of many of the broad spectrum of crimes committed by offenders and would not necessitate specialist assessment and treatment (Palmer, Caulfield, & Hollin, 2007). In support of the generalist hypothesis, many studies show that firesetting appears to co-exist amidst a substantial array of general offending (Hill et al., 1982; Sapsford, Banks, & Smith, 1978; Soothill, Ackerley, & Francis, 2004). Furthermore, recidivism research shows that firesetters are far more likely to reoffend by committing a crime other than arson (Rice & Harris, 1996; Soothill & Pope, 1973; Soothill et al., 2004). These data, in effect, suggest that fire is one of multiple tools used by criminals who engage in antisocial behavior and that specialist treatment would be unnecessary and ineffective.

On the other hand, using the *specialist hypothesis*, firesetters may be conceptualized as representing a unique category of offender necessitating specialist assessment and treatment (Hollin, 2012; Taylor et al., 2002; Swaffer et al., 2001). In support of this hypothesis, there is evidence suggesting that firesetters are a unique offending population. For example, research indicates that fire interest is one factor that increases the likelihood of an individual setting deliberate fires (Dickens et al., 2009). Furthermore, a small number of practice reports suggest that firesetters show short-term reductions in fire interest and fire-related attitudes following fire-specific treatment experiences (Clare, Murphy, Cox, &

Chaplin, 1992; Taylor et al., 2002). Other research shows that firesetters report some sense of personal identity as a firesetter that is not adequately accounted for on generic offending behavior programs (Haines, Lambie, & Seymour, 2006). Together, these data suggest that firesetters experience a unique association with fire that necessitates specialized fire-focused treatment. To date, very few established measures have been developed to adequately examine fire-associated variables. Those that do exist focus on general fire interest (Fire Interest Rating Scale, Murphy & Claire, 1996), and fire supportive attitudes (Fire Attitude Scale, Muckley, 1997). Recently, however, Ó Ciardha et al. (2013) factor analyzed these two established fire measures along with their own newly established measure resulting in a five factor solution comprising identification with fire, interest in serious fires, knowledge about fire safety, interest in everyday fires, and viewing firesetting as 'normal'. Ó Ciardha et al. (2013) report good psychometric properties for these scales with imprisoned UK firesetters making them ideal for an investigation of the specialist hypothesis.

In accordance with the specialist hypothesis, many professionals contend that firesetters hold other key psychological differences that differentiate them from non-firesetting offenders. For example, researchers have reported that firesetters are characterized by emotional or self-regulation problems such as anger (Rix, 1994), impulsivity (Hurley & Monahan, 1969; Räsänen, Puumalainen, Janhonen, & Väisänen, 1996), and an inability to tolerate frustration or provocation (Jackson, 1994). In support of these deficits, numerous studies consistently pinpoint the most prevalent motivator of adult male firesetting as being revenge (Inciardi, 1970; Koson & Dvoskin, 1982; Lewis & Yarnell, 1951; Rix, 1994). Social competency problems such as lack of assertiveness and associated loneliness are also commonly reported firesetter characteristics (Hurley & Monahan, 1969; Inciardi, 1970; Rice & Chaplin, 1979) as is a problematic self-concept in the form of impoverished self-esteem (Swaffer et al., 2001). A key issue with reported psychological differences, however, is that

they are generally drawn from small-scale psychiatric studies lacking methodological rigor. In particular, these studies do not employ adequately tested psychometric measures of the hypothesized constructs, or adequate control groups for comparative purposes. Nevertheless, theorists have drawn upon these findings to suggest that in the context of perceived ineffectiveness (i.e., low social competency and self worth) and anger or frustration, individuals characterized by fire interest will use deliberate firesetting to facilitate positive social and environmental changes (Jackson, Glass, & Hope, 1987). Finally, some professionals have suggested that boredom may represent a key experience facilitating firesetting activity (Perrin-Wallqvist, Archer, & Norlander, 2004; Sapp, Huff, Gary, & Icove, 1999). However, boredom proneness has not been adequately tested as a key psychological variable that may differentiate firesetters from non-firesetters.

Consulting clinicians working in correctional services require adequately controlled, evidence-based information regarding firesetters' psychological characteristics for assessment and treatment purposes. Although other comparison studies have examined the psychological characteristics of firesetters these studies have tended to focus on psychiatric populations (e.g., Geller & Bertsch, 1985; Ritchie & Huff, 1999; Rix, 1994), have not been adequately controlled (e.g., Ritchie & Huff, 1999; Rix, 1994), and have not been underpinned by any predefined theory or hypotheses regarding firesetters' fundamental treatment needs. Not only will a controlled study of firesetters' psychological characteristics provide a way of testing the specialist hypotheses, but it will also provide valuable information about the treatment needs associated with this population.

The generalist hypothesis would predict that firesetters are not unique from the general offending population and, as such, are unlikely to be distinguishable—psychologically—from the general offending population. The specialist hypothesis, on the other hand, would predict that firesetters are a unique subgroup of offenders psychologically

distinguishable from the general offending population on a variety of fire and non-fire related characteristics.

The aim of the present research was to provide a rigorous examination of adult male firesetters' psychological characteristics—in the form of potential treatment needs—and the specialist hypothesis. This research is unique from previous research in several important ways. First, it examines imprisoned firesetters rather than a psychiatric population. Second, this study explicitly matches firesetters with a randomly selected non-firesetter offender control group. Third, this study explicitly examines both statistical and clinical significance testing and on the basis of the latter provides preliminary clinical cut off scores for establishing problematic responding.

