

**Bond University**

## **DOCTORAL THESIS**

### **The Functional Consistency of Proximal Dynamic Risk Factors across Co-Occurring Behavioural Problems: Do Juvenile Arsonists and General Offenders Differ?**

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The Functional Consistency of Proximal Dynamic Risk Factors across Co-Occurring  
Behavioural Problems: Do Juvenile Arsonists and General Offenders Differ?

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This document is submitted in total fulfilment of the requirements of the degree of

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This degree was completed under the supervision of Dr Bruce Watt and Dr Katarina Fritzon.

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## Abstract

The thesis comprised four studies examining the fundamental risk factors associated with deliberate firesetting risk, the dynamic proximal psychological and behavioural processes precipitating juvenile firesetting and general offending, and the functional relationships between deliberate firesetting and broader antisocial behavioural problems.

First, a meta-analysis amalgamated existing empirical studies comparing deliberate firesetters and non-firesetters to determine the strongest correlates of juvenile firesetting. A search of electronic databases identified 39 independent samples from 30 studies ( $N=22,292$ ) conducted between 1985 and 2015. Significant effects were found for deliberate firesetting behaviour and 80 per cent (%) of the variables explored. Fire-specific variables yielded the strongest association, followed by behavioural, environmental, and psychopathology risk factors. Protective factors were significantly and negatively associated with deliberate firesetting behaviour. Overall, juvenile firesetters exhibited more risk across multiple domains in comparison to juveniles without a history of firesetting. This meta-analysis is the first to compare juvenile firesetters with non-firesetters.

The second study employed a qualitative methodology to explore the offence chains and proximal psychological processes of a matched sample of juvenile firesetters and general offenders. A forensic sample of  $N=70$  ( $n=35$  firesetters and  $n=35$  non-firesetters) was recruited from community services ( $n=32$ ) and detention centres ( $n=38$ ). A comprehensive framework of juvenile offender function was determined, irrespective of firesetting status. Four overarching functions were found to explain juvenile offending: antisocial cognition/influence, emotional dysregulation, revenge/retribution, power and control. Underlying these four primary functions were various sub-themes and implicit cognitive scripts illustrating the presence of heterogeneity within a function. Juveniles were found to present with multiple

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scripts across different functions. A closer examination of firesetting behaviour in isolation revealed deliberate firesetters hold one or more of six offence-specific scripts precipitating deliberate firesetting. This is the first study to explore the cognitive scripts specific to juvenile firesetting, providing a plausible explanation for how juvenile firesetting and non-firesetting offenders differ.

The third study drew upon the qualitative findings from study two and provided the foundation for a quantitative comparative analysis of the offence chains between: (1) juvenile arson and non-arson offenders; and (2) deliberate firesetting and co-occurring behavioural concerns.

Arson offenders were statistically significantly more antisocial than controls in their behavioural function and modus operandi, with non-arson offenders found to be more emotionally dysregulated. Overall, arson offenders were found to be more unpredictable and delinquent in their functioning, and have fewer protective factors than non-arson offenders. revealed functional consistency among groups of offenders.

The final study was an evaluation of functional consistency across time. A four-way comparison of participant's index offences and additional problematic behaviours across two-time points yielded partial evidence for functional consistency across a mean time-period of 6.48 months ( $N=24$ ). However, the predictive accuracy was low over a mean time-lapse of 25.80 months. The environment of behavioural occurrence (i.e., community or detention) was determined to have a significant effect on the functional consistency of offence characteristics; a change in environment over time resulted in lower functional consistency. The findings of the final study were not robust enough to conclude absolute offence paralleling behaviour among juvenile offenders across time.

Overall the studies illustrate the importance of the dynamic psychological process of juvenile offenders and that fire-specific cognitive scripts exist for juvenile firesetters, plausibly

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differentiating them from their non-firesetting counterparts. The findings have implications for the assessment and risk management of both juvenile firesetters and general offenders.

*Keywords: juvenile, firesetting, arson, offending, antisocial, functional consistency, offence paralleling behaviour.*

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## Declaration

This thesis is submitted to Bond University in fulfilment of the requirements for the degree of Doctor of Philosophy (PhD). This thesis represents my own original work towards this research degree and contains no material that has previously been submitted for a degree or diploma at this University or any other institution, except where the due acknowledgement is made.

Full name: Danielle Louise Chesters Perks

Signature:

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## Research Outputs

### Declaration of Author Contributions

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Publications co-authored	Statement of Contribution
Doley, R.M., Watt, D., & Perks, D.L.C. (2017). Deliberate firesetting by children and juveniles. <i>The SAGE Encyclopedia of Abnormal and Clinical Psychology</i> . doi: 10.4135/9781483365817.n386	RD 40%, BW 30%, DP 30%.

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### Peer Reviewed Publications

Doley, R.M., Watt, D., & Perks, D.L.C. (2017). Deliberate firesetting by children and juveniles. *The SAGE Encyclopedia of Abnormal and Clinical Psychology*. doi: 10.4135/9781483365817.n386

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## Ethics Declaration

The research associated with this thesis received ethics approval from the Bond University Human Research Ethics Committee. Ethics application ID: 15300, approved 23 September 2015.



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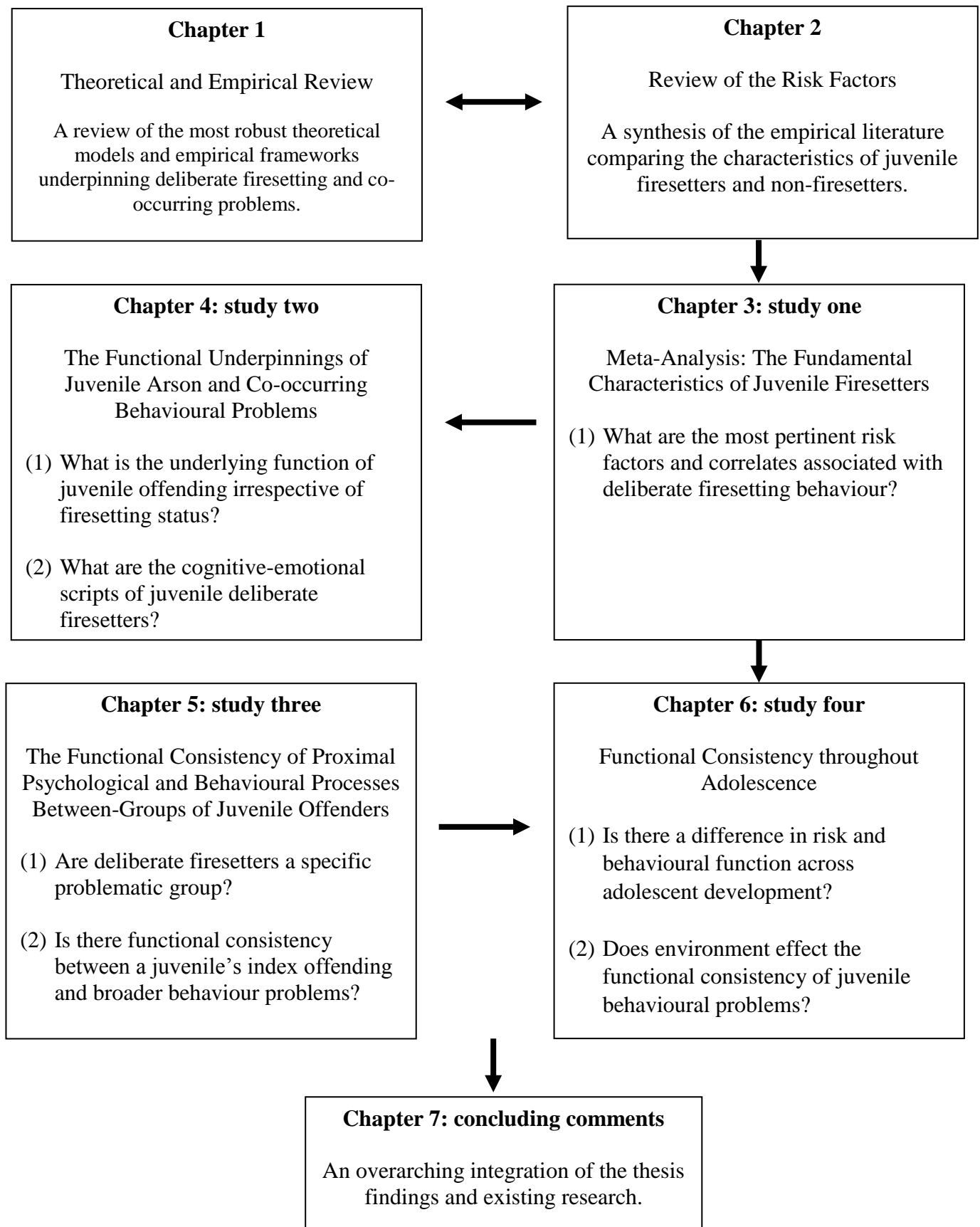
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## Schematic Overview of the Thesis Structure and Studies Aims



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## CHAPTER ONE

### The Theoretical and Empirical Understanding of Juvenile Firesetting and Co-occurring Concerns

The terms *arson* and *firesetting* are used interchangeably to describe the act of deliberately setting a fire. Arson is the legal definition given to the act of intentionally and maliciously setting a fire causing damage (Australian Institute of Criminology, 2009); whereas firesetting is used to describe the behaviour of unsanctioned firesetting, including fires that did not result in criminal conviction (Gannon & Barrowcliffe, 2012). Another term to recently emerge in the literature is Youth Misuse of Fire (YMF; Johnson, Beckenbach, & Kilbourne, 2013). YMF has been described as an all-encompassing term for firesetting behaviours across the juvenile lifespan, from childhood curiosity to adolescent deliberate firesetting (Pooley & Ferguson, 2017). The term YMF, however, does not differentiate between behaviours with disparate outcomes. Establishing the consequence of problematic behaviour and how an individual subsequently responds can inform the efficacy of the behaviour from the perspective of the individual responsible, as well as the likelihood of behavioural reoccurrence. Social learning and conditioning principles demonstrate the role of consequence in behavioural reinforcement (Skinner, 1904-1958), with both positive and negative reinforcement perpetuating problematic behaviour (Jackson, Hope, & Glass, 1987).

Using the term arson indicates that the consequence of the juvenile behaviour was a legal sanction. The continuation of a juvenile's deliberate firesetting behaviour despite receiving a criminal charge or conviction illustrates that either the enforcement of legal sanctioning is not influential enough to stop the problem behaviour or the use of fire serves a higher functional purpose. Conversely, desistance from deliberate firesetting following an interaction with the criminal justice system (e.g., Youth Conferencing) illustrates either the firesetting behaviour is amenable to low-level intervention strategies (i.e., fire-safety

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education) or there has been a topographic shift in behaviour and the underlying functional deficit remains (Offence Paralleling Behaviour; Daffern et al., 2007). Thus, reinforcing principles and underlying functions of deliberate firesetting are the focus of the current research. Consistent with previous studies describing juvenile firesetting, behaviours resulting in a criminal charge will be differentiated from behaviours that did not result in a legal sanction. The term 'firesetter' or 'deliberate firesetting' will be used throughout, while the term 'arson' will be used in the context of behaviour with a legal outcome, applicable for any criminal offence caused by fire (e.g., property damage by fire or other fire-related offences).

### **The Problem and Prevalence of Juvenile Deliberate Firesetting**

The implications associated with deliberate firesetting are a financial burden for communities on a global scale, with annual economic impacts of \$1.3 billion in the United States (Evarts, 2012), \$2.3 billion in Australia (Smith, Jorna, Sweeney, & Fuller, 2014), and £2.3 billion in the United Kingdom (Department for Communities & Local Government, 2011). These costs pertain to property loss, indirect and intangible loss, and the cost of emergency services. In addition to the financial consequences, deliberate firesetting can result in loss of life, serious injury, and devastation to the environment. These consequences can have a significant detrimental impact on the emotional, psychological, and physical well-being of victims, families and the wider community.

Queensland Government Crime Statistics (2017) reveal an increase in the overall number of offenders arrested for the offence of arson between 2015/2016 and 2016/2017, with 325 and 343 recorded arrests respectively. Of the 325 offenders arrested for the offence of arson in 2015/2016, 142 were juveniles aged between 10 and 17 years old (34.69%), 82.39% of which were male. During the 2016/2017 reporting period, the number of arson offences committed by juveniles increased by over 13% so that 48.10% of all arson was attributable to adolescents. Similar rates were attributable to young males (82.42%). Most concerning,

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juveniles at the age of criminal responsibility comprised only 12.71% of the Queensland (QLD) population in 2017, yet were responsible for almost half of all arson offences throughout the state (ABS; Australian Bureau of Statistics, 2017). In previous years the younger children comprised the majority of juvenile arson offences; in 2015/2016, 66.90% ( $n=95$ ) were aged 10-14 years. Throughout 2016/2017 however, the age group disparity decreased, and similar crime rates were reported for juveniles aged 10-14 years ( $n=84$ ; 50.91%) and 15-17 years ( $n=81$ ; 49.09%).

Interstate, the New South Wales Bureau of Crime Statistics and Research (BOSCAR) reported a substantial increase for arson offending between 2015/2016 ( $N=285$ ) and 2016/2017 ( $N=336$ ). The number of unlawfully lit fires attributable to juveniles likewise increased between the two reporting periods; juvenile offenders were responsible for 26.67% ( $n=76$ ) of all arson offences during 2015/2016 and 41.69% ( $n=141$ ) throughout 2016/2017 (NSW BOSCAR, 2017). In 2017, 84.40% of juvenile perpetrators were male, juvenile arson predominantly occurred in rural locations, and the offence target was primarily park/bushland (49.60%) or residential property (14.90%). Similar to QLD, the rates of juvenile arson far outweigh the proportion of juveniles in the state of New South Wales (NSW). According to the ABS (2017), juveniles aged 10-19 years comprise approximately 11.90% of the NSW general population (ABS, 2017), yet juveniles aged 10-17 years were responsible for 42% of all arson offences in the state (NSW BOSCAR, 2017).

Throughout 2016/2017 juveniles prominently contributed towards the offence of arson over all other offences in the state of NSW; 42% of juveniles compared to 58% of adults. In contrast, juveniles were responsible for 18.30% of all theft offences; they were responsible for 35.70% of all motor vehicle thefts. Moreover, juveniles were responsible for 35.40% of all robbery offences, including 30.40% of robbery with a weapon (not a firearm), and 32% of all break and enters, non-dwelling (NSW BOSCAR, 2017). Juvenile prevalence figures indicate

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arson is a significant concern for adolescents aged 10-17 years and that the use of fire plausibly facilitates additional offending behaviours among juveniles (i.e., crime concealment in the context of theft-related offences, such as motor vehicles, robbery, or break and enters). The use of fire for crime concealment has previously been documented/discussed (Swaffer & Hollin, 1995).

The disproportionate attribution of arson to the juvenile population is echoed internationally, with youth aged between 10-19 years accounting for 61.60% of all fire-related offences in New Zealand (NZ) between 2014 and 2016 (i.e., property damage by fire and explosives), the 10-14 year age group were responsible for just over half (65%) of these juvenile offences (Statistics New Zealand, 2016). Between 2016 and 2017, the rate of juveniles responsible for fire-related offences in NZ increased to 63.70% (Statistics New Zealand, 2017). Similarly, in the United Kingdom, the rate of criminal proceedings against juveniles for the offence of arson remained consistently high between 2014 and 2015 (Ministry of Justice, 2016). Official figures illustrate there has been no significant decline in the rate of juvenile arson in recent years, with the offending behaviour regarded as a global concern. The high co-occurrence between juvenile arson and general offending illustrates the importance of understanding arson behaviour among the juvenile population to mitigate the risk of wider offending behaviour (Lambie, Ione, & Randell, 2015).

**The barriers to understanding juvenile arson.** Official figures are shown to underrepresent the number of juveniles engaging in deliberate firesetting behaviours, with self-reported prevalence rates exceeding official figures. For example, 44.79% of all adjudicated arson offences throughout the state of QLD were perpetrated by juveniles aged between 10-17 years during the 2014/2015 reporting period (Queensland Government Crime Statistics, 2017). According to Watt, Geritz, Hassan, Harden, and Doley (2015), however, 67.40% of juveniles in the community self-report deliberately lighting a fire during this same

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time-period. Self-report rates between 2% and 67% have been reported throughout the literature showing considerable variation; this is likely attributable to fragmented methodology across empirical research studies, including age groups, sample population, and measures used (Dadds & Fraser, 2006; Del Bove, Caprara, Pastorelli, & Paciello, 2008; Grolnick, Cole, Larentit, & Schwartzman, 1990; Kafry, 1980; Mackay, Paglia-Boak, Henderson, Marton, & Adlaf, 2009; Martin, Bergen, Richardson, Roegar, & Allison, 2004; Watt et al., 2015). Nevertheless, the discrepancy between official figures and self-report illustrate deliberate firesetting frequently occurs covertly and without detection.

There are currently no official figures available on the number of juveniles in detention or supervised on a community-based order specifically for the offence of arson in Australia. A plausible explanation is the standard offence classification procedure, whereby offenders are categorised under an offence type (ANZSOC; Australian & New Zealand Standard Offence Classification, 2011), which does not recognise arson as an independent offence category. Arson is often categorised as a property offence based on the most common target of the behaviour (e.g., property or environment) and thus, it is not possible to discern how many individuals are specifically engaging in deliberate firesetting, as opposed to another vandalising behaviour. In 2017 the ABS released a report on youth crime rates, categorising youth offenders by their *predominant principle offence* (ABS, 2018); though, arson did not feature as an offence category. Failure to report arson as an independent offence category creates a barrier to understanding a behaviour that is a precursor to more serious offending behaviour (Lambie, Ioane, & Randell, 2016). The current model of crime classification therefore, inadvertently prevents the identification of offenders requiring offence-specific attention, thus perpetuating persistent and widespread risk.

### **Deliberate Firesetting Intervention in Australia**

Throughout Australia, intervention for deliberate firesetting behaviour is primarily

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provided by fire fighters who deliver community-based fire-safety education programs (Muller & Stebbins, 2007). For example, Fire and Rescue New South Wales (FRNSW) run a community-based intervention and fire awareness program (IFAP) for juveniles and their families up to the age 17. The IFAP provides advice to young persons and their families on problematic firesetting behaviours and education on fire safety, working closely with those who require additional support, by assisting with referrals to appropriate services. The IFAP program is a structured program seeking to enhance its evidence base to facilitate the continual development of firesetting intervention in the community (FRNSW, 2017).

Likewise, Queensland Fire and Emergency Services (QFES) provide a fire-specific educational awareness program known as Fight Fire Fascination (FFF) to juveniles in the community. The FFF program was discontinued in 2012 due to government budget cuts (Department of Community Safety Annual Report 2012-13), later reinstated in 2016. QFES (2016) report a 90% decrease in “unsafe fire behaviour” among those who complete the program. This report echoes Muller and Stebbins’s (2007) earlier review of arson intervention programs in Australia, which concluded a reduction in fire misuse and high parental satisfaction following participation. The reinstatement of the FFF program is encouraging and this decision aligns with empirical literature that fire safety education should be included into the treatment of juvenile deliberate firesetters and arsonist (Stadolnik, 2015).

For NSW, the outcome plan for bush fire and arson offences committed specifically by juveniles, is diversion towards youth conferencing and offence-specific reparatory alternatives (AIC, 2016). A specific outcome plan for juvenile arson is not outlined in others states, though in QLD court-ordered referrals to the restorative justice process of youth justice conferencing was reinstated in 2016, after its discontinuation in 2013 (Queensland Government Data, 2017; Youth Justice Act, 1992). This decision, much like in NSW, provides opportunity for fire-safety education and awareness training pertaining to deliberate firesetting, which has recently

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shown to have potential for reducing deliberate firesetting behaviour (Pooley, 2017).

For juvenile offenders who are not diverted to reparative alternative and sentenced to a period of youth detention, there are no fire-specific interventions available throughout Australia (Heseltine, Sarre, & Day, 2011; Queensland Corrective Services, 2015). This is of particular concern as the rate of juvenile incarceration has increased in recent years (Annual Report on Government Services, 2017), without provisions in place to meet the complex and specific psychosocial and criminogenic needs of juveniles with a proclivity for lighting fires. Additionally, as outlined by Stadolnik (2015) the heterogeneity of youth firesetters and the myriad of co-morbid behavioural concerns means for many young firesetters/arsonists fire safety awareness alone will be insufficient. The entrenched implicit beliefs pertaining to the use of fire (O Ciardha & Gannon, 2012), curiosity and attraction to fire (Kolko, Herschell, & Scharf, 2006), and co-morbid psychopathology (MacKay, Paglia-Boak, Henderson, & Adlaf, 2009) cannot be reduced by fire-safety education alone.

While internationally there are promising multifaceted treatment programs which account for associated mental health and co-morbid behavioural concerns (see Stadolnik, 2015 for a review), the actions of deliberate firesetters have shown to differ cross nationally. Drawing upon environmental theories of criminal behaviour Fritzon, Doley, and Hollows, (2014) concluded the offence actions of an Australian arsonist differ from a British arsonist. Australian arsonists were significantly more likely to set fire to a motor vehicle and less likely to set fire to a residential property, or pose a threat to human life. Fritzon and colleagues suggest the findings are a reflection of Australia's relatively dense population (i.e., less likely to endanger human life) and the vast availability of bushland (i.e., less like to set fire to a residential property). The tendency of an Australian arsonist to light fires in more urban-rural locations further explains why endangering life is less common among Australian arsonists. Fritzon et al. however, outline this behavioural action can also be explained by Rational



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Choice Theory (Cornish & Clarke, 1987), as the decision to light a fire in a rural/remote location decreases the risk of detection. Finally, Australian arsonists were less likely to plan their fire or light fires due to being triggered, thus indicating either a cross-cultural difference in temperament, or exposure to/interaction with fire is more entwined with the routine of Australian arsonists (RAT; Felson & Cohen, 1980).

As inferred by Fritzon and colleagues, if the underlying theme of a behaviour differs, then strategies to identify and reduce the behaviour will likely differ too. Accordingly, the sole reliance on international research for the assessment and treatment deliberate firesetting behaviour in Australia is not advised. In Australia, however, there is a dearth of contextually specific research and to date, there is only one psychologically informed treatment program specific to deliberate firesetting behaviour, which is still undergoing evaluation. The ACART treatment program, developed by Fritzon, Doley, Davey, and McEwan (2012) at the Australian Centre for Arson Research and Treatment is based on psychological evidence and understanding of deliberate firesetting behaviour. The program was primarily developed for adult firesetters and is underpinned by adult firesetting theory (Gannon, Ó Ciardha, Doley, & Alleyne, 2012), thus it cannot be assumed effective for juveniles. Currently, there is no psychologically informed evidence based intervention available for juvenile deliberate firesetters in Australia. Youth Justice Services throughout Australia are, therefore, not equipped to provide fire-specific intervention and dynamic assessment of juveniles who have committed an offence of arson or exhibit deliberate firesetting behaviour.

The stable prevalence of juvenile arson offending, evidence of undetected firesetting, and limited provision of offence specific intervention in the community/correctional services indicates current protocols to prevent, or reduce deliberate firesetting may be insufficient and/or the integrity of their implementation may be inconsistent.

### **Development and Desistance of Juvenile Offending**

The integrated cognitive antisocial potential theory (ICAP; Farrington, 2008) amalgamates key criminological concepts to understanding the onset, fluctuation, continuation, desistance of offending behaviour among juvenile males. Farrington (2008) purports that those engaging in antisocial acts and offending behaviour have a greater antisocial potential than those who do not offend; this is known as long term action potential (LT-AP). Individual differences across domains of distal risk offers explanation for between-group difference in offending behaviour. The distal risk factors informing LT-AP fall into three distinct categories: (1) energizing factors (e.g., low income, unemployment, and school failure); (2) antisocial models; individuals and institutions guiding a young person (e.g., criminal parents, delinquent peers, schools, and neighbourhoods); and (3) attachment and socialization (e.g., poor child rearing, anxiety, and dysfunctional family climate). The moderating factors for the manifestation of these vulnerabilities are said to be the individual's proclivity to be impulsive and the interaction of life events. The interaction between distal and moderating factors offers explanation for why not all individuals with distal risk go on to become offenders.

In close proximity to the offending behaviours, variation, continuation, and desistance in offending is predominantly dependent on the individual (i.e., individual difference); Farrington (2008) refers to this as short term antisocial potential (ST-AP). Dynamic influences (e.g., boredom, anger, substance, and peer groups) and the environmental routine of the individual, which moderates the opportunity for crime and the victimology, all influence an individual's cognitive process (e.g., cost-benefit analysis, scripts, and decision making) which leads to the commission of an offence. The routine activities of an individual and their ability to meet their needs in a legitimate way generally evolve over the course of development and across contexts. Therefore, antisocial potential will manifest differently for diverse age groups

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and across environments.

The diversity of behaviour across adolescence is attributable to the biopsychosocial development of a juvenile, thus stage of development is pivotal to determining typical from atypical behaviour during adolescence. Low level and temporary externalised behavioural problems are consistent with indicators of psychosocial immaturity but/thus are regarded as part of normal development (Loeber & Ahonen, 2015). For some juveniles however, their pattern of externalising behaviour persists and escalates in severity, with individual differences in neurological development, psychological vulnerability, and familial environment complicating the opportunity for change. Delinquency, which is confined to an individual's adolescent years, known as *adolescent-limited offending*, is considered to be part of a *maturity-gap* with many juvenile behavioural problems *ageing out* as the individual matures (Moffitt, 1993). The age-crime curve, which describes the incline, peak, and decline of offending behaviour at different age points during adolescent development, is reported to be one of the most robust concepts in developmental criminology (Loeber & Farrington, 2014). Problematic precursors, rather than offending per se, are more characteristic in childhood, however, as a young person approaches adolescence the likelihood of offending increases rapidly, peaking in mid-adolescence at 16 years old. During late adolescence though, offending is found to decline rapidly (Loeber & Farrington, 2014).

While offending varies with age and many antisocial youth become conforming adults, there is a noticeable continuity among those with childhood antisocial behavior, through adolescence, and into adulthood (Farrington, 2008). Jolliffe, Farrington, Piquero, Lobeber, and Hill (2017) expand upon their earlier empirical work in the field of developmental criminology and suggest the development of psychosocial maturity is more progressive and protracted than first theorised. The concept of *adolescent-limited offending* is defined by Jolliffe et al. as offending behaviour occurring before the age of 20 years old (AL20) and desisting before 30

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years old. This time frame is said to be more representative of the age at which a young adult reaches maturation (Farrington, Loeber, & Howell, 2012). According to Jolliffe et al. (2017), AL20 also better reflects the shift in societal norms since the turn of the 21<sup>st</sup> century, whereby individuals are dependent for longer, leaving home and getting married later in their life course. As pointed out by Farrington (2008), the main life events associated with desistance after the age of 20-years old are getting married, having a satisfying job, or relocating to a good area.

Juveniles who continue to engage in antisocial behaviour into their early 20s are reported to be significantly less psychosocially mature than those who desist (Monahan, Steinberg, Cauffman, & Mulvey, 2009). Psychosocial maturity influences an individual responding to the consequences, labelling, reinforcement, and punishment after the commission of an offence or antisocial act. Monahan et al. refer to the work of Steinberg and Cauffman (1996) outlining temperament (i.e., impulse control and suppression of aggression), perspective (i.e., consideration of others and future orientation), and responsibility (i.e., personal responsibility and resistance to peer influence), as the three core areas to comprise psychosocial maturity and contribute to problematic behaviour persistence. Continuation of antisocial behaviour into late adolescence and early adulthood is linked with a greater deficit in future orientation and temperament compared to those who desist from offending (Monahan et al., 2009).

The escalation, diversification, and persistence of behavioural problems are explained as a cumulative effect across the course of development, with the majority of juveniles who commit violent and serious delinquent acts found to systematically progress through lower level behavioural problems first (Loeber & Ahonen, 2015). An early onset of offending behavior predicts a relatively longer criminal career (Farrington, 2008) and juveniles who escalate to severe and violent offending typically retain their early behavioural problems

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(Loeber & Ahonen, 2015). The retention of prior behavioural concerns provides an explanation for how old behaviours intertwine with new behaviours, manifesting in more entrenched and complex presentations, with broader treatment needs. The dynamic and malleable phase of pre-adolescence and adolescence is, therefore, a crucial period within which to effectively address the individual deficit and behavioural problems of a juvenile and implement preventative measures to reduce the likelihood of offence escalation.

The development of offending behaviour through the course of childhood and adolescence is explained by Loeber and Ahonen (2015) to fit within three developmental pathways (covert, overt, and authority conflict), each with three levels of severity (minor, moderate, and serious). The overt pathway explains externalising and confronting acts commencing with minor aggression in early childhood (e.g., bullying and annoying others). Minor behavioural problems can later escalate to physical aggression (e.g., fights or gang fighting) and finally, serious violence (e.g., rape, armed robbery, and assault). The escalation to serious overt offending is said to be influenced by an individual's physiological maturity. Plausibly, the development of violence is linked with age development factors, such as physical maturity and maturation stage (puberty).

The covert pathway is found to commence before the age of 15 years old and consists of concealed acts. Examples of minor behaviours are frequent lying and shoplifting which escalate to behavioural concerns such as property damage (e.g., vandalism and firesetting) and later, serious delinquency (e.g., motor vehicle theft and burglary). Cognitive maturity is proposed to mediate the escalation of covert offending; with the severity of acts advancing as an individual's cognitive capacity develops. Finally, the authority conflict pathway occurs prior to the age of 12 years old, often commencing with stubbornness, which can escalate to frequent and persistent defiance/disobedience. Later serious anti-authoritarian behaviours include gang affiliation and enmeshed antisocial self-concept. Escalations in either the covert

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or overt behavioural pathway are preceded by an escalation in the authority conflict pathway (Loeber & Ahonen, 2015).

As well as escalating linearly through a pathway, a juvenile's behaviour may also escalate by crossing between developmental pathways, such as exhibiting both overt and covert behaviours (Loeber & Ahonen, 2015). An example of linear escalation within the covert pathway can be demonstrated by a juvenile who commenced with minor vandalism or deliberate firesetting, later escalating to more severe delinquency (e.g., break and enter or motor vehicle theft). Alternatively, cross-pathway escalation can be demonstrated by a juvenile who displays early childhood aggression (overt pathway), as well as early covert behaviours (e.g., deliberate firesetting behaviour). Severity may either develop predominantly in one pathway or simultaneously across both pathways. Any escalation is plausibly mediated by individual attributes (e.g., physical/cognitive maturity or psychological/emotional temperament) or environmental factors (e.g., parent-child relationship or peer affiliation/influence).

The pathways model can explain the versatility and behavioural escalation co-occurring with deliberate firesetting behaviour. Behaviours from each of the developmental pathways yield significant associations with deliberate firesetting. For example: Authority conflict/oppositional behaviour (McCarthy & McMahon, 2005; Stickle, 2002), covert conduct such as animal cruelty (Watt, Geritz, Hasan, Harden, & Doley, 2015) and lying (Kolko & Kazdin, 1991), and overt behaviours, including aggression (McCardle, Lambie, & Barker-Collo, 2004), delinquency (Becker et al., 2004), serious antisocial behaviour (Martin, Bergen, Richardson, Roger, & Allison, 2004), and violence (Del Bove, Caprara, Pastorelli, & Paciello, 2008). The retention of earlier behavioural problems would plausibly lead to their integration into new behaviours, such as the use of fire for crime concealment (Swaffer & Hollin, 1995).

**The development of deliberate firesetting behaviour.** Like many exploratory childhood behaviours, experimenting with fire is regarded a normal part of development. Deliberate and continued involvement with fire past the age of 10 years-old is, however, regarded as an indicator of future psychological and behavioural problems (Grolnick, Cole, Larenitis, & Schwartzman, 1990; Kolko, 2002; Walsh & Lambie, 2013). As discussed by Lambie et al. (2015) deliberate firesetting among children and adolescence is particularly concerning given the high co-occurrence with wider antisocial behavioural problems and future offending. In addition to these developmental projections, under Australian Federal law, juveniles cannot be held criminally responsible for their actions until aged 10 years old and are considered an adult after age 18 in all Australian jurisdictions (AIC, 2009); including more recently in the state of QLD (*Youth Justice and Other Legislation Amendment Act, 2016*). In the state of QLD after the age of 18, an offender is transferred to adult corrective services. In the state of NSW however, a young person who committed their offence under the age of 18 is permitted to serve part or all of their sentence in a juvenile facility up to the maximum age of 21 years (*Child [Detention Centres] Act 1987*). Accordingly, the exploration of juvenile firesetting behaviour in the current research program focuses on juveniles aged between 10 and 17 years at the time of index offending, with the expectation that some participants would exceed age 18 throughout the course of the research. A comprehensive review of the empirical literature examining firesetting risk for children and youth is presented in chapter two.

### **Theoretical Underpinnings of Deliberate Firesetting**

Functional analysis theory of recidivistic arson (Jackson et al., 1987) and dynamic behaviour theory of firesetting behaviour (Fineman 1980; 1995) were the first models to unify single-factor explanations of firesetting behaviour (i.e., social learning, cognitive, psychodynamic, and conditioning theories). Through the application and integration of multiple factors such as behavioural, cognitive, and social learning principles, the facilitation

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and maintenance of firesetting can be better understood.

**Functional analysis theory (Jackson et al., 1987).** Jackson et al. explain firesetting behaviour to be facilitated and maintained by an interaction between a series of antecedents and consequences. Antecedents are defined as the preceding features or events that may be influential in the development of firesetting behaviour, while consequences are the reinforcing factors that influence maintenance or desistance of the behaviour. Jackson et al. hypothesised individuals who commit arson are attempting to make a change to a life situation or avoid interpersonal confrontation. Individuals engage in firesetting when alternative behaviours have been, or are perceived to be, ineffective. According to the theory, five main factors facilitate the onset, maintenance, and exacerbation of deliberate firesetting behaviours: (1) psychosocial disadvantage (e.g., low socioeconomic status and family dysfunction which are linked with adverse psychological consequence); (2) life dissatisfaction (e.g., dysthymia and low self-esteem in response to psychosocial disadvantage); (3) social ineffectiveness (e.g., poor social interaction and communication problems); (4) an individual's experiences of fire (e.g., previous interactions with fire and vicarious learning); and (5) internal/external firesetting triggers (e.g., psychophysiological states).

Support for the association between psychosocial disadvantage and arson as a maladaptive strategy to cope is evidenced in multiple empirical studies (Blackburn, 1993; Coid, Wilkens, & Coid, 1999; Dadds & Fraser, 2006; Rice & Harris, 1991; Hollin, 1989; Kafrey, 1980; Kolko & Kazdin, 1991; Lewis & Yarnell, 1951; McCarty & McMahon, 2005; Nurcombe, 1964; Repo, 1998; Sakheim & Osborn, 1999). Individual (e.g., aggression) and environmental factors (e.g., dysfunctional family climate) found to contribute to the onset of deliberate firesetting behaviours are however, not fire-specific, but factors commonly found among non-firesetting offenders. Jackson's functional analysis theory provides guidance on the areas that require close consideration in order to reduce firesetting behaviour and



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highlights the role of both positive and negative reinforcement in the continuation of deliberate firesetting behaviour. Gannon, Ó Ciardha, Doley, and Alleyne, however, critique the theory for failing to explain why those who do not suffer early adversity sometimes present with deliberate firesetting behaviour, and individuals who experience early adversity do not go on to develop a proclivity for firesetting. While developmental and distal risk factors influence and shape an individual's behavioural style, proximal risk factors immediately precipitate the problematic behaviour (e.g., substance abuse, problematic cognition/belief, or a situational stressor). The proximal factors triggering a maladaptive response, therefore, emphasise the purpose of firesetting and indicate when deliberate firesetting is most likely to occur or reoccur. Jackson's theory however, fails to attend to proximal risk factors (Gannon et al., 2012).

**Dynamic behaviour theory (Fineman, 1995).** Akin to Jackson et al.'s functional analysis theory, Fineman explains firesetting to be predisposed by distal psychosocial factors and childhood experience of fire, via social learning and conditioning principles. Dynamic behavioural theory hypothesises firesetting occurs by way of an interaction between general psychosocial disadvantage predisposing general delinquency; previous or existing environmental factors that reinforce firesetting; and immediate environmental factors which reinforce firesetting. The incorporation of instant environmental factors is an addition to functional analytic theory (Jackson et al. 1987) and is posited to moderate an individual's propensity to set a fire and assist in understanding potential triggers. The instant environmental factors identified by Fineman to facilitate the onset and continuation of deliberate firesetting include: (1) impulsivity triggers (e.g., trauma, rejection, or victimisation); (2) cognitive and affective factors pre, post and during the firesetting behaviour (e.g., cognitive and emotional dysregulation); (3) crime scene features (e.g., indicators of specific targets or motivation for firesetting behaviour); (4) internal and external fire-specific

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reinforcers (e.g., external reinforcers such as to conceal a crime, and internal reinforcers such as sensory stimulation or reduction in negative affect).

Fineman (1995) emphasised the importance of conducting a qualitative analysis of an individual's offence sequence to identify the problematic cognitions, emotional experiences, and behaviours leading up to and surrounding a firesetting incident. The integration of instant environmental factors and reinforcers provides an explanation for both impetus and maintenance of firesetting behaviour. The exploration and integration of proximal risk factors into frameworks of juvenile firesetting however, is relatively infantile compared to the research available on distal and static risk factors associated with other forms of juvenile offending behaviour. Further exploration of dynamic risk factors occurring in close proximity to deliberate firesetting will provide further specificity to the understanding of why a juvenile gravitates towards deliberate firesetting, the heterogeneity of juvenile deliberate firesetting, intra-individual versatility of firesetting behaviour, and the continuation of and desistance from deliberate firesetting.

Dynamic behaviour theory (Fineman, 1995) is the most robust theoretical understanding of juvenile firesetting behaviour to date; however, it is not without limitation. The theory provides limited explanation for how juveniles who are engaging in deliberate firesetting desist from the behaviour; aligning with the limited knowledge of general offender desistance. Factors which directly prevent criminal involvement or promote desistance from offending are known as *protective* factors, as they are associated with a low probability of offending among those at risk of offending (Ttofi, Farrington, Piquero & Delisi, 2016). Shepherd, Luebbers, Ogloff, Fullam, and Dolan (2014) explicate that protective factors (e.g., the presence of prosocial behaviour) yield a significant negative effect on recidivism for young offenders, thereby contributing to desistance. Shepherd et al. recommend further examination of factors that may prevent a behavioural onset or support the desistance of offending. Losel

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and Farrington (2012) compare the probability of offending to a dose-response relationship with protective factors; as the number of protective factors increases, the likelihood of offending reduces. This indicates that resistance to and desistance from offending may not be attributable to any one specific factor in isolation, but rather a combination of protective factors and resilience to risk factors (Ttofi et al., 2016). Nevertheless, exploring potential protective factors that may prevent the onset of and promote desistance from deliberate firesetting are essential for reducing recidivism.

Fineman (1995) proposed a model of classification from his theoretical developments in order to determine risk and treatment needs of firesetters. Several categories of firesetter were proposed, one non-pathological firesetter (i.e., the curious firesetter) and four pathological firesetters' in need of clinical attention (i.e., cry for help, delinquent, severely disturbed, and cognitively impaired). While Fineman's typology demonstrates the heterogeneity and complexity of firesetting behaviour and has been helpful in identifying risk and directing treatment over the past decade, MacKay, Ruttle, and Ward (2012) identify the typology lacks empirical support. For example, Fineman's original theoretical definition of a non-pathological firesetter was one of a young firesetter (under 10 years), motivated by curiosity and treatable by means of fire education. In 2011 however, Del Bove and Mackay developed an empirically derived classification of juvenile firesetting and concluded that fire curiosity is a fundamental risk factor for high risk and recidivistic firesetters. Moreover, young firesetters were equally as likely as adolescent firesetters to have multiple risk factors (Del Bove & Mackay, 2011). Curiosity with fire is, therefore, evidenced as a characteristic pertinent to multiple types of deliberate firesetting behaviour, irrespective of severity or age. The heterogeneity of fire-specific appraisals, attitudes, attribution, and beliefs among juveniles deliberate firesetting has received little to no attention (Del Bove & Mackay, 2011), and may plausibly mediate deliberate firesetting behaviour among juveniles.

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**The Action Systems Model (ASM; Canter & Fritzon, 1998; Fritzon, 1998).** Unlike functional analytic and dynamic behavioural theory, the ASM provides an empirically supported explanation for the onset of offending behaviour, while also determining the underlying mechanism of the behaviour. The model provides empirical guidance for determining motivational and functional differences between offending behaviours (Fritzon, 2012; Fritzon & Miller, 2010). The ASM explains that offending behaviour arises from internal or external cues as a result of a dynamic interaction between individuals and their psychosocial environment. Through analysing the source of behavioural action (internal/external) and the locus behavioural effect (internal/external) in the context of the individual, treatment targets and risk scenarios can be identified to inform offender management.

The interactions between the source of behaviour and locus of behavioural effects gives rise to four pathways toward offending behaviour, which are interchangeably referred to as an offender's *mode of action* or *modus operandi* (i.e., habitual pattern, style, or method of behavioural responding): (1) expressive; an action with an internal trigger but an external target, such as a communicative act or fixation on a particular target; (2) integrative; internally triggered and internally directed, such as self-immolation or setting fire to one's home; (3) adaptive; responding to an external environmental factor by adjusting the external environment to meet a need, such as opportunistic vandalism or car theft, perhaps to conceal a crime; or (4) conservative; a response to an external frustration or event which alleviates an internal state. Often a conservative mode of action will have a specific functional purpose, including revenge, restoration of power, or resolution of interpersonal conflict. The application of the ASM specifically to arson is similar to Ward and Siegert's (2003) pathways towards sexual offending, whereby one of four primary mechanisms brings about the offending behaviour (Fritzon, 2012). An individual who engages in deliberate firesetting therefore,

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operates as a result of one of these four dysfunctional mechanisms.

The ASM of arson aligns with Fineman's (1995) introduction of internal/external fire-specific reinforcers (Fritzon, 2012). For example, Fineman proposes that fire-specific behaviours can be externally reinforced by crime concealment, likely owing to the destructive nature of fire and the subsequent eradication of evidence. Internal reinforcement, in contrast, arises from sensory stimulation or the removal of negative affect. Similarly, the ASM purports a series of dynamic interactions between an individual's appraisal (source of action) and desired locus of effect, but the ASM offers greater specificity by producing four possible modes of behavioural action and reinforcement. For instance, expressive and adaptive firesetters are both externally reinforced, yet behaviour arises and manifests differently for each mode of action. Likewise, integrative and conservative firesetters are internally reinforced, though the two modes differ in underlying processes evoking and maintaining a behavioural occurrence. The ASM is validated for multiple offence-types, including arson, intra-familial homicide, terrorism, and school homicide (Fritzon, 1998; Fritzon & Brun, 2003; Fritzon, Canter & Wilton, 2001; Glorney & Fritzon, 2002; Santtila, Häkkänen, Alison & Whyte, 2003). In addition, the ASM has previously demonstrated its clinical utility for identifying treatment-interfering and offence paralleling behaviour (Miller & Fritzon, 2007; Neville, Miller, & Fritzon, 2005).

Modus operandi and functional purpose of offending are found to be predominantly consistent among adult arson offenders, with 79% of serial adult arsonists ( $n=37$ ) operating within the same mode of action for each deliberately lit fire (Fritzon, 1998). This demonstrates that the ASM can facilitate the identification of dysfunction underpinning persistent problematic behaviour (Fritzon, 2012). In Fritzon's sample however, nine individuals (21%) exhibited varying behavioural styles; in these cases, the most recent offence in a series of offences was classified as the most severe. This progressive change and increase in severity

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has been compared to the desensitisation to psychological reward commonly observed in substance abuse disorders (Fritzon, 2012). Variation in behavioural style and functional needs are suggested to arise from proximal changes in environmental or implicit experiences. In the case of juvenile firesetters however, dynamic changes in behavioural function may be influenced by alternative systems such as the physiological development of puberty. A shift in behaviour may reflect development, rather than a new and enduring domain of risk. For instance, one functional need may be dominant and another more dormant, with the dormant need later manifesting with a shift in psychological and physiological development. Closer evaluation of proximal and dynamic risk factors will be of particular importance in the context of developing adolescents who are undergoing psychosocial and physiological adaptations (Al-Attar, 2010). Monitoring changes in dynamic risk, function, and behavioural style among the juvenile population will be pertinent for preventing future offending.

Fritzon's (1998) findings are akin to a study by Swaffer and Hollin (1995) who conducted semi-structured interviews with adolescent firesetters to understand the purpose of firesetting behaviour. A small sample of young adjudicated firesetters ( $N=17$ ) were interviewed; with all but one reporting the same reasoning for each fire they deliberately lit ( $n=16$ ). Six reasons for firesetting were identified: revenge, crime concealment, self-injury, peer pressure, denial/accidental, and fascination. Swaffer and Hollin validated their findings using archival data for each young person, identifying a strong match between the two data sources. Swaffer and Hollin's study lends support to Fritzon's notion that firesetters repeatedly operate under one particular mode of action. Swaffer and Hollin however, used a small sample and measured at one time-point only. Thus, with a larger sample size and dynamic assessment across development, variation in functional purpose and clinical needs may be revealed.

In addition to the functional consistency observed for a specific offending behaviour (i.e., arson operating via the same mode of action), functional consistency has been

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documented across different problem behaviours. The concept of functional consistency between an offending behaviour and additional problematic behaviour is known as offence paralleling behaviour (Daffern et al., 2007; Jones, 2004). Offence paralleling behaviour (OPB) resembles the sequence of cognitions, emotions, and behaviours leading up an index offence. The OPB framework is consistent with Fritzon's (1998) suggestion that studying an individual's behavioural function (mode of action), rather than the behaviour per se, is a more purposeful way of evaluating offending behaviour.

Applying the ASM, Miller and Fritzon (2007) explored the concept of functional consistency between firesetting and self-harm in a sample of female psychiatric patients ( $N=50$ ). A case file review of patients with self-harming behaviour and an index offence of arson revealed the majority of individuals showed one predominant mode of action for firesetting (78%) and one predominant mode of action for self-harm (70%). Subsequent analysis demonstrated a significant relationship between the modes of action across the two problem behaviours. For example, patients exhibiting an integrative mode of firesetting were more likely to exhibit an integrative mode of self-harm compared to the other functions. This was also true for the adaptive mode of behaviour, but not for conservative or expressive modes. The findings demonstrate functional parallels across the externalised act of firesetting and the internalised act of self-harming behaviour. It is, therefore, plausible that firesetting behaviour may serve a higher functional purpose (i.e., emotional regulation) and self-harm among firesetters may fulfil that same function (i.e., an OPB), as evidenced by the underlying mechanism of offending behaviour yielding consistency across co-occurring problematic behaviours.

Miller and Fritzon (2007) emphasise that while their empirical findings demonstrate self-harm as an OPB for deliberate firesetting, this OPB link may not be true for all firesetters, and individuals who light a fire for other reasons may present with different OPBs. For

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instance, an act of violence or aggression against a person may be an OPB for firesetting that assumes a conservative mode, whereas an act of vandalism towards property may be an OPB for firesetting that assumes an adaptive mode. The findings demonstrate the multi-faceted nature of firesetting behaviour, such that two individuals who are committing the same offence may not be doing so for the same reason (Miller & Fritzon, 2007).

In summary, the ASM provides a clinically meaningful approach to understanding different forms of behaviour by adopting a functional rather than behavioural focus. Most importantly, the model has shown to be empirically validated for its application to arson and co-occurring behavioural concerns among adult offenders (Fritzon, 1998; Fritzon et al., 2001; Miller & Fritzon, 2007). A functional perspective has implications for both risk mitigation and treatment intervention. The assumption that differing problematic behaviours may be functionally consistent allows for predictions about an individual across multiple offending and problematic behaviours. This is of clinical importance for identifying treatment targets and developing adaptive functionally equivalent means of meeting the client's cognitive and emotional needs (Miller & Fritzon, 2007). The concept of OPB is, however, a relatively new concept in the field of firesetting, particularly in its application to juvenile firesetters. There is still limited knowledge of what specific behavioural problems and offending behaviours most commonly co-occur among deliberate firesetters (Lambie et al., 2013).

In response to the high co-occurrence of internalising and externalising behavioural problems, Tanner, Hasking, and Martin (2014) investigated the shared and unique characteristics of deliberate firesetting and non-suicidal self-injury (NSSI). Non-suicidal self-injury, considered a product of emotional dysregulation, has been found to co-occur with behavioural disorders such as conduct disorder (CD). This has given rise to the assumption that conduct disordered behaviours (e.g., rule-breaking and risk-taking) may represent a higher functional purpose. Tanner et al. hypothesised that NSSI (an internalised behavioural problem)



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and firesetting (an externalised behavioural problem) may operationalise in the same way among school-based adolescents aged 12 to 18 years ( $N=2,356$ ; 67.5% female), as a means to regulate challenging thoughts, feelings, or social experiences. It should be noted the high proportion of females in the sample was a result of more girl-only schools participating in the study. The hypothesis was developed on previous findings that indicate NSSI and firesetting share common environmental and individual characteristics. Four participant groups were established: NSSI and firesetting, NSSI only, firesetting only, and control.

Tanner et al. (2014) found that NSSI behaviour and deliberate firesetting were both characterised by emotional dysregulation and behavioural disinhibition suggesting the two behaviours may be of functional equivalence and represent a maladaptive strategy to cope with life stressors. The parallels between NSSI and firesetting (Tanner et al., 2014) are similar to Miller and Fritzon (2007) who established functional consistency among adult female firesetters who engage in self-harm. Tanner et al. concluded that the co-occurrence of NSSI and firesetting, in comparison to deliberate firesetting in isolation, was associated with significantly greater adverse life events, less cognitive reappraisal, and non-productive coping. The likelihood of co-occurrence increased with the number of life events and level of non-productive coping. Problem focused coping was also associated with both NSSI and firesetting, but not predictive of co-occurrence.

Significant unique predictors for each focus group in isolation were determined by Tanner et al. (2014). For example, unique predictors of the NSSI group included the individual characteristics of cognitive rumination and poor self-esteem. Therefore, Tanner et al. suggest that self-critical orientation is more associated with self-directed behaviour, opposed to externalised acts. Conversely, the unique predictors of deliberate firesetting were socio-demographic factors of being male, religious, and with low behavioural inhibition, and fun-seeking temperament. Finally, certain characteristics predictive of firesetting in isolation were

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also significant predictors of co-occurrence, but not NSSI alone, including male gender, sensation seeking behaviours, and poor inhibition. Accordingly, this illustrates that adolescents engaging in NSSI are at heightened risk of engaging in deliberate firesetting when they are *male* and present with *low behavioural inhibition* (Tanner et al., 2014).

Tanner, Hasking and Martin (2016) advanced their 2014 study and concluded that juveniles with co-occurring deliberate firesetting and NSSI were found to have greater risk and deficit in domains of interpersonal communication, psychopathology, substance misuse, and suicidal behaviours compared to juveniles with only one presenting problem. Tanner et al. used a community school sample thus, the findings cannot be generalised to a forensic population at this stage. The study also only sought to explore one type of co-occurring behaviour, a behaviour associated with emotional dysregulation. Theoretical underpinnings of firesetting have widely established that there is more than one pathway towards firesetting (e.g., ASM; Fritzon, 1998). Consequently, future research should endeavour to explore various co-occurring behaviours and functional consistency for different types of juvenile firesetting, with different norms of