An Examination of Risk Factors and Dangerousness associated with Firesetters

By

Becky Wyatt

University of Kent

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Declaration

The research for this thesis was conducted at the School of Psychology, University of Kent, while the author was a part time postgraduate student. The theoretical and empirical work presented within the thesis is the independent work of the author. Intellectual debts are acknowledged within the text, and referenced. The studies reported in the thesis were conducted with limited practical and technical assistance from others. The author has not been awarded a degree, by this, or any other university for the work included in this thesis.

Signed: 

Acknowledgements

This thesis is dedicated to the loving memory of my Nannie Annie, who we sadly said goodbye to during the completion of this thesis.

Nannie Annie- 1938-2017

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Glossary of Terms

Term	Meaning
Arson	Arson is a legal term used to describe the criminal act of deliberately setting a fire. Only incidents of arson that have attracted the attention of the law, can be defined as arson.
Deliberate/Intentional Firesetting	This term refers to the behaviour that includes setting fires intentionally/deliberately or accidentally.
Firesetter	This term refers to the individual responsible for the act of setting a fire. This person may not have been legally apprehended for this behaviour.
Firesetting Dangerousness Rating Scale (FDS)	The Firesetting Dangerousness Scale (FDS, Wyatt et al., 2014) is a tool specifically developed for this study to examine conceptualizations of firesetting dangerousness. Analysis has determined that the FDS contains three factors of firesetting dangerousness which include motive/intent, cognitions, and the context within which the fire is set.
Fire Attitudes	This term refers to attitudes that are supportive of firesetting. These attitudes may be implicit.
Fire Factors	This term encompasses the risk factors that detail an individual cognitive and emotional response to fire. These include fire scripts, fire interest, identification with fire and fire attitudes.
Fire Interest	The term fire interest refers to the emotional and/or cognitive response of an individual to a serious fire. This response can include sexual arousal, excitement and symptom relief. An individual with a high level of fire interest may gain satisfaction/excitement from watching a serious fire.
Fire Scripts	This term refers to a series of behavioural guides developed from past behaviours. These inform future behaviours. Deemed a key concept when explaining why an individual might set a fire (Butler & Gannon, 2015).
Identification with Fire	This term refers to the individuals that see fire as a part of their personality in some way.
Parasuicide	This term refers to the act of attempting suicide without the intent of killing oneself.
Pyromania	This term refers to the diagnostic term defined by the DSM-5. In order to be diagnosed with Pyromania, an individual must be deemed to: (1) have set more than one fire, (2) experience tension/ arousal before the act, (3) have a high level of fire interest, (4) experience pleasure, gratification or relief from setting or watching fires, (5) have set a seemingly motiveless fire (i.e. not for monetary gain).

Term	Meaning
Recidivist/Repeat Firesetter	This term refers to an individual that has set more than one deliberate fire.
Risk Assessment	This term refers to the clinical practise of formulating risk management plans by using risk factors to assess the likelihood and imminence of risk.
Risk Prediction	This term differs somewhat to that of risk assessment. Risk prediction is used for research purposes but rarely in clinical practice. Risk prediction is informed by statistics to determine the likelihood of an event happening based upon the presence/absence of a series of related risk factors. Risk prediction is a vital process in developing risk management/assessment techniques but is not directly used in clinical practise.
Spate Firesetting	This term refers to a series of fires being set within quick succession of one another.

Abstract

The main issue addressed within this thesis was the exploration of risk factors and dangerousness associated with firesetters. Research surrounding firesetters is sparse, and of poor quality. As a result, the risk assessment process offered to firesetters in clinical practice lacks empirical evidence. Two research studies and a systematic review provide a series of novel contributions to the field of firesetting. Study 1 identified several dynamic risk factors that were able to predict female mentally disordered firesetters. Study 2 examined conceptualizations of firesetting dangerousness. Finally, this thesis puts forward the first universal empirically based conceptualization of firesetting dangerousness. The resultant term represents a multifactorial consideration of three domains. These include: (1) motive/intent of the individual firesetter, (2) the context within which the fire has been set and (3) cognitions of the individual firesetter. More practically these are referred to as the why, what, and where/when considerations of firesetting. The combined impact of all three domains, provides a universal conceptualization of firesetting dangerousness which can be used to quantify dangerousness levels for incidents of firesetting. This thesis concludes with a discussion of the clinical application of this novel information, and how it can be used to improve rehabilitation processes.

Chapter One. General Introduction

1.1 General Introduction

In England, between 2014-2015 and 2015-2016, deliberate firesetting increased by 8%. Furthermore, a total of 19,365 deliberate fires accounted for 12% of all fires recorded between 2015-2016 (Home Office, 2017). These statistics demonstrate that deliberate firesetting continues to be a harmful societal problem. Whilst dangerousness has long been synonymous with firesetting, very little research has been carried out to quantify its potential dangerousness (Sugarman & Dickens 2009). Is it the individual who is dangerous? The fire itself? Or is it the context within which the fire is set, that determines the resultant dangerousness? The answer to these questions impact upon the way in which we prevent serious deliberate fires in the future. The concept of firesetting dangerousness has wide implications for those responsible for the prevention of future fires.

With a lack of literature that empirically evidences the process of risk prediction and dangerousness for firesetting, it is therefore unsurprising that risk assessment processes remain underdeveloped and sparse (Gannon & Pina, 2010). Determining dangerousness and the process of risk prediction are somewhat abstract concepts in clinical practise (to be discussed in greater detail later in the chapter).

The process of risk prediction (a clinically redundant process of determining the likelihood of imminent risk of firesetting) is imperative on a research level in order to develop an understanding about the necessary risk factors associated with firesetting. However, the literature pertaining to risk prediction, directly informs risk assessment developments in clinical practise. This lack of empirical evidence in firesetting has led to a lack of any psychological interventions available for firesetters. Brett (2004), noted that until

recently (see Gannon et al., 2015), the most regularly used intervention for firesetting was imprisonment. With few treatment options available, individual liberties have been indeterminately deprived, in favour of protecting the public (Bennett, 2008). Consequently, in the absence of any guiding literature, services are cautious when dealing with individuals who have a history of firesetting (Burton, McNiel & Binder, 2012). This may explain why firesetting individuals often have trouble securing placements for residential and treatment facilities (Burton et al, 2012; Centre for Mental Health, 2011; Gruber, Heck & Mintzer, 1981). Gruber et al. (1981) worryingly suggested that an individual's firesetting risk may be minimised or simply left out of reports to ascertain accommodation. Therefore, it is the aim of this thesis to introduce and explore the concept of dangerousness, whilst also exploring the risk factors associated with firesetting. This thesis will demonstrate both clinical (risk factors) and theoretical (the concept of dangerousness) progression in this area.

1.2 Aim of Chapter

Overall, this thesis focuses upon the risk factors and dangerousness of firesetters. The process of assessment of offenders relies heavily upon the use of risk factors in order to quantify future offending. This chapter will outline the key historical and theoretical developments that have furthered assessment and management processes into those that we see in practice today. The second part of this chapter presents the theoretical background which underpins the current understanding of firesetters. The limitations of the current understanding of firesetting will be discussed, and the implications that this has upon clinical practice with this offending group.

1.3 Risk Prediction

It is noteworthy at this stage to determine the differences between risk assessment and risk prediction. Risk prediction is a popular term within forensic psychology. This process is based primarily upon actuarial predictors. As will be discussed further in the chapter, risk processes were once based entirely upon the prediction of risk using static variables. This method was found to be invalid within clinical practice as it did not account for individual differences of the offender. However, the process of risk prediction still exists within research as a tool to measure the efficacy of existing risk tools. This process is based upon statistic information, most commonly the Receiver Operator Characteristics, ROCs. This particular statistical test measures a risk tools sensitivity and specificity. ROC provides information similar to that of an effect size (known as the ROC-AUC parameter, ranging from 0 to 1). The nearer to 1 a risk tool can achieve, the more effective the tool. By using ROC analysis researchers can strive for risk tools that provide true positive and true negative conditions. As opposed to false positive (Type I error) and false negative (Type II error).

1.4 Risk Assessment

A risk assessment is a tool used to determine the level of 'Risk' possessed by an individual. For example, if an individual is deemed to hold several key risk factors that are indicative of dangerousness- then an individual will be classified as higher risk relative to an individual who holds fewer factors. Furthermore, in order to identify the criminogenic 'Needs' that are to be targeted within psychological intervention- a risk assessment tool that specializes in identifying the risk factors associated with a specific offending behaviour (i.e. violence, for example). Andrews and Bonta (2006; 2010) state that the effective reduction in recidivism can only be achieved when the risk factors empirically linked to a

specific offending behaviour are identified. Finally, risk assessment processes are used to identify any responsivity issues held by an individual which may have an impact upon participation in interventions. The ultimate aim of risk assessments is to address two main concerns: (1) how likely an offender is to commit a new offence; and (2) what can be done to decrease this likelihood (Bonta, 1999). In order to address these concerns, professionals require a series of risk factors to guide their responses. The recent introduction of clinical risk formulation has deepened the responsivity of management of individuals as it allows for an individual risk management plan to be devised (Hart, et al., 2011).

Static Risk Factors

Static risk factors describe the unchanging historical factors that remain present throughout the offender's lifetime. Static risk factors include the environment within which an individual was raised (e.g. immediate family environment, or society). Social Learning Theory (Bandura, 1973) dictates that offending behaviours are learnt within childhood, by copying the behaviour witnessed by others. This behaviour is then replicated in adulthood. Static risk factors can also include biological predispositions for offending behaviour. For example, increased levels of offending behaviour have been linked to deficits of monoamine oxidase (Brunner, Nelen, Breakefield, Ropers & van Oost 1993; Checknita et al., 2015), low levels of serotonin (Larsen & Buss, 2005; Morley & Hall, 2003; Lowenstein, 2003) and an increase in dopamine (Elliot, 2000; Morley & Hall, 2003). Static risk factors provide professionals with a clearly identifiable risk level. However, when solely using static risk factors, risk levels will remain constant. This is because static risk factors do not consider the fluid psychological changes within the individual.

Dynamic Risk Factors

Dynamic risk factors allow practitioners to prioritise psychological vulnerabilities that require further monitoring and treatment (Grieger & Hosser, 2014; Vess & Ward, 2011). By treating the dynamic risk factors, professionals reduce the likelihood of reoffending. Dynamic risk factors can be further categorized into *stable* and *acute* factors. Stable dynamic risk factors are longstanding predictor variables, such as personality traits. Acute dynamic risk factors relate to highly transient, environmentally dependent variables, such as drug use (Hanson, 1998).

Protective Factors

The Structured Assessment of Protective Factors for Violent Risk (SAPROF; de Vogel, de Vries Robbé, de Ruiter & Bouman, 2011) now encourages professionals to focus upon the protective factors associated with an offender akin with the Strengths based approach to therapy such as the Good Lives Model (Ward & Gannon, 2006). Research has shown that negative focused paradigms of offender rehabilitation were neither beneficial nor effective (Cullen & Gendreau, 2000). de Vogel and colleagues have found that positive aspects of an offender's life can protect individuals from reoffending (de Vogel et al., 2011; de Vries Robbé, de Vogel & Douglas, 2013).

Contextual Risk Factors

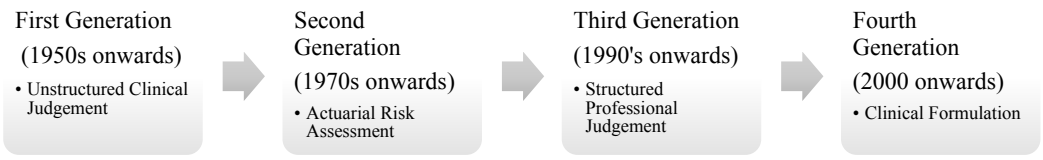
Critics of current risk assessment processes call for an increase in the ecological validity of risk management plans (Boer, McVilly & Lambrick, 2007). Contextual risk factors appear to be vital in the effective risk assessment and management of firesetting. In these instances, the likelihood of a behaviour occurring once detained, is significantly reduced as a result of the physical barriers that are put in place (i.e., the removal of access to fire lighting

equipment). However, contextual solutions are not reflective of an offender's reduction in risk; as this risk is likely to return once opportunity is reintroduced.

1.5 Risk Assessment Generations

The 'What Works' literature (Blackburn, 1980; Cullen & Gendreau, 2000) saw the introduction of the Scientist/Practitioner model (Hilgard et al., 1947) to the Criminal Justice System (CJS). This led to an increase in research exploring the recidivism of offenders (Andrews, 2001; Lipsey, 1992; Gendreau, 1996; Hollin, 1999). In line with the 'What Works' literature, societal attitudes began to change towards offenders and the effectiveness of rehabilitation. As offender rehabilitation became more effective, the fluid nature of offender risk came to light. It became accepted that risk could undergo active reformation in order to reduce the likelihood of future offending. The term dangerousness is rarely used within clinical settings. Instead, the term is reserved for criminal justice settings; here the term is used to provide evidence for sentencing and disposal decisions. As a consequence, risk assessment processes underwent an evolution (see Figure 1). Within clinical settings we have now forgone the term 'dangerousness' in exchange for the more fluid process of risk assessment.

Figure 1 - Evolution of Risk Assessment Processes



First Generation - Unstructured Professional Judgment (1950's onwards)

Unstructured professional judgement represents one of the earliest methods used to determine an individual's level of risk. Whilst this approach to risk assessment has been commended for its person centeredness and flexibility, there is a great degree of unmonitored variability between clinicians (Johnstone,

2013). Professional judgement alone, can be based upon incomplete information which creates issues of transparency and bias (Brown & Rakow, 2016; Hastie & Dawes, 2010; Hogge, 2001; Holzworth, 2001). More importantly, this approach lacks predictive validity (Cooke & Mitchie, 2013; Quinsey, Harris, Rice & Cormier, 1998). As a result, good practice guidelines for risk assessment now discourages the use of unstructured clinical judgement (Department of Health, National Risk Management Programme, 2007).

Second Generation Risk Assessment: Actuarial Risk Assessment (1970's onwards)

In the 1970's, a second wave of risk assessments saw the introduction of actuarial risk assessments. It was found that empirically based risk factors provided better risk predictions than professional judgement alone (Andrews, Bonta, & Wormith, 2006; Hilton, Harris & Rice, 2006). Here risk levels are mathematically determined by the risk factors present. The quantification of risk factors can be useful in securing risk management resources. However, basing risk management decisions on risk factors alone, has been heavily criticized (Campbell, French & Gendreau 2009; Cooke & Mitchie, 2013; Dolan & Doyle, 2000, Harcourt, 2006; Hart et al., 2003). This is because actuarial tools provide little information about why an offender may go on to commit such behaviours.

Third Generation Assessment: Structured Professional Judgement (1990s onwards)

Within Structured Professional Judgement (SPJ), evidence-based risk factors associated with increased levels of offending, are used in combination with the expertise of a professional to determine the likelihood of offending. SPJ differs from actuarial tools, as the tool is not guided by numerical outcomes. SPJ risk assessments have become popular in the assessment of offending (see

Douglas, Hart, Webster, & Belfrage, 2013; Kropp, Hart, Webster & Eaves, 1995; Hart et al., 2003). The predictive validity of SPJ tools has been positive (Heilbrun, Yasuhara & Shah, 2010; Hanson & Morton-Bourgon, 2009). The combination of risk factors and professional judgement allows risk management plans to be directly mapped onto a detailed treatment plan; improving the ease of clinical work (Bonta & Wormith, 2013).

Fourth Generation Assessment: Clinical Formulation (2000 onwards)

The fourth generation of risk assessment involves the integration of SPJ risk information into an individualized clinical risk formulation (Hart & Logan, 2011). Within this formulation, professionals provide a series of hypotheses to explain the manifestation of offending behaviours within the individual. For example, whilst an SPJ approach would determine that a history of violence is risk relevant for an individual; a clinical formulation would explain how this risk factor results in offending behaviour. This approach bridges the gap further, between assessment and management (Lewis & Doyle, 2009). This approach to risk assessment allows professionals to use the risk information collated in a clinically useful manner which map directly onto risk management plans (Douglas, Blanchard & Hendry, 2013). Current practices within the Criminal Justice System (CJS) now reflect a more positive and humane balance between the rehabilitation of offenders and the protection of the public. Decision making within the CJS is now empirically informed, and therefore risk assessments are more transparent. Current conceptualizations of dangerousness focus more upon the psychological aspects of the individual. With the introduction of the aforementioned Scientist-Practitioner model into the CJS, a paradigm based upon knowledge construction has been developed. As a result, we have seen a reduction of purely punitive sentencing. However, herein lies the problem;

conceptualizations of dangerousness are varied. It became paradoxical that individuals were labelled as 'dangerous offenders' (Brown, 2000). This particular debate is outside of the scope of this chapter; however, will be discussed in Chapter 5 in further detail.

1.6 Firesetting

Prevalence and Key Terms

Statistics show that the United Kingdom fire service attended 17,933 deliberate fires in 2013 (Home Office, 2017). However, only 1136 guilty convictions for arson were reported in 2013-2014 (Home Office, 2017). Thus, only 6% of deliberate fires result in a conviction. Many firesetting behaviours remain undetected. Therefore, to use the term 'arson' would limit discussion to deliberate fire behaviours that have attracted a sentence of 'arson'. Therefore, within this thesis, the term 'deliberate firesetter' will be used, as this is an all-encompassing term describing all instances of wilful firesetting. Each theory and typology of firesetting will be reviewed with regard to its contribution to the literature on the risk factors of firesetters. Firstly, a few key terms relevant to the thesis will be introduced.

Fire Interest

Fire interest is a key term that will be used within this thesis. Fire interest is deemed to be the explanation as to why individuals set seemingly 'motiveless' fires. Deliberate firesetting is often thought to be caused by the individual's emotional response to either setting a fire or watching a fire. The emotions experienced by individuals can vary, however typically these include sexual arousal, excitement and symptoms relief (Doley & Watt, 2012). The individual emotional response towards fire are thought to have a reinforcing effect upon the likelihood of future firesetting. It is important to note that fire interest differs to

the diagnostic term *Pyromania (*American Psychological Association, 2013). Whilst fire interest is the most recognisable diagnostic criteria of pyromania, the presence of fire interest does not singularly predict a diagnosis of Pyromania (Fineman, 1980, 1995; Jackson, Glass & Hope, 1987; Vreeland & Levin, 1980). Gannon, Ó Ciardha, Doley and Alleyne (2012) acknowledge that everyday fire interest is a common feature in many people. However, they make the differentiation between those that appreciate a camp fire, to those who experience positive emotions to more serious and life-threatening fires.

Fire interest provides a logical explanation for why individuals set fires. However, there appears to be a lack of empirical research which empirically links fire interest to an increased risk of firesetting (Tyler, Gannon, Dickens & Lockerbie, 2015). Within clinical practise fire interest can be measured using the Fire Interest Scale (FIRS, Murphy & Clare, 1996). However, the validity and reliability of this scale had yet to be scrutinised (Curtis, McVilly & Day, 2012). More recently the FIRS scale has been incorporated into the Four Factor Fire Scale which amalgamates the FIRS (Murphy & Clare, 1996); the Fire Attitude Scale (FAS, Muckley, 1997); and the Identification with Fire Questionnaire (IFQ, Gannon, Ó Ciardha & Barnoux, 2011) to produce a valid scale for use in clinical practice (Ó Ciardha, Tyler & Gannon, 2015). The four-factor fire scale measures an individual's *identification with fire*, *serious fire interest*, *fire safety* and *firesetting as normal*.

Fire Scripts

Fire scrips are a relatively new concept within the firesetting literature. The term was initially presented by Gannon et al. (2012) within the Multi Trajectory Theory of Adult Firesetting (M-TTAF, to be discussed in further detail later). Fire scripts refer to the implicit cognitions that an individual hold about

fire (Ó Ciardha & Gannon, 2012). Butler and Gannon (2015) further describes fire scripts as behavioural guides that shape how an individual thinks about fire. In the instance of firesetting, fire scripts will inform an individual when it is appropriate to use fire. For example, an individual may have learnt that firesetting can provide relief from negative feelings. Therefore, when they are experiencing low mood, they know that setting a fire will make them feel better. Butler and Gannon (2015) proposed three hypothetical scripts that exist including: 1) fire is a powerful messenger, 2) fire is the best way to destroy evidence, and 3) fire is soothing. Butler and Gannon believe that these firesetting scripts may provide an explanation as to why some individuals set multiple fires. However, the existence of these scripts has yet to be empirically tested.

Adult Firesetting Typologies

A series of typologies have been introduced to aid in the definition of different categories of adult firesetters. Dickens and Sugarman (2013) further refine motivational typologies into *inductive* and *deductive* typologies.

Inductive Firesetting Typologies

One of the first attempts to classify firesetters inductively was by Lewis and Yarnell (1951), who hypothesised four typologies of firesetting: (1) *Unintentional*; (2) *Delusional*; (3) *Erotic*; and (4) *Revenge*. However, the inclusion of the 'erotic' category is a point of contention for many critics of Lewis and Yarnell (1951). This category is underpinned by the unfounded belief that individuals who set deliberate fires, do so as a result of Pyromania-like tendencies (see Diagnostic Statistics Manual, IV; DSM IV; American Psychological Association, 1980). However, pyromania has a low diagnostic rate within clinical populations (see Lindberg, Holi, Tani & Virkkunen., 2005; Rice &

Harris, 1991). Furthermore, Lewis and Yarnell (1951) provide little information as to how this information would impact upon perceived levels of risk.

Inciardi (1970) later proposed a typology including: (1) *Revenge*, (2) *Excitement,* (3) *Institutionalisation*, (4) *Insurance Claim*, (5) *Vandalism*, and (6) *Crime Concealment*. This typology incorporates a consideration of motive as well as offence characteristics. Inciardi (1970) proposed that those classified under the 'revenge' category were the most dangerous. However, no explicit explanation for this claim is provided. In addition, the typology has a problem of exclusivity as firesetters can be classified under multiple categories.

Prins (1994) proposed an amended version of Inciardi's (1970) typology for firesetting. This typology included the addition of (1) *Arson committed for political purposes*; (2) *Self-immolation as a political gesture*; (3) *Arson committed as an attention seeking act*; and finally (4) *Arson for mixed motives*. This typology combines motives with characteristics; increasing the usability in clinical settings.

Deductive Firesetting Typologies

Deductive firesetting characteristics are based upon characteristics that can be observed; this increases utility in practice (Dickens & Sugarman, 2013). Canter and Fritzon (1998) proposed that firesetting can be categorised into four categories: (1) *instrumental person* - whereby fires were typically revenge motivated and accelerant based; (2) *expressive person* - individuals categorised here possess a need for attention, and have an intention to endanger life; (3) *instrumental object*, whereby individuals typically set fires for criminal purposes; and (4) *Expressive Object,* where individuals commit serial offences, and often target public buildings. The typology hypothesised by Canter and Fritzon (1998) was replicated within a sample of prison offenders (Almond,

Duggan, Shine & Canter, 2005) confirming the validity of this typology. Furthermore, the *person directed* typology enables professionals to determine individuals who set more serious fires. This information is useful in risk management decisions.

Harris and Rice (1996) used file information from mentally disordered firesetters to propose four categories. These include: (1) *Psychotic* - this group typically had fewer incidents of firesetting and did not use accelerants; (2*) Unassertive,* describing firesetters who demonstrated little aggression, revenge tendencies and low levels of assertiveness; (3) *Multi-Firesetters*, describing firesetters who were criminally versatile and who experienced difficult childhoods (relative to the firesetters in other categories); and (4) *Criminals*, who typically suffered from parental abuse, had a diagnosis of personality disorder, exhibited assertiveness, and were the most likely to reoffend. The typology proposed by Harris and Rice (1996) has the best clinical utility, as it can be directly mapped onto risk management plans. In terms of risk assessment, Harris and Rice (1996) provide clear risk prediction information relating to the typology most likely reoffend (those in the *criminal* category).

In conclusion, the typologies used to classify firesetters may lack theoretical applicability, however some have proven useful in determining management strategies (Gannon & Pina, 2010; Dickens & Sugarman, 2013).

Adult Firesetting Theories

The firesetting typologies described thus far have provided a way in which firesetters can be categorised. With no real tangible application to clinical practice, typologies appear to merely assist in defining a heterogonous offending group into more manageable groups. Adult firesetting theories may however, provide more information as to the risk factors or dangerousness of adult

firesetters. There have been many theories to explain adult firesetting, therefore a meta-level framework to be used in the classification of theories will be used (see Ward and Hudson 1998).

Level III Theories of Firesetting

Level III theories of offending behaviour, or micro-theories relate to specific offense chains arising from qualitative data. Micro theories tend to focus upon the 'how 'explanations in an individual's commencement of offending behaviours. At present, there are only two Level III theories of firesetting.

Firesetting Offence Chain Model for Mentally Disordered Offenders (FOC-MD; Tyler et al., 2013). Tyler et al. (2013) developed the first offence chain model for mentally disordered firesetters (MDFs). This offence chain was devised from the interviews of 23 MDFs, using grounded theory. Individual firesetters were interviewed regarding the affective, cognitive, behavioural, and contextual factors leading up to an incident of firesetting. The offence chain consists of four phases: (1) *background*, (2) *early adulthood,* (3) *pre-offence period* and (4) *offence and post offence period.* The FOC-MD proposes that individuals will develop affective responses towards fire as a result of negative or positive experiences early in life. The FOC-MD explains mental health as a moderator of firesetting; whereby only in the presence of other risk factors will the likelihood of firesetting increase (see also Gannon et al., 2012).

Unlike the typologies presented earlier, this offence chain provides an explanation for the acquisition of firesetting. Furthermore, the FOC-MD can be applied to both male and female firesetters, and accounts for different motives. Considering the clinical utility of the FOC-MD, it guides professionals to consider the impact of an individual's early history on risk for future firesetting.

This contributes to the individualization of risk management plans. However, the FOC-MD is limited in its application to non-mentally disordered firesetters.

The Descriptive Model of Adult Male Firesetting (DMAF; Barnoux, Gannon & Ó Ciardha, 2014). Similar to the FOC-MD, the DMAF offence chain focuses upon the sequential events which lead to firesetting perpetrated by imprisoned firesetters. The DMAF includes: (1) *background,* (2) *early adulthood*, (3) *pre-offence period* and (4) *offence and post offence period.* The DMAF places a focus upon the wider environment; suggesting that firesetting behaviours are learnt. The DMAF also highlights factors such as: *fire interest, normalization of fire, deliberate firesetting* and *negative fire experience*. These are clinically relevant risk factors, which can be used to inform risk management plans. Finally, the DMAF shows an awareness of triggering events such as *moral transgression, conflict/provocation,* and *unmet needs*, which can result in emotional responses which lead to firesetting. The structure of the DMAF provides an in-depth explanation as to how firesetting motives can be developed. Barnoux et al., (2014) provides pathways to explain how firesetters may present in therapeutic settings. The pathways represent *avoidant* or *approach* firesetters (e.g., a firesetter uses fire to *avoid* an event, or they may use fire in a more aggressive *approach* manner to bring about change). This categorization describes the manner in which firesetting is used as an offence 'goal' (e.g. a firesetter uses fire to avoid an event, or they may use fire in a more aggressive approach manner to bring about change, and so on). Clinically, this information is then easily mapped onto a risk management plan.

Level II Theories of Firesetting

Ward and Hudson (1998) suggest that level II theories describe a single phenomena associated with offending behaviour. Also known as single factor

theories, these can often be quite vague in their full explanation of an offending behaviour. However, Level II theories of offending can be helpful in the development of multifactorial theories of offending. Whilst there are several level II theories of firesetting within the literature (including: Psychoanalytical Theory; Freud, 1932); and Biological Theory; Virkkunen, 1984; Virkkunen, Goldman, Nielsen, & Linnoila, 1995; Virkkunen, Nuutila, Goodwin, & Linnoila, 1987), only the most popular theories will be discussed.

Social Learning Theory (SLT; Bandura, 1976). Within the principles of SLT, firesetting is conceptualized as a behaviour learnt from positive or negative reinforcement. For example, an individual may have found that by setting a fire, they can attract the attention of an otherwise neglectful caregiver. The theoretical principles of SLT have been incorporated within micro theories and multifactorial theories of firesetting (Barnoux et al., 2014; Gannon et al., 2012; Jackson, Glass & Hope, 1987; Tyler et al., 2013; Vreeland & Levin, 1980). The SLT can be useful in clinical practice, as it suggests that interventions should focus upon the development of prosocial emotional responses in the face of triggers.

Level I Theories of Firesetting

Ward and Hudson (1998) suggest within their framework for theory development, that Level I theories are the most comprehensive. Level I theories provide a causal framework for offending behaviour in their multifactorial structure (Ward & Hudson, 1998). At present, there are only three multifactorial theories of firesetting.

Functional Analysis Theory of Firesetting (FAToF; Jackson, Glass & Hope, 1987). Jackson et al., (1987) represents the first multifactorial theories of firesetting. As suggested by the title, this theory is presented within the

framework of functional analysis theory and the previously mentioned Social Learning Theory (Bandura, 1976). This results in a theory that provides an explanation for the acquisition and continuation of firesetting behaviours. The FAToF explains firesetting within the context of five factors; (1) *psychosocial disadvantage*, (2) *Life Dissatisfaction/Self Loathing*, (3) *Social Infectiveness*, (4) *Individual Experience of Fire*, and (5) *Internal/External triggers of Firesetting.* Jackson et al., (1987) posit the functional capability of fire as a reason for commencing firesetting. The FAToF is one of the most widely referenced theories of firesetting, as it is logical in its explanation of firesetting (Gannon et al., 2013). It provides key focuses for assessment of firesetters. Jackson et al., guide professionals towards the treatment of deficits in social and personal skills as a way to reduce the likelihood of future firesetting. Evidence of the theories clinical utility is further seen as it provides a framework for a risk tool (Taylor, Thorne & Salvkin, 2005). However, critics have suggested that the FAToF does not provide an explanation for individuals who do not possess deficits in social skills, who also set fires. This theory is reliant upon firesetters all having problems with social skills, which in reality is not the case.

*Dynamic Behavioural Theory of Firesetting (DBToF; Fineman, 1980, 1995***.** The second multi-factorial theory of firesetting is the Dynamic Behaviour theory, proposed by Fineman (1980; 1995). Interestingly, the DBToF offers an explanation of deliberate juvenile firesetting in the form of a formula:

$$Firesetting = G1 + G2 + E$$

$$Where\ [E = C + CF + D1 + D2 + D3 + F1 + F2 + F3 + Rex + Rin]$$

The DBToF proposes a dynamic behavioural explanation of firesetting whereby (G1) historical factors lead to a predisposition to juvenile firesetting

behaviours. (G2) refers to the historical environment that may have encouraged the reinforcement of firesetting, and (E) current environments that support the reinforcement of firesetting. Within (E), Fineman describes the triggering life events, crime scene characteristics, cognitions, and affective states that can all be conducive to firesetting. Finally, the DBToF suggests that firesetting behaviours are then reinforced through either, external factors, such as financial gain, or internal factors, such as a restoration of emotional affect. Fineman's theory (1980; 1995) provides information relating to the static, dynamic and contextual risk factors that are indicative of firesetting. The DBToF therefore possess great clinical utility and can directly guide professionals in the form of proposing key risk factors associated with firesetting. One of the DBToF's major limitations, however, is its lack of generalisability as it refers to juvenile firesetting, as opposed to adult firesetting, which is the focus of this thesis.

Multi-Trajectory Theory of Adult Firesetting (M-TTAF; Gannon, Ó Ciardha, Doley, & Alleyne, 2012). To date, the M-TTAF is arguably the most comprehensive theory of firesetting as it provides an explanation of all adult firesetting. The multi-factorial structure of this theory provides an explanation for the commencement, maintenance, and desistance of adult firesetting (see Figure 2). The M-TTAF adheres to the principles of theory knitting (see Kalmar & Sternberg, 1988; Ward & Hudson, 1998). This ensures that the M-TTAF incorporates all of the main strengths from previous firesetting theories. The M-TTAF describes the interplay between developmental, biological, learning, and cultural influences that combine with psychological vulnerabilities and proximal factors to determine the significance of four specific risk factors. These include: (1) fire factors (i.e. cognitive and emotional response to fire); (2) Attitudes (i.e. antisocial attitudes); (3) social effectiveness (i.e. poor social skills and social

isolation); and (4) coping and control (i.e. emotion regulation problems and poor impulse control). The M-TTAF states that when paired with a triggering event, individuals possessing certain developmental and psychological deficits, and suffering from mental health problems; are at a greater risk of firesetting behaviours. The M-TTAF is one of the only theories to explicitly discuss risk factors. The risk factors discussed are generally dynamic in nature; the *developmental context* domain is the only risk factor which is static, as it refers to the historical background of an individual.

The clinical utility of the M-TTAF is further highlighted in Tier two of the theory (see Figure 3). Tier two uses the risk factors of the M-TTAF to propose a series of trajectories or typologies. These are: (1) antisocial, (2) grievance, (3) fire interest, (4) emotionally expressive/need for recognition; and (5) multi-faceted. Tier two of the theory represents the array of firesetters that may be seen in practice. However, the trajectories offer little guidance as to the recidivism likelihood of firesetters in each trajectory. Nor does the M-TTAF provide any information regarding the incident-related characteristics of firesetting (such as premeditation or multiple ignition points).

1.7 Firesetting Risk Assessments

In terms of potential risk, firesetting is undoubtedly on a par with violent and sexual offending. The consequence of a deliberately set fire can cause harm to life and property. So, in terms of risk assessment, what is available for offenders with a history of firesetting? Unfortunately, very little. As a result, professionals often resort to existing violence tools, such as the HCR-20 V3 (Douglas et al., 2013) to assist in risk management planning. However, firesetting is not always motivated by violence (Butler & Gannon, 2015; Barnoux & Gannon, 2013). Yet, few attempts have been made to design a

specific firesetting risk assessment. Furthermore, the violence risk tools currently being used with MDFs, are not fire specific, and do not consider fire factors, such as fire interest or fire scripts (Butler & Gannon, 2015; Gannon, et al., 2013; Tyler, Gannon, Dickens, & Lockerbie, 2015). Many institutes use locally developed guidance systems to inform the risk assessment of firesetters, however only three have been published.

Pathological Fire-Setters Interview (PFSI; Taylor, Thorne & Salvkin, 2004)

The PFSI is a structured interview which aims to collate all relevant risk information with a view to formulating risk, need and management plans. The PFSI is underpinned by the Functional Analytic framework, thereby ensuring that it is theoretically grounded. However, at present the tool has only yet been used in case studies, and its reliability and validity is yet to be empirically tested (Davies & Beech, 2012).

Northgate Firesetter Risk Assessment (NFRA; Taylor & Thorne, 2005; 2013).

The Northgate Firesetter Risk Assessment (NFRA; Taylor & Thorne, 2005; 2013) is based upon the SPJ structure of the HCR-20 V3 (Douglas et al., 2013). The measure consists of five historical/static factors including: (1) incidents of childhood firesetting; (2) incidents of firesetting as an adult; (3) incidents of targeted firesetting; (4) evidence of hoax calls to emergency services; and (5) previous self-harm/suicide attempts. The measure also contains six dynamic risk factors: (1) recent build-up of stress/depression; (2) high levels of anger; (3) poor interpersonal conflict resolution skills; (4) impulsivity; (5) current/recent signs of major mental illness; and (6) low social attention. Whilst the NFRA appears consistent with the literature favouring SPJ, this tool has not been the subject of any evaluations for predictive validity.

Similarly, the risk factors contained within the tool do not offer a sufficient empirically informed evidence-base (for e.g., hoax calling). Furthermore, there is no consideration for fire factors which may explain why individuals choose to use fire over other methods of offending. Furthermore, this tool was developed within an intellectually disabled offending population, and therefore has limited applicability to firesetters as a whole. Positively however, in order to rate the historical items, professionals are requested to consider how serious the fire was. Thus, encouraging considerations for the outcome/severity of the fire.

St. Andrew's Fire and Arson Risk Instrument (SAFARI; Long, Banyard, Fulton & Hollin (2014)

The St. Andrew's Fire and Arson Risk Instrument (SAFARI; Long et al., 2014) is a semi structured interview schedule which examines the antecedents, behaviour, and consequences associated with firesetting. The SAFARI risk items were augmented from the literature, ensuring that they are evidence-based. The SAFARI is not a standalone risk tool and takes the form of a guiding interview schedule to ensure that professionals are collating the correct information relating to firesetting. Long et al., (2014) suggest that the tool should be used in conjunction with existing measures of offending behaviour (such as the HCR-20V3, Douglas, Hart, Webster, & Belfrage, 2013). The SAFARI tool is helpful as it encourages a consideration as to how firesetting behaviours commenced. However, the SAFARI is not a risk assessment in its true form and provides little information in the way of risk factors. With only antecedent and behavioural information, the SAFARI offers no real risk management solutions.

1.8 Theoretical and Research Problems within the Firesetting Literature

Firesetting is dangerous, this is an unchallenged statement. Yet why is the risk assessment literature so underdeveloped? Professionals within the CJS are relied upon to make risk informed sentencing and disposal decisions based upon quantifications of dangerousness (Cooke & Mitchie, 2013). So, what does it mean when we say that firesetting is dangerous? Within clinical settings the term 'dangerousness' has been forgone in exchange for the more fluid process of risk prediction. And yet, as discussed earlier, risk assessments facilitate a reduction of

Figure 2 - Overview of Tier One of the Multi-Trajectory Theory of Adult Firesetting (M-TTAF; Gannon, Ó Ciardha, Doley & Alleyne, 2012)

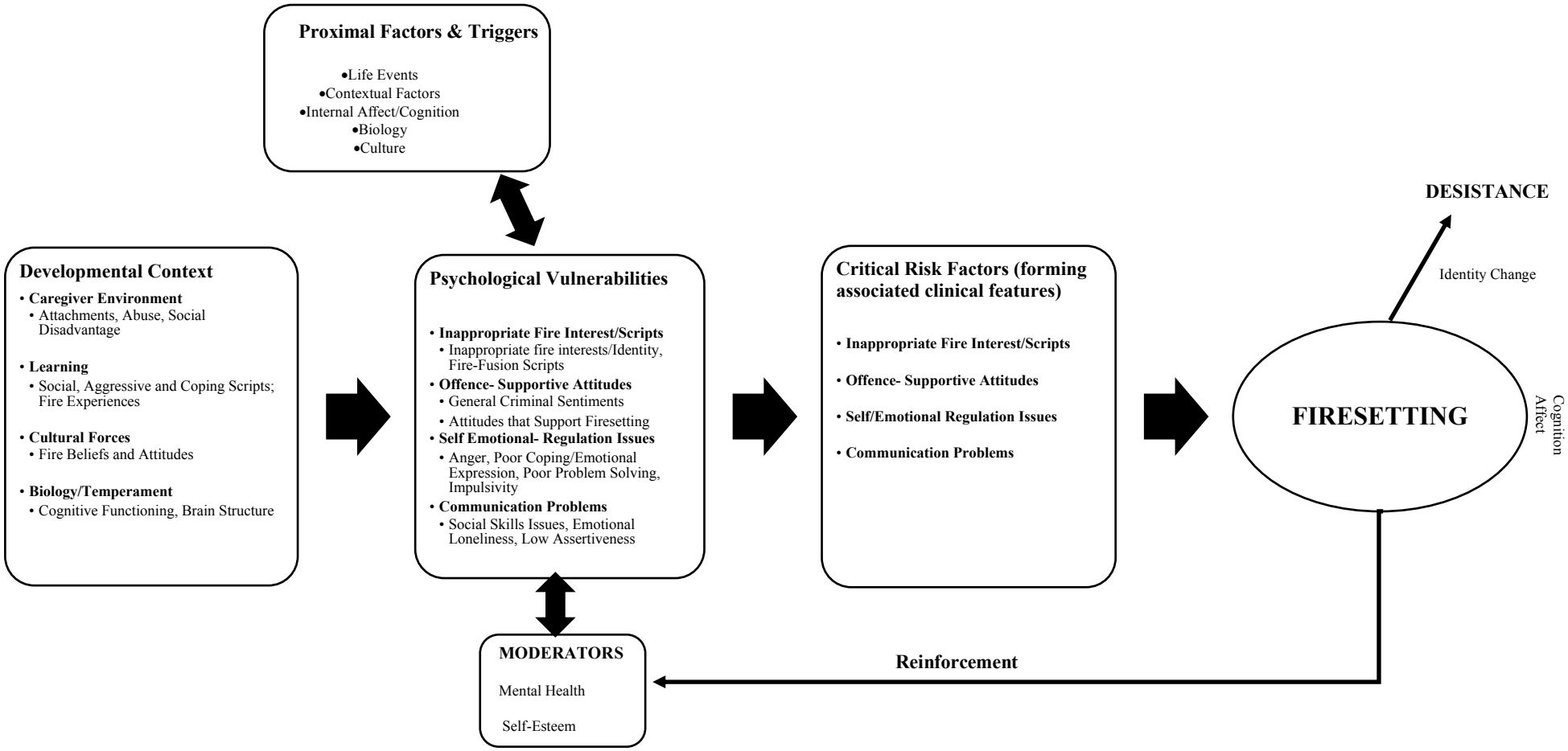


Figure 3 - Overview of Tier Two of the Multi-Trajectory Theory of Adult Firesetting (M-TTAF, Gannon et al., 2012)

Trajectory	Prominent risk factor	Other likely risk factors	Potential clinical feature	Potential motivators.
Antisocial	Offence-Supportive attitudes/ values (supporting general criminality)	Self-regulation issues (e.g. poor emotional modulation)	Antisocial values/attitudes Impulsivity	Vandalism/boredom Crime concealment Profit Revenge/Retribution
Grievance	Self- regulation issues	Communication problems Inappropriate Fire Script	Low assertiveness Poor Communication Fire aggression fusion scripts Anger (rumination) Hostility	Revenge/retribution
Fire Interest	Inappropriate fire interest/scripts	Offence-supportive attitudes (supporting firesetting)	Fire fascination/interest Impulsivity Attitudes supporting fire	Fire interest/thrill Stress/Boredom
Emotionally expressive/need for recognition	Communication problems	Self-regulation issues[1] (e.g. poor emotional modulation)	Poor communication Impulsivity Depression Fire-coping fusion script Personality traits/disorder	Cry for help[1] Self-harm[1] Suicide[1] Need for recognition
Multi-faceted	Offence-supportive attitudes/values (supporting general criminality and firesetting) Inappropriate fire interest/scripts	Self-regulation issues Communication problems	Pervasive firesetting/general criminal behaviour Fire fascination/interest Antisocial values/attitudes Conduct disorder or Antisocial personality disorder	Various

dangerousness by highlighting the most pertinent areas of risk to focus on in treatment and management plans. However, it appears that information relating to the risk and dangerousness of firesetting is underdeveloped.

In the instance of violence, determinants of risk are based upon the presence or absence of a series of risk factors. These risk factors form the basis of a risk tool which aids risk predictions. However, when we consider firesetting, it appears that by simply considering these risk factors, is to minimize an otherwise complicated event. Risk assessment with firesetting requires professionals to consider more than just the individual. Current risk assessment processes do not allow for contextual, incident related characteristics to be considered. It therefore appears that the firesetting literature is the subject of an

[1] Emotionally expressive subtype only.

unfounded paradox. It is widely accepted that firesetting is harmful. And yet, the literature does not appear to provide any real empirical support in the quantification of risk prediction. Without empirically informed risk information relating to firesetting, how can professional risk management decisions be valid?

This has directly impacted upon the overarching aim of this thesis, which is to provide further information pertaining to the risk factors and dangerousness of firesetters. Information relating to the risk factors of firesetters will be examined by answering the following questions: (1) do firesetters have different risk factors to non firesetters? (2) Do male and female MDFs differ in risk factors from one another? (3) Do one time and multiple MDFs differ in risk factors? By answering these questions, further information will be provided towards the development of an empirically based risk assessment. In order to determine the information currently missing from the literature pertaining to the dangerousness of firesetters. This study aims to answer the following questions: (1) what are the current professional conceptualisations of firesetting dangerousness? (2) How can these be streamlined? (3) Are there incident related characteristics or contextual information that increase the dangerousness of fire?

1.9 Conclusion

This chapter provides an overview of the current processes that take place within risk assessment. In the second part of the chapter presents the current theory and knowledge of firesetting. It should now be apparent to the reader that the literature relating to the risk assessment and quantification of dangerousness is sparse and has very little clinical applicability. In order to effectively reduce the dangerousness of apprehended firesetters; professionals require a risk assessment tool. For this to be done, further information pertaining to the risk factors associated with firesetting behaviours is required.

Chapter Two. Systematic Review of Mentally Disordered Firesetting Risk Factors

2.1 Aim of Chapter

This chapter presents a systematic review of the mentally disordered firesetting literature. The domains of the Multi-Trajectory Theory of Adult Firesetting (M-TTAF; Gannon, et al., 2012) will be used to structure the systematic review, as well as providing a guide to determining gaps in the literature. All of the journals included will be quality assessed using an adapted version of the MERGE guidelines (Liddle et al., 1996).

2.2 Introduction

As a result of the low apprehension rates in firesetting, little is known about individuals who set fires. Yet, 10% of patients residing in secure institutions have a conviction for firesetting (Dickens & Doyle, 2016). The notion that mental health is associated with firesetting is widely documented (Swaffer, Haggett, & Oxley, 2001). Current firesetting theories document mental health as an important motive or moderator (see Chapter One). Despite this, however, advancements in the risk assessment needs of MDFs remains slow. This paper will systematically review the existing literature pertaining to the risk factors of MDFs.

Firesetting research remains in its infancy when compared to that of sexual or violent offending (Long, Banyard, Fulton, & Hollin, 2014; Taylor & Thorne, 2005; 2013). Until recently, a *'generalist'* hypothesis of firesetting had been accepted (Gannon & Pina, 2010). This hypothesis assumes that firesetters generally hold the same risk factors as other offending groups. This hypothesis assumes that firesetters do not require specialist assessment processes (Soothill & Pope, 1973). However, Gannon et al., (2013) found evidence to support a

'*specialist'* hypothesis of firesetting. A sample of incarcerated firesetters were found to possess factors such as fire interest, greater problems with emotional regulation, and low levels of self-esteem, relative to other incarcerated offenders. This raises doubts over the validity of the generalist hypothesis.

As has already been discussed, current risk processes centralise dynamic risk factors as they enable clinicians to track an individual's progress and prioritise interventions (Klepfisz, Daffern, & Day, 2016). These risk factors also play a huge part in the development of clinical formulations (Hart, Sturmey, Logan, & McMurran, 2011). Dynamic risk factors enable us to measure fluctuating levels of risk over a period of time (Beech & Ward, 2004). Static risk factors also provide guidance in the identification of individuals predisposed to certain offending behaviours. Static risk factors are often unchangeable and offer no guidance regarding the reduction of future risk (Jones, Brown, & Zamble, 2010). Best practice guidelines for risk promotes the use of both static and dynamic risk factors in risk assessments (Department of Health, National Risk Management Programme, 2007). Risk factors used to inform risk-based assessments should be evidence-based, and specific to the target behaviour. However, no such risk assessment exists for firesetting.

Currently, there is a clinical need for a risk assessment for MDFs. Attempts have been made to establish a tool (see Chapter one), however the validity of these tools are yet to be empirically tested. In the absence of any guiding literature, clinicians are reliant upon existing violence assessment tools (i.e. Historical, Risk Clinical- 20 V3, HCR-20 V3, Douglas, et al., 2013). As to be expected with any well-established risk tool, these tools boast a breadth of literature demonstrating their validity. However, no empirical evidence examining the predictive validity of the HCR-20 exists for MDFs. Additionally,

existing risk tools formulate behaviours in the context of violence and are not specific to firesetting. Yet, research shows that firesetting is not always motivated by violence (Butler & Gannon, 2015; Jayaraman & Frazer, 2006; Leong & Silva, 1999; Puri, Baxter, & Cordess, 1995; Rix, 1994).

Furthermore, the violence risk tools currently being used with MDFs, are not fire specific, and do not consider fire factors, such as fire interest or fire scripts (Butler & Gannon, 2015; Gannon, et al., 2013; Tyler et al., 2015). Research carried out by Gannon et al., (2013) has revealed that a sample of incarcerated firesetters (many of whom were likely to have held mental health issues) demonstrated significantly higher scores on fire related measures (such as fire interest and identification with fire), relative to the mainstream offending group. Additionally, Tyler et al., (2015) found that fire interest was the greatest predictor of firesetting recidivism within a mixed gender MDF sample. However, these risk factors are absent from aforementioned violence risk assessment tools, such as the HCR-20V3 (Douglas, et al., 2013). This is not a limitation of these risk tools, as they were not designed for firesetting. A fire specific risk assessment tool is required, so that firesetting risk can be effectively managed.

First, the risk factors specific to MDFs should be examined. Drawing upon the existing firesetting research, it becomes clear that research is often poorly designed and unreliable. For example, research appears to rely upon the use of a comparison group to determine the presence of specialist traits within MDFs, as opposed to a matched control group. The use of a comparison group demonstrates a lack of scientific rigor since participants may differ on several dimensions. The use of a matched control group, on the other hand, ensures that confounding variables are controlled for, leaving only the true effects to be identified (Liddle, Williamson, & Irwig, 1996).

As noted in Chapter One, the Multi-Trajectory Theory of Adult Firesetting (M-TTAF, Gannon, et al., 2012) describes four specific risk factors. These include: (1) fire factors, (2) Attitudes, (3) social effectiveness, and (4) coping and control. Such risk factors are indicative of future firesetting and should be included in any subsequent assessment processes. The M-TTAF also hypothesizes the influence of 'developmental context'. These factors include: 1) caregiver environment, 2) learning, 3) cultural forces, and 4) biology/temperament. These factors are historical and unchangeable with intervention, and so can be described as static risk factors.

The M-TTAF takes a unique approach to the role of mental health in firesetting. Gannon et al., (2012) document mental health as a moderator of firesetting. In addition to self-esteem, mental health determines the impact that proximal triggers (i.e., life events) will have upon an individual at a given time. In this way, the M-TTAF improves upon firesetting typologies, which document mental health as a primary motive for firesetting (Lewis & Yarnell, 1951; Harris & Rice, 1996; Prins, 1994). The role of mental health in firesetting risk is debated. Therefore, it is important that this thesis focuses upon mentally disordered firesetters and compares them to matched mentally disordered controls. This will enable an examination of mental health's role in firesetting risk. For the purpose of outlining the risk factors associated within MDFs, mental health will be classified as a dynamic risk factor. This is due to the fluctuating and acute nature of mental illness.

To maintain the validity of the review's resultant data, each study underwent careful methodological scrutiny. Participants should be matched on several variables such as gender and age, to reduce the impact of any confounding effects. Furthermore, recruiting samples large enough to detect

appropriate effect sizes will ensure that the data collected contains enough power to produce valid and meaningful results. As has already been established, the progression of firesetting research has been stifled as a result of poor research design. This has resulted in very few studies investigating female MDFs as a single entity (Alleyne, Gannon, Mozova, Page, & Ó Ciardha, 2016; Long, Fitzgerald, & Hollin, 2015; Tennent, McQuaid, Loughnane, & Hands, 1971). The approximate gender ratio of male to female firesetters within general firesetting research is 5:1 (Dickens & Sugarman, 2012). However, when looking specifically at MDFs, Enyati, Grann, Lubbe, and Fazel (2008) found a narrowing of the gender ratio to 3:1. This study shows that female MDFs are more highly represented within a psychiatric sample. It is therefore important to establish if there are specific risk factors associated with female MDFs to ensure gender responsivity within risk assessment processes. The need for gender sensitivity in risk assessment has already been raised within the violence literature (de Vogel & de Vries Robbe, 2013; de Vogel, Stam, Bouman, Ter Horst, & Lancel, 2016). Empirically based conclusions should now be drawn for firesetters. Existing research appears to suggest that there are very few differences in risk factors between male and female MDFs (Tyler, et al., 2015). However, much of the existing knowledge about female MDFs stems from studies that include only a small percentage of female MDFs within an otherwise all male sample. The issue of small sample sizes appears common within firesetting research. A study with low statistical power has a reduced chance of detecting a true effect. The consequences of this include: overestimates of effect size and low replicability of results. To investigate gender sensitivity within mentally disordered firesetting, larger and equal sample sizes are needed. This, in turn, will determine the need

for different assessment approaches for male and female MDFs (Gannon & Pina, 2010).

Klepfisz et al., (2016) hypothesise that the status of a variable as a risk factor should only be determined by whether the presence or absence of this variable directly impacts recidivism. Often within firesetting research, comparisons are made between a firesetting offending group and a nonfiresetting offending group. It is important that descriptive characteristics of MDFs are not confused with risk factors. In order to establish the predictive capability of a variable, comparisons should be made between one-time firesetters and repeat firesetters. However, the research examining the reoffending rate of firesetters provides us with a further example of poor measurement. Differing conceptualizations of recidivism, differences in follow up length, and methods of measuring recidivism (i.e. self-report or Police National Computer) may all contribute to the difference in rates found (Rice & Harris, 1991; Soothill & Pope, 1973).

This chapter presents a systematic review of the risk factors associated with MDFs. In addition to this, any seeming differences between male and female MDFs and one time vs. repeat MDFs will also be reported. The risk factors contained within the M-TTAF (Gannon, et al., 2012) will structure the results of this systematic review and inform the completeness of the literature. To reduce the likelihood of invalid results being used, the quality of design for each paper will be assessed using a set of guidelines for assessing research quality (MERGE, Liddle et al., 1996). The MERGE guidelines have been adapted to include a quantitative numerical scoring system. Studies included in the review can be scored 1-10 depending on the five evaluation criteria. These include: (1) 50 or more firesetters included in sample size; (2) equal sample sizes used; (3)

matched variables used; (4) outcomes measured (i.e. recidivism); and (5) risk factors within the M-TTAF included in the analysis (see Appendix 1 for the adapted scoring sheet).

2.3 Methodology

Inclusion Criteria

To be included in the systematic review, studies were required to (1) have quantitative results or findings, (2) demonstrate the use of an offending comparison[2] or control group, (3) be written in English, and (4) have a sample of adult mentally disordered offending firesetters. As aforementioned, the quality of each study was reviewed using the guidelines set out by MERGE (Liddle et al., 1996; see Appendix 1). As defined by MERGE, it was important that all studies were based upon empirical research designs.

Document Search and Extraction

The databases used for the initial journal searches included PubMed, Scopus, Web of Knowledge, PsychInfo and PsychArticles. The following terms were included in the search: 'arson', 'firesetting', 'arsonists' *and* 'risk', 'recidivism', 'characteristics', 'risk assessment' *and* 'mental illness', 'mentally disordered', 'psychosis', and 'pathological'. Retrieved journals were not limited to any restrictions due to the anticipated limited research in the area. Any journals containing the terms juvenile', 'child', *and* 'adolescent' were removed, ensuring that only adult firesetting samples were included in the review.

The initial search retrieved 651 documents. Each article was verified to ensure that it complied with the inclusion criteria. The criteria as defined by

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[2] Whilst it was preferable that all studies include a matched control group, only two of the studies included met this criterion. Therefore, the inclusion criteria was extended to include studies that used a comparison group as well.

MERGE (Liddle et al., 1996) was used in order to determine document quality. Eighty-three documents were excluded from the review. The removal of these documents was justified as they were either; book chapters (with no quantitative/ no data) or were papers that did not contain any quantitative data or any data at all. Additionally, 15 journal articles were removed because they were not written in English. Finally, 509 journal articles were duplicates, or were not deemed theoretically relevant to the review. After the application of the inclusion criteria, eleven documents remained. However, after discussions with colleagues' familiar to the firesetting literature, and a thorough review of the reference lists, an additional three articles were identified (see Table 1). A review of unpublished grey literature did not yield any further suitable studies for inclusion. Searches for unpublished material took place on the British Library, Ethos, JISCMAIL, OpenGrey and Zetoc websites. Consequently, the search resulted in fourteen articles in total.

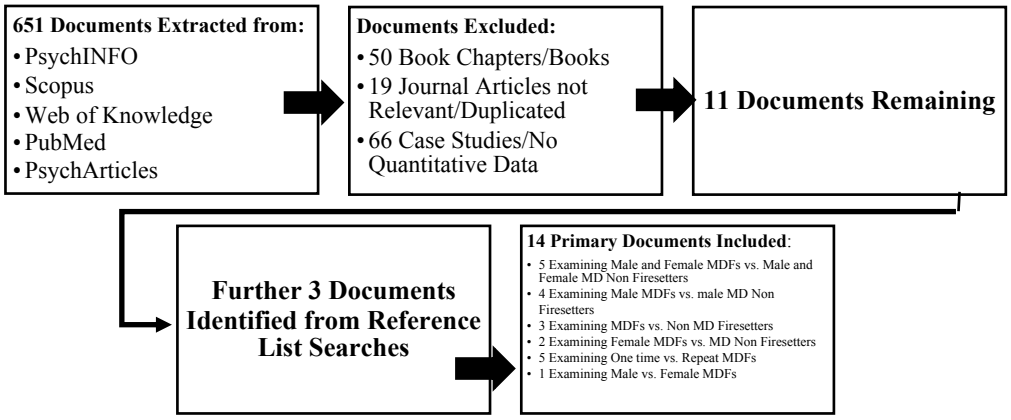
The application of the MERGE guidelines illustrated the poor quality of many of the studies included. Table 1 documents the variables that were used to evaluate the quality of the study. Whilst not included in the MERGE guidelines as evaluation criteria, the percentage of female/male participants, the composition of the comparison group, and the design of the research are also reported.

Samples and recruitment

Table 1 shows detail of each of the fourteen studies extracted for review. These studies included participants from various countries. Out of the fourteen studies, four came from the UK (28.6%), four from Nordic Countries (28.6%), three from the Netherlands (21.4%), and three from Canada (21.4%). Participants were mostly recruited from within high secure/forensic psychiatric

institutions (six studies; Hagenauw, Karsten, Akkerman-Bouwsema, de Jager & Lancel, 2014; Labree, Mijmna, van Marle & Rassin, 2010; Long et al., 2015; Rice & Harris, 1991; Tennent, et al., 1971; Tyler, et al., 2015). Five studies included participants who were undergoing pre-trial psychiatric assessments (Bradford, 1982; Dalhuisen, Koenraadt, & Liem, 2015; Hill, et al., 1982; Räsänen, Hakko, & Väisänen, 1995; Repo, Rawlings, & Linnoila, 1997). Participants referred for psychiatric assessment after their conviction were also included in two studies (Dickens, et al., 2009; Enyati et al., 2008). Finally, one study was recruited from the Federal Central Register held within Germany (Barnett, Richter, Sigmund & Spitzer, 1997).

Figure 4 - Schematic Overview of Study Selection



Study focus and design

The focus of the review was to collate all the risk factors associated with adult mentally disordered firesetters (male and female). As part of the inclusion criteria, studies had to include an offending comparison/control group. Whilst the existence of a control group was preferable, only two studies reported matching variables (Bradford, 1982; Tennent, et al., 1971). Therefore, the inclusion criteria was extended to studies using unmatched comparison groups. The presence of an offending comparison/control group allow for assurances to be made that the identified risk factors are specific to MDFs. Compositions of

the comparison/controls groups varied between the fourteen studies (See Table 1). Most studies examined the difference between unmatched male and female mentally disordered firesetters and non firesetting male and female mentally disordered offenders (MDOs; five studies, 35.7%; Bradford, 1982; Enayati et al., 2008; Hagenauw et al., 2014; Räsänen et al., 1995; Tyler et al., 2015). Four studies compared male MDFs with unmatched male non-firesetting MDOs (28.6%; Hill et al, 1982; Labree et al., 2010; Rice & Harris, 1991; Repo et al., 1997). Three studies examined the differences between mixed gender MDFs and mixed gender non-mentally disordered firesetters (21.4%; Barnett et al., 1997; Dalhuisen et al., 2015; Rice & Harris, 1991). Five studies examined the differences between one time and repeat MDFs (35.7%, Dickens et al., 2009; Long et al., 2015; Rice & Harris, 1991; Repo et al., 1997; Tyler et al., 2015). Within these five studies, Dickens et al., (2009) and Tyler et al., (2015) used a mixed gender MDF sample. Repo et al., (1997) and Rice and Harris, (1991) used an all-male sample of MDFs. The only all-female sample of MDFs examining the differences between one time and repeat MDFs was Long et al., (2015). Two studies examined the difference between female MDFs and female non-firesetting MDOs (14.3%; Long et al, 2015; Tennent et al., 1971). Finally, one study examined the differences between male and female MDFs (7.1%; Tyler et al., 2015).

In order to consider the quality of each study included, the MERGE guidelines were amended to include an arbitrary scoring system (See Appendix 1 for scoring system, and Table 1 for further detail on scores assigned to each study). The majority of the studies included in the review (eight out of fourteen), were classified as ‘low’ in quality (Bradford, 1982; Dalhuisen et al., 2015; Enayati et al., 2008; Hagenauw et al., 2014; Hill et al., 1982; Labree et al., 2010;

Long et al., 2015; Tyler et al., 2015). Five of the studies were deemed 'medium' in quality (Barnett et al., 1997; Dickens et al., 2009; Räsänen et al., 1995; Repo et al., 1997; Rice & Harris, 1991). Only one of the fourteen studies included was classified as 'high' quality (Tennent, et al., 1971). None of the studies in the review used social desirability scales, and only two out of the 14 used a matched control subject design. Matched variables included gender and time of admission (Bradford, 1982), and length of current admission and age (Tennent, et al., 1971). Studies included in the review all use quantitative methods to compare the risk factors between MDFs and the comparison group.

2.4 Review Findings

Evidence was found to support the majority of M-TTAF dynamic risk factors (Gannon et al., 2012). The literature supporting *attitudes* (e.g., attitudes supportive of firesetting or offending more generally) in MDFs was sparse. It was therefore difficult to determine whether this domain of risk could be applied to MDFs. Furthermore, within the M-TTAF, Gannon et al., (2012) encapsulate fire interest and fire scripts as part of the *fire factors* domain. Whilst the literature demonstrated some attention towards fire interest – no research has examined the fire scripts possessed by MDFs.

Dynamic Risk Factors

Fire Factors

Tyler et al., (2015) found that male and female MDFs were significantly more likely to report fire interest than male and female non-firesetting MDOs. They also found that an expressed interest in fire was the biggest predictor of multiple incidents of firesetting ($p = .02$). This indicates that those demonstrating a high level of fire interest were 15 times more likely to be repeat firesetters. In further support of this notion, several studies have found that MDFs tend to have

set more than one fire. Barnett et al., (1997) and Tyler et al., (2015) both found that male and female MDFs were significantly more likely to have a history of firesetting prior to the current recorded index offence. Rice et al., (1991) also found that male MDFs were more likely to have committed fire related acts, such as false fire alarms, bomb threats and threats of arson than the male non firesetting MDOs (p <.001). Interestingly, Tyler et al., (2015) found that female MDFs tend to set a significantly greater number of fires (convicted and unconvicted) throughout their lifetime than male MDFs. Finally, Dickens et al., (2009) found that male and female repeat MDFs were significantly younger at the time of their first fire/index-fire respectively, relative to male and female one-time MDFs. Rice and Harris (1991) also replicated this finding with an all-male MDF sample. This factor plays an important role in the consideration of why an individual uses fire versus another behavioural response.

Attitudes

This particular domain of risk was not located within the literature. Therefore, it was difficult to determine the nature to which it could be associated with MDFs. The scant research available in this area appears contradictory. For example, Dalhuisen et al., (2015), and Long et al., (2015) both demonstrated that MDFs had significantly more convictions than non firesetting MDOs. Furthermore, Repo et al., (1997) found that male MDFs were younger than male MDOs, when they received their first convictions; perhaps suggesting an element of antisocial attitudes. In contrast to this, however, Barnett et al., (1996) found that male and female MDFs had fewer entries on the Federal Register relative to non-mentally disordered male and female firesetters.

Social Effectiveness

Poor social skills, emotional loneliness, and low assertiveness all highlight social ineffectiveness. Labree et al., (2010) found that male MDFs appeared to score lower on the 'Superficial Charm' factor of the Psychopathy Checklist Revised (Hare, 2003) than the male non firesetting MDOs (t (71) = 4.0, p = .04). Although within the context of this psychometric assessment superficial charm is symptomatic of psychopathic traits, this interpersonal facet of personality also relates more generally to social intelligence and relational success. Similarly, Hagenauw et al., (2014) found that male and female MDFs scored significantly lower on the 'Social and Relational Skills' factor of the HKT-30 (Werkgroep Risicotaxatie Forensische Psychiatrie, 2003) than the male and female non-firesetting MDOs.

Relationship problems appear to be indicative of social ineffectiveness. Rice and Harris (1991) found that male MDFs were significantly more likely to have never been married (N = 186, 76.7%) than the male non-firesetting MDOs (N = 56, 55.6%; p < .001). Furthermore, Dalhuisen et al., (2015) also found that male and female MDFs were significantly more likely to be single (N = 28, 93.3%) than the male and female non-mentally disordered firesetting group (N = 68, 72.3%; p < .05). Dickens et al., (2009) also found that relationship difficulties were present in a mixed gender sample of MDFs; however repeat MDFs were most likely to be single (N = 53, 65%) relative to one-time MDFs (N = 39, 45%).

Coping and Control

MDFs appear to have difficulty in regulating their internal affective states, which affects their ability to control and cope. Problems with coping and control may manifest in self-harm or suicidal preoccupation, self-neglect, and

violence towards others. (Robertson, Daffern & Bucks, 2014). Räsänen et al., (1995) found that male and female MDFs were significantly more likely to self-report suicidal thoughts ($N = 67$; $N = 29$, $p < .001$), and have made a suicide attempt ($N = 47$; $N = 28$, $p < .001$) than the male and female non-firesetting MDOs. Long et al., (2015) found that female MDFs demonstrated higher self/emotional regulation issues than the female non-firesetting MDOs ($r = 0.48$, $p <. 01$). Similarly, Dalhuisen et al., (2015) found that male and female MDFs were more likely to demonstrate lower levels of self-reliance than male and female non-mentally disordered firesetters (χ^2 (2, $N = 119$) = 9.21, $p < .03$).

Many of the reviewed studies focused upon individual facets of self/emotional regulation. For example, Hagenauw et al., (2014) found that male and female MDFs were more passive aggressive and more easily irritated, than the male and female non-firesetting MDOs. Tennent et al. (1971) also found that significantly more female MDFs had a history of aggression prior to admission ($N = 51$, 91%, $N = 18$, 32.1%; $p < .01$), as well as a significantly greater history of damage to property ($N = 35$, 62.5%, $N = 6$, 10.7%; $p < .01$) than female non firesetting matched control MDOs. Equally, an individual's level of impulsivity can determine their ability to control or suppress an emotion/behaviour. Labree et al., (2010) found that male MDFs scored significantly lower on the 'Impulse Control' item of the PCL-R (Hare, 2003) than the male non-firesetting MDOs. ($N = 1.7$, 0.6%; $N = 1.3$; 0.7%). Similarly, Long et al., (2015) replicated this finding within an all-female sample. Here, female MDFs had a significantly higher impulsivity score (t (64) = 2.30, $p < .05$) than the female non-firesetting MDOs.

Many individuals often demonstrate inappropriate coping methods to deal with unwanted internal affect. Labree et al., (2010), Räsänen et al., (1995),

and Rice and Harris, (1991) found that MDFs were significantly more likely to suffer from alcohol abuse problems relative to non-firesetting MDOs. The participant sample compositions of these studies varied. Alcohol problems were also found to be significantly higher in violent repeat MDFs (N = 97, 85.8%) and non-violent repeat male MDFs (N = 84, 76.4%) than one time offending male MDFs (N = 27, 45.8%; $p < .001$) (Repo et al., 1997). Furthermore, Enayati et al., (2008) found that female MDFs were more likely to have a diagnosis of an alcohol abuse disorder than the female non-firesetting MDOs (N = 15, 25.4%; N = 28, 14.4%, $p < .01$). In addition

Dalhuisen et al., (2015) found that male and female MDFs were more likely to suffer from prolonged/severe problems with soft drugs such as cannabis (N = 14, 54%, N= 28, 33%; $p < .05$) than male and female non-mentally disordered firesetters.

Mental Health

MDFs appear to have extensive histories of psychiatric problems and significantly more diagnoses than non-firesetting MDOs (Dalhuisen et al., 2015; Hagenauw, et al., 2014; Hill, et al., 1982; Räsänen, et al., 1995; Rice & Harris, 1991). In addition to this, Dickens et al., (2009) found that male and female repeat MDFs were significantly younger at the time of their psychiatric assessment than male and female one-time MDFs (N= 27.1; N = 31.7 $p < .01$). Similarly, Rice and Harris (1991) found that male MDFs were younger upon admission than the male non-firesetting MDOs (N = 28.7; N = 31.9 $p < .05$). Long et al., (2015) replicated this, finding that female repeat MDFs were significantly younger at first contact with psychiatric services than the female one-time firesetters (t (45) = 9.02, $p < .05$). Higher instances of mental illness also appear to be related to repeat offences of firesetting; Rice and Harris (1991)

found that male repeat MDFs were more likely to have experienced a childhood institutionalization ($N = 17$, 17.3%) than the male one-time MDFs ($N = 42$, 29.2%). Upon closer inspection of the specific mental illnesses experienced by MDFs, the research appears to show that MDFs typically suffer from psychotic/schizophrenic type disorders (Dalhuisen, et al., 2015; Hagenauw, et al., 2014; Long, et al., 2015; Tyler, et al., 2015) relative to non-firesetting MDO groups. Interestingly, however, within an all-male sample, Labree et al., (2010) found a higher presence of psychotic disorders in the male non-firesetting MDOs ($N = 7$; $N = 27$ $p < .05$). Examining the group differences between MDFs, Dickens et al., (2009) found that male and female repeat MDFs were significantly more likely to meet the criteria for Pyromania ($N = 4.0$; $N = 0$, $p < .05$) than male and female one-time MDFs.

The presence of active mental illness etiology in MDFs appears to have a disinhibiting effect upon the individual; thus, increasing the risk of firesetting behaviours in the short term. Repo et al., (1997) found that symptoms of psychosis were significantly more common amongst male one-time MDFs than male repeat MDFs ($N = 35.6$; $N = 16.4$; $N = 12.4$ $p < .001$). Similarly, within a mixed gender sample, Dickens et al., (2009) found a higher presence of psychosis in repeat MDFs than one-time MDFs ($N = 16.3$; $N = 5.7$ $p < .05$). Further findings from Bradford (1982) solidify the importance of active symptomology within mentally disordered firesetting. They found that male and female MDFs were more likely to be deemed incompetent to plead during their trial relative to male and female non-firesetting MDOs ($\chi^2 = 10.89$; $df = 3$; $p < .01$).

Much of the reviewed research found that a diagnosis of a personality disorder was associated with mentally disordered firesetting. Dalhuisen et al.,

(2015) found that male and female MDFs demonstrated significantly more traits of a personality disorder (N = 12, 48%; N = 31, 39%) or an actual diagnosis of a personality disorder (N = 11, 44%; N = 26, 33%) than the male and female non-mentally disordered firesetters. Long et al., (2015) found that a diagnosis of Emotionally Unstable Personality Disorder was more typical in female MDFs than the female non-firesetting MDOs *(*χ^2 (1) = 3.83, $p < .05$).

Static Risk Factors

Developmental Context - Learning Experiences

This review found evidence to suggest that exposure to firesetting at an early age increased the likelihood firesetting behaviours' in later life (Tyler et al, 2013). Rice and Harris (1991) found that MDFs were more likely to have a family history of firesetting relative to non-firesetting MDOs (N = 23.1, 9.5%; N = 0, 0%, $p < .01$*)*

Developmental Context - Caregiver Environment

Childhood problems relating to abuse, social status, and attachment have been found to be more evident in MDFs than mentally disordered comparison

Table 1

Studies Examining the Risk Factors of Mentally Disordered Firesetters

Authors	Sample	Sex (MDFs)	Comparison Group	Matched Variables	Design	Results	Recidivism measured?	Total Quality Score
Barnett, Richter, Sigmund, and Spitzer (1997)	186 MDFs deemed 'not responsible' for psychiatric reasons. **(Score 2)**	80% Male 20% Female	97 firesetters deemed to have 'Diminished responsibility' and 187 deemed 'fully responsible' for their firesetting.	None **(Score 0)**	A retrospective file review of all individuals convicted of arson taken from the Federal Central Register.	MDFs were found to be older, more likely to be female, have fewer entries on the Federal Central Register (suggesting fewer criminal charges) and have a history of previous firesetting than non-mentally disordered firesetting comparison group. **(Score 1)**	Yes **(Score 2)**	5- Medium
Bradford (1982)	34 adult pre-trial MDFs referred for a psychiatric assessment. **(Score 0)**	76.5% Male 23.5% Female	50 mentally disordered individuals charged with non-firesetting related offences.	Gender Time of Admission **(Score 2)**	A comparison of psychiatric, psychosocial and medico legal issues were observed over an 18-month period.	MDFs were significantly more likely to be unskilled workers and have had less schooling than the mentally disordered non-firesetting comparison group. MDFs were more likely to be declared incompetent to plead due to psychiatric illness. **(Score 1)**	No **(Score 0)**	3- Low
Dalhuisen, Koenraadt, & Liem (2015)	30 psychotic pre-trial MDFs referred for psychiatric assessment. These individuals were deemed to have committed their offence because of mental health symptomology. **(Score 0)**	86.3% Male 13.7% Female	94 pre-trial non-mentally disordered firesetters referred for psychiatric assessment.	None **(Score 0)**	A retrospective file review of patients was completed between 2000-2010. Information reviewed included social background, report of accused's behaviour on the ward, a brief medical examination, and a psychological and psychiatric assessment.	Results of this study found that MDFs were more likely to be single, unemployed, have a lack of self-reliance, and have experienced less physical abuse in childhood than the non-mentally disordered firesetting comparison group. MDFs were also found to have more extensive/intensive histories of mental health care with significantly more diagnoses, more likely to have a traits/diagnosis of personality disorder, to have a problem with soft drugs (cannabis) and be experiencing suicidal ideation at the time of their offence. **(Score 2)**	Yes **(Score 2)**	4- Low
Dickens, Sugarman, Edgar, Hofberg, Tewari and Ahmad (2009)	81 Repeat MDFs referred to a regional forensic psychiatric service for psychiatric assessment. **(Score 2)**	77% Male 23% Female	86 Historical one-time MDFs identified from psychiatric assessment over a 24-year period.	None **(Score 0)**	A retrospective review of participants' case notes. Variables of interest were gathered from the literature on recidivistic firesetting.	Results found that repeat MDFs were younger, single, have a family history of violence, and were younger at their first conviction. Repeat MDFs were also more likely to have spent more time in prison. Other factors such as school adjustment factors, enuresis, psychosis, learning disability and a diagnosis of Pyromania were all found to be more common in repeat MDFs than one-time MDFs. **(Score 2)**	Yes **(Score 2)**	6- Medium
Enayati, Grann, Lubbe and Fazel (2008)	214 Convicted MDFs referred for psychiatric assessment. **(Score 2)**	72.4% Male 27.6% Female	2395 mentally disordered offenders convicted of crimes other than arson.	None **(Score 0)**	A retrospective review of all MDFs referred for a psychiatric assessment over a five-year period. File information including basic socio-demographic, diagnostic, and criminal history information was collated.	Results found that male and female MDFs were more likely to have a diagnosis of learning disability. Male MDFs were also found to have a significantly higher rate of Asperger's Syndrome. Female MDFs were also found to have a high level of alcohol use disorders. **(Score 1)**	No **(Score 0)**	3- Low

Hagenauw, Karsten, Akkerman-Bouwsema, de Jager and Lancel (2014)	14 MDFs detained within a forensic psychiatric hospital in the Netherlands. **(Score 0)**	78.6% Male 21.4% Female	59 Non firesetting mentally disordered offenders detained within a forensic psychiatric hospital in the Netherlands	None **(Score 0)**	Retrospective review of file data, including Historical Clinical Future, (HKT-30, Werkgroep Risicotaxatie Forensische Psychiatrie, 2003) and Patient interviews.	Results found that MDFs were more likely to have experienced behavioural problems before the age of 12, have a greater history of mental health care and were more likely to have a psychotic disorder. Additionally, MDFs were found to be more hostile, and have fewer social and relational skills. **(Score 2)**	No **(Score 0)**	2- Low
Hill, Langevin, Paitich, Handy, Russon & Wilkinson (1982)	38 male pre-trial MDFs referred for psychiatric assessment at a Forensic Inpatient Service. **(Score 0)**	100% male	30 male mentally disordered property offenders with no history of violence. Additionally, 24 male mentally disordered violent offenders. Both of whom had been referred for a psychiatric assessed at a Forensic Inpatient Service.	None **(Score 0)**	A retrospective review of medical records completed by two raters. Pertinent information was extracted after a list of hypotheses was derived from the literature.	Results found that MDFs were significantly more likely to be diagnosed with a psychiatric disorder and mental retardation. **(Score 1)**	Yes **(Score 2)**	3- Low
Labree, Mijman, van Marle, and Rassain. (2010).	25 male MDFs within a Maximum-security forensic Hospital. **(Score 0)**	100% male	50 male non-firesetting mentally disordered patients detained at the same maximum-security forensic hospital.	None **(Score 0)**	A retrospective review of psychiatric, psychological, personal, and criminal backgrounds of all participants.	Results found that male MDFs were more likely to have received psychiatric treatment in the past, display a higher level of alcohol abuse, and were less likely to have been diagnosed with a psychotic disorder. Arsonists also scored more highly on the 'impulsivity' factor of the Psychopathy Checklist-Revised (PCL-R, Hare, 2003). In addition to this, MDFs were found to demonstrate 'less superficial charm' on the PCL-R. **(Score 1)**	Yes **(Score 2)**	3- Low
Long, Fitzgerald, & Hollin (2015)	49 female MDFs **(Score 1)**	100% female	41 female mentally disordered non firesetters	None **(Score 0)**	Retrospective case review of admissions spanning from 2002-2010. Information was gathered from the following areas: demographic details, psychometric assessments of symptomology; impulsivity, need, global functioning, and self-efficacy.	Results found that female MDFs were more likely to demonstrate lower levels of global functioning, have higher levels of impulsivity, and have lower self-efficacy. Female MDFs were also more likely to have previous convictions and be diagnosed with Emotionally Unstable PD or schizophrenia. Repeat MDFs were also found to be were typically younger at first contact with psychiatric services. **(Score 1)**	Yes **(Score 2)**	4- Low

Räsänen, Hakko & Väisänen (1995)	98 pre-trial MDFs referred for psychiatric assessment between 1975-1993. **(Score 2)**	87.8% Male 12.2% Female	55 pre-trial homicide mentally disordered offenders referred for psychiatric assessment.	None **(Score 0)**	A retrospective file review of subjects' case records and the forensic psychiatric examination pronouncements drawn up by the order of the court (fully responsible, diminished responsibility and not responsible).	Results found that pre-trial MDFs were more likely to be single, have lower levels of education, be unemployed, and have a history of psychiatric care relative to pre-trial mentally disordered homicide offenders. MDFs were also found to have more alcohol abuse problems, experienced suicidal thoughts/attempted suicide, have a diagnosis of psychiatric disorder (specifically learning disability, psychosis, and acute/severe depression). MDFs were also more likely to be deemed not responsible at the time of their offence. **(Score 1)**	Yes **(Score 2)**	5 Medium
Repo, Virkkunen, Rawlings, & Linnoila (1997)	59 male one-time MDFs over 15 years who were referred for a psychiatric assessment **(Score 2)**	100% male	110 male MDFs with a history of other non-violent criminal offences and 113 male MDFs with a history of violent criminal offences.	None **(Score 0)**	A retrospective file review of demographic, psychiatric and criminal variables.	Results found that violent repeat MDFs were more likely to be alcohol dependent and have a diagnosis of Antisocial Personality Disorder. Non-violent repeat MDFs were significantly more likely to have a history of enuresis. More generally, repeat MDFs were more likely to be intoxicated at the time of the offence and were younger at the time of their first criminal offence than one-time MDFs. Finally, they found that one-time MDFs were most likely to be suffering from psychosis. **(Score 1)**	Yes **(Score 2)**	5 Medium
Rice and Harris (1991)	243 males MDFs admitted to a maximum-security psychiatric institution. **(Score 2)**	100% male	100 male mentally disordered non-firesetters admitted to the same maximum-security psychiatric institution.	None **(Score 0)**	A retrospective file review of every patient admitted over an 11-year period.	Results found that MDFs were typically younger at admission, had employment problems, and had a slightly lower IQ. In addition to this, MDFs had committed fewer acts of physical aggression, were more likely to have a history of institutionalization, have family reports of fire interest, have a family history of fire setting, and had fewer contacts with correctional system prior to admission. **(Score 2)**	Yes **(Score 2)**	6 Medium
Tennent, McQuaid, Loughnane & Hands (1971)	56 Female MDFs admitted to High Secure Special Hospitals **(Score 2)**	100% female	56 mentally disordered non-firesetters. Matched for age (within 1 year) and length of current admission (within 1 year)	Age (within one year) Length of current admission (within 1 year) **(Score 2)**	Social, criminal, and psychiatric histories were obtained from both patient groups. Semi structured interviews with the patients were also carried out.	The results showed that female MDFs were significantly more likely to have experienced separation from a parent and have a history of damage to property. **(Score 1)**	Yes **(Score 2)**	8 High
Tyler, Gannon, Dickens & Lockerbie (2015)	43 MDFs. **(Score 1)**	60.5% Male 39.5% Female	34 mentally disordered non-firesetters.	None **(Score 0)**	Retrospective file information was collected from patient hospital records at six psychiatric hospitals in the UK; information included sociodemographic, family, psychiatric, and criminal factors.	Results found that MDFs were more likely to have a diagnosis of a schizophrenic illness, were less likely to be learning disabled, and held a higher level of reported fire interest/interest in explosives relative to the comparison group. Additionally, male MDFs were more likely to have convictions for drug/alcohol offences. Alternatively, female MDFs had committed significantly more incidents of firesetting over their lifespan (convicted/unconvicted). The variable most predictive of repeat firesetting was fire interest. **(Score 1)**	Yes **(Score 2)**	4 Low

Table 2

Studies Evidencing Dynamic Risk Factors of the M-TTAF

Dynamic Risk Factor	Study
Fire Factors	Barnett, Richter, Sigmund, and Spitzer (1997); Dickens, Sugarman, Edgar, Hofberg, Tewari and Ahmad (2009); Rice and Harris (1991); Tyler, Gannon, Dickens, and Lockerbie (2015).
Attitudes	Barnett, Richter, Sigmund, and Spitzer (1997); Dalhuisen, Koenraadt, & Liem (2015); Repo, Virkkunen, Rawlings, & Linnoila (1997);
Social Effectiveness	Dalhuisen, Koenraadt, & Liem (2015); Dickens, Sugarman, Edgar, Hofberg, Tewari and Ahmad (2009); Hagenauw, Karsten, Akkerman-Bouwsema, de Jager and Lancel (2014); Labree, Nijman, van Marle and Rassin (2010); Rice and Harris (1991).
Coping and Control	Dalhuisen, Koenraadt, & Liem (2015); Enayati, Grann, Lubbe and Fazel (2008); Hagenauw, Karsten, Akkerman-Bouwsema, de Jager and Lancel (2014); Labree, Nijman, van Marle and Rassin (2010); Long, Fitzgerald & Hollin (2015); Räsänen, Hakko & Väisänen (1995); Repo, Virkkunen, Rawlings, & Linnoila (1997); Rice and Harris (1991); Tennant, McQuaid, Loughnane and Hands (1971).
Mental Health	Bradford, (1982); Dalhuisen, Koenraadt, & Liem (2015); Dickens, Sugarman, Edgar, Hofberg, Tewari and Ahmad (2009); Hagenauw, Karsten, Akkerman-Bouwsema, de Jager and Lancel (2014); Hill, Langevin, Paitich, Handy, Russon & Wilkinson (1982); Labree, Nijman, van Marle and Rassin (2010); Long, Fitzgerald & Hollin (2015); Räsänen, Hakko & Väisänen (1995); Repo, Virkkunen, Rawlings, & Linnoila (1997); Rice and Harris (1991); Tyler, Gannon, Dickens and Lockerbie (2015).

groups. Hagenauw et al., (2014) found that male and female MDFs scored significantly higher on the '*behavioural problems before the age of 12'* factor of the HKT-30 (Werkgroep Risicotaxatie Forensische Psychiatrie, 2003) than the non-firesetting male and female MDOs. Similarly, Tennent, et al., (1971) found that female MDFs were significantly more likely to have experienced separation from a parent before the age of 3 years ($N = 19$) than the matched control female non-firesetting MDOs ($N = 5$). Rice and Harris (1991) found that male MDFs were significantly less likely to be recorded as living within the parental home at the age of 16 ($N = 100$, 41%) than male non-firesetting MDOs ($N = 25$, 25%, $p < .01$). Furthermore, Tyler et al., (2015) found that male and female MDFs demonstrated a greater family history of mental illness ($N = 21$, 48.8%) than the male and female non firesetting MDOs ($N = 10$, 29.4%). This result was trending

towards significance (p = .06). This review suggests that generally MDFs appear to experience neglectful parenting, as opposed to overtly abusive parenting. This is supported by the findings of Dalhuisen et al., (2010) who found that male and female MDFs were significantly less likely to have suffered from physical abuse growing up (N = 5, 22%) relative to the male and female non-mentally disordered firesetters (N = 39, 47%).

Equally, it was also found that MDFs appear to have greater educational problems than MDOs. Räsänen et al., (1995) found that male and female pre-trial MDFs were significantly more likely to have attended a comprehensive school (N = 84, 82%) than the male and female non-firesetting pre-trial MDOs (N = 63, 32%). Bradford (1982) also found that a higher number of male and female pre-trial MDFs had less than 7 years of schooling (N = 13, 38%) which was significantly higher than that found within the male and female non-firesetting pre-trial MDOs (N = 12, 35.5%; p < .001). Furthermore, Dickens et al., (2009) associated an increased risk of recidivism with an individuals' lack of education. Male and female repeat MDFs had a higher level of school adjustment issues (measured by their attendance at a special school) (N = 56, 69%) relative to the one-time MDF comparison group (N = 41, 48%).

Developmental Context - Biology/Temperament

The review appears to show that MDFs demonstrate a higher rate of learning disability than the MDOs. Enayati et al., (2008) found that male and female pre-trial MDFs (N = 16, 10.3%; N = 5, 8.5%) were significantly more likely to have a DSM-IV diagnosis of learning difficulties than the convicted male and female non-firesetting MDOs (N = 74, 3.4%; N = 5, 2.6%, p < .001). In addition to this, Hill et al., (1982) found that male pre-trial MDFs were more likely to have a diagnosis of mental retardation than the male non-firesetting

MDOs. Likewise, intelligence quotients appear to differ significantly between MDFs and non-firesetting MDOs. Rice and Harris (1991) found that male MDFs demonstrated an average IQ of 92.6, differing significantly from the average IQ of 99.0 found in male non firesetting MDOs. Conversely, however, Tyler et al., (2015) demonstrated contrasting results; whereby MDFs had significantly less diagnoses of learning disability than the non-firesetting MDOs ($N = 1$, 2.3%, $N = 6$, 17.6%; $p < .05$). Finally, Dickens et al., (2009) showed that the presence of a learning disability was significantly more likely in male and female repeat MDFs than male and female one-time MDFs ($N = 11$, 14%, $N = 4$, 5%; $p < .05$). This result suggests that the presence of a learning disability increases the risk of firesetting behaviours.

Table 3

Studies Evidencing Static Dynamic Risk Factors of the M-TTAF

Static Risk Factor	**Study**
Developmental Context-*Learning Experiences*	Rice and Harris (1991); Tyler, Gannon, Dickens, and Lockerbie (2015).
Developmental Context-*Caregiver Environment*	Bradford, (1982); Dalhuisen, Koenraadt, & Liem (2015); Dickens, Sugarman, Edgar, Hofberg, Tewari and Ahmad (2009); Hagenauw, Karsten, Akkerman-Bouwsema, de Jager and Lancel (2014); Räsänen, Hakko and Väisänen (1995); Rice and Harris (1991); Tennant, McQuaid, Loughnane and Hands (1971); Tyler, Gannon, Dickens, and Lockerbie (2015).
Developmental Context-*Biology/Temperament*	Dickens, Sugarman, Edgar, Hofberg, Tewari and Ahmad (2009); Enayati, Grann, Lubbe and Fazel (2008); Hill, Langevin, Paitich, Handy, Russon & Wilkinson (1982); Rice and Harris (1991); Tyler, Gannon, Dickens, and Lockerbie (2015).

2.5 Discussion

The review highlights the lack of research in relation to MDFs. The existing research is patchy and makes drawing finite conclusions difficult. Despite this, the review provided evidence to support the majority of the static and dynamic risk factors within the M-TTAF (Gannon, et al., 2012). MDFs were found to have significantly higher deficits in areas of developmental context,

such as caregiver environment, learning, and biology. In addition to this, psychological vulnerabilities such as fire factors, social ineffectiveness and problems with coping and control were all found to be significant attributes within MDFs. The review found very little empirical support for MDFs demonstrating attitudes supportive of offending. Furthermore, there was no exploration of fire scripts within MDFs. However, the systematic review found evidence to support mental health as a significant moderator of mentally disordered firesetting.

Overall, it was found that there were few significant differences in overall demographic information between the MDFs and the variety of offending non firesetting comparison groups used (Bradford, 1982; Hagenauw et al., 2014; Long, et al., 2015; Tyler, et al., 2015). This finding may offer an explanation as to why the 'generalist hypothesis' has, until recently, been prevalent within the assessment of firesetters. By assuming this generalist hypothesis of firesetting, there has been a lack of empirical research with this offending group. Consequently, this has left a distinct lack of risk assessment options for firesetters. Ducat, McEwan and Ogloff (2013) offered further comment on this, suggesting that firesetters may in fact share the risk/need factors that are common to all offenders (Andrews, Bonta & Hoge, 1990). However, firesetting behaviourally manifests differently to other offences.

Fire Factors

The presence of fire interest appears to segregate MDFs as a specialist-offending group relative to non firesetting MDOs. Despite fire interest featuring heavily in current theories of mentally disordered firesetting (Barnoux et al., 2014; Fineman, 1980;1995; Gannon, et al., 2012; Tyler, et al., 2013), it was only examined by a few of the studies outlined in this review (Rice & Harris, 1991;

Tyler, et al., 2015). With an absence of fire scripts in the literature, the fire factor domain, as defined by Gannon et al., (2012) has not been explored in full. Thus, firesetting scripts arguably remain a hypothetical concept (Butler & Gannon, 2015; Gannon et al., 2012).

Attitudes

This systematic review found very little empirical support for offence supportive attitudes in MDFs. whilst it was found that female MDFs were more likely to have previous convictions relative to female MDOs (Long, et al., 2015), this information does not provide the confidence required to support the notion of MDFs holding offence supportive attitudes. Further research is required here, as it is difficult to draw conclusions from the existing research.

Social Effectiveness

The findings from this review suggest that MDFs experience problems with social effectiveness relative to non firesetting MDOs (Dalhuisen, et al., 2015; Dickens, et al., 2009; Hagenauw, et al., 2014; Labree, et al., 2010; Räsänen, et al., 1995). Individuals who have problems expressing their feelings may be more likely to use firesetting as a form of communication. Geller (1992) hypothesized the existence of communicative firesetting; whereby fire is used as a form of communication. This may explain why this review found that MDFs tend to have a greater incidence of learning disability than non-firesetting MDOs (Enyati, et al., 2008; Hill, et al., 1982; Räsänen, et al., 1995). Similarly, MDFs showed a lower engagement with work (Bradford, 1982; Dalhuisen, et al., 2015; Räsänen, et al., 1995; Rice & Harris, 1991) and lower levels of education (Bradford, 1982; Räsänen, et al., 1995).

Coping and Control

This review highlighted that MDFs appear to experience significant problems with coping and control relative to non firesetting MDOs (Dalhuisen, et al., 2015; Enyati, et al., 2008; Hagenauw, et al., 2014; Labree, et al., 2010; Long, et al., 2015; Räsänen, et al., 1995; Repo, et al., 1997; Rice & Harris, 1991; Tennent, et al., 1971). MDFs also seemed to show greater deficits in impulse control (Labree, et al., 2010; Long, et al., 2015) relative to non-firesetting MDOs. A lack of impulse control appears to make the occurrence of firesetting behaviours more likely. This finding appears logical given the classification of pyromania as an 'Impulse Control Disorder' in the DSM-V (American Psychological Association, 2013). As a consequence of an MDF's impaired ability to respond to difficulties; we see increased levels of hostility (Hagenauw et al., 2014) suicide attempts/self-harm (Dalhuisen et al., 1995) and substance abuse (Dalhuisen et al., 2015; Enyati et al., 2008; Labree et al., 2010; Räsänen et al., 1995) (Repo et al., 1997) relative to non firesetting MDOs.

Mental Health

One of the most consistent findings within the review literature was the vast psychiatric involvement that MDFs appear to experience. MDFs appear to have more extensive psychiatric histories relative to non firesetting MDOs (Dalhuisen, et al., 2015; Hagenauw, et al., 2014; Labree et al., 2010; Räsänen, et al., 1995). Similarly, repeat MDFs are significantly younger at their first contact with mental health services (Long et al., 2015)

Developmental Context

MDFs appear to experience a dysfunctional family environment. Rice and Harris (1991) found that MDFs appear to suffer neglectful abuse, as opposed to more overt forms of abuse. This result corresponds to the work of Butler and

Gannon (2015), who hypothesise that ineffective childhood supervision surrounding fire may lead to the development of unhealthy fire scripts later in life.

Gender

Turning now to the issue of gender and mentally disordered firesetting. Most female MDFs included in the review were within a sample of mostly male MDFs. The percentage of females included in these studies was consistently lower than the percentage of males, ranging from 12.2% - 39.5%. It seems logical that differences in clinical features between the two sexes is established before mixed gender samples are used. It follows that the review found very few etiological differences between male and female MDFs. Gannon (2010) highlighted the lack of literature on female firesetters; an area also neglected in this review, with only one of the studies examining male and female MDFs (Tyler, et al., 2015). Despite an overall similarity in the risk factors documented for male and female MDFs; females appeared to have set significantly more fires than males throughout their lifetime. However, based upon one study alone conclusions are difficult to draw.

Limitations

A lack of research examining mentally disordered firesetting restricts the results of this systematic review. The guidelines used to assess the quality of the studies included determines that this review is based upon mostly low-quality studies. Almost all of the studies had a sample size of 50 MDFs or less (Bradford, 1982; Dalhuisen et al., 2015; Enayati, et al., 2008; Hagenauw et al., 2014; Hill et al., 1982; Labree et al, 2010; Long et al., 2015; Tyler et al., 2015). Furthermore, a large majority of the studies included in this review used comparison groups, instead of a matched control group. Only two of the studies

included matched variables (Bradford, 1982; Tennent, 1971). Therefore, the reliability of the findings could be questioned. Whilst the research examining MDFs remains sparse, this will remain an issue. However, this review presents a collation of the research that has taken place thus far. More importantly however, it highlights a need for further research.

Conclusion and Recommendations

Within this review, evidence has been found for several risk factors displayed by MDFs as conceptualised within the MTTAF. This thereby supports the MTTAF and confirms the need for a validated specialised risk assessment (Gannon & Pina, 2010). The risk factors highlighted within this review are not comprehensively covered within the violence risk tools currently being used to assess MDFs. Consequently, professionals are making risk averse decisions with MDFs in the absence of any guiding literature. Thus, MDFs are experiencing difficulty when trying to move on from secure services (Centre for Mental Health, 2011). With the introduction of a fully valid and reliable risk tool, risk decisions made with MDFs would be more transparent and evidence-based. However, to develop an appropriate risk assessment for this complex behaviour; significant expansion of the current knowledge of firesetting risk factors is required. The literature shows no empirical consideration for the attitudes (antisocial or supportive of firesetting) demonstrated by MDFs. Thus, an investigation of fire interest and fire scripts within mentally disordered firesetting should take place, as these will provide vital risk information needed for the formulation of risk. Finally, gender informed research should be generated to establish whether female MDFs require a gender sensitive risk tool.

Chapter Three. Study 1: Mentally Disordered Firesetters Have Distinct Risk Factors that Predict Gender[3]

3.1 Aim of Chapter

As highlighted in the systematic review, very little research examining firesetting risk for MDFs has been completed. The research that has been completed is poor in quality, with small sample sizes, unequal comparison groups, and unmatched variables. This chapter presents a study which aimed to examine the risk-related characteristics of mentally disordered patients who had either been: (1) involved in a firesetting incident, or (2) involved in a non-firesetting incident. Leading by example, this study is one of the first studies to match variables in an attempt to examine the static, dynamic, and incident-related factors in the prediction of firesetting. In an attempt to further complete the literature, this study aimed to examine any differences between male or female, and one-time or repeat firesetter.

3.2 Introduction

Approximately 10% of patients in secure mental health institutions hold a conviction for deliberate firesetting (Dickens & Doyle, 2016). Yet, alarmingly, there is no specialised risk assessment tool to aid professionals in their risk management decisions with these individuals. In the absence of a specialised risk assessment tool, many professionals rely on violence risk assessments to bridge the gap (Historical Risk Clinical-20 V3, HCR-20 V3; Douglas, et al., 2013). However, contemporary theory and research indicates that deliberate firesetting most often originates from non-violent motivators such as fire interest or problems with impulse control and general communication (Butler & Gannon,

[3] This study is currently under review for publishing

2015; Gannon, et al., 2012). Thus, violent risk assessments appear wholly unsuitable for widespread use with firesetters.

Risk Assessment

Within psychology and psychiatry, the most popular method of forensic risk assessment relies upon combining historical, unchangeable static risk factors (such as criminal history) with fluctuating—yet treatable—dynamic risk factors (e.g., relationship problems or hostility). These risk factors are brought together with professional judgement to create a formulation of offending behaviour (Hart, et al., 2011). Whilst static risk factors can provide a long-term view of future risk, it is the dynamic risk factors that allow practitioners to prioritise the psychological vulnerabilities that require further monitoring and treatment (Vess & Ward, 2011).

Theoretical and Research Indicators of Firesetting Risk

Until relatively recently, there was no comprehensive theory available to explain why adults with or without a mental disorder choose to misuse fire. In 2012, Gannon and colleagues developed the *Multi-Trajectory Theory of Adult Firesetting* (or M-TAFF)—using available evidence—to explain the facilitation and maintenance of all adult perpetrated firesetting (see Chapter One). Within the theory, Gannon et al. (2012) propose that individuals begin to misuse fire due to various dynamic risk factors spanning four key areas: *Fire Factors* (i.e., cognitive, and emotional responses to fire), *Attitudes* (i.e., antisocial attitudes), *Social Effectiveness* (i.e., poor social skills and social isolation), and *Coping and Control* (i.e., emotion regulation problems and poor impulse control). Few gender differences are alluded to although women, in particular, are hypothesized to hold problems with impulsivity that are likely to result in fire misuse as a form of 'cry for help', self-harm, or suicide. Within the M-TTAF,

static risk factors are largely ignored in favour of dynamic risk factors and there is no focus on how characteristics of the firesetting (e.g., multiple ignition points or premeditation) might be associated with gender or firesetting maintenance. Even when focusing on dynamic risk factors, the M-TTAF provides no explicit guidance on (a) which of these factors might best discriminate firesetters from their non-firesetting counterparts, (b) whether male and female firesetters are characterized by differential dynamic risk factors, and (c) whether repetitive firesetting holds unique dynamic risk factors relative to one-time firesetting. Answers to these questions are key to developing theoretical models of firesetting risk in mentally disordered firesetting.

Static risk and incident-related characteristics

In the absence of sophisticated theoretical models of firesetting risk, research examining risk in mentally disordered firesetters (MDFs) is scant; focusing mostly on unchangeable static factors. Studies suggest that male dominated samples of MDFs are characterized by negative developmental histories that include childhood behavioural problems, and poor-quality education relative to non-firesetter mentally disordered offenders (Hagenauw et al., 2014; Räsänen et al., 1995). Male MDFs are also more likely to recall having a family member who has also misused fire (Rice & Harris, 1991). Finally, male dominated samples of MDFs appear to hold a higher prevalence of personality disorder diagnoses relative to non-firesetting mentally disordered offenders (Bradford, 1982) as well as higher numbers of previous mental health service contacts or admissions (Ducat, Ogloff & McEwan 2013; Geller, Fisher, & Moynihan, 1992). When female MDFs have been analysed separately to male MDF, some static and incident-related differences have been reported by Dickens and colleagues (2007). They found that female MDFs, relative to male

MDFs, were more likely to have experienced past relationship difficulties, but were less likely to have problems with alcohol. Female MDFs were also less likely to have been intoxicated at the time of their firesetting and were more likely to set fires to attract attention or as a form of 'parasuicide' relative to male MDFs. Enayati et al., (2008) compared the psychiatric issues of male and female MDFs in Sweden and found no distinctive patterns related to gender.

Dynamic risk factors

Despite the importance of dynamic risk factors for risk assessment purposes, current understanding of such variables remains particularly underdeveloped for MDFs. Existing research has found that when compared to other mentally disordered offending groups, groups of male or mostly male MDFs are characterized by hostility (Hagenauw et al., 2014; Rice & Harris, 1991), and alcohol misuse (Enayati et al., 2008; Labree, et al., 2010; Räsänen et al., 1995). Additionally, active symptoms of mental illness (particularly psychosis) and social skills issues appear common in groups of mostly male MDFs (Bradford, 1982; Hagenauw et al., 2014; Räsänen et al, 1995).

Recent research suggests that male imprisoned firesetters—many of whom hold mental health difficulties—exhibit unique dynamic risk factors from that of mainstream offenders (Gannon et al., 2013; Ó Ciardha, Tyler, & Gannon, 2015). For example, Gannon et al. (2013) found that male firesetters self-reported greater problems in their cognitive and emotional responses to fire relative to matched non-firesetting offenders. This included normalising fires, viewing serious fires as interesting, and valuing fire as an important part of their self-identity. Deficits in the areas of emotional-regulation and self-esteem were also apparent for male imprisoned firesetters. Although one study (see Tyler et al., 2015) comparing mostly male MDFs with mentally disordered comparisons

on static and dynamic risk factors has shown that MDFs also hold significant problems in their emotional response to fire relative to controls, other discernible dynamic risk factors could not be identified. Other work, however, suggests that female MDFs are likely to be characterized by impulsivity (Long et al., 2015) and emotional-regulation deficits that promote self-harm or suicidal preoccupation (Miller & Fritzon, 2007).

Key Research Problems

One of the key reasons why understanding of mentally disordered firesetting remains limited is poor study design (See Chapter Two). Studies tend to use male dominated samples and do not use control groups of other mentally disordered individuals who are meaningfully matched on key characteristics. Furthermore, few studies adequately compare female and male MDFs (Bradford, 1982; Tyler et al., 2015) and when they do, few differences are reported (see Dickens et al., 2007; Rix, 1994). Thus, rigorous research is required to draw more definitive conclusions about whether or not male and female MDFs hold differential risk factors for firesetting.

Finally, very few studies have explored determinants of repeat firesetting in MDFs. Rice and Harris (1996) examined 208 male MDFs and found that young age at first fire, low intelligence, and lack of aggression predicted repeat firesetting. Repeat MDFs also appear to have more convictions and have spent a greater time in prison relative to non-firesetting mentally disordered offenders (Dickens et al., 2009; Repo et al., 1997). Unsurprisingly, then, antisocial personality disorder appears predictive of repeat mentally disordered firesetting (Repo et al., 1997). In addition, dynamic risk factors such as active symptoms of mental illness (particularly psychosis) appear common amongst repeat MDFs relative to one-time MDFs (Dickens et al., 2009; Repo et al., 1997).

Furthermore, Tyler et al. (2015) found that MDFs exhibiting fire interest were most likely to have perpetrated multiple episodes of firesetting.

The Current Research

This study draws upon specialist archived National Health Service patient data files ($N = 132$) to identify the static, dynamic, and incident-related risk predictors for firesetting in mentally disordered individuals. The systematic review in the previous chapter highlighted a number of concerns within the firesetting literature. This study therefore aims to answer important questions key to developing theoretical models of firesetting risk in relation to mentally disordered offending. These questions revolve around (a) whether predictors of firesetting are considerably different to predictors of other undesirable behaviours that do not involve firesetting, (b) whether male and female firesetting is characterized by different predictors, and (c) whether repetitive firesetting holds substantially different predictors relative to one-time firesetting.

The data set is novel since it matches—and compares—mentally disordered individuals who have set fires during their time as an NHS patient with mentally disordered individuals who have never set a fire but who have perpetrated another undesirable incident whilst under NHS care. Thus, this study will be the first to examine the possible dynamic risk factors characterizing MDFs using a matched group of mentally disordered controls (MDCs). The use of a matched control group will allow us to control for the potentially confounding effects of gender, age, and NHS establishment. Firstly, this study compares the static, dynamic, and incident related risk factors associated with the firesetting or control incident to examine whether MDFs hold unique risk factors that differentiate them from MDCs (including sub-analyses by gender). This study then focuses on the MDF group examining whether static, dynamic, and

incident-related characteristics differentiate male and female MDFs or one time or repeat MDFs.

3.3 Method

Design

This study was conducted in accordance with APA ethical guidelines and was reviewed and approved by the University's Research Ethics Committee (Ref: 20143546, see Appendix 2), London Fulham NHS REC (Ref: 14/LO/1060, see Appendix 3 and 4) and the NHS Confidentiality Advisory Group (14/CAG/1005, see Appendix 5). This study design was retrospective and involved examining pre-existing trust incident report forms from 3 January 2005 – 24 June 2014 to identify participants who had either been (a) involved in a firesetting incident, or (b) involved in a non-firesetting comparison incident (e.g., drug taking, self-harm, violence). Logistic regression was used to model the ability of static, dynamic, and incident-related factors (IVs) in predicting the following sets of dependant variables: MDF or MDC status (overall and subdivided by gender), Male or Female MDF status, and One-time versus Repeat MDF status.

Participants

One hundred and thirty-two participants were recruited within an NHS Care Group in England (66 MDFs, 66 MDCs). Approval was sought under Regulation 5 of the Health Service (Control of Patient Information) Regulations 2002 to process patient identifiable information without seeking prior informed consent. This regulation could be used since all patients admitted to trust care are provided with documentation informing them that their details will be used for research purposes unless they opt out. A fair processing notice was placed on the NHS trust website, detailing the research intentions to access patient records for

the purpose of this study and providing contact details for any patients who wished to opt out of the study (see Appendix 6). However, no opt out requests from patients were received.

MDFs. A total of 66 MDFs were included, as only 66 individuals (that were deemed suitable) were found to have set deliberate fires between the period of 3 January 2005 to 24th June 2014. To be classified as an MDF, individuals needed to be: (1) under the care of the trust for a psychiatric problem, and (2) the named perpetrator of a deliberate incident of firesetting within a trust incident form for the period 3 January 2005 to 24 June 2014. This particular time frame was chosen as January 2005 was the date that the existing incident reporting system became active, up until the date that data collection ceased (June 2014). Full demographic details are available in Table 4. Participants' ages ranged from 18-71 years (M = 41.7 years, SD = 15.1) at the time of their firesetting and the majority identified themselves as White British (93.9%, n = 62). Overall, 60.6% (n = 40) were females (see Table 4) and the mean age of male and female MDFs was similar (around 41 years of age; see Table 4). Patients were distributed across the services within the trust. Most were under the care of inpatient services when the firesetting took place (71.2%, n = 47). The remainder came from acute community mental health services (i.e., early community intervention and crisis resolution; 28.8%, n = 19).

MDCs. The matched MDCs consisted of 66 mentally disordered individuals who were: (1) under the care of the NHS for a psychiatric problem, and (2) the named perpetrator of a non-firesetting incident recorded within a trust incident form for the period 3 January 2005 to 24 June 2014. This time frame was chosen to match that chosen for the incidents in the MDF participant group. Incidents included violence, sexual abuse, absconsion, self-harm and drug

taking. All available documentation was reviewed to ensure that MDCs did not have a history of firesetting. MDCs were matched to MDFs on gender, age (+/- five years), as well as the service that the incident occurred within. MDCs were not matched with MDFs on mental health diagnoses in order to determine any differences or similarities in diagnoses between the two groups. Full demographic details are available in Table 4.

Group similarities. As a result of matching, analyses indicated that the MDF and MDC groups did not differ on gender, $\chi^2(1, N = 132) = < .001$, $p = 1.00$, $\phi = < .001$, age, $t\,(130) = -.11$, $p = .91$, $d = .02$, service that the incident took place in $\chi^2(1, N = 132) = .86$, $p = .35$, $\phi = .08$, or race, $\chi^2(1, N = 132) = .12$, $p = 1.00$ $= .03$, (see Table 4). However, they did differ regarding the target of their incident ($\chi^2\,(1, N = 132) = 28.98$, $p = <.001$, $\phi = .48$). MDFs showed near equal incidents of targeting a person ($N = 31$, 47%) or property ($N = 35$, 53%). MDCs, however, primarily targeted a person ($N = 55$, 91.7%).

Procedure and Materials

First, pre-existing trust incident report forms were requested and reviewed either electronically or in paper format to ensure sufficient information was available for coding. MDFs' files were reviewed first so that a corresponding MDC file could be sourced and matched. Second, following a literature review, a basic checklist of characteristics was devised encompassing static, dynamic, and incident-related characteristics (see Appendix 7). Using the checklist, each patient's file information was then dichotomously scored by the author for present or absent risk factors. File information reviewed included risk assessments, Mental Health Review Tribunal reports, psychological assessments, and nursing progress notes. In the case of dynamic risk, factors needed to be present one month prior to the incident (firesetting or control) in order to be rated

as present. The checklist evolved substantially throughout the review. To promote the discovery of previously unrecorded dynamic risk factors, potentially risk-increasing behaviours found within the patient files were documented. Then, upon review completion, all items were reviewed and collapsed as appropriate. For example, the preliminary items of 'poor sleep hygiene' and 'poor diet', were combined into a broader item entitled 'poor self-care'. Variables such as fire interest, passive personality, and confrontation avoidance had to be removed from the original checklist because of the difficulty in ascertaining their presence/absence from file review data alone.

Variables. Basic static factors were recorded for each participant and included: marital status, psychiatric diagnosis, and previous hospital admissions. The final recorded dynamic risk factors included: Active mental health symptoms, change in care plan, dependency on others, emotional-regulation problems, external locus of control, impulsivity, hostility, medication non-compliance, poor physical health, poor self-care, relationship problems, requests help from services, social isolation, substance misuse, suicidal ideation/self-harm, treatment disengagement, and triggering event. The recorded incident-characteristics included: Incident occurred at night, intoxication, threats prior to incident, and evidence of premeditation. Specific items were also recorded for firesetting incidents which included: Fire target and location, steps taken to extinguish fire, fire as self-harm or suicide, multiple ignition points, and spate firesetting.

Coding. The author collected and coded all files. To reduce possible bias, an independent second independent researcher—experienced in working with mentally disordered offenders—coded a randomly selected 20% of the patient files independently (n = 28; 14 MDFs, 14 MDCs). The two coders demonstrated

a 100% concordance rate, whereby both had independently noted the same codes for all double coded files. Some small differences occurred in the basic descriptors of the risk factors; however, all related to the same underlying concept and were mutually agreed upon following discussion.

3.4 Results

Data Analysis Strategy

All analyses were conducted using IBM SPSS statistics 24.0. Initial exploratory analyses between groups were conducted using χ^2 and independent *t* tests. Adjustments were made to account for sample size and group sizes where appropriate (e.g., Fishers exact test). For all factors significant at $\leq$ 05, further analyses were conducted to model their combined predictive validity using binomial forced entry logistic regression. G*Power (Version 3.1; Faul, Erdfelder, Lang, & Buchner, 2007; with at least 80% power and $\alpha = .05$) indicated that a total sample size of 88 participants would be required to conduct each χ^2 and detect a medium effect (.30), and a total sample size of 102 would be required to conduct each independent *t* test and detect a medium effect (.50). Finally, Vittinghoff and McCulloch's (2007) large logistic regression simulation study demonstrates that 10 participants for each IV (df) per outcome event is more than adequate for optimum model performance using binomial forced entry logistic regression.

Are Predictors of Firesetting Different to Predictors of other Undesirable Behaviours?

Initial comparisons between MDFs and MDCs were carried out in three separate areas (1) static risk factors, (2) dynamic risk factors, and (3) incident characteristics (see Table 4). For static factors, MDCs were associated with higher occurrences of trauma/dissociative disorders ($N = 14$, 21.2%), χ^2 (1, $N =$

132) = 3.77, p = .05, ϕ = .17) relative to MDFs (N = 6, 9.1%). Similarly, MDCs were associated with higher instances of substance disorders (MDCs N = 36, 54.5% vs MDFs N = 13, 19.7%), χ^2 (1, N = 132) = 17.20, p = <.001, ϕ = .36). MDFs, on the other hand, were associated with more previous admissions to hospital (MDFs N = 56, 84.8% vs MDCs N = 46, 69.7%), χ^2 (1, N = 132) = 4.31, p = .04, ϕ = .18).

MDFs and MDCs also differed on dynamic risk factors recorded one month prior to the incident. MDFs were associated with behaviours indicative of social isolation (N = 24, 36.4%), χ^2 (1, N = 132) = 4.54, p = .03, ϕ = .19) relative to MDCs (N = 13, 19.7%) and suicidal ideation/self-harm (MDFs N = 42, 63.6% vs MDCs N = 30, 45.5), χ^2 (1, N = 132) = 4.40, p = .04, ϕ = .18), However, it was the MDCs who were associated with higher instances of an external locus of control (MDCs N = 16, 24.2% vs MDFs N = 7, 10.6%), χ^2 (1, N = 132) = 4.30, p = .04, ϕ = -.18). When comparing general incident characteristics, MDFs were associated with higher levels of premeditation prior to the incident (MDFs N = 40, 60.6% vs MDCs N = 23, 34.8%), χ^2 (1, N = 132) = 8.78, p = <.001, ϕ = .26).

Table 4

Static, Dynamic and Incident-Related Factors Recorded for MDFs and MDCs

Variable	MDFs (n = 66)	MDCs (n = 66)	t/χ^2	Effect Size d/ϕ
Demographic Variables				
Incident Age (*M*, *SD*)	41.7 (15.1)	41.4 (15.4)	.11	.02
Gender (*N*, %)				
Male	26 (39.4)	26 (39.4)		
Female	40 (60.6)	40 (60.6)	< .001	< .001
Race/Ethnicity (*N*, %)				
White British	62 (93.9)	61 (92.4)		
Non-White British	4 (6.1)	5 (7.5)	< .001	.03
Service (*N*, %)				
Inpatient	47 (71.2)	42 (63.6)		
Community	19 (28.8)	24 (36.4)	.86	.08
Target				
Property	35 (53)	5 (8.3)		
Person	31 (47)	55 (91.7)	**28.98**	.48
Static Factors				
Marital Status (*N*, %)				
Single or Divorced	56 (84.8)	49 (74.2)		
Partnership/Married	10 (15.2)	17 (25.8)	2.30	.13
Diagnoses (*N*, %)				
Personality Disorder	33 (50)	29 (43.9)	.49	.06
Bipolar Disorder	14 (21.2)	9 (13.6)	1.30	.10
Depressive Disorder	12 (18.2)	13 (19.7)	.05	.02
Trauma/dissociative Disorder	6 (9.1)	14 (21.2)	**3.77**	.17
Substance Disorder	13 (19.7)	36 (54.5)	**17.20**	.36
Psychotic Disorder	36 (54.5)	33 (50)	.27	.05
Neurological Disorder	11 (7.7)	17 (25.8)	1.6	.11
Previous Hospital Admission (*N*, %)	56 (84.8)	46 (69.7)	**4.31**	.18
Dynamic Factors[a]				
Active MI Symptoms (*N*, %)	54 (81.8)	51 (77.3)	.42	.06
Change in Care Plan (*N*, %)	22 (33.3)	24 (36.4)	.13	.03
Dependency on Others (*N*, %)	7 (10.6)	6 (9.1)	.09	.03
Emotional-regulation Problems (*N*, %)	47 (71.2)	41 (62.1)	1.23	.10
External Locus of Control (*N*, %)	7 (10.6)	16 (24.2)	**4.30**	.18
Impulsivity (*N*, %)	49 (74.2)	39 (59.1)	3.41	.16
Hostility (*N*, %)	47 (71.2)	19 (28.8)	3.58	.17
Medication Non-compliance (*N*, %)	29 (43.9)	27 (40.9)	.12	.03
Poor Physical Health (*N*, %)	13 (19.7)	12 (18.2)	.05	.02
Poor Self Care (*N*, %)	40 (60.6)	36 (54.5)	.50	.06
Relationship Problems (*N*, %)	31 (47)	25 (37.9)	1.12	.09
Requests Help from Services (*N*, %)	12 (18.2)	9 (13.6)	.51	.06
Social Isolation (*N*, %)	24 (36.4)	13 (19.7)	**4.54**	.19
Substance Misuse (*N*, %)	26 (39.4)	21 (31.8)	.83	.08
Suicidal Ideation/Self-Harm (*N*, %)	42 (63.6)	30 (45.5)	**4.40**	.18
Treatment Disengagement (*N*, %)	27 (40.9)	31 (47)	.49	.06
Triggering Event (*N*, %)	29 (43.9)	35 (53)	1.09	.09
Incident Characteristics – General				
Incident Occurred at Night (10pm-6am)	28 (42.4)	19 (28.8)	2.68	.14
Intoxication	28 (42.4)	19 (28.8)	.18	.04
Threats Prior to Incident	15 (22.7)	13 (19.7)	.04	.02
Premeditation	40 (60.6)	23 (34.8)	**8.78**	.26

Note. Values resulting in $p < .05$ are in boldface. [a] indicates measurement one month prior to the incident. [b] = Fisher's Exact Test

The predictive validity of all seven significant factors outlined in Table 4 was assessed using a binomial forced entry logistic regression. The full model containing all predictors was statistically significant, $\chi 2\ (7) = 40.28$, $p = <.001$ indicating that MDFs and MDCs were distinguishable on the following factors: trauma/dissociative disorder Static Risk, substance disorder Static Risk, previous hospital admissions Static Risk, external locus of control Dynamic Risk, social isolation Dynamic Risk, suicidal ideation/self-harm Dynamic Risk, and premeditation Incident Characteristic. The model as a whole explained between 26.3% (Cox and Snell R

Square) and 35.1% (Nagelkerke R Square) of the variance in offending group, and correctly classified 75% of cases (78.8% of MDFs, 71.2% of MDCs). Two variables made a unique contribution to the model (*substance disorder* Static Risk*, and incident premeditation* Incident Characteristic; see Model 1, Table 7). The strongest predictor of an incident of mentally disordered firesetting was premeditation Incident Characteristic, with an odds ratio of 2.32 (CI .88 – 6.11). This indicates that MDFs were more than twice as likely to premeditate their incident relative to MDCs.

The model was reran using only female participants ($N = 80$). Trauma/dissociative disorder and external locus of control were excluded from entering the model due to low levels of positive occurrences. The model remained significant, $\chi 2\ (5) = 30.66$, $p = <.001$ explaining between 31.8% (Cox and Snell R Square) and 42.4% (Nagelkerke R Square) of the variance in offending group (overall classification rate = 76.3%). Similarly, to the overall model, *substance disorder* Static Risk, and *premeditation* Incident Characteristic retained their status as unique model predictors (see Model 1a, Table 7). However, *social isolation* Dynamic Risk was also found to make a unique prediction for female MDFs relative to female MDCs. This was the strongest predictor of an incident of female perpetrated mentally disordered firesetting with an odds ratio of 5.16 (CI 1.33 – 20.04). When the same model was applied to male only participants ($N = 52$; see Model 1b, Table 7)[4], although the model remained significant, $\chi 2\ (5) = 15.90$, $p = .007$ (Cox and Snell R Square = 26.4%, Nagelkerke R Square =

[4] Again, removing trauma/dissociative disorder and external locus of control due to low levels of occurrence.

35.1%), only *substance abuse disorder* was a unique predictor. This predictor uniquely predicted male MDCs (OR = .09, CI .02 – .40).

Are Male and Female MDFs Characterised by Differing Predictors?

Initial exploratory analyses showed that male and female MDFs did not differ significantly on any of the static variables collected (see Table 5). However, on dynamic factors, female MDFs were associated with greater impulsivity ($N = 35$, 87.5%), $\chi^2 (1, N = 66) = 7.66$, $p = <.001$, $\phi = .38$ relative to male MDFs ($N = 14$, 53.8%). Similarly, female MDFs—relative to males—were associated with emotional-regulation problems ($N = 33$, 82.5% versus $N = 14$, 53.8%), $\chi^2 (1, N = 66) = 4.99$, $p = .024$, $\phi = .31$. When examining the general incident-related characteristics of male and female MDFs, Male MDFs were more likely to be intoxicated at the time of their firesetting (Male MDFs $N = 11$, 42.3% vs female MDFs $N = 4$, 10%), $\chi^2 (1, N = 66) = 7.62$, $p = .005$, $\phi = .38$. When examining firesetting incident-related characteristics, female MDFs appeared to be associated with setting fires to a person ($N = 25$, 62.5%), which in the majority of cases was themselves ($N = 23$, 92%). In contrast, male MDFs—relative to female MDFs— appeared more likely to set fire to property ($N = 20$, 76.9%), $\chi^2 (1, N = 66) = 8.31$, $p = .004$, $\phi = .39$.

The predictive validity of the risk factors *emotional-regulation problems* $^{\text{Dynamic Risk}}$, *impulsivity* $^{\text{Dynamic Risk}}$, *intoxication* $^{\text{Incident Characteristic}}$, and *fire target self* $^{\text{Incident Characteristic}}$ were assessed using a binomial forced entry logistic regression. The full model containing all four predictors was statistically significant, $\chi^2 (4) = 27.37$, $p = <.001$. This indicates that the model was able to distinguish between male and female MDFs using these factors; explaining between 33.9% (Cox and Snell R Square) and 46% (Nagelkerke R Square) of the variance in gender. Overall, the model correctly classified 80.3% of cases (65.4% of male MDFs,

90% of female MDFs). Three variables (see Model 2, Table 7) made a unique contribution to the model (impulsivity [Dynamic Risk], intoxication [Incident Characteristic], and fire target self [Incident Characteristic]). The strongest predictor of an incident of mentally disordered firesetting

Table 5

Static, Dynamic, and Incident Related Factors Recorded for Male and Female MDFs

Variable	Male (n = 26)	Female (n = 40)	t/χ^2	Effect Size d/ϕ
Demographic Variables				
Incident Age (*M*, *SD*)	40.8 (15.2)	42.2 (15.2)	.38	.10
Race/Ethnicity (*N*, %)				
White British	24 (92.3)	38 (37.6)		
Non-White British	2 (7.7)	2 (2.4)	> .001	.06
Service (*N*, %)				
Inpatient	17 (65.4)	30 (75)		
Community	9 (34.6)	10 (25)	.32	.10
Static Factors				
Marital Status (*N*, %)				
Single or Divorced	23 (88.5)	33 (82.5)		
Partnership/Married	3 (11.5)	7 (17.5)	1.0	.08
Diagnoses (*N*, %)				
Personality Disorder	9 (34.6)	24 (60)	3.11	.25
Bipolar Disorder	8 (30.8)	6 (15)	1.50	.19
Depressive Disorder	2 (7.7)	10 (25)	2.12	.22
Trauma/dissociative Disorder	3 (11.5)	3 (7.5)	.01	.07
Substance Disorder	6 (23.1)	7 (17.5)	.06	.07
Psychotic Disorder	15 (57.7)	21 (52.5)	.03	.05
Neurological Disorder	2 (7.7)	9 (22.5)	1.54	.19
Previous Hospital Admission (*N*, %)	20 (76.9)	36 (90)	1.20	.18
Dynamic Factors[a]				
Active MI Symptoms (*N*, %)	21 (80.8)	33 (82.5)	> .001	.02
Change in Care Plan (*N*, %)	9 (34.6)	13 (32.5)	> .001	.02
Dependency on Others (*N*, %)	3 (11.5)	4 (10)	> .001	.02
Emotional-regulation Problems (*N*, %)	14 (53.8)	33 (82.5)	**4.99**	.31
External Locus of Control (*N*, %)	2 (7.7)	5 (12.5)	.04	.08
Impulsivity (*N*, %)	14 (53.8)	35 (87.5)	**7.66**	.38
Hostility (*N*, %)	18 (69.2)	29 (72.5)	> .001	.04
Medication Non-compliance (*N*, %)	13 (50)	16 (40)	.30	.10
Poor Physical Health (*N*, %)	6 (23.1)	7 (17.5)	.06	.07
Poor Self Care (*N*, %)	18 (69.2)	22 (55)	1.81	.14
Relationship Problems (*N*, %)	10 (38.5)	21 (52.5)	.75	.14
Requests Help from Services (*N*, %)	7 (26.9)	5 (12.5)	1.34	.18
Social Isolation (*N*, %)	8 (30.8)	16 (40)	.25	.09
Substance Misuse (*N*, %)	13 (50)	13 (32.5)	1.36	.18
Suicidal Ideation/Self-Harm (*N*, %)	14 (53.8)	28 (70)	1.15	.16
Treatment Disengagement (*N*, %)	12 (46)	15 (38)	.20	.09
Triggering Event (*N*, %)	8 (30.8)	21 (52.5)	2.20	.21
Incident Characteristics – General				
Incident Occurred at Night [(10pm-6am)]	12 (46.2)	16 (40)	.06	.06
Intoxication	11 (42.3)	4 (10)	**7.62**	.38
Threats Prior to Incident	5 (19.2)	12 (30)	.48	.12
Premeditation	15 (57.7)	25 (62.5)	.02	.05
Incident Characteristics – Firesetting				
Fire Target				
Property	20 (76.9)	15 (37.5)		
Person	6 (23.1)	25 (62.5)	**8.31**	39
Fire Location				
Hospital Bedroom	11 (42.3)	12 (30.8)		
Community	10 (38.5)	10 (25.6)		
Hospital Corridor	2 (7.7)	9 (23.1)		
Garden	3 (11.5)	8 (20.5)	4.34	.26
Steps Taken to Extinguish Fire	6 (23.1)	5 (12.5)	.62	.14
Fire as Self-harm/Suicide	8 (30.8)	23 (57.5)	3.51	.26
Multiple Ignition Points	4 (15.4)	2 (5)	.99	.18
Spate Firesetting	3 (11.5)	6 (15)	.001	.05

Note. Values resulting in $p < .05$ are in boldface.[a] indicates measurement one month prior to the incident. [b] = Fisher's Exact Test

being set by a female was impulsivity, with an odds ratio of 6.11 (CI 1.34-27.92); this indicates that female MDFs were over six times more likely to have demonstrated impulsive traits in the month leading up to their firesetting relative to male MDFs.

One time and Repeat MDFs

Initial exploratory analyses showed that repeat MDFs were more likely to be associated with a diagnosis of personality disorder [Static Risk] ($N = 21$, 65.6%) than one-time MDFs ($N = 12$, 35.3%), χ^2 (1, $N = 66$) = 4.91, $p = .03$, $\phi = .30$. Upon further examination, a significant association was found regarding medication compliance [Dynamic Risk]. One-time MDFs were more likely to be associated with medication non-compliance ($N = 20$, 58.8%) than repeat MDFs ($N = 9$, 28.1%), χ^2 (1 $N = 66$) = 5.12, $p = .02$, $\phi = -.31$. However, repeat MDFs were more likely to be associated with social isolation [Dynamic Risk] (repeat MDFs $N = 16$, 50% vs one time MDFs $N = 8$, 23.5%), χ^2 (1, $N = 66$) = 3.91, $p = .05$, $\phi = .28$, Repeat MDFs were also associated with greater impulsivity [Dynamic Risk] (repeat MDFs $N = 28$, 87.5% vs one time MDFs $N = 21$, 61.8%), χ^2 (1, $N = 66$) = 4.44, $p = .02$, $\phi = .29$, as well as an external locus of control [Dynamic Risk] (repeat MDFs $N = 6$, 18.8% versus one time MDFs $N = 1$, 2.9%), χ^2 (1, $N = 66$) = 2.84, $p = .05$, $\phi = .26$. Interestingly, however, one-time MDFs were more likely to take steps to extinguish the fire once it was set ($N = 9$, 26.5%), relative to the repeat MDFs ($N = 2$, 6.3%), χ^2 (1, $N = 66$) = 3.51, $p = .05$, $\phi = .27$.

The predictive validity of these significant variables was assessed using a binomial forced entry logistic regression. Since gender was not associated with repeat or one-time firesetting status, χ^2 (1, $N = 66$) = .66, $p = .42$, $\phi = .10$ it was not entered as a covariate. External locus of control and steps taken to extinguish the fire were also excluded from entering the model due to low levels of positive

occurrences. The final model containing all four predictors was statistically significant in distinguishing one-time and repeat MDFs χ^2 (4) = 15.96, p = .003. The model as a whole explained between 21.5% (Cox and Snell R Square) and 28.6% (Nagelkerke R Square) of the variance in recidivism, and correctly classified 72.7% of cases (79.4% of one-time MDFs, 65.6% of repeat MDFs). As shown in Table 7 (Model 3), none of the entered variables made a unique contribution to the model.

Table 6

Static, Dynamic and Incident-Related Factors Recorded for One Time and Repeat MDFs

Variable	One Time (n = 34)	Repeat (n = 32)	t/χ^2	Effect Size d/ϕ
Demographic Variables				
Incident Age (*M*, *SD*)	44.2 (16.71)	38.9 (12.87)	4.60	.36
Gender (*N*, %)				
Male	15 (44.1)	11 (34.4)		
Female	19 (55.9)	21 (65.6)	.31	.10
Race/Ethnicity (*N*, %)				
White British	31 (91.2)	31 (96.9)		
Non-White British	3 (8.8)	1 (3.1)	.21	.12
Service (*N*, %)				
Inpatient	19 (55.9)	28 (87.5)		
Community	15 (44.1)	4 (12.5)	**6.6**	.35
Static Factors				
Marital Status (*N*, %)				
Single or Divorced	30 (88.2)	26 (81.3)		
Partnership/Married	4 (11.8)	6 (18.8)	.20	.10
Diagnoses (*N*, %)				
Personality Disorder	12 (35.3)	21 (65.6)	**4.91**	.30
Bipolar Disorder	7 (20.6)	7 (21.9)	> .001	.02
Depressive Disorder	9 (26.5)	3 (9.4)	2.19	.22
Trauma/dissociative Disorder	3 (8.8)	2 (6.3)	> .001	.05
Substance Disorder	4 (11.8)	9 (28.1)	1.85	.21
Psychotic Disorder	19 (55.9)	17 (53.1)	> .001	.03
Neurological Disorder	6 (17.6)	5 (15.6)	> .001	.03
Previous Hospital Admission (*N*, %)	28 (82.4)	28 (87.5)	.06	.07
Dynamic Factors[a]				
Active MI Symptoms (*N*, %)	27 (79.4)	27 (84.4)	.04	.06
Change in Care Plan (*N*, %)	8 (23.5)	14 (44)	2.19	.21
Dependency on Others (*N*, %)	6 (17.6)	1 (3.1)	2.30	.24
Emotional-regulation Problems (*N*, %)	22 (64.7)	25 (78.1)	.87	.15
External Locus of Control (*N*, %)	1 (2.9)	6 (18.8)	**2.84**	.26
Impulsivity (*N*, %)	21 (61.8)	28 (87.5)	**4.44**	.29
Hostility (*N*, %)	22 (64.7)	25 (78.1)	.87	.15
Medication Non-compliance (*N*, %)	20 (58.8)	9 (28.1)	**5.12**	.31
Poor Physical Health (*N*, %)	8 (23.5)	5 (15.6)	.25	.10
Poor Self Care (*N*, %)	21 (61.8)	19 (59.4)	> .001	.02
Relationship Problems (*N*, %)	15 (44.1)	16 (50)	.05	.06
Requests Help from Services (*N*, %)	9 (26.5)	3 (9.4)	2.19	.22
Social Isolation (*N*, %)	8 (23.5)	16 (50)	**3.91**	.28
Substance Misuse (*N*, %)	14 (41.2)	12 (37.5)	.003	.04
Suicidal Ideation/Self-Harm (*N*, %)	20 (58.8)	22 (68.8)	.34	.10
Treatment Disengagement (*N*, %)	12 (35.3)	15 (46.9)	.50	.12
Triggering Event (*N*, %)	15 (44.1)	14 (43.8)	> .001	.01
Incident Characteristics – General				
Incident Occurred at Night (10pm-6am)	13 (38.2)	15 (46.9)	.21	.09
Intoxication	9 (26.5)	6 (18.8)	.21	.09
Threats Prior to Incident	6 (17.6)	11 (34.4)	1.62	.19
Premeditation	19 (55.9)	21 (65.6)	.31	.10
Incident Characteristics – Firesetting				
Target				
Property	17 (50)	18 (56.3)		
Person	17 (50)	14 (43.7)	.07	.06
Fire Location				
Hospital Bedroom	8 (24.2)	15 (46.9)		
Community	14 (42.4)	6 (18.8)		
Hospital Corridor	6 (18.2)	5 (15.6)		
Garden	5 (15.2)	6 (18.8)	5.5	.29
Steps Taken to Extinguish Fire	9 (26.5)	2 (6.3)	**3.51**	.27
Fire as Self-harm/Suicide	15 (44.1)	16 (50)	.05	.06
Multiple Ignition Points	3 (8.8)	3 (9.4)	> .001	.01
Spate Firesetting	2 (5.9)	7 (21.9)	2.35	.23

Note. Values resulting in $p < .05$ are in boldface. [a] indicates measurement one month prior to the incident. [b] = Fisher's Exact Test

Table 7

Predictors of Firesetting Status, Firesetter Gender, and Repeat Firesetting

	B	S.E.	Wald	df	*p*	OR	95% CI for OR	
							Lower	Upper
Model 1								
MDFs vs. MDCs (*N* = 132)								
Trauma/dissociative Disorder	-1.05	.63	2.81	1	.09	.35	.10	1.20
Substance Disorder	-1.65	.44	14.02	1	**< .001**	.19	.08	.46
Previous Hospital Admission	.84	.50	2.89	1	.09	2.32	.88	6.11
External Locus of Control	-.95	.57	2.77	1	.10	.39	.13	1.19
Social Isolation	.50	.48	1.12	1	.29	1.65	.65	4.20
Suicidal Ideation/Self-harm	.80	.42	3.54	1	.06	2.22	.97	5.10
Premeditation	.84	.42	4.05	1	**.04**	2.32	.88	6.11
Model 1a (*N* = 80)								
Female MDFs vs. Female MDCs								
Substance Disorder	-2.04	.68	9.14	1	**.003**	.13	.04	.49
Previous Hospital Admission	.92	.73	1.59	1	.21	2.50	.60	10.40
Social Isolation	1.64	.69	5.62	1	**.02**	5.16	1.33	20.04
Suicidal Ideation/Self-harm	.39	.58	.45	1	.50	1.48	.48	4.57
Premeditation	1.61	.63	6.56	1	**.010**	5.01	1.46	17.18
Model 1b (*N* = 52)								
Male MDFs vs. Male MDCs								
Substance Disorder	-2.45	.78	9.76	1	**.002**	.90	.02	.40
Previous Hospital Admission	.96	.78	1.51	1	.22	2.61	.57	12.08
Social Isolation	-1.06	.80	1.74	1	.19	.35	.07	1.67
Suicidal Ideation/Self-harm	.96	.68	1.99	1	.16	2.60	.69	9.86
Premeditation	-.70	.72	.01	1	.92	.93	.23	3.83
Model 2 (*N* = 66)								
Male MDFs vs. Female MDFs								
Emotional-regulation Problems	1.11	.71	2.47	1	.12	3.03	.76	12.06
Impulsivity	1.81	.76	5.46	1	**.02**	6.11	1.34	27.92
Intoxication	-2.03	.79	6.65	1	**.01**	.13	.03	.69
Fire Target Self	1.49	.69	4.63	1	**.03**	4.45	1.14	17.30
Model 3 (*N* = 66)								
One Time MDFs vs. Repeat MDFs								
Personality Disorder	.99	.56	3.08	1	.08	2.68	.89	8.08
Impulsivity	1.19	.70	2.85	1	.09	3.28	.83	12.99
Medication Non-compliance	-.83	.60	1.90	1	.17	.44	.13	1.42
Social Isolation	.81	.62	1.72	1	.19	2.26	.67	7.61

3.5 Discussion

This study is the first to compare MDFs with a matched group of MDCs on static, dynamic, and incident-related characteristics. Overall, it was found that mixed gender MDFs could be differentiated from their MDC counterparts using a cluster of variables that spanned static, dynamic, and incident-related predictors (i.e., higher levels of previous hospital admissions, social isolation, suicidal ideation/self-harm, and incident premeditation). Of these variables, premeditation emerged as a unique predictor for mentally disordered firesetting illustrating that MDFs were twice as likely to premeditate their incident relative to MDCs. When the majority of these variables were examined separately for

MDFs and MDCs subdivided by gender, they still proved to be reliable discriminators. However, premeditation uniquely predicted only *female* mentally disordered firesetting. In addition, social isolation during the lead up to the firesetting incident uniquely predicted female MDFs relative to female MDCs. The results found here demonstrate the possibility of gender specific trajectories that may be relevant within clinical practice.

Previous studies have highlighted that MDFs are generally characterized by a higher number of previous mental health service contacts or admissions relative to mentally disordered non-firesetting offenders (Ducat et al., 2013; Geller et al., 1992). Social skills issues and self-harm have also been identified as being prevalent within MDFs (Geller, 1992; O'Sullivan & Kelleher, 1989). However, no research has ever suggested that MDFs are more likely to premeditate an incident of firesetting relative to MDCs who commit other undesirable behaviours. Since most of the individuals in this study were under the supervision of psychiatric services, this suggests a clear element of wilfulness to firesetting within this context. This static variable was a unique predictor of female firesetting—but not male firesetting—suggesting a clear gender difference. This is finding is clinically relevant, as it shows that females with a history of firesetting may require heightened supervision. Particular behaviours indicative of an intention to set a fire may include lighter secretion. Given social isolation in the lead up to the firesetting was also a unique predictor for women, it is possible that they actively attempted to isolate themselves in order to plan their firesetting. Alternatively, women may have premeditated their firesetting as a result of social isolation. In support of this latter hypothesis, research suggests that negative internal states, such as loneliness, can lead an

individual to self soothe using fire, in an attempt to restore positive affect (Gannon et al., 2012; Ó Ciardha & Gannon, 2012).

Interestingly, when best static, dynamic, and incident-related predictors of male MDFs versus female MDFs were examined, it was found that women were clearly distinguishable from males—with a high level of classification success (90%)—using the variables outlined in Model 2, Table 7 and were uniquely predicted by the two factors of impulsivity [dynamic risk] and self being the target of their firesetting [incident characteristic]. Male MDFs, on the other hand, were uniquely predicted by intoxication. These findings appear to support those of Dickens et al. (2007) who found that female MDFs were more likely to set fires to attract attention or as a form of 'parasuicide' relative to male MDFs (see also Miller & Fritzon, 2007) and that male MDFs were more likely than females to have been intoxicated at the time of their firesetting. However, the findings also extend those of Dickens et al. (2007) through suggesting that impulsive decision-making is particularly notable in female MDFs relative to their male counterparts in the month leading up to their firesetting incident (cf. Long et al, 2015 who found impulsivity differentiated female MDFs from other female patients). Significant impulsivity issues are a key feature of Borderline Personality Disorder and Borderline Personality Disorder is more prevalent in female firesetters relative to male firesetters (see Ducat, McEwan, & Ogloff, 2017). Although Borderline Personality Disorder was not recorded separately in this study, it may explain why the female MDFs in the study targeted themselves when misusing fire. This study extends previous findings through showing that male MDFs appear to require a disinhibitor (i.e., intoxication) in order to misuse fire whereas female MDFs appear to hold internalized disinhibition in the form of impulsivity.

Whilst the M-TTAF (Gannon et al., 2012) hypothesises different trajectories that describe typical characteristics that lead to firesetting, the results of this study suggest that gender specific trajectories for firesetting may also exist. By applying the results of this study to the existing trajectories of the M-TTAF it becomes clear that female MDFs typically demonstrate characteristics akin with the '*emotionally expressive/need for recognition*' trajectory. Gannon et al (2012) suggest that individuals fitting into this trajectory should have treatment that focuses around developing effective communication skills. For these individuals, firesetting is used as a tool to communicate negative internal affect, or to seek help. In theory, by increasing an individual's ability to seek help in prosocial ways, the risk of deliberate firesetting would decrease. Unfortunately, the results found here for male MDFs, an increase of alcohol use, have little clinical applicability to the existing trajectories proposed within the M-TTAF, suggesting a need for further research into this.

It was found that four key variables—as a group—distinguished one-time MDFs and repeat MDFs although none of these variables appeared to have clear independent effects on group categorization. These variables spanned static and dynamic factors (i.e., personality disorder $^{\text{static risk}}$, impulsivity $^{\text{dynamic risk}}$, medication non-compliance $^{\text{dynamic risk}}$, and social isolation $^{\text{dynamic risk}}$). In brief, one-time MDFs appeared less likely to have a diagnosis of personality disorder or to experience social isolation and impulsivity in the month prior to their firesetting relative to repeat MDFs. One-time MDFs also appeared less likely to comply with prescribed medication. These results generally support the mainstream mentally disordered offending literature showing social inclusion functions as a protective factor (Bouman, de Ruiter, & Schene, 2010) and that recidivists demonstrate high levels of personality disorder (Coid, Hickey,

Kahtan, Zhang, & Yang, 2007; Walter, Wiesbeck, Dittmann & Graf, 2011) and antisocial characteristics such as poor impulse control (Bonta, Blais, & Wilson, 2014).

Key Theoretical Contributions

These findings provide important theoretical contributions to the MDF literature. First, they suggest that individuals who misuse fire—relative to other mentally disordered offenders—hold a more pervasive mental health history characterized by hospitalization, isolation, and attempts to harm self. This provides support for the dynamic risk factors of *social effectiveness* and *coping and control* proposed within the M-TTAF; showing that particular elements of these factors can discriminate firesetters from their non-firesetting counterparts. Most importantly, however, these findings show that female MDFs are relatively distinct from male MDFs and hold a suite of unique static, dynamic, and incident-related features. For example, when they were separated from their male counterparts in Model 1, it became apparent that the female MDFs were driving some of the mixed sex differences obtained. They appeared most likely to premeditate their incident of firesetting and to isolate themselves in the lead up to their incident relative to female MDCs. This contributes to the M-TTAF through showing that characteristics of the firesetting offence itself (i.e., premeditation) are related to gender. Furthermore, when specifically compared to male MDFs, female MDFs were characterized by marked problems with self-regulation in the form of impulsivity which appeared to have resulted in them misusing fire towards themselves. This supports the emotionally expressive subtype of the M-TTAF which proposes that women, in particular, are likely to hold problems with impulsivity that are likely to result in fire misuse as a form of 'cry for help', self-harm, or suicide (see also Long, Dickens, & Dolley, 2014).

The findings highlight the importance of examining male and female MDFs separately in future studies in order to develop gender-informed theoretical models of firesetting risk in mentally disordered firesetting. The findings also highlight the importance of acknowledging gender in practitioner formulations of firesetting risk. Female and male MDFs may set fires as a result of differing clusters of variables which should be examined separately. The results of this study suggest that it may be appropriate to explore gender specific trajectories for firesetting. These will be particularly useful in the clinical rehabilitation of MDFs of both genders. This is particularly important given that secure services appear to focus primarily upon the needs of male patients (Coid, Kahtan, Gault, & Jarman, 2000).

Strengths, Limits, and Future Directions

This study examined specialist archived National Health Service records obtained from clinical incident recording practices. This ensured that the data collected was ecologically grounded. However, it was difficult to determine some key dynamic risk factors associated with mentally disordered firesetting because of this. For example, fire interest has been linked to firesetting behaviour in MDFs (Tyler et al., 2015) and imprisoned firesetters (Gannon et al., 2013). However, because this was not reliably measured or documented within patient files this dynamic risk variable was removed from the study. Such information would have allowed for more in-depth and rounded conclusions to be drawn about these particular dynamic risk factors in MDFs. Thus, further exploration of these factors needs to be carried out in the future. Furthermore, although the design allowed us to compare male and female MDFs and one time and repeat MDFs, the number of firesetting participants meant that the binary regression analyses was not always able to incorporate variables which had low

rates of occurrence. This restricted the predictor variables for these analyses. Future studies would benefit from increasing the numbers of firesetting participants for such sub-analyses.

3.6 Conclusion

In conclusion, it was found that a number of static, dynamic, and incident-related characteristics predict whether a mentally disordered offender has misused fire or engaged in some other undesirable behaviour whilst under the care of the National Health Service. It was also discovered that female MDFs, in particular, appear to hold predictors that differentiate them from males who misuse fire, and that one-time and repeat firesetters appear to be associated with a cluster of predictors, although none emerged as holding unique predictive status. These results suggest that a gender informed approach is needed when formulating risk for MDFs and that numerous static, dynamic, and incident-related characteristics hold promise for future focus when determining risk in MDFs.

Chapter Four. Study 2. Developing an Evidence Based Conceptualisation of Firesetting Dangerousness

4.1 Aim of Chapter

In the previous chapters, the importance of contextual information in firesetting risk assessment was established. The findings of Study 1 showed that: (1) incident characteristics such as *premeditation* were predictive of mentally disordered firesetting; (2) *intoxication at the time of incident* was predictive of male mentally disordered firesetting; and (3) *fires targeted against self* were predictive of female mentally disordered firesetting. It is the authors belief that such contextual information is a key consideration when determining all firesetting dangerousness, not just fires that take place within clinical settings. The purpose of this chapter is to explore the notion of firesetting dangerousness and achieve a model to explain all firesetting dangerousness. This chapter presents the development of the Firesetting Dangerousness Rating Scale (FDS, Wyatt, Gannon & Lockerbie, 2014; see Appendix 8). The FDS was developed to explore fire professionals' conceptualizations of fire dangerousness, to enable a bottom-up conceptualisation of dangerousness. The scale is also used to determine whether: (1) firesetting professionals differ in their conceptualizations of firesetting dangerousness relative to the conceptualizations of members of the general public; and (2) whether firesetting dangerousness is rated differently by different fire professionals (i.e., members of the police, fire, and clinicians). The implications of this study's findings will then be discussed in relation to risk prediction and clinical practice.

4.2 Introduction

Deliberate firesetting continues to be a harmful societal problem. In England, a total of 19,365 deliberate fires were recorded between 2015-2016

(Home Office, 2017). Whilst dangerousness has long been synonymous with firesetting, very little research has been carried out to quantify this concept (Sugarman & Dickens, 2009). Initially, it is important to discuss the term dangerousness. As briefly discussed within Chapter One, in the instance of firesetting professionals are faced with making the decision about whether it is the individual who is dangerous? Or is it the context within which the fire is set, that determines the resultant dangerousness? The answer to these questions will impact upon the way in which we assess and manage deliberate firesetters in the future. But what is dangerousness? The concept of firesetting dangerousness has wide implications for the assessment and management of firesetters. And yet, there appears to be a disparity between professional definitions of fire dangerousness. For example, the Crown Prosecution Service (CPS) define dangerousness as "a significant risk to members of the public of serious harm occasioned by/ commissioned by further specified offences" (Criminal Justice Act, 2003; The National Archives, 2017). Thus, within a legal framework dangerousness is defined by the likelihood of recidivism. Alternatively, however, members of the fire service are likely to focus upon aspects of the incident of fire itself in determining dangerousness, i.e. whether accelerant has been used in the acquisition of fire. This disparity has never been empirically studied (A Danton, personal communication, 2014).

Multiple conceptualizations of firesetting dangerousness also appear within the literature. For example, Brett (2004) conceptualizes dangerousness as the frequency of fires set by an individual. However, this definition does not consider the level of damage and/or harm that may have been caused by a fire. Therefore, this approach to firesetting dangerousness is reductionist. Dickens et al., (2009) furthered this notion, and tested whether multiple firesetters were

responsible for the most severe fires. The severity was assessed using the harm and/or extensive property damage that resulted from the fire. Recidivist firesetters did not set more serious fires than one-time firesetters. As a result, Dickens et al. (2009) concluded that it would be misguiding to base definitions of dangerousness solely on the frequency of fires set. As a result, Dickens et al., (2009) suggested that dangerousness should be based upon the resultant harm/damage of a fire. Such a definition of dangerousness can be useful in sentencing. However, this approach to dangerousness offers very little information as to how fires could be prevented. Thus, taking a passive stance on deliberate firesetting.

Finally, Stewart and Culver (1982) recommend a conceptualization of firesetting dangerousness based upon the motive of the individual. Stewart and Culver (1982) state that fires set with a motive of revenge are more likely to be dangerous, as opposed to fires that are set out of curiosity (Adler, Nunn, Northam, Lebnan, & Ross, 1994). Whilst it is logical to consider the goal of the individual, intent and motive can be difficult to prove in a legal context. Without a confession from the perpetrator, intent can only be implied. This leads to prosecutors relying upon behaviours shown at the time of the offence as evidence.

Whilst all conceptualizations of firesetting dangerousness appear logical, the reliance of a single approach to dangerousness results in a failure to consider the unpredictability of fire. Brett (2004) importantly stated, “The initial intent of the firesetter does not always equate to the outcome and it is an adage among fire-fighters that a big fire is just a small fire that hasn’t been controlled”. (p. 419). The presence of uncontrollable external factors within the environment can lead a fire to be disproportionate to the intentions of the offender (see Figure 5),

creating a '*paradox of firesetting'* dangerousness. Firesetting is a unique offending behaviour in this respect. Whilst firesetting individuals may be differentiated by risk factors, these do not appear to completely explain the relationship between firesetting and its unpredictable potential for harm. It is the belief of the author that it is because of the firesetting dangerousness paradox that professionals thus far, have been unsuccessful in trying to assess individuals for the risk of serious firesetting.

The firesetting literature is in its infancy. Therefore, problems of clarity and definitions should be expected. However, in the absence of any guiding literature, services are cautious when dealing with 'dangerous' individuals who have a history of firesetting (Burton, McNiel, & Binder, 2012). Without any guiding literature exploring the risk prediction of risk factors, many clinicians are making false negative risk management decisions. This explains why firesetting individuals often have trouble securing placements for residential and treatment facilities (Burton, et al., 2012; Centre for Mental Health, 2011; Gruber, Heck, & Mintzer, 1981). Gruber et al. (1981) worryingly suggested that an individual's firesetting risk may be minimized or simply left out of reports to ascertain accommodation. With the introduction of the FDS (Wyatt, Gannon, & Lockerbie, 2014) it is the authors intention to commence the literature surrounding the risk prediction of firesetters, in an attempt to subsequently influence the risk assessment of these individuals.

It is the belief of the author that firesetting dangerousness should be an all-encompassing term, which addresses the risk factors of the individual, the contextual risk factors provided by the environment, as well as the resultant harm caused. The contextual risk aspects of a fire often remain unconsidered by clinicians. This study aims to develop a universal conceptualization of firesetting

dangerousness incorporating the single factor considerations of dangerousness currently described within the literature. This will be done by developing a scale containing individual elements of firesetting dangerousness to examine the conceptualizations of fire professionals and the general public.

4.3 Method

Design

The study was reviewed and approved by the University of Kent's Research Ethics Committee (Ref: 20154128/ 20154150, see Appendix 9) and London Fulham NHS REC (Ref: 14/LO/0675). Participants were recruited via opportunity sampling. The main aim of this research was to develop a universal conceptualization of firesetting dangerousness. This was done using the 'Firesetting Dangerousness Rating Scale' (FDS, Wyatt, Gannon & Lockerbie, 2014, see Appendix 8). This scale contains individual factors hypothesised to represent firesetting dangerousness. Fire professionals and members of the general public were asked to complete the FDS in order to establish a bottom up conceptualisation of firesetting dangerousness.

Validation of the FDS took place with a group of fire professionals (fire, police, and clinicians) and a large group of the general public. By recruiting members of the public, this study was also able to determine whether they differed from professionals in their conceptualisations of firesetting dangerousness. Analyses were also undertaken to determine if separate fire professional groups differed in their views of firesetting dangerousness. An online version of the FDS was made available through the online survey programme, Qualtrics. Paper copies of the research documentation were distributed in situations where participants had limited access to a computer.

Participants

Fire Professionals

An individual's suitability for the research was determined by whether a professional had experience of dealing with deliberate firesetting. A total of 54 fire professionals were recruited from several establishments throughout Great Britain and Australia. As this was a preliminary examination of fire professionals' opinions towards firesetting dangerousness no exclusion criteria based upon role or title was applied to the participants. This means that the participants groups are heterogeneous. A large majority of the fire professionals recruited were members of the Fire Service (n = 28, 51.9%). The specific roles included operational fire fighters, specialist fire investigation officers, senior management, and a variety of education and intervention roles dealing with juvenile and adult firesetters. The members of the fire service had a range of 1-29 years of experience (M = 14.52, SD = 9.81). Clinicians were recruited from UK (n = 21) and Australian healthcare institutes (n = 1, 40.7% in total). The decision to use Australian clinicians was deemed appropriate as the issues/conceptualisations of firesetting dangerousness within clinical practice would not differ too significantly to that of the UK. The clinicians had between 2-31 years of professional experience (M = 10.3, SD = 10.4). Their specific job roles included, research mental health nurses, clinical/forensic psychologists, and forensic psychiatrists. Finally, Members of the Police were recruited (n = 4, 7.4%). Their roles included, police officer, senior investigating officer, and police community support officer. The Police participants held between 6-23 years of professional experience (M = 16.6, SD = 8.32).

A Kruskall-Wallis Test revealed no statistical difference in the years of experience across the three different profession groups (Fire, n = 28: Police, n =

4: Clinicians, $n = 22$), $\chi 2$ (2, $n = 54$) = 1.76, $p = .41$; partial eta squared = .61. However no further demographic information was collected from the participants which means no further assurances of homogeneity can be made. Purposive opportunity sampling was employed to recruit all fire professionals. Advertisements were disseminated via email to different fire professional services and health institutes. Adverts with a link to the online questionnaire were placed on members' websites to widen recruitment of participants.

General Population

The general public participant group were recruited through opportunity sampling using email and social media platforms ($n = 63$). Participants in this group, were not subject to any exclusion criteria. Few demographics were recorded for the general population participant group, therefore the extent to which it can be claimed that this group is representative of the general population is limited. This should therefore be considered when reviewing the conclusions drawn with this participant group.

Materials

The Firesetting Dangerousness Scale (FDS, Wyatt et al., 2014) was specifically developed for this study to examine conceptualizations of firesetting dangerousness. The FDS initially contained 61 items relating to firesetting dangerousness. The items contained within the FDS were developed from conversations with colleagues about the different fires that they had seen in practice. The FDS is rated on a 5-point scale (0 = Not Dangerous at all through to 4 = Extremely Dangerous). Participants were also provided with a 6th option, 'Can't make a decision'. Participants were asked to rate a variety of items, according to how dangerous they would make a fire. Items included*: a fire set for fraudulent/monetary gain, a fire set in a public building* and *a person who*

has a high level of fire interest. Upon reading the individual statements, participants were instructed to make a decision of dangerousness. For example, participants were asked to consider the dangerousness of *a fire set for fraudulent/monetary gain*. As the aim of the study was to determine the conceptualizations held by different groups, the term 'dangerousness' was left intentionally ambiguous. The amended and refined version of the FDS (reflective of all changes made) can be found under Appendix 8.

Procedure

Qualtrics, the online survey program, was used to administer the FDS. In situations where a participant reported limited access to a computer, a paper copy of the FDS was distributed (n = 3). Participants were required to rate all 61 items. Responses on the scale reflected the participant's attitude of how dangerous that item would be in the circumstance of a deliberate fire. The term dangerousness was left ambiguous with the aim of drawing out the individual's own conceptualization of dangerousness.

Data Analysis

An exploratory factor analysis was undertaken in order to reduce the dimensions of the FDS. A one way between groups multivariate analysis of variance (MANOVA) was then carried out to investigate the differences between fire professions and the general public. A final MANOVA was carried out to investigate the differences between fire professions and their conceptualisations of firesetting dangerousness. The MANOVA tested the hypothesis that profession would be associated with differing attitudes towards firesetting dangerousness. An a priori analysis of the data ensured that there were no concerns regarding assumptions of normality, linearity, univariate and multivariate outliers, homogeneity of variance-covariance matrices, and

multicollinearity. Whilst no serious violations were noted, an unequal sample size may result in Type I errors. Therefore, Pillai's Trace is reported, as this is more robust (Tabachnick & Fidell, 2013).

An a-Priori power analysis for a MANOVA with three hypothesised levels and three dependent variables was conducted in G Power 3.1 (Faul et al., 2007). This indicated that a total of 114 participants (57 firesetters, 57 non-firesetters) are required to detect a small to medium (.22) with power of .80. This showed that there was an 80% chance of correctly rejecting the null hypothesis, (i.e. that profession has no association with attitudes towards firesetting dangerousness), with 114 participants. A post hoc analysis informs us that the actual sample size used is enough to correctly detect small/medium effects between groups ($N = 54, f = 0.22$).

4.4 Results

Factor Analysis

Prior to analysis, the collected data was screened. Any individuals' recording a 'Can't make a decision' response were reviewed. As a high number of participants were unsure about responding to the item '*fire set within the presence of a witness'*, ($N = 5$, 4.3%) this item was removed from further analysis. The remaining respondent data was assessed prior to the extraction of factors. Upon initial primary analysis, fourteen highly correlated items were removed to reduce issue of singularity (items with $r < .3$ were removed), these included *fire set at night, fire set outdoors, fire set in daylight, food intentionally left to burn, inappropriate firework use, a fire set to a stolen car, a fire set for the purpose of crime concealment, a person who uses fire recklessly, a fire set to a building due to be demolished, a premeditated fire, no attempt made to extinguish the fire once set, a fire set out of boredom, a fire set to wasteland in*

the UK and *a fire set knowingly within an unoccupied building*. Further analysis of the remaining factors included: the Kaiser-Meyer-Olin (KMO) measure of sampling adequacy (.83) and Bartlett's Test of Sphericity ($p < 0.001$). These tests determined that factor analysis was appropriate with the remaining items. Missing values were replaced using the hot deck imputation method, as recommended by Myers (2011). This method imputes randomly selected data from the same dataset[5].

Finally, factor analysis was conducted on the final remaining 47 items of the FDS. Initially, the retention of 12 factors was examined using Kaiser's criterion of retaining factors with eigenvalues over 1; however, the resultant solution had several weak factor loadings. Parallel analysis suggested the retention of 3 factors. For further confirmation of factor retention, Cattel's criteria was applied to the scree plot. The scree plot suggested a retention of either 3 or 7 factors. As parallel analysis also confirmed 3 factors, it was decided that 3 factors was the better solution. As the data set contained non-normally distributed items, a *Principal Axis Factoring* method of extraction was adopted. Finally, *Direct Oblimin* rotation was chosen, as it was likely that the resultant factors will correlate with one another (Fields, 2005). Items with a factor loading strength of >.32 or greater were considered to significantly load onto a factor (Tabachnick & Fidell, 2007).

The three-component solution explained 47.5% of the variance, with component one contributing 33.1% of the variance. Component one consisted of items relating to a firesetter's own reason for committing an incident of

[5] Running the analysis without replacing the missing data resulted in the same factorial structure

deliberate firesetting and was therefore entitled '*Motive/Intent*'. Component two contributed to 8.9% of the variance. This factor consisted of items relating to the location, material and geographical considerations associated with the fire that was set and was therefore named '*Contextual Aspects*'. Finally, component three was entitled '*Cognitions'* as it consisted of individual items that related to the cognitions demonstrated by the perpetrator, such as fire interest, and impulsivity. Component three contributed 5.5% of the variance. To aid in the interpretation of these three factors, Oblimin rotation was performed. The rotated solution revealed that all three components showed a high number of strong loadings. It is noteworthy that all items highly loaded onto the *context* factor are all negatively loaded, which simply means that when coded, these items should be reverse scored. The item '*a fire set within an individual's own home'* did not load highly onto any of the factors, therefore this item was removed from further analysis (see Table 8 for factor loadings).

There was a positive medium correlation between the factor's *motive/intent* and *cognitions* (r = .36). Similarly, showing a stronger negative correlation was *motive/intent* and *contextual* items (r = -.47). However, the factors *cognitions* and *context* factors showed a weaker negative correlation (r = -.15). See Table 8 for further factor loading information including eigenvalues and percentage of variance explained. The internal consistency of the FDS was assessed using Cronbach's alpha. As a result, a decision was made to remove the items *'a person with an intent to endanger life'* and '*a person experiencing command hallucinations'* from further analysis. These items were found to have a negative impact upon reliability. After all unsuitable items were removed, the final FDS contained 44 items, with an excellent internal consistency (α = .95).

Table 8

Factor Loadings of Exploratory Factor Analysis of the Dangerousness Rating Scale

Item	Pattern Coefficients		
	Motive/Intent	Context	Cognitions
A fire set for fraudulent/monetary gain	.76		
A fire set with the use of fire bombs	.73		
A person who sets a fire under the influence of drugs	.73		
A person who sets a fire under the influence of alcohol	.70		
A person who sets a series of fires in a short period of time	.69		
A fire set using fuel/accelerant	.63		
A fire set by putting flammable material on a hob/ in a microwave	.60		
A person who sets a fire for attention/recognition	.57		
A fire that has been knowingly set, in an uninhabited building	.57		
A house fire resulting from a cigarette not being extinguished properly	.57		
A fire set in a place where it could easily be discovered	.56		
A fire set at a time where it could easily be discovered	.54		
A fire resulting from a person that has set fire to themselves	.53		
A fire set to cardboard by a homeless person for warmth	.51		
A fire set in wet conditions	.50		
A fire set with multiple ignition points	.47		
A person who sets a fire and fails to call the fire brigade	.47		
Curtains that have been set on fire	.45		
A person with a political motivation to set a fire	.41		
A person with a revenge motivation to set a fire	.40		
A fire in a public building		-.88	
A fire set in a residential setting		-.87	
A fire set in a business setting		-.82	
A fire set in a school		-.80	
A fire that has been set within a hospital setting		-.70	
A fire that has been and concealed (Under the foundations of a house etc.)		-.68	
A fire set indoors		-.63	
A fire set by more than one offender		-.57	
A fire set within a prison		-.55	
A fire that has been set and fire escape routes blocked		-.54	
A fire that has been set and telephone wires have been cut	.32	-.50	
A fire that has been set by posting lit material through a letter box of a house	.40	-.44	
A fire that has been set and the fire alarms have been removed	.41	-.42	
A fire set in dry conditions		-.38	
A fire set in high winds		-.37	
A person who acts impulsively			.83
A person with mental health problems			.78
A person who has problems controlling their emotions			.72
A person who has antisocial attitudes			.67
A person who has little/ no knowledge of the dangers of smoke inhalation			.64
A person who has a high level of fire interest			.57
A person who has little/no knowledge of fire safety			.56
A person with a previous history of firesetting			.40
Eigenvalues	14.22	3.83	2.38
% of Variance	33.06	8.91	5.53

Multivariate Analysis of Variance (MANOVA)

A one way between groups' multivariate analysis of variance (MANOVA) was performed to investigate differences between fire professionals (n = 54) and members of the general public (n = 63) in their responses to the three factors identified by the factor analysis: *motive/intent, context,* and *cognitions*. Preliminary assumption testing was conducted to check for normality, linearity, univariate and multivariate outliers, homogeneity of variance-covariance matrices, and Pillai's Trace will be reported, as this is more robust (Tabachnick & Fidell, 2013)[6].

Due to unequal n values, there were no statistically significant differences between professions on the combined factors of opinions of firesetting dangerousness, F (9, 339) = 1.18, p = .31; Pillai's Trace = .09; partial eta squared = .03. On further exploration of the results, no univariate results were significant either. Therefore, the null hypothesis that professional status, has no impact upon opinions of deliberate firesetting dangerousness, should be accepted. The MANOVA allows for the conclusion that the hypothesis that professional status will have an impact upon opinions of deliberate firesetting dangerousness has to be rejected.

An additional MANOVA was performed to investigate differences in professional conceptualisation of firesetting dangerousness. This analysis included a total of 54 fire professionals. There was no statistically significant difference between professions regarding conceptualisations of the factors associated with dangerous deliberate firesetting, F (6, 100) = 1.06, p = .39;

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[6] It is noteworthy that Pillai's Trace is robust enough to deal with the small size of the Police participant group (n = 4).

Pillai's Trace = .12; partial eta squared = .06. Furthermore, no statistically significant results could be gleamed from the univariate results. Therefore, the null hypothesis that profession has no significant impact upon overall opinions of deliberate firesetting dangerousness, should be accepted. This additional MANOVA rejects the hypothesis that professional status has a significant impact upon overall opinions of deliberate firesetting.

Table 9

Comparison of Estimated Marginal Means

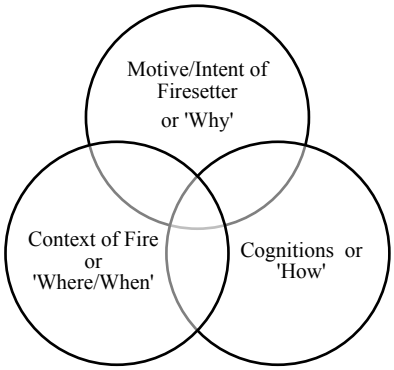
	Motive/Intent	Context	Cognitions
	M (SE)	*M (SE)*	*M (SE)*
Fire Professionals (*N = 54)*	.008 (.14)	.14 (.14)	.08 (.14)
General Public (*N = 63)*	-.007 (.13)	-.12 (.13)	-.07 (.13)
Fire (*N = 28)*	.19 (.18)	.20 (.22)	-.30 (.17)
Police (*N = 4)*	-.30 (.49)	-.35 (.59)	-.03 (.46)
Clinician (*N = 22)*	-.17 (.21)	.17 (.25)	.24 (.20)

4.5 Discussion

This study aimed to: (1) develop a universal conceptualization of firesetting dangerousness that can be applied to the entire population. This was done by measuring fire professionals' conceptualizations of firesetting dangerousness. This study also aimed to (2) validate the FDS; a scale developed to capture firesetting dangerousness conceptualisations. The FDS also allows for the (3) determination as to whether firesetting dangerousness is rated differently by different fire professionals, and (4) examine whether fire professional conceptualizations of firesetting dangerousness differed to that of general members of the public. This study aimed to provide a model that explains dangerous firesetting.

Whilst earlier studies have attempted to investigate the aspects of firesetting which were considered the most dangerousness (Sugarman & Dickens, 2009), this study is the first to develop a bottom up conceptualization of firesetting dangerousness. An exploratory factor analysis confirmed that the FDS contained three domains :(1) Motive/Intent (why), (2) Context (where/when), and (3) Cognitions (how). Figure 6 represents the first empirically based conceptualization of firesetting dangerousness.

Figure 5 - A Multi-Factorial Conceptualization of Firesetting Dangerousness



(1). Trigger event + 1 Factor = **Moderate Danger**

(2). Trigger Event + 1 Factor + 1 Factor = **High Danger**

(3). Trigger Event + 1 Factor + 1 Factor + 1 Factor = **Highest**

The universal conceptualization of firesetting dangerousness formulated here has clinical utility in making risk predictions. The interplay between the domains of dangerousness and a triggering event can be used to quantify levels of dangerousness. For example, if an individual faces a triggering event (e.g., the death of a loved one), whilst also possessing only one of the domains (e.g., of intent to harm), then this would mean that a subsequent fire set by that individual, could be rated as moderately dangerous (Trigger event + 1 Factor = Moderate Danger). However, if that same individual also set a fire within a context that promotes fire acquisition (i.e. by using accelerant), then the subsequent fire would increase in dangerousness (Trigger Event + 1 Factor + 1 Factor = High Danger). Finally, if this same individual set the same fire with the addition of having poor fire safety, the subsequent fire would be the highest

danger (Trigger Event + 1 Factor + 1 Factor + 1 Factor = Highest). Unlike current risk assessment processes, this universal conceptualization of firesetting dangerousness allows contextual aspects of firesetting to impact upon risk prediction. Thus, avoiding the firesetting dangerousness paradox; whereby firesetting dangerousness is not entirely reliant upon individual characteristics, but also recognises the symbiosis of the fire itself and the context within which it is set.

The third and fourth aims of this study were to establish whether individual fire professionals and the general public had different perspectives on firesetting dangerousness. The results suggested that no such differences existed. It is therefore posited that the fire professionals have similar views concerning the three domains (motive/intent, context, and cognitions) contained within the FDS, in determining firesetting dangerousness. This finding provides further evidence in support of the new conceptualization of firesetting, as it appears to represent general attitudes of firesetting dangerousness. The resultant conceptualization of firesetting dangerousness represent all three of the single factor conceptualizations of firesetting dangerousness discussed earlier (Brett, 2004; Dickens et al., 2009; Stewart & Culver, 1982). Bringing them all together ensures a more comprehensive conceptualization of firesetting dangerousness. The results of this study have clinical implications for those working with firesetters. Whilst this study documents a rudimentary outline of firesetting dangerousness and how professionals conceptualize it, it highlights the importance of thorough assessment processes with individuals. It is imperative that fire professionals work together in order to determine the motive/intent, context and cognitions demonstrated by an individual. This information can then provide vital information in future risk assessment for firesetting.

Limitations

This study represents one of the first attempts to quantify and conceptualize firesetting dangerousness. The analysis demonstrated that the FDS contains three domains of firesetting dangerousness. However, it cannot be assumed that the FDS measures the concept of firesetting dangerousness as a whole. This study is only the first to explore this area of firesetting, and its speculative nature cannot be ignored. Further investigation is required, with more rigorous selection of participants. One of the biggest limitations of this study is the lack of homogeneity between and within the participant groups. Many different professionals were included to one single participant group, which may have contributed to the findings. Furthermore, no demographic information was taken from the participants, which means that confounding variables may have contaminated the results. Further research is needed to establish whether there are other factors making up the concept of firesetting dangerousness. It would therefore be interesting to see if the FDS could be further refined/validated with other fire professionals, such as members of the criminal justice system.

Some participants reported difficulty in determining dangerousness based upon one singular factor of information. Whilst this result highlights that risk assessment should be seen as multi-faceted processes; it also suggests that the FDS may be compromised on ecological validity for some fire professionals. The FDS does not contain a high level of contextual information relevant for assessing risk in firesetting. Several items were removed from the FDS after not being deemed reliable or valid enough to be held within the scale. Further contextual items for inclusion within the FDS should be explored within future research.

Conclusion

To conclude, this study determined that at least three domains of firesetting dangerousness exist. These include motive/intent, cognitions, and the context within which the fire is set. Whilst these domains may not explain firesetting dangerousness fully, they have helped to kick start the difficult task of consolidating dangerousness in relation to firesetting. By providing an evidence-based universal conceptualization of firesetting dangerousness, the different single factor approaches to fire dangerousness are brought together. However, the combined domains may help aid in risk predictions. By using the presence or absence of factors relating to each of the three domains; more appropriate levels of risk may be determined. On a broader level, it is hoped that this study will encourage fire professionals to consider fire dangerousness more widely.

Chapter Five. General Discussion

5.1 Aim of Chapter

A general overview of the findings will be given before examining how these fit with background research. The chapter will include a discussion of the significance of the presented findings and recommendations for the future study. The findings uncovered throughout this thesis include (1) highlighting the sparse literature available for offenders with a history of firesetting, (2) strong indications that male and female mentally disordered firesetters may follow different trajectories of which social isolation and premeditation are key, (3) that recidivism in mentally disordered firesetting could be predicted by personality disorder, impulsivity, medication noncompliance and social isolation, and finally (4) the first universal conceptualisation of firesetting dangerousness based upon considerations of motive/intent, context and cognitions.

5.2 General Overview of Findings

This thesis set out with the main aim of examining the risk factors and dangerousness of firesetters. It should now be clear, that the literature surrounding firesetters, is comparatively sparse. The phenotypical nature of the behaviour is one of secrecy and detachment. This makes firesetters difficult to identify within clinical samples. With a lack of guiding literature, professionals rely upon existing violence risk assessments to report and assess for firesetting risk.

Systematic Review

The systematic review carried out within this thesis documented that the research in this area is sparse. With a total of fourteen documents included in the review, this highlights the significance of the problem. In addition to the issue of quantity, the review also highlighted the issue of research quality. It appears that

because research is underdeveloped, when compared to violent and sexual offending, there has been a tendency to forgo the principles of best practice research design. The MERGE guidelines (Liddle et al., 1996) were quantitatively adapted for the purpose of highlighting the quality of firesetting research. Worryingly, only one of the fourteen journals included could be classified as 'high' quality research. Analysis of the existing literature pertaining to mentally disordered firesetting risk concluded the following problems: (1) unclear participant groups (i.e., containing mixed gender samples, with little regard for any gender bias that may be confounding the results); (2) small sample sizes; and (3) a lack of matching between comparison/control groups. For example, out of fourteen documents within the systematic review, only two of the studies matched variables between the firesetting group and the non firesetting group (Bradford, 1982; Tennent, et al., 1971). This limited the validity of conclusions that could be drawn from the systematic review. However, in light of the small amount of research being published in the arena of firesetting, this limitation was an unavoidable one.

Furthermore, the findings of the systematic review enabled the risk domains of the M-TTAF (Gannon et al., 2012) to be validated with mentally disordered firesetters. The M-TTAF posits that firesetting can be best explained through an examination of developmental, biological, learning, and cultural influences. The M-TTAF suggests that these predispose an individual towards firesetting, and when combined with key psychological vulnerabilities, and triggering events – result in firesetting. Because of the comprehensive nature of the M-TTAF, its principles became central to this thesis and the exploration of risk factors. The systematic review found evidence to support three of the four dynamic risk factor domains of the M-TTAF. Literature supporting the dynamic

risk factor *attitudes*, was found to be lacking. Furthermore, the extent to which *fire factors* could be found within the mentally disordered firesetting literature was limited. Whilst there were examples of fire interest being examined within MDF samples; nothing could be found on *fire scripts.* This particular facet of firesetting risk appears to be a hypothetical notion at present and requires further examination in order to provide evidence for its inclusion as a risk factor for firesetting.

Lastly, the systematic review found that very few studies had examined differences between male and female firesetters. Many researchers included male and female firesetters together in the same participant group, potentially hiding critical information. The limitations of the literature demonstrated within the systematic review directly informed the manner in which my own studies were carried out. The absence of matched variables within firesetting risk studies meant that it was imperative that examinations of risk factors contained a control group. The review also highlighted the gap in our knowledge of gender informed risk in relation to firesetting, as well as incident related contextual risk factors.

Study 1 – Dynamic Risk Factors

The first empirical study aimed to examine the dynamic, static and incident-related risk factors associated with MDFs. Within the systematic review, it had been identified that the literature pertaining to risk factors was particularly sparse. Already documented within this thesis, is the importance of dynamic and static risk factors, in determining the effectiveness of assessment, treatment, and management processes with offenders (Andrews & Bonta, 2006; 2010). However, this study marks one of the few studies to determine differences in incident related contextual risk factors between firesetters, male/female and one-time vs. repeat firesetters. Contextual aspects of firesetting were rarely

considered within the studies included in the systematic review, and so their inclusion in this study provide a novel contribution to the literature.

This study aimed to compare the dynamic, static and incident-related risk factors of mentally disordered patients who had been either (1) involved in a firesetting incident, or (2) involved in a non-firesetting incident. Leading by example, this study, is one of the few studies to match key variables between the firesetting group and the nonfiresetting group. This reduced the impact of bias that confounding variables may have had upon the results. It is therefore interesting that this study found very few differences between the two groups. Whilst differences were observed between the two, these were mostly descriptive in nature, and could not be used in risk assessment or management processes. Further investigation is required to examine the differences between the two groups, with a more in-depth focus upon research quality. However, this study marks one of the few studies to examine the differences *between* male and female MDFs.

The study found that mixed gender firesetting could be predicted using a cluster of variables which included: (1) *higher levels of previous hospital admissions,* (2) *social isolation,* (3) *suicidal/self-harm,* and (4) *incident premeditation. Incident premeditation* was found to be the most predictive risk factor of mentally disordered firesetting. When further subdivided by gender, *incident premeditation* and *social isolation* were solely predictive of female mentally disordered firesetting. One of the most salient findings from this study, was the notion that female MDFs could be clearly distinguishable from male MDFs. The two distinguishing factors for females included: (1) *Impulsivity* and (2) *self being the target of their firesetting*. Male MDFs on the other hand were best predicted by the presence of one incident characteristic, *intoxication.* Whilst

existing research has documented impulsivity and self-harm/parasuicide being typically female features (Dickens et al., 2007; Long et al., 2015; Miller & Fritzon, 2007), this is the first study to find that this risk factor possesses the capabilities to predict female MDFs. This finding appears to go some way in providing support for the *emotionally expressive/need for recognition* trajectory of the M-TTAF (Gannon et al., 2012) for female mentally disordered firesetters. This finding provides clinicians with tangible empirical evidence which can further enrich clinical practice with this offending group. Unfortunately, this study did not provide findings that enabled correlations with an M-TTAF trajectory for male mentally disordered firesetters. Further research would be necessary to determine gender specific trajectories for males.

Finally, this study was able to predict recidivism in MDFs with a model consisting of both dynamic and static risk factors. Predictive factors included: (1) *personality disorder*, (2) *impulsivity,* (3) *medication non-compliance,* and (4) *social isolation*. The findings of this study fit into the existing literature which suggest that social inclusion can have a protective function in preventing future offending (Bouman et al., 2010). The results suggest that a typical repeat MDF can be typified by higher instances of personality disorder (Coid, Hickey, Kahtan, Zhang, & Yang, 2007; Walter et al., 2011), and poor impulse control (Bonta et al., 2014). This study found that most of the risk factors defined by the M-TTAF (Gannon et al., 2012), could be found within a mentally disordered firesetting sample.

Study 2 – Dangerousness

The second, and final empirical study within this thesis was used to generate a universal conceptualization of firesetting dangerousness. It seems that the unpredictable nature of fire has, thus far, limited the progress in the

availability of a risk assessment for firesetters. In light of unknown and unquantifiable responses by the environment in an incident of firesetting, this has led to all incidents of firesetting being termed ‘dangerous’. Chapter four contains an empirical study which produced the first evidence-based conceptualization of firesetting dangerousness. This conceptualization of firesetting dangerousness incorporates the three single factor conceptualizations of firesetting. These already exist in the literature; however, this study brings them together. These include considerations for the: (1) Motive/Intent (why), (2) Context (where/when), and (3) Cognitions (how) of an incident of firesetting as measured by The Firesetting Dangerousness Scale (Wyatt et al., 2014). This scale was developed for the purpose of examining the opinions of fire professionals in relation to firesetting dangerousness. The fire professionals included in this study were members of the police and fire, as well as forensic clinicians. Whilst the scale was developed for the purpose of developing a conceptualization of firesetting dangerousness; the FDS also allowed analyses to be carried out. These determined that fire professionals as a whole, and members of the general public, do not differ in their opinions of firesetting dangerousness. Furthermore, analyses concluded that fire, police, and clinicians do not differ in their opinions of which domain of dangerousness is most important (i.e., motive/Intent (why), Context (where/when), and (3) Cognitions (how)).

The conceptualization of firesetting dangerousness evidenced within this study has direct clinical utility as it guides professionals as to the information necessary in drawing conclusions regarding firesetting dangerousness. Primarily, the results of this study contribute to the firesetting risk prediction literature. As it allows for the refinement of areas of risk to focus upon. It is hoped that this information will be fed into a risk tool at some stage. The three domains of

firesetting dangerousness highlighted within the study can be used to inform future developments in the area of firesetting risk assessment (Brett, 2004; Dickens et al., 2009; Stewart & Culver, 1982). This conceptualization of firesetting dangerousness offers a novel contribution to clinical practice as it encourages the use of contextual information when determining the dangerousness.

As a whole, the results of this thesis demonstrate that further research should be carried out with firesetters. Whilst the phenotypical aspects of firesetting can make it difficult to apprehend, treat, and assess – this should encourage professionals to seek alternative methods to approach these. This thesis provides some novel contributions to the literature; however, these are by no means conclusive.

5.3 Theoretical and Practical Issues

Although the results of this research contribute to the firesetting literature the limitations of the research should also be considered. As previously mentioned, firesetting research is, for the most part, poor in quality. This should be considered when reviewing the results of the systematic review in particular. Additionally, whilst attempts to improve the quality of research have been noted, this thesis contains smaller sample sizes than considered ideal. Whilst the statistical requirements for all analyses used, have been met, it is always preferable to have large sample sizes. To highlight this point further, when applying the adapted assessment criteria used in Chapter Two to access the quality of studies (Lidde et al., 1996), Study One would be classified as 'high quality'. However, the study falls short of including all five of the M-TTAF (Gannon et al., 2012) dynamic risk factors. Study One was restricted in the dynamic risk factors it was able to examine because of the methodology chosen

(i.e., retrospective file review). Unfortunately, *fire factors* and *attitudes* could not be examined.

5.4 Theoretical and Practical Significance

As already discussed, this thesis provides further contributions to the firesetting literature. These take the form of further information relating to the risk factors and dangerousness of firesetters. This information can be useful in clinical practice, as it allows for assessment processes to take another step towards evidence-based practice. Specifically, the results of Study 1 provide a series of empirically based risk factors, which, in the absence of a risk assessment schedule, can help guide the judgement of professionals. These risk factors were initially hypothesized within the M-TTAF (Gannon et al., 2012). The majority of these have been established as necessary in the risk assessment of mentally disordered firesetting. However, further exploration of attitudes is required within a mentally disordered firesetting sample, as this was missing from the MDF literature. Furthermore, there was no evidence of any research examining the scripts of MDFs. As an emerging area of research, this will be an important consideration for firesetting risk assessment as the field develops. The findings from this study also highlight the need for more gender awareness in offender rehabilitation. The results from Study One, suggest that female and male firesetter's risk factors are not the same, and may require assessment and treatment processes that are reflective of these differences.

Finally, the introduction of an evidence-based multi-factorial conceptualization of firesetting dangerousness, brings together the three single-factor conceptualizations that previously exist within the literature. The universal conceptualization of firesetting dangerousness evidenced and developed within this thesis provides clinical practice with a new conceptual guide for determining

firesetting dangerousness. Whilst the conceptualisation is likely to be updated in the future, it is novel in its suggestion that contextual information is vital in determining dangerousness in firesetting.

5.5 Conclusions and Future Research Recommendations

The thesis concludes that firesetting research needs to continue to ensure that the risk assessment processes of this offending group matches that of violent and sexual offending. Whilst the results of this thesis provide some novel contributions, continued progress is required. The notion of gender-specific risk assessment processes for female firesetters is in its infancy and requires further exploration. This will ensure that clinical practice is as responsive as it can possibly be.

Furthermore, it is imperative that future firesetting research takes heed of mistakes made previously by firesetting researchers. Firesetting research should be carried out to the same high standards as that of other offending behaviour research. In this way, we can ensure that one day we can have a fully justified risk assessment for firesetters.

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Appendix

Appendix 1 – Adapted MERGE Checklist for Studies Assessing Risk Factors (Liddle, Williamson, & Irwig, 1996)

DESCRIPTIVE INFORMATION ABOUT THE STUDY	**NOTES**	
Study Identification	Include author, title, year of publication, and study time frame.	
What is the study type?	e.g. Case Control Studies	
What Risk Factors are considered?		
What outcomes are considered?	e.g. recidivism	
What other factors could affect the outcome?	Include potential confounding factors, demographic characteristics	
What are the characteristics of the population and study setting?	Personal characteristics, e.g. sex, characteristics of the population. Study setting, e.g. inpatient, outpatient, community	
EVALUATION CRITERIA	**SCORING**	
1. Participants in each participant group?	2- Over 50 1- Over 40 0- Less than 40	
2. Equal sample sizes used?	1-Yes 0- No	
3. Matched variables used?	2- Yes 0- No	
4. Are outcomes (recidivism) measured?	2 – Yes 0 – No	
5. Are all important risk factors included in the analysis?	3 – All six of the M-TTAF risk factors are included. 2 – Most of the M-TTAF risk factors are included (four or more). 1 – Few M-TTAF risk factors are included (two or more). 0 – No important risk factors included.	
TOTAL SCORE	Score of 8 and above	High Quality
	Score of 5 and above	Medium Quality
	Score of 4 or less	Low Quality

Return to Home

View Application (20143546)

Approval Email

APPROVAL BY PSYCHOLOGY RESEARCH ETHICS COMMITTEE
The following research project has been approved by
The Psychology Research Ethics Committee
Date: 15:28 04-06-2014
Code: 20143546
Applicant details:
Name: Becky W[redacted]
Status: PhD St[redacted]
Email address: bw269@kent.ac.uk
Title of the research:
Dynamic Risk Factors Associated with Mentally Disordered Firesetting
When carrying out this research you are reminded to
* follow the Departmental Guidelines for Conducting Research with Human Participants
* comply with the Data Protection Act 1998
* refer any amendments to the protocol to the Panel
Please keep this form in a safe place. You may be asked to present it at a later stage of your study for monitoring purposes. Final year project students and MSc students will need to submit a copy of this form with their project.
You can log in at http://www.kent.ac.uk/psychology/technical/ethics/index.php to copy or print pregenerated handouts for this study.

Comments
Theresa Gannon Joseph Brooks I am approving this application internally but it MUST be approved by the relevant NHS ethics board before data collection can start. Once approval is received from that board, please upload a copy of the approval letter as a supporting file for this application. Aleksandra Cichocka I am approving the application but, as Joe said, the approval is only valid with joint approval by the relevant NHS ethics board. Becky Wyatt-Theresa Gannon

Applicant Details:

Name of the researcher	Becky Wyatt
Name of the supervisor	Theresa Gannon
Status	[redacted]
Email address	bw269@kent.ac.uk
Title	Dynamic Risk Factors Associated with Mentally Disordered Firesetting
Summary	The research aims to establish which dynamic variables are associated with firesetting recidivism. This research is particularly pertinent as there is an absence of a structured professional judgement risk assessment focusing specifically on firesetting. This research would provide a scientific evidence base for the risk assessment; increasing user confidence. With the addition of a risk tool it is anticipated that the assessment and management of firesetting individuals will become a more transparent, fluid process. The identification of the dynamic risk factors associated with future mentally disordered firesetting will be the focus of the research. The research intends to review a minimum of 50 incidents of firesetting within the trust (identified through incident forms). In order to participate in this study, the incident form must have a named perpetrator of the deliberate firesetting. The corresponding patient notes will be consulted (via Information Governance) and a review of the individual's clinical notes will take place in order to establish the dynamic risk factors that were present within a four week period leading up to the incident. In order to participate, a participant must have committed an incident of firesetting whilst under the supervision of KMPT trust. Additionally, extensive clinical files must exist on the identified individual in order for the file review to take place. (Ideally, a daily note written by a Care Professional a month prior to the firesetting individual). The study will not require any face to face contact with the participants, and will look at a minimum of 50 separate incident forms). In order to participate in this study, the incident form must have a named perpetrator of the deliberate firesetting. The corresponding patient notes will be consulted (via Information Governance) and a review of the

individuals clinical notes will take place in order to establish the dynamic risk factors that were present within a four week period leading up to the incident. Due to logistical and ethical considerations, it is the intention of the researchers to gain Section 251 approval in accordance with the NHS Act 2006 which will allow patient identifiable information to be accessed for the purpose of this research without the consent of the individual.

Course PhD Forensic Psychology

Review Status

Joseph Brooks has approved this application.

Aleksandra Cichocka has approved this application.

Comments
The comments associated with this application are listed below, oldest first:

Theresa Gannon

Joseph Brooks
I am approving this application internally but it MUST be approved by the relevant NHS ethics board before data collection can start. Once approval is received from that board, please upload a copy of the approval letter as a supporting file for this application.

Aleksandra Cichocka
I am approving the application but, as Joe said, the approval is only valid with joint approval by the relevant NHS ethics board.

Becky Wyatt
-

Theresa Gannon

Research checklist

The following 4 points were indicated on the checklist.

- The study will require the co-operation of a gate-keeper for initial access to the groups or individuals recruited. (e.g. students at school, members of self-help groups, residents of a nursing home)
- It will be necessary for paricipants to take part in the study without their knowledge and consent at the time (e.g. covert observation of people in non-public places)
- The study will involve questions related to topics that are both personal to the respondent and potentially stigmatizing to answer (e.g., referring to sexual, illegal, or deviant activities/beliefs)
- Study will involve recruitment of patients or staff through the NHS.

Application details

The section below only show the relevant parts of the application. For example, if the researcher answered no to the project being based on a previous project that section will be omitted from below.

Source of participants

Fire incidents will be identified through trust IRIS incident forms which will be assessed via the Health and Safety department of Kent and Medway Partnership Trust. The researcher will then request all incident forms of any recorded incident of deliberate firesetting within the last nine years. For the sake of comparison, a control group will also be used. The control group will consist of a review of non-fire related incidents (i.e. incident of violence, self-harm, AWOL, use of alcohol/substance) that have occurred within the trust. The inclusion criteria will remain the same for both firesetting incidents and the control non-firesetting incidents. The researcher will then review the incident forms to see if they meet the inclusion criteria of the file review. In order to participate in the incident file review study an incident form must document a named perpetrator (i.e. a patient) of the deliberate incident of firesetting within the trust. Once identified, the names of the associated patient, date of birth (or NHS number in the absence of a recorded date of birth) and the location of the incident will be logged into a database. The RIO notes of the associated patients will then be accessed, and clinical progress notes will be reviewed in order to identify the presence of dynamic risk variables one month prior to the incident. Any patient, who predates the introduction of RIO notes, will have their paper notes requested from Medical Records (i.e. The patient files one month prior to the incident of firesetting). When the presence of a dynamic risk factor is identified this will be recorded on a file review checklist. The researcher will dichotomously record the presence or absence of a risk factor; ticking either 'yes' or 'no' (see attached). The researchers have conducted a literature review to establish the acute and stable dynamic risk factors that have previously been linked to firesetting. These have been included in the review checklist; however blank spaces have also been included to document any dynamic risk variables that have not been anticipated. This ensures that the review process remains consistent

Health Research Authority

National Research Ethics Service

NRES Committee London - Fulham
HRA NRES Centre Manchester
Barlow House
3rd Floor, 4 Minshull Street
Manchester
M1 3DZ

Telephone: 0161 625 7816
Facsimile: 0161 625 7299

08 August 2014

Miss Becky Wyatt

[redacted]

Dear Miss Wyatt

Study title:	**The identification of Dynamic Risk Factors associated with Mentally Disordered Firesetting within a Mental Health Trust**
REC reference:	**14/LO/1060**
Protocol number:	**n/a**
IRAS project ID:	**151109**

Thank you for your letter of 7 August 2014. I can confirm the REC has received the document listed below and that this complies with the approval conditions detailed in our letter dated 25 June 2014

Documents received

The documents received were as follows:

Document	*Version*	*Date*
Other [Letter of approval from the Confidentiality Advisory Group]		06 August 2014

Approved documents

The final list of approved documentation for the study is therefore as follows:

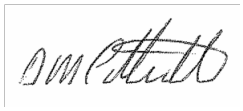
Document	*Version*	*Date*
Covering letter on headed paper [Cover Letter]	v1	15 April 2014
Evidence of Sponsor insurance or indemnity (non-NHS Sponsors only) [Evidence of Sponsor]	v1	16 April 2014
Interview schedules or topic guides for participants [File Review Checklist]	v2	22 May 2014
IRAS Checklist XML [Checklist_29052014]		29 May 2014

Other [Your Information Leaflet]	v1	16 April 2014
Other [NGIB Data Flow Part B Section 8]	v2	06 May 2014
Other [Evidence of Sponsor]	v1	16 April 2014
Other [Letter of approval from the Confidentiality Advisory Group.]		06 August 2014
REC Application Form [REC_Form_29052014]		29 May 2014
Referee's report or other scientific critique report [Becky Wyatt Research_Peer_Review_JLW.doc]	v1	16 May 2014
Research protocol or project proposal [Research Protocol]	v5	22 May 2014
Summary CV for Chief Investigator (CI) [Becky Wyatt CV]	V1	06 May 2014
Summary CV for student [Becky Wyatt CV]	v1	06 May 2014
Summary CV for supervisor (student research) [Theresa Ann Gannon CV SV]	v1	07 May 2014
Summary, synopsis or diagram (flowchart) of protocol in non-technical language [Research Proposal Synopsis]	v4	06 May 2014

You should ensure that the sponsor has a copy of the final documentation for the study. It is the sponsor's responsibility to ensure that the documentation is made available to R&D offices at all participating sites.

14/LO/1060	**Please quote this number on all correspondence**

Yours sincerely



Miss Diane Catterall REC Assistant

E-mail: nrescommittee.london-fulham@nhs.net

Appendix 4 - Research and Development Approval Letter for Study One

NHS
National Institute for Health Research
RM&G Consortium for Kent & Medway
No 6, The Courtyard
Campus Way
Gillingham Business Park
Kent ME8 0NZ
Phone: 01634 350430
Email: rmgconsortium.km@nhs.net

[redacted]
University of Kent
Canterbury CT2 7NP

12th August 2014

Dear Miss Wyatt,

Permission for research

I am writing to inform you that permission has been granted to the NHS organisation or organisations listed below, for the following research project, on the basis described in the application form, protocol and supporting documentation.

Study details:

Study Title	The identification of Dynamic Risk Factors associated with Mentally Disordered Firesetting within a Mental Health Trust
Chief Investigator	Becky Wyatt
Sponsor name	University of Kent
RM&G Consortium study number	14-034
IRAS or UKCRN ID number	151109
REC number (REC name)	14/LO/1060 London - Fulham
CAG	14/CAG/1005

NHS organisations and locations:

Organisation giving permission	Date of Permission	Site or sites to which permission applies
Kent and Medway NHS and Social Care Partnership Trust	12/08/14	Trevor Gibbens Unit Hermitage Lane Maidstone Kent ME16 9PH

Amendments to date	Amendment number (local ref)
None	

Permission is granted on the understanding that the study is conducted in accordance with the Research Governance Framework, ICH GCP (ONLY if applicable), The Data Protection Act (1998) and NHS Trust policies and procedures. Permission is only granted for the activities for which a favourable opinion has been given by the REC or university ethics committee and which have been authorised by the MHRA (ONLY if applicable).

The following local conditions will apply:

1. **Sponsorship of study** — The research sponsor will be the organisation named above; the management and design of the study is not the responsibility of the trust or trusts giving permission.

2. **Confidentiality** — You are required to ensure that all information regarding participants remains *secure* and *strictly confidential* at all times. You must ensure that you understand and comply with the requirements of the Data Protection Act (1998) and the NHS Confidentiality Code of Practice (www.dh.gov.uk/assetRoot/04/06/92/54/04069254.pdf). Furthermore, you should be aware that under the Data Protection Act (1998), unauthorised disclosure of information is an offence and such disclosures may lead to prosecution.

3. **Researcher authorisation** — **Important.** Only those researchers holding a Letter of Access or Honorary Research Contract, as appropriate, from the NHS organisation or organisations may have direct contact with the participants of the study or the patients' notes, unless they already hold a substantive or honorary clinical contract with the organisation or organisations.

4. **Urgent safety actions** — The research sponsor, or the Chief Investigator, or the local Principal Investigator at a research site, may take appropriate urgent safety measures in order to protect research participants against any immediate hazard to their health or safety. This office should be notified that such measures have been taken. The notification should also include the reasons why the measures were taken and the plan for further action. This office should be notified within the same time frame of notifying the REC and any other regulatory bodies.

5. **Serious adverse events (SAE)** — Should an SAE occur during the course of the project, this office must be notified immediately. This is in addition to your legal duty to report such events to the Sponsor.

6. **Amendments** — All amendments (including changes to the local research team) need to be submitted in accordance with guidance in IRAS. This office should be informed at the same time as the REC or university ethics committee is notified in order to avoid unnecessary delays.

7. **Indemnity** — You must check with the Sponsor that the indemnity arrangements, as confirmed in the Sponsor's Declaration and described in the application forms, are in place before any participants are recruited.

8. Study progression	You will inform us of any significant developments that occur as the study progresses. You will complete and return any report forms that we send you and provide up-to-date information on the number of participants recruited when asked.
9. Audit of Study	You may also be subject to a random audit of research which will involve a site visit, a requirement to view study documents and a request to interview researchers.
10. Study completion	You will notify the Chief Investigator and this office when the study has completed recruiting participants and when the study is finally finished at your site. You will complete and return the final report that we send you and inform us of any publications relating to the study.
11. Presentation of findings	**For Kent and Medway NHS and Social Care Partnership Trust (KMPT) studies,** KMPT expects that the findings of this study will be presented to members of the appropriate Service Line. You should contact the service line research lead upon completion of the study to arrange a suitable venue and time.
12. Contract arrangements	Permission for research has been granted on the basis that the Honorary Forensic Researcher has clinical contractual arrangements in place with the Trust.

Finally, I wish you every success with the study.

Yours sincerely,

Richard Collins

RM&G Manager, RM&G Consortium for Kent and Medway

copies to Lona Lockerbie (Local Collaborator)
Nicole Palmer(Sponsor's representative)
Sarah Dickens (Mental Health Team)

NHS
Health Research Authority
Confidentiality Advisory Group

Miss Becky Wyatt
80Skipton House London Road
[redacted]
London

06 August 2014

Dear Miss Wyatt

Study title:	**The identification of Dynamic Risk Factors associated with Mentally Disordered Firesetting within a Mental Health Trust**
CAG reference:	**14/CAG/1005**

Thank you for your research application, submitted for approval under Regulation 5 of the Health Service (Control of Patient Information) Regulations 2002 to process patient identifiable information without consent. Approved applications enable the data controller to provide specified information to the applicant for the purposes of the relevant activity, without being in breach of the common law duty of confidentiality, although other relevant legislative provisions will still be applicable.

The role of the Confidentiality Advisory Group (CAG) is to review applications submitted under these Regulations and to provide advice to the Health Research Authority on whether an application should be approved, and if so, any relevant conditions. This application was considered on 19 June 2014.

Health Research Authority approval decision

The Health Research Authority, having considered the advice from the Confidentiality Advisory Group as set out below, has determined the following:

1. The application is approved, subject to compliance with the standard and specific conditions of approval.

Context

Purpose of application

This application from the University of Kent set out the purpose of a research study which aimed to establish which dynamic risk factors are associated with firesetting recidivism. The results of the study would provide information to aid professionals in the short-term assessment of future firesetting behaviours.

A recommendation for class 4 and 6 support was requested to cover access to patient records in relation to cohort and control group. Approximately 200 patient records would be accessed, and confidential patient information was required in order to link incident forms to patient records; identifiers will be destroyed as soon as possible following linkage.

Confidential patient information requested

Access was requested to name, NHS number and date of birth.

Confidentiality Advisory Group advice
Practicable alternatives

Members considered whether a practicable alternative to the disclosure of patient identifiable data without consent existed, taking into account the cost and technology available in line with Section 251 (4) of the NHS Act 2006.

- Feasibility of consent

Members noted that the applicant had asserted that seeking consent in these circumstances may be distressing for the cohort. Members agreed that in these instances it would be difficult to seek consent, noting the responses provided following patient consultation and the requirement for a complete sample.

- Use of anonymized/pseudonymised data

Members noted that confidential patient information would be required in order to link incident forms and that identifiers would be destroyed as soon as possible following linkage.

Data Protection Act compliance

It is a requirement of the Regulations that an application cannot be inconsistent with the principles of the Data Protection Act 1998 (DPA). The first principle of the DPA requires that reasonable efforts are made to inform data subjects of the use of their data. Members noted that a generic patient information leaflet had been provided which was distributed by Kent and Medway NHS and Social Care Partnership Trust. Members noted that there were assurances within the leaflet which suggested that anonymous information only would be provided for research purposes and that permission would be sought when identifiable data was required. Members advised that this information sheet should be updated to ensure it provided an accurate account of the potential uses of confidential patient information.

Members agreed that as the current information did not indicate identifiable data could be used, further efforts should be made to inform patients of this activity. Members noted the concerns raised by patients in

relation to contacting them after discharge and advised that information could be displayed where the cohort potentially might see it, such as the hospital website.

Access to confidential patient information

Members queried which individuals would require access to identifiable information and asked that the applicant confirm this prior to final approval.

Confidentiality Advisory Group advice conclusion

In line with the considerations above, the CAG agreed that the minimum criteria under the Regulations appeared to have been met *and that there was a public interest in research of this nature being conducted*, and therefore advised recommending *provisional* support to the Health Research Authority, subject to compliance with the specific and standard conditions of support *and further clarifications* as set out below.

Specific conditions of support

1. Favourable opinion from REC. **Confirmed 25/06/2014**
2. Confirmation of suitable security arrangements via IG Toolkit submission, please see security review requirement section here. **Confirmed 10/06/2014**
3. Confirmation that further information about the study would be displayed on hospital website. **Confirmed 21/07/2014**
4. Confirmation regarding who will have access to identifiable data. **Confirmed that the chief investigator and one research assistant, employed by KMPT, would have access.**

As the above conditions have been accepted and/or met, this letter provides confirmation of final approval. I will arrange for the register of approved applications on the HRA website to be updated with this information.

Annual review

Please note that your approval is subject to submission of an annual review report to show how you have met the conditions or report plans, and action towards meeting them. It is also your responsibility to submit this report on the anniversary of your final approval and to report any changes such as to the purpose or design of the proposed activity, or to security and confidentiality arrangements. An annual review should be provided no later than 31 July 2015 and preferably 4 weeks before this date.

Reviewed documents
The documents reviewed at the meeting were:

Document	Version	Date
Covering letter on headed paper		15/04/2014

Other [Query sheet]		03/06/2014
Patient information sheet (PIS)		January 2013
IRAS Application Form		17/04/2014
Research protocol or project proposal		22/05/2014
File review checklist		22/05/2014

Membership of the Group

The members of the Confidentiality Advisory Group who were present at the consideration of this item are listed below.

There were *no* declarations of interest in relation to this item.

Feedback

You are invited to give your view of the service provided by the Confidentiality Advice Team and the application procedure in general by completion of this survey http://www.hra.nhs.uk/about-the-hra/governance/quality-assurance/. We would be grateful if you could take some time to provide your feedback.

With the Group's best wishes for the success of this project.

Yours sincerely

Claire Edgeworth
Deputy Confidentiality Advice Manager

Email: HRA.CAG@nhs.net

Enclosures: List of members who were present at the meeting and those who submitted written comments
Standard conditions of approval

Copy to: *nrescommittee.london-fulham@nhs.net*

Group members

Name	Capacity
Dr Mark Taylor (Chair)	Lay
Professor Ann Jacoby	
Dr Kambiz Boomla	
Dr Tony Calland (Vice Chair)	
Mrs Hannah Chambers	Lay
Professor Barry Evans	
Professor Julia Hippisley-Cox	
Dr Patrick Coyle (Vice Chair)	
Mr Anthony Kane	Lay
Professor Jennifer Kurinczuk	
Ms Clare Sanderson	
Dr Murat Soncul	
Mr C. Marc Taylor	
Ms Gillian Wells	Lay
Dr Miranda Wolpert	

In attendance

Name	Position (or reason for attending)
Ms Natasha Dunkley	Confidentiality Advice Manager, HRA
Ms Claire Edgeworth	Deputy Confidentiality Advice Manager, HRA
Mr Stephen Robinson	Corporate Secretary, HRA (observing)

NHS
Health Research Authority

Confidentiality Advisory Group

Standard conditions of approval

The approval provided by the Health Research Authority is subject to the following standard conditions.

The applicant will ensure that:

1. The specified patient identifiable information is only used for the purpose(s) set out in the application.

2. Confidentiality is preserved and there are no disclosures of information in aggregate or patient level form that may inferentially identify a person, nor will any attempt be made to identify individuals, households or organizations in the data.

3. Requirements of the Statistics and Registration Services Act 2007 are adhered to regarding publication when relevant.

4. All staff with access to patient identifiable information have contractual obligations of confidentiality, enforceable through disciplinary procedures.

5. All staff with access to patient identifiable information have received appropriate ongoing training to ensure they are aware of their responsibilities.

6. Activities are consistent with the Data Protection Act 1998.

7. Audit of data processing by a designated agent is facilitated and supported.

8. The wishes of patients who have withheld or withdrawn their consent are respected.

9. The Confidentiality Advice Team is notified of any significant changes (purpose, data flows, data items, security arrangements) prior to the change occurring.

10. An annual report is provided no later than 12 months from the date of your final confirmation letter.

11. Any breaches of confidentiality / security around this particular flow of data should be reported to CAG within 10 working days, along with remedial actions taken / to be taken.

Appendix 6 - Research Fair Processing Notice Placed on KMPT Website for Study One

Research Fair Processing Notice

The Identification of Dynamic Risk Factors associated with Mentally Disordered Firesetting within a Mental Health Trust

The Kent and Medway NHS and Social Care Partnership Trust ("KMPT") holds and processes the personal data of individuals who receive care and treatment, or are referred to KMPT for consideration for care and treatment. Information is also used to help the NHS including undertaking health research and development.

KMPT has recently been given approval under Regulation 5 of the Health Service (Control of Patient Information) Regulations 2002 to process patient identifiable information for the purpose of a research project into identifying the dynamic risk factors associated with mental disordered firesetting within a Mental Health Trust. The research aims to establish which dynamic risk factors are associated with firesetting tendencies and the results will provide information to aid health care professionals in the short-term assessment of future firesetting behaviours.

The research will require the review of incident forms highlighting those incidents of deliberate firesetting over the last 10 years to identify the perpetrators and link the incident forms to the relevant patient records. It is envisaged that approximately 200 patient records during this period will be accessed by the research team and confidential information required as part of the research. This is made up of 100 records relating to incidents of deliberate firesetting and 100 incidents of non-firesetting (control group) to include incidents such as violence, AWOL, verbal abuse, sexually inappropriate behaviour etc. All information accessed by the research team and identified as relevant to the research project will be de-identified and names replaced with a participant number. Identifiable information will not be retained by the research team and anonymous information will be held for 5 years and then destroyed securely.

For more information about how the Trust uses the information it collects, please review our leaflets which can be found by following the link below:-

http://www.kmpt.nhs.uk/Freedom-of-Information.htm

If you feel this research project may affect your confidentiality and you wish to object to your records being made available during this, or any other research activities, please advise the Trust, writing to:-

The Information Rights Manager
St Michaels House
St Michaels Road
Sittingbourne
Kent
ME10 3DW

Appendix 7 - Checklist Used in Retrospective File Review

Demographic Information		
Age at the time of Incident		
Gender		
Ethnicity		
Current Service		
Marital Status		
Psychiatric diagnosis		
Previous hospital admissions	YES	NO
Offence Related Characteristics		
Location of Incident (e.g. garden, bedroom)		
Target (e.g. building, self, other)		
Time of day set	Day	Night (10pm-6am)
Intoxicated at the time of incident	YES	NO
Threats prior to incident	YES	NO
Evidence of Premeditation	YES	NO
Fire as a form of self-harm/suicide*	YES	NO
Spate Firesetting*	YES	NO
Attempt to extinguish fire/Seek Help*	YES	NO
Multiple Ignition Point Fire*	YES	NO
History of Firesetting*	YES	NO

Dynamic Risk Factors	**√ if present**	**Comments/Details**
Reported psychiatric symptoms in month before offence? (if yes what)		Reported psychiatric symptoms in month before offence? (if yes what)
Active Symptoms of Mental Illness		
Evidence of hostility		
Evidence of substance/alcohol misuse		
Reported suicidal ideation/self-harm		
Noncompliance with psychiatric medication		
Socially isolative		
Poor physical health		
Recent triggering event		
Poor self-care		
Lack of engagement with treatment		
Requesting help from services		
Change in care plan		
Impulsivity		
Problem with Self/Emotional regulation		
External Locus of Control		
Dependent on Others		
Problematic relationships		

*Documented only for the firesetting group.

Appendix 8 - Firesetting Dangerousness Rating Scale

Please rate the following variables in terms of level of dangerousness:
Just to remind you again, when the researcher talks about firesetting, she means fires that have been set deliberately by individuals. She is asking you to comment about the dangerousness of fires; this means the potential damage to person or property that could have occurred as a result of the fire had there been no intervention (i.e. fire brigade, alarms raised etc.).

NB: Please try to avoid using box 5 '*Can't make a decision'* unless necessary.

	0 Not Dangerous at all	**1 Slightly Dangerous**	**2. Moderately Dangerous**	**3 Very Dangerous**	**4 Extremely Dangerous**	**5. Can't make a decision**
A person with a political motivation to set a fire						
A person with a revenge motivation to set a fire						
A person with a previous history of firesetting						
A person who sets a fire for attention/ recognition.						
A person who has a high level of fire interest						
A fire that has been knowingly set in an uninhabited building.						
A person who sets a fire under the influence of alcohol.						
A person who has little/no knowledge of fire safety.						
A person who acts impulsively						
A person with mental health problems.						
A fire set with multiple ignition points.						
A person who sets a series of fires in a short period of time						

	0 Not Dangerous at all	1 Slightly Dangerous	2 Moderately Dangerous	3 Very Dangerous	4 Extremely Dangerous	5. Can't make a decision
A person who has problems controlling their emotions.						
A person who sets a fire and does not call the fire brigade.						
A fire set with the use of fire bombs.						
Curtains that have been set on fire.						
A person who has antisocial attitudes						
A fire set in a business setting.						
A fire that has been set within a hospital setting						
A person who sets a fire for fraudulent purposes/ monetary gain.						
A fire has been set and fire escape routes have been blocked.						
A fire set in wet conditions						
A fire that is set in high winds.						
A fire set using fuel/accelerant						
A fire has been set to a building, and telephone wires have been cut.						
A fire that has been set by posting lit material through a post box of a house.						
A fire resulting from a person that has set fire to themselves.						

	0 Not Dangerous at all	1 Slightly Dangerous	2 Moderately Dangerous	3 Very Dangerous	4 Extremely Dangerous	5. Can't make a decision
A fire has been set and the fire alarms have been removed.						
A fire set in a residential setting						
A fire set by putting flammable material on a hob/in a microwave						
A fire set indoors						
A fire that has been set and concealed. (Under the foundations of a house etc.)						
A fire set by more than one offender						
A fire set in dry conditions						
A fire in a public building						
A fire set within a prison.						
A fire set to cardboard by a homeless person for warmth.						
A house fire resulting from a cigarette not being extinguished properly.						
A fire set in a school						
A person who has little/no knowledge of the dangers of smoke inhalation						
A fire set in a **place** where it could be easily discovered						
A fire set at a **time** where it could be easily discovered						

	0 Not Dangerous at all	**1 Slightly Dangerous**	**2 Moderately Dangerous**	**3 Very Dangerous**	**4 Extremely Dangerous**	**5. Can't make a decision**
A person who sets a fire under the influence of drugs						

Appendix 9 - University Ethics Committee Approval for Study Two

APPROVAL BY PSYCHOLOGY RESEARCH ETHICS COMMITTEE

Your study has been approved. You can now proceed to do your study without resubmitting documents to the ethics committee. However, before proceeding with the research, please ensure you deal with all the issues outlined below. You MUST deal with these issues prior to data collection, otherwise this Ethics approval is not vaild.

Date: 2014/06/08
Code: 20143571

Applicant details:
Name: Becky Wyatt
Status: PhD Student
Email address: [redacted]

Title of the research:
Firesetting Dangerousness : Fire Professionals' Attitudes (Amended)

When carrying out this research you are reminded to
* follow the School Guidelines for Conducting Research with Human Participants
* comply with the Data Protection Act 1998
* refer any amendments to the protocol to the Panel

Please keep this form in a safe place. You may be asked to present it at a later stage of your study for monitoring purposes. Final year project students and MSc students will need to submit a copy of this form with their project.

You can log in at http://www.kent.ac.uk/psychology/technical/ethics/index.php to copy or print pregenerated handouts for this study.

Comments:
Theresa Gannon

Joseph Brooks
This change does substantially change the risk to participants and thus I am happy to approve the change.

Information Sheet v3 15/08/2014

University of Kent | Centre of Research and Education in Forensic Psychology (CORE-FP)

School of Psychology
Keynes College
University of Kent
Canterbury, CT2 7NP

Firesetting Dangerousness: Fire Professionals' Attitudes

Who is Organizing This Study?

This research is organized by the Psychology Department of the University of Kent. The researcher is Becky Wyatt, a PhD Student. The research supervisor is Theresa Gannon.

Why Are We Doing It?

At present, there is very little information upon the impact that potential dangerousness can have upon future incidents of firesetting. By rating the opinions of fire professionals who deal with deliberate firesetting, we will be able to gain a little more information into this area. This information will subsequently provide a basis for the development of a firesetting risk assessment for mentally disordered offenders.

What Are the Aims of the Study?

This study intends to examine the opinions of fire related professionals regarding what makes a fire potentially dangerous, compared to other fires.

Who Can Take Part?

Individuals who have professional membership to one of the following fire related professions: -Fire Department -Police -Solicitors/Barrister - Magistrates -Crown Court judges - Clinical Academics (e.g. Forensic Psychologists/Clinical Psychologists who also work within an academic environment) if this applies to you, you will then also need to access and complete an online survey.

Who Can Not Take Part?

Unfortunately, you will be unable to participate if you have no prior experience of dealing with fire setting in a professional context since this will make it difficult to comment on the dangerousness variables of firesetting that are contained with the interviews. Due to financial restraints of the research we are also unable to provide translation services, and therefore rely upon participants having a good grasp of the English language.

What You Will Need to Do?

You will be required to complete a short survey which will rate your attitudes of dangerousness. This survey must be completed online. The researcher will send you the link to this survey. The online survey will take a maximum of 20 minutes.

What Happens to the Information I Provide?

Participation in this study guarantees confidentiality of the information you provide in line with the UK Data Protection Act 1998. Only researchers involved in the study and, if required, the body funding this research will be authorized to access the data. We will not ask you to write your name on the study materials. Instead we will ask you to create a unique participant identification number. Your name and any other identifying information will be stored separately from your data. Surveys will be stored in a securely locked room for as long as is required by the Data Protection Act. The data collected for this study will be used for a student project. Once the data is analysed a report of the findings may be submitted for publication. Only broad trends will be reported, and it will not be possible to identify any individuals. A summary of the results will be available from the researcher on request.

Contact for Further Information

Researcher contact details:

Becky Wyatt
[redacted]
Address: CORE-FP, School of Psychology, Keynes College, University of Kent, CT2 7NP

Supervisor contact details:

Professor
Theresa
Gannon
Address: CORE-FP, School of Psychology, Keynes College, University of Kent, CT2 7NP

Secondary Supervisor Details:

Dr Lona Lockerbie
[redacted]
Address: Trevor Gibbens Unit, Hermitage Lane, Maidstone, Kent, ME16 9PH.

If you have any serious concerns about the ethical conduct of this study, please inform the Chair of the Psychology Research Ethics Panel (via the Psychology School Office) in writing, providing a detailed account of your concern.

Appendix 10 – Study Two Fire Professionals Study Consent Form

School of Psychology

Keynes College

University of Kent

Canterbury, CT2 7NP

Consent Form - Copy 1 (For Participant)

Title of project: Firesetting Dangerousness: Fire Professionals' Attitudes

Name of Researcher: Becky Wyatt [redacted]

Research Supervisor: Professor Theresa Gannon [redacted] (T.A.Gannon@kent.ac.uk

Please read the following statements, and if you agree, initial the corresponding box to confirm the agreement.

1. I Confirm that I have read and understand the information sheet for the above study and have the opportunity to ask questions.	☐
2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, without my medical care or legal rights being affected.	☐
3. I agree to take part in the above study	☐
4. I understand that my data will be treated confidentially and any publication resulting from this work will report only data that does NOT identify me.	☐

Name of the Participant: _____

Signature: _____ Date: _____

Please retain this copy for your records

If you have any complaints or concerns about this research, you can direct these, in writing, to the Chair of the Psychology Research Ethics Committee by email at: psychethics@kent.ac.uk. Alternatively, you can contact us by post at: Ethics Committee Chair, School of Psychology, University of Kent, Canterbury, CT2 7NP.

University of Kent | Centre of Research and Education in Forensic Psychology (CORE-FP)

School of Psychology

Keynes College

University of Kent

Canterbury, CT2 7NP

Firesetting Dangerousness: Fire Professionals' Attitudes

Thank you very much for your participation in this research. We would like to provide some further information about the purpose of the study and what we expect to find.

This study was an investigation into the views of related professionals on what variables of firesetting are more dangerous than others. For example, setting fire to an occupied building may be considered more dangerous than a fire that has been set in an empty building. We want to see whether this might be true.

In order to determine this, we are measuring the opinions of fire related professionals, with the aim that fire related professionals such as firemen; police, solicitors; clinical academics and magistrates will have a working knowledge of firesetting within the criminal justice system. In this study, we measured the responses of fire related professionals and this acted as our main dependent variable. This was achieved by asking fire professionals to rate several variables of firesetting on a five-point Likert scale ranging from 'not at all dangerous' to 'extremely dangerous', allowing quantitative information to be gathered. The resultant data from the interviews will allow the researchers to further refine a risk assessment tool for firesetting that is currently in development.

Please contact Becky Wyatt at the following e-mail address (bw269@kent.ac.uk) if you have any questions regarding this study. If you wish contact the research supervisor for this study, please contact Professor Theresa Gannon at t.a.gannon@kent.ac.uk.

THANK YOU AGAIN FOR YOUR CO-OPERATION

If you have any queries about this research or would like to ask any further questions, please contact the researcher or research supervisor using the contact details below.

If you would like to withdraw your data at any point, please contact the Psychology School office on **01227 823961**. If you have been given a participant code, you need to cite this. You do not have to give a reason for your withdrawal.

Once again, we would like to thank you for your valuable contribution to this research. Your participation is greatly appreciated.

Yours sincerely,

Researcher contact details:

Becky Wyatt
[redacted]
Address: CORE-FP, School of Psychology, Keynes College, University of Kent, CT2 7NP

Supervisor contact details:

Professor Theresa Gannon
[redacted]
Address: CORE-FP, School of Psychology, Keynes College, University of Kent, CT2 7NP

Secondary Supervisor Details:

Dr Lona Lockerbie
[redacted]
Address: Trevor Gibbens Unit, Hermitage Lane, Maidstone, Kent, ME16 9PH.

If you have any serious concerns about the ethical conduct of this study, please inform the Chair of the Psychology Research Ethics Panel (via the Psychology School Office) in writing, providing a detailed account of your concern.

Appendix 12 - Qualtrics Information Presented to Members of the General Public for Study Two

General Attitudes of Firesetting Dangerousness: Dangerousness Rating Scale

Thank you for your interest in my research. I am currently in the process of developing a risk assessment tool for individuals with a history of firesetting. I am therefore provisionally gathering peoples' opinions on the individual aspects of firesetting dangerousness. If you are interested in taking part, please ensure that you answer all of the questions. If you wish to continue then please ensure that you provide your consent on the following page. Thanks again, Becky Wyatt

Participant Consent

Please read the following consent statements carefully and tick the confirmation box at the bottom of the page, which indicates that you fully consent to participate in this study.

- I have been adequately informed about the nature of this study and received full information about my ethical rights as a participant and I have been given opportunity to ask questions.
- I fully understand that the decision to participate is up to me and that I can change my mind and withdraw from the study at any time without it affecting how I am treated in the future. I also understand that I am not obliged to answer any questions in this questionnaire that make me uncomfortable.
- I have been guaranteed that all the information collected in this study is strictly confidential and will not bear any personal details that may identify me.
- I have read the participant information and agree to take part in this study.

❑ Please tick to confirm the above (1)

You must now create a participant number. Please make a note of this, as you will be asked to quote this number if you wish to withdraw from the research in future. Your participant number will consist of your initials and DOB. For example, Becky Wyatt DOB 22/06/1987 would be represented as: BW22061987

Fire-setting Dangerousness: General Attitudes

Thank you very much for your participation in this research. We would like to provide some further information about the purpose of the study and what we expect to find. This study was an investigation into the views of individuals on what variables of firesetting are more dangerous than others. For example, setting fire to an occupied building may be considered more dangerous than a fire that has been set in an empty building. We want to see whether this might be true. In this study, we measured the responses of the general public and this acted as our main dependent variable. Each participant was asked to rate several variables of fire-setting on a five-point Likert scale ranging from ‘not at all dangerous’ to ‘extremely dangerous’, allowing quantitative information to be gathered. By collecting two types of data, the researcher will be able to gain

greater insight into the general opinions of fire-setting dangerousness. The resultant data from the interviews will allow the researchers to further refine a risk assessment tool for fire-setting that is currently in development. Please contact Becky Wyatt at the following e-mail address if you have any questions regarding this study. If you wish contact the research supervisor for this study, please contact Professor Theresa Gannon at t.a.gannon@kent.ac.uk.

THANK YOU AGAIN FOR YOUR CO-OPERATION If you have any queries about this research or would like to ask any further questions, please contact the researcher or research supervisor using the contact details below. If you would like to withdraw your data at any point, please contact the Psychology School office on 01227 823961. If you have been given a participant code, you need to cite this. You do not have to give a reason for your withdrawal. Once again, we would like to thank you for your valuable contribution to this research. Your participation is greatly appreciated.

Yours sincerely, Becky Wyatt

Researcher contact details: Becky Wyatt [redacted] Address: CORE-FP, School of Psychology, Keynes College, University of Kent, CT2 7NP Supervisor contact details: Professor Theresa [redacted]nt.ac.uk Address: CORE-FP, School of Psychology, Keynes College, University of Kent, CT2 7NP Secondary Supervisor Details [redacted] lona.lockerbie@kmpt.nhs.uk Address: Trevor Gibbens Unit, Hermitage Lane, Maidstone, Kent, ME16 9PH. If you have any serious concerns about the ethical conduct of this study, please inform the Chair of the Psychology Research Ethics Panel (via the Psychology School Office) in writing, providing a detailed account of your concern.