Using the specialist hypothesis, we hypothesized that firesetters would be distinguishable, as an overall group, from non-firesetting criminals in their attitude towards and interest in fire, emotional/self regulation problems, social competency, overall self-concept, and boredom proneness. In particular, in line with previous research, we hypothesized that firesetters would show higher levels of fire interest (Dickens et al., 2009; Clare et al., 1992; Taylor et al., 2002), less fire safety awareness, more identification with fire (Haines et al., 2006) and higher levels of fire-supportive attitudes (Clare et al., 1992; Taylor et al., 2002). We also hypothesized that firesetters would exhibit more problems with anger and provocation (see Rix, 1994; Hurley & Monaham, 1969), less general assertiveness, and higher levels of emotional loneliness (Hurley & Monaham, 1969; Rice & Chaplin, 1979), lower levels of general self-esteem (Swaffer et al., 2001), a higher external locus of control associated with low self-esteem, and more boredom proneness (Sapp et al., 1999). We also included a measure of general criminal attitudes and associates, which we did not expect to differentiate firesetters from other offenders if these groups were matched adequately on previous numbers of offenses/criminality.

Method

Participants

The initial sample consisted of 249 male prisoners (126 firesetters, 123 non-firesetters) recruited from ten English prison establishments across five counties. Firesetters were selected from institutional file records indicating either a conviction for firesetting (i.e., arson) or prison firesetting activity (e.g., prison documented cell fires). Non-firesetters were selected randomly from each prison establishment. Each non-firesetting participant's full offence history and prison records were checked to ensure that they held no convictions or adjudications associated with deliberate firesetting. Overall, 84% of the entire sample identified themselves as being White-UK/Irish. In order to be eligible for participation, all participants were required to comprehend and speak English sufficiently to read and understand questionnaires. Participants experiencing psychosis, suicidal ideation, or at risk of hostage taking were excluded. Although it was not possible to obtain formal refusal rates from participating prisons, using our individual records we estimate that the participation rate was over 80%. Initial analyses showed that the groups differed significantly on number of total offensesⁱⁱ, $t(209) = 2.56, p = .01, \eta_p^2 = .26$, since firesetters held a higher number of offenses than non-firesetters ($M = 36.4$ versus $M = 23.5$ respectively). Groups also differed significantly on previous engagement with mental health services, $\chi^2(1, N = 224^{\text{iii}}) = 20.30, p < .0001, \phi = .31$, since firesetters were more likely to report having had contact with mental health services compared to non-firesetters (58.3%, $n = 67$ versus 27.5%, $n = 30$ respectively)^{iv}. Since these differences were likely to produce analyses that were problematic to interpret we matched the two groups on these variables in addition to severity of index offense (i.e., sentence length) resulting in two matched groups of prisoners (68 firesetters, 68 non-firesetters). Each participant's demographic data on each of the three matching variables was extracted from the database. The lead author then selected 'best match' cases by hand.

For continuous variables (e.g., number of total offences) matching was conducted using ± 1 SD. In a minority of cases matching on all three variables was not possible and so participants were matched on the remaining variables. The final matched groups were statistically indiscriminable on age, formal education, sentence length, number of violent, sexual, theft, and fraud offenses, and previous engagement with mental health services (see Table 1). However, readers should take note that the matching process—by definition—results in samples that are non-random. In particular, the non-firesetters have been chosen, by necessity, to hold more previous contact with mental health services and more total number of offences. The 68 firesetters described in this study were responsible for 125 officially recorded deliberate fires ($M = 1.84$, $SD = 2.43$). Thirty-two of these fires were index offenses. Firesetting motivators were recorded in 21 of these index offenses of which revenge accounted for the majority (i.e., 66.7%).

Measures

All measures were presented in a randomized order to prisoners. Where possible, simplified or shortened versions of measures were chosen to heighten measure validity for our prison sample and minimize fatigue. We report internal reliability according to the following criteria (George & Mallery, 2003): $\geq .90$ excellent, $.89$ to $\geq .80$ good, $.79$ to $\geq .70$ acceptable, and $.69$ to $.60$ questionable.

Fire-Related Measures. The *Five Factor Fire Scale* (Ó Ciardha et al., 2013) combines items from three fire-related measures: the *Fire Interest Rating Scale* (Murphy & Claire, 1996), the *Fire Attitude Scale* (Muckley, 1997), and the *Identification with Fire Questionnaire* (Gannon, Ó Ciardha, & Barnoux, 2011). The resulting five subscales have been empirically determined via factor analysis (see Ó Ciardha et al., 2013) and demonstrate generally acceptable scale reliabilities. The five factors examine (a) identification with fire (“Fire is almost part of my personality”; 11 items), (b) serious fire interest (“Watching a

house burn down”; 7 items), (c) perceived fire safety awareness (“I know a lot about how to prevent fires”; 6 items), (d) everyday fire interest (“Watching a bonfire outdoors, like on bonfire night”; 6 items), and (e) firesetting as normal (“Most people have set a few small fires just for fun”; 7 items). The present study showed acceptable to good measure reliability for the majority of subscales (see Table 2) although it should be noted that our sample does overlap, in part, with that of Ó Ciardha et al. (2013).

Emotional Regulation Measures. The *Novaco Anger Scale and Provocation Inventory* (NAS-PI; Novaco, 2003) are two related, yet separate, self-report measures. The NAS (60 items) examines anger experiences across the four domains of cognition (NAS-COG; e.g., hostile attitudes, rumination), arousal (NAS-ARO; e.g., somatic experiences, anger duration), behavior (NAS BEH; e.g., indirect anger expression, verbal aggression), and anger regulation (NAS-REG; e.g., regulation of angry thoughts, effective coping mechanisms) rated using three response options (never, sometimes, or always true). The PI (25 items) measures an individual’s ability to tolerate general provocation on a 4-point Likert scale (1 = not at all angry, 4 = very angry). The NAS-PI has well-established psychometric properties (Culhane & Morera, 2010; Novaco, 2003). Good to excellent measure reliabilities were evidenced in our current study (see Table 2).

Social Competence Measures. *The Revised UCLA Loneliness Scale* (Russell, Peplau, & Cutrona, 1980) is a 20-item self-report measure of emotional loneliness (e.g., “I lack companionship”) rated on a 4-point scale (1 = never, 4 = often). Good psychometric properties have been established by the scale authors and external researchers (Horowitz, Rosenberg, Baer, Ureño, & Villaseñor, 1988) and good measure reliability was evidenced in our current study ($\alpha = .86$).

The Simple Rathus Assertiveness Schedule—Short Form (Jenerette & Dixon, 2010) is a simplified 19-item self-report measure of assertiveness across a variety of social situations

(e.g., “To be honest, people often get the better of me”) rated on a 6-point scale (1 = very much unlike me, 6 = very much like me). The authors of the measure report good measure reliability which was also evidenced in the current study ($\alpha = .80$).

Self-concept Measures. *The Culture-Free Self-Esteem Inventory-General* (Battle, 1992) measures general adult self-esteem (e.g., “Are you lacking in self-confidence?”) across 20 self-report items using a yes/no response format. The psychometric properties of this measure are well established (see Battle, 1997) and were good in our current study (KR20 = .86).

The Nowicki-Strickland Locus of Control (Nowicki, 1976) is a 40-item self-report measure of an individual’s perception of their internal versus external control over events (e.g., “Are some people just born lucky?”) rated using a yes/ no response format. Acceptable psychometric properties of the scale have been established (Nowicki & Duke, 1974). Our study also showed acceptable measure reliability (KR20 = .73).

Offense-Supportive Attitude Measures. *The Measure of Criminal Attitudes and Associates-Part B* (MCAA-Part B; Mills & Kroner, 1999) is a 46 item self-report measure of antisocial attitudes examining (a) violence (“It’s understandable to hit someone who insults you”), (b) entitlement (“Taking what is owed you is not really stealing”), (c) antisocial intent (“I could see myself lying to the police”), and (d) associates (“I always feel welcome around criminal friends”). Respondents are asked to either agree or disagree with each item. The psychometric properties of the MCAA-Part B are well established (see Mills, Kroner, & Forth, 2002; Mills, Kroner, & Hemmati, 2004). Measure reliability ranged from acceptable to good in our current study (see Table 2).

Boredom Proneness *The Boredom Proneness Scale-Short Form* (Vodanovich, Wallace, & Kass, 2005) is a 12-item self-report measure of perceptions of limited internal or external stimulation (e.g., “I find it easy to entertain myself”) rated on a 7-point Likert scale

(1 = strongly disagree, 7 = strongly agree). Adequate to good psychometric properties have been established by the scale authors and external researchers (Hopley & Nicki, 2010).

However, our study showed questionable measure reliability ($\alpha = .62$).

Impression Management The *Impression Management Scale* (IM) of the Paulhus Deception Scales (Paulhus, 1998) is a 20-item self-report measure of intentional fake good responses (e.g., “I never swear”) rated on a 5-point scale (1 = not true, 5 = very true). The IM has well established psychometric properties with offending populations (Paulhus, 1998). In our current study, measure reliability was good ($\alpha = .81$).

Each test was hand scored by a qualified psychologist. One third were also double checked by an independent scorer to maximize accuracy.

Procedure

The study was reviewed and approved ethically by the University Research Ethics Committee (REF 20101507). Prisoners were assessed in individual sessions (lasting approximately 90 minutes) to maximize validity of self-report responding. At each assessment, prisoners provided written informed consent, key demographic information, and completed the questionnaires. To ensure maximum questionnaire comprehension, prisoners were asked if they would like the questionnaires to be read aloud to them by the researcher. This format was chosen by the majority of prisoners (88%; $n = 60$ of firesetters, 82%; $n = 56$ of non-firesetters)^v.

Results

The two groups of 68 matched prisoners were compared using multivariate analyses of variance (MANOVA). A separate MANOVA was conducted for each group of dependent variables: Fire-Related Measures (comprising the five dependent variables of fire identification, serious fire interest, fire safety, everyday fire interest, and firesetting as normal), Emotional/Self Regulation Measures (comprising the four dependent variables of

the NAS-COG, NAS-ARO, and NAS-REG subscales of the NAS^{vi}, and the PI), Social Competency Measures (comprising the two dependent variables of the emotional loneliness, and assertiveness scales), and Offense-Supportive Attitude Measures (comprising the four dependent variables from the MCCA-Part B of violence, entitlement, antisocial intent, and associates). Separate univariate analyses were performed on the conceptually distinct single variables of boredom proneness and impression management (see Huberty & Morris, 1989 for guidance on choosing dependent variable constructs).

Firesetters could not be differentiated from non-firesetters on their overall impression management scores. Thus, the following reported results represent scores unadjusted for the effects of impression management.

The MANOVA conducted on the combined fire-related measures revealed a significant effect, $F(5,130) = 3.98, p = .002$; Wilk's Lambda = .87; $\eta_p^2 = .13$. Follow up univariate tests (see Table 2) revealed that firesetters differed significantly from non-firesetters on all fire-related variables. Firesetters showed a higher identification with fire, $F(1,134) = 8.83, p = .004$; $\eta_p^2 = .06$, more interest in serious firesetting activities, $F(1,134) = 7.70, p = .006$; $\eta_p^2 = .06$, less perceived fire safety awareness, $F(1,134) = 7.27, p = .008$; $\eta_p^2 = .05$, more interest in everyday firesetting activities, $F(1,134) = 4.95, p = .028$; $\eta_p^2 = .04$, and more acceptance of firesetting as normal, $F(1,134) = 8.44, p = .004$; $\eta_p^2 = .06$.

The MANOVA conducted on the combined emotional/self regulation measures revealed a significant effect $F(4,131) = 2.42, p = .05$; Wilk's Lambda = .93; $\eta_p^2 = .07$. As Table 2 illustrates, univariate tests revealed that firesetters showed higher scores on the NAS-COG, NAS-ARO, and PI. The MANOVA conducted on the combined self-concept measures also revealed a significant effect $F(2,130) = 3.88, p = .02$; Wilk's Lambda = .94; $\eta_p^2 = .06$. Here, univariate tests revealed that firesetters had lower general self-esteem and lower external locus of control scores relative to non-firesetters (see Table 2).

The MANOVAs conducted on the combined social competence and offense-supportive attitudes measures respectively failed to reach conventional levels of statistical significance. The univariate ANOVA on boredom proneness also failed to discriminate firesetters from non-firesetters.

A discriminant function analysis was performed in addition to the overall MANOVA and univariate tests to determine which of the statistically significant variables outlined in Table 2 best discriminated firesetters from non-firesetters. In this analysis, we utilized the first discriminate function and examined correlations between each of the predictors and the discriminant function. The resulting discriminant function was significant, $\chi^2(10) = 23.54, p = .009$; R^2 Canonical = .41. Table 3 illustrates that the variables identified as best for distinguishing between firesetters and non-firesetters—in descending order of correlations—were the NAS-COG, firesetting as normal, fire safety awareness, general self-esteem, identification with fire, and serious fire interest subscales. All of these scales correlate with the discriminant function of .5 or above. The remaining variables of the PI, NAS-ARO, everyday fire experiences, and locus of control held slightly less substantial but notable correlations with the discriminant function above .4.

Clinical Significance

Clinically significant cut-off points were calculated for each discriminating measure using Jacobson and Truax's (1991) formula^{vii} (see Table 4). Normative statistics for a functional or general population sample were taken from published studies or test manuals^{viii}. Prisoners were then coded regarding whether or not they held a score above (or below) the cut-off point for each of the variables and a series of chi-square analyses were conducted to examine the proportions of firesetters and non-firesetters whose scores fell outside the normative functioning range. As shown in Table 4, the variables indicating a significantly higher proportion of firesetters scoring outside of the normal functioning range—in

descending order of Odds Ratios (see Table 4)—were NAS-COG (OR = 2.8), serious fire interest (2.6), perceived fire safety awareness (2.5), general self-esteem (2.5), PI (2.3), locus of control (2.3), and identification with fire (2.0). The variables everyday fire interest, firesetting as normal, and COG-ARO did not successfully discriminate firesetters.

Discussion

The aim of this study was to provide the first rigorous examination of adult male firesetters' psychological characteristics. In particular, using both statistical and clinical significance testing, this study tested the specialist hypothesis by examining whether firesetters could be distinguished, psychologically, from a matched group of non-firesetting offenders on a variety of fire and non-fire related measures.

Five main areas of psychological functioning were hypothesized to differentiate firesetters from their non-firesetting counterparts. Using conventional statistical significance testing, three of these areas—fire-related factors, emotional/ self regulation, and self-concept—clearly differentiated firesetting offenders from non-firesetting offenders. Two areas previously suggested to be defining features of firesetting (i.e., social competency problems and boredom proneness) did not clearly differentiate firesetters from non-firesetters. Finally, as hypothesized, the differences highlighted in this study were not accounted for by general criminal attitudes and associates since firesetters were adequately matched with non-firesetters on these variables. In summary then, this study found evidence to support the specialist hypothesis since firesetters were clearly differentiable from other offenders on key psychological characteristics.

Examining the fire-related characteristics, statistically, firesetters reported significantly more identification with fire, fire interest in both serious and everyday fires, attitudes that legitimize firesetting as 'normal', and less perceived fire safety awareness. These results support findings from small scale practice reports in psychiatric settings (Clare

et al., 1992; Taylor, 2002) confirming that fire interest and other fire-related constructs represent unique psychological characteristics for firesetters. In terms of emotional/ self regulation characteristics, although firesetters scored similarly to non-firesetters on their ability to regulate or cope with anger, firesetters reported significantly more anger-related cognition (e.g., rumination and hostility), physiological arousal to anger, and more experiences of anger in relation to provocation. These findings confirm previous reports suggesting that firesetters hold problems in the area of emotional/ self-regulation (Räsänen et al., 1996; Rix, 1994; Hurley & Monahan, 1969; Jackson, 1994). Finally, in terms of self-concept, firesetters reported significantly lower levels of general self-esteem. These findings also confirm previous clinical reports (Jackson, Glass, & Hope, 1987; Swaffer et al., 2001). However, contrary to hypothesis firesetters self-reported significantly lower levels of external locus of control relative to their non-firesetting counterparts. A discriminant function analysis examining the variables that best distinguished firesetters from non-firesetters using statistical significance showed that the most important variables, in descending order of correlations, were anger-related cognition, firesetting as normal, fire safety awareness, general self-esteem, identification with fire and an interest in serious fires. Finally, when clinically significant cut-off scores were calculated for all discriminatory measures, analysis of the proportions of firesetters and non-firesetters scoring outside the normative functioning range confirmed the discriminatory value of these variables with the exception of anger-related arousal, everyday fire interest, and firesetting as normal.

Taken as a whole, these findings are consistent with the notion that firesetters represent a specialist category of offender necessitating unique assessment and treatment (Gannon & Pina, 2010; Hollin, 2012; Taylor et al., 2002; Swaffer et al., 2001). In particular, the results support longstanding theoretical notions that firesetting stems from an attraction towards fire, increased frustration/anger, and perceived social ineffectiveness (i.e., low self-

esteem; Jackson, Glass, & Hope, 1987). In terms of fire-related variables, the results of both the discriminatory function analysis and the clinically significant cut off score analyses suggest that it is an interest in serious fires (e.g., house or hotel fires) rather than everyday fires (e.g., bonfires or coal fires) that best discriminate firesetters from other offenders. In addition, our results suggest that lower perceived levels of fire safety awareness, and identification with fire are also highly unique characteristics of firesetters. There are numerous possible reasons why firesetters hold unique psychological characteristics in these areas. For example, low levels of perceived fire safety awareness may represent deficits in fire-related consequential thinking or may reflect a longer term attentional bias on the sensory properties of fires. Furthermore, a sense of identity with fire may indicate an over reliance on fire as a coping mechanism. Consequently, identity exploration and the promotion of alternative meaningful coping strategies may prove to be valuable in assessment and treatment for firesetters.

In terms of non-fire related factors, the results of both the discriminatory function and the clinical cut off score analyses show that anger-related cognition, anger to provocation, general self-esteem, and locus of control were good characteristics for discriminating firesetters from their non-firesetting counterparts. Of particular note was the finding that anger-related cognition was found to be the best discriminating variable across both statistical and clinical significance testing methods. This finding, alongside the high levels of anger reported in relation to provocation, is perhaps unsurprising given that the majority of motivators recorded for the participants in our sample related to revenge-seeking. The wider firesetting literature also reports revenge as being one of the most prevalent motivators for firesetting behavior (Inciardi, 1970; Koson & Dvoskin, 1982; Lewis & Yarnell, 1951; Rix, 1994). Furthermore, researchers have suggested that anger-related deficits, in combination with fire-interest, is likely to trigger revenge seeking in which firesetting is the preferred

weapon of ‘retaliation’ (Gannon, Ó Ciardha, Doley, & Alleyne, 2012). The findings of this study suggest that anger-related cognition in the form of rumination and hostility is likely to represent a key area for exploration in firesetter assessment and treatment. The study findings in terms of self-esteem support previous assertions regarding the low levels of perceived self-worth held by firesetters in relation to other offenders (Swaffer et al., 2001; Jackson et al., 1989). Given this finding, it is curious that, contrary to hypothesis, firesetters were distinguishable from non-firesetters based on their *lower* external locus of control scores and that firesetters did not appear to show particular deficits—relative to non-firesetters—regarding their social competence in the form of assertiveness and emotional loneliness. In keeping with theoretical notions regarding firesetters’ lack of social competence it is possible that the lower external locus of control reported by firesetters simply indicates slightly more internalization of blame for negative antisocial acts relative to non-firesetting counterparts.

There are several limitations to this study. A selection bias is present at two main levels. First, only offenders who agreed to volunteer (i.e., the most pro-social ones) were included in our study. Second, because we matched firesetters with non-firesetters on total number of offences, sentence length, and previous mental health service contact this meant that the non-firesetters whom were selected as ‘best matches’ and were not randomly selected. Consequently, we cannot presume that the results of this study generalize to other offender populations or indeed firesetters. However, although we have selected more problematic non-firesetting individuals, the data shows clearly that when problematic firesetters (i.e., those with mental health problems and a high number of previous offences) are compared with a similar group of non-firesetting offenders then key psychological differences do emerge. We also did not collect information on the IQ scores of our participants. Consequently, it is unclear how IQ scores were distributed across our groups or how this might compare to other correctional samples. Caution should also be taken in

drawing definitive clinical conclusions from this study since the measures used—including the impression management measure—were all self-report and transparent in nature. In addition, information on firesetting motive was available only for a small proportion of the sample. Further information on this aspect would have provided some basis for follow up analysis between subgroups of firesetter according to motive. Finally, the design and preliminary nature of this study meant that it was not possible to determine causality or key relationships amongst variable and their association with firesetting. Future studies should aim to pinpoint the exact mechanistic interrelations between factors and how they interact to facilitate firesetting.

In summary, the results of this study provide clinicians with the first controlled empirical evidence to show that firesetters are a specialist group of offenders with unique psychological characteristics. The differences outlined in this study are noteworthy since they clearly indicate that firesetters hold unique psychological differences that, to date, are largely ignored by generic offending behavior programs. Conducting more standardized interventions for male firesetters that target these factors may provide one fruitful way of reducing deliberate firesetting.

References

- Battle, J. (1992). *Culture-free Self-Esteem Inventories* (2nd ed.). Austin, TX: PRO-ED.
- Battle, J. (1997). Culture-free Self-esteem Inventories for Children and Adults. In C. P. Zalaquett & R. J. Wood (Eds.), *Evaluating Stress: A Book of Resources* (pp. 67-95). London: The Scarecrow Press, Inc.
- Clare, I. C. H., Murphy, G. H., Cox, D., & Chaplin, E. H. (1992). Assessment and treatment of fire-setting: A single-case investigation using a cognitive-behavioural model. *Criminal Behaviour and Mental Health*, 2(3), 253-268.
- Culhane, S. E., & Morera, O. F. (2010). Reliability and Validity of the Novaco Anger Scale and Provocation Inventory (NAS-PI) and State-Trait Anger Expression Inventory-2 (STAXI-2) in Hispanic and Non-Hispanic White Student Samples. *Hispanic Journal of Behavioral Sciences*, 32(4), 586-606. doi:10.1177/0739986310381458
- 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
- Dickens, G., Sugarman, P., Edgar, S., Hofberg, K., Tewari, S., & Ahmad, F. (2009). Recidivism and dangerousness in arsonists. *Journal of Forensic Psychiatry & Psychology*, 20(5), 621-639. doi:10.1080/14789940903174006
- Dickens, G., Sugarman, P., & Gannon, T. A. (Eds.). (2012). *Firestting and mental health: Theory, research and practice*. London: RCPsych Pubs.
- Dickens, G. L., & Sugarman, P. A. (2012). Adult firesetters: prevalence, characteristics and psychopathology. In G. L. Dickens, P. A. Sugarman & T. A. Gannon (Eds.), *Firesetting and Mental Health: Theory, Research and Practice* (pp. 3-27). London: RCPsych Publications.

Federal Bureau of Investigation (2004). *Crime in the United States: Uniform Crime Reports*.

Washington DC: US Department of Justice.

Federal Bureau of Investigation (2011). *Crime in the United States, 2010*. Retrieved from

<http://www.fbi.gov/about-us/cjis/ucr/crime-in-the-u.s/2010/crime-in-the-u.s.-2010/overviews/tab32overview.pdf>

Gannon, T. A., Ó Ciardha, C., & Barnoux, M. L. (2011). *The identification with fire questionnaire*. Unpublished manuscript, CORE-FP, School of Psychology, University of Kent, UK.

Gannon, T. A., Ó Ciardha, C., Doley, R. M., & Alleyne, E. (2012). The Multi-Trajectory Theory of Adult Firesetting (M-TTAF). *Aggression and Violent Behavior*, 17(2), 107-121. doi:10.1016/j.avb.2011.08.001

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

Aggression and Violent Behavior, 15(3), 224-238. doi:10.1016/j.avb.2010.01.001

Geller, J. L., & Bertsch, G. (1985). Fire-setting behavior in the histories of a state hospital population. *The American Journal of Psychiatry*, 142(4), 464-468.

George, D., & Mallery, P. (2003). *SPSS for windows step by step: A simple guide and reference 11.0 update* (4th ed.). Boston, MA: Allyn and Bacon.

Hall, J. R. (2007). *Intentional fires and arson*. Quincy, MA: National Fire Protection Association.

Hall, J. R. (2010). *Intentional Fires*. Quincy, MA: National Fire Protection Association Fire Analysis and Research Division.

Haines, S., Lambie, I., & Seymour, F. (2006). *International approaches to reducing deliberately lit fires: Prevention programmes, final report*. New Zealand Fire Service Commission Research Report, 63. Retrieved November 21, 2008, from <http://www.sosfires.com/New%20Zealand%20Report%202.pdf>.

- Hill, R. W., Langevin, R., Paitich, D., Handy, L., Russon, A., & Wilkinson, L. (1982). Is arson an aggressive act or a property offence? A controlled study of psychiatric referrals. *Canadian Journal of Psychiatry*, 27(8), 648-654.
- Hollin, C. R. (2012). Arson: Treatment and interventions. In G. Dickens, P. Sugarman & T. A. Gannon (Eds.), *Firesetting and Mental Health: Theory, Research and Practice* (pp. 224-239). London, UK: RCPsych Publications.
- 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
- Horowitz, L. M., Rosenberg, S. E., Baer, B. A., Ureño, G., & Villaseñor, V. S. (1988). Inventory of interpersonal problems: Psychometric properties and clinical applications. *Journal of Consulting and Clinical Psychology*, 56(6), 885-892.
doi:10.1037/0022-006x.56.6.885
- Huberty, C. J., & Morris, J. D. (1989). Multivariate analysis versus multiple univariate analyses. *Psychological Bulletin*, 105(2), 302-308. doi:10.1037/0033-2909.105.2.302
- Hurley, W., & Monahan, T. M. (1969). Arson: The criminal and the crime. *British Journal of Criminology*, 9(1), 4-21.
- Inciardi, J. (1970). The adult firesetter. *Criminology*, 8, 145-155.
- Jackson, H. F. (1994). Assessment of fire-setters. In M. McMurrin & J. Hodge (Eds.), *The Assessment of Criminal Behaviours in Secure Settings* (pp. 94-126). London: Jessica Kingsley.
- Jackson, H. F., Glass, C., & Hope, S. (1987). A functional analysis of recidivistic arson. *British Journal of Clinical Psychology*, 26(3), 175-185.

- Jackson, H. F., Hope, S., & Glass, C. (1987). Why are arsonists not violent offenders? *International Journal of Offender Therapy and Comparative Criminology*, 31(2), 143-151. doi:10.1177/0306624x8703100207
- Jacobson, N. S., & Truax, P. (1991). Clinical significance: a statistical approach to defining meaningful change in psychotherapy research. *Journal of Consulting and Clinical Psychology*, 59(1), 12-19. doi:10.1037//0022-006X.59.1.12
- 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
- Kelly, J., Goodwill, A. M., Keene, N., & Thrift, S. (2009). A retrospective study of historical risk factors for pathological arson in adults with mild learning disabilities. *The British Journal of Forensic Practice*, 11(2), 17-23.
- Kolko, D. J. (2002). *Handbook on Firesetting in Children and Youth*. San Diego, CA: Academic Press.
- Koson, D. F., & Dvoskin, J. (1982). Arson: A diagnostic survey. *Bulletin of the American Academy of Psychiatry & the Law*, 10(1), 39-49.
- Lewis, N. D. C., & Yarnell, H. (1951). *Pathological firesetting; pyromania*. New York: Nervous and Mental Disease Monographs.
- 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.

- Mills, J. F., Kroner, D. G., & Hemmati, T. (2004). The Measures of Criminal Attitudes and Associates (MCAA). *Criminal Justice and Behavior, 31*(6), 717-733.
doi:10.1177/0093854804268755
- Muckley, A. (1997). *Firesetting: Addressing offending behaviour, A resource and training manual*: Redcar and Cleveland Psychological Service.
- 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
- Novaco, R. W. (2003). *The Novaco anger scale and provocation inventory : NAS-PI*. Los Angeles, CA: Western Psychological Services.
- Nowicki, S., & Duke, M. P. (1974). A Locus of Control Scale for Noncollege as Well as College Adults. *Journal of Personality Assessment, 38*(2), 136-137.
doi:10.1080/00223891.1974.10119950
- 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., Barnoux, M., Alleyne, E., Tyler, N., Mozova, K., & Gannon, T. A. (2013). *Multiple factors in the assessment of firesetters' fire interest and attitudes*. Manuscript submitted for publication.
- Palmer, E. J., Caulfield, L. S., & Hollin, C. R. (2007). Interventions with arsonists and young fire setters: A survey of the national picture in England and Wales. *Legal and Criminological Psychology, 12*(1), 101-116. doi:10.1348/135532505x85927
- Paulhus, D. L. (1998). *Paulhus deception scales (PDS) : the balanced inventory of desirable responding-7 : user's manual*. Toronto, ON: Multi-Health Systems.

- Perneger, T. V. (1998). What's wrong with Bonferroni adjustments. *British Medical Journal*, *316*, 1236-1238.
- Perrin-Wallqvist, R., Archer, T., & Norlander, T. (2004). Adolescents' fire-setting awareness under boredom: Relation to personality variables. *Psychological Reports*, *94*(3), 863-871.
- R v Calladine, Court of Appeal UK (Criminal Division. Jan. 01, 1975).
- Räsänen, P., Puumalainen, T., Janhonen, S., & Väisänen, E. (1996). Fire-Setting from the Viewpoint of an Arsonist. *Journal of Psychosocial Nursing and Mental Health Services*, *34*(3), 16-21.
- 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
- Rice, M. E., & Harris, G. T. (1996). Predicting the recidivism of mentally disordered firesetters. *Journal of Interpersonal Violence*, *11*(3), 364-375.
doi:10.1177/088626096011003004
- Ritchie, E. C., & Huff, T. G. (1999). Psychiatric aspects of arsonists. *Journal of Forensic Sciences*, *44*(4), 733-740.
- Rix, K. J. B. (1994). A psychiatric study of adult arsonists. *Medicine Science and the Law*, *34*(1), 21-34.
- 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 Publishers.

Sapsford, R. J., Banks, C., & Smith, D. D. (1978). Arsonists in prison. *Medicine, Science and the Law*, 18(4), 247-254.

Soothill, K., Ackerley, E., & Francis, B. (2004). Profiles of Crime Recruitment: Changing Patterns over Time. *British Journal of Criminology*, 44(3), 401-418.

doi:10.1093/bjc/azh018

Soothill, K. L., & Pope, P. J. (1973). Arson - a twenty-year cohort study. *Medicine, Science, and the Law*, 13(2), 127-138.

Swaffer, T., Haggett, M., & Oxley, T. (2001). Mentally disordered firesetters: a structured intervention programme. *Clinical Psychology & Psychotherapy*, 8(6), 468-475.

Taylor, J. L., Thorne, I., Robertson, A., & Avery, G. (2002). Evaluation of a group intervention for convicted arsonists with mild and borderline intellectual disabilities. *Criminal Behaviour and Mental Health*, 12(4), 282-293.

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

Williams, D. (2005). *Understanding the arsonist: From assessment to confession*. Tucson, AZ: Lawyers and Judges Publishing Company, Inc.

Table 1

Demographic and Offense Characteristics

Variable	Firesetter <i>M (SD)</i>	Non-Firesetter <i>M (SD)</i>
Age (Years)	31.93 (9.33)	35.22 (12.30)
Formal Education (Years)	12.15 (1.57)	12.52 (1.84)
Sentence Length (Years)	4.87 (4.57)	5.72 (4.99)
Number of Offenses		
Violent Offenses	2.46 (3.32)	2.37 (2.84)
Sexual Offenses	.13 (.48)	.31 (1.09)
Thefts	17.07 (24.28)	15.15 (18.36)
Fraud	.75 (2.04)	1.43 ^a (9.53)
Engagement with Mental Health		
Yes (%)	57.1	41.2

^a = 5% trimmed mean.

Note. Violent Offenses refer to offenses against the person charges only.

Table 2

Comparison of Matched Offender Groups on Psychological Characteristics

Measures	Firesetters <i>N</i> = 68			Non-Firesetters <i>N</i> = 68			<i>F</i> (1, 134)	α / KR20	
	<i>M</i>	<i>SD</i>	95% <i>CI</i>	<i>M</i>	<i>SD</i>	95% <i>CI</i>			
Fire-Related Measures									
Identification with Fire	32.35	13.78	29.02, 35.69	26.71	7.48	24.91, 28.51	8.83**	.88	
Serious Fire Interest	35.04	15.79	31.22, 38.86	28.24	12.60	25.19, 31.29	7.70**	.86	
Fire Safety Awareness	16.12	11.40	13.36, 18.88	11.32	9.20	9.10, 13.55	7.29**	.68	
Everyday Fire Interest	44.22	8.82	42.09, 43.36	41.08	7.62	39.24, 42.92	4.95*	.67	
Firesetting as Normal	41.01	13.96	37.63, 44.39	33.93	14.46	30.43, 37.43	8.44**	.73	
Emotional/Self Regulation									
The Novaco Anger Scale									
Cognitive	32.18	6.33	30.66, 33.70	28.76	6.75	27.14, 30.38	9.40**	.88	
Arousal	29.79	7.25	28.05, 31.54	26.85	8.17	24.88, 28.82	4.97*	.91	
Regulation	24.75	5.42	23.44, 26.05	26.08	4.94	24.90, 27.28	2.31	.86	
Provocation Inventory	65.07	16.86	60.10, 69.15	58.49	17.25	54.31, 62.68	5.05*	.95	

Social Competency									
The Revised UCLA Loneliness Scale	42.09	11.81	39.21, 44.97	39.24	11.27	36.52, 41.97	2.06	.86	
The Simple Rathus Assertiveness Schedule	75.45	16.24	71.49, 79.41	76.16	15.59	72.36, 79.97	0.66	.80	
Self-Concept									
The Culture-Free Self-Esteem Inventory - General	10.22	4.14	9.20, 11.24	11.78	3.48	10.94, 12.63	5.568*	.86	
The Nowicki-Strickland Locus of Control	24.19	5.15	22.94, 25.43	25.92	4.52	24.82, 27.02	4.33*	.73	
Offense-Supportive Attitudes									
The Measure of Criminal Attitudes and Associates									
Violence	6.09	4.22	5.07, 7.11	4.84	4.23	3.81, 5.86	2.97	.83	
Antisocial	7.34	3.68	6.45, 8.23	6.35	4.17	5.34, 7.36	2.13	.78	
Entitlement	6.80	2.89	6.09, 7.49	6.00	2.95	5.29, 6.71	2.52	.72	
Associates	7.87	2.29	7.32, 8.42	7.20	2.37	6.63, 7.78	2.75	.88	
Boredom Proneness	45.26	9.05	43.05, 47.47	42.86	7.80	40.98, 44.75	2.71	.62	
Impression Management	4.90	3.71	4.01, 5.80	5.72	4.16	4.72, 6.73	1.48	.81	

Note. Higher scores on the Fire Safety Awareness Scale indicate less fire safety awareness. Higher scores on the Nowicki-Strickland Locus of Control indicate an external locus of control.

* $p < .05$ ** $p < .01$; We have not made any adjustments for multiple comparison errors (see Perneger, 1998 for underlying reasoning).

Table 3

Correlations Between Predictor Variables and the Discriminant Function

Predictor Variable	Statistical Significant Correlation
Fire Interest and Identification	
Identification with Fire	.50
Serious Fire Interest	.50
Fire Safety Awareness	.52
Everyday Fire Interest	.41
Firesetting as Normal	.54
Emotional/Self Regulation	
The Novaco Anger Scale	
Cognitive	.58
Arousal	.42
Provocation Inventory	.46
Self-Concept	
The Culture-Free Self-Esteem Inventory - General	-.51
The Nowicki-Strickland Locus of Control	-.41

Table 4

Calculated Clinical Cut Off Scores for Statistically Discriminable Measures

Measures	Cut off	Firesetters % (n)	Non-Firesetters % (n)	χ^2 (1, N = 68)	ϕ	OR	95% CI
Fire Interest and Identification	28.69	44.1 (30)	27.9 (19)	3.86*	.17	2.0	0.9, 4.4
Identification with Fire	31.26	50 (34)	27.9 (19)	6.96**	.23	2.6	1.2, 5.6
Serious Fire Interest	13.46	55.9 (38)	33.8 (23)	6.69**	.22	2.5	1.2, 5.3
Fire Safety Awareness	42.54	76.5 (52)	64.7 (44)	2.27	.13	1.7	0.8, 4.0
Everyday Fire Interest	37.53	52.9 (36)	38.2 (26)	2.96	.15	1.8	0.9, 3.8
Firesetting as Normal							
Emotional/Self Regulation							
The Novaco Anger Scale	30.53	61.8 (42)	36.8 (25)	8.50**	.25	2.8	1.3, 5.9
Cognitive Arousal	28.34	44.1 (30)	39.7 (27)	.272	.05	1.1	0.6, 2.5
Provocation Inventory	64.24	57.4 (39)	36.8 (25)	5.79*	.21	2.3	1.1, 4.9
Self-Concept							
The Culture-Free Self-Esteem Inventory †	11.08	56.1 (37)	33.8 (23)	6.70**	.23	2.5	1.2, 5.4
The Nowicki-Strickland Locus of Control †	25.11	64.7 (44)	36.7 (30)	5.41*	.20	2.3	1.1, 4.8

Note. OR = odds ratio; CI = confidence interval.

† Percentage of sample scoring below cutoff.

* $p < .05$ ** $p < .01$; We have not made any adjustments for multiple comparison errors (see Perneger, 1998 for underlying reasoning).

Footnotes

- ⁱ Latest available figures show there were 7514 arrests for arson in 2010.
- ⁱⁱ Excluding cautionable offenses. In the UK, a cautionable offense will form part of an individual's national police record but does not represent an official court conviction.
- ⁱⁱⁱ Twenty-five prisoners left this section blank.
- ^{iv} It is important to note here that this difference is likely to have occurred due to Appeal Court recommendations made in UK law which request a psychiatric report prior to sentencing for arson (R v Calladine 1975). No other statistically significant differences on key demographic variables were detected.
- ^v The pattern of results reported does not differ according to questionnaire administration format.
- ^{vi} Before conducting this MANOVA, bivariate correlations amongst each of the dependent measures were explored for multicollinearity. This revealed a strong correlation (>.80) between the behavioral subscale of the NAS and the cognitive and arousal subscales. Consequently, the behavioral subscale was removed from the analysis due to multicollinearity.
- ^{vii} Where clinical cut-off = $(SD \text{ clinical} \times M \text{ nonclinical}) + (SD \text{ nonclinical} \times M \text{ clinical}) / (SD \text{ Clinical} + SD \text{ nonclinical})$.
- ^{viii} Because general population norms are unavailable for the fire-related variables, norms obtained from the non-firesetters were used as a functional baseline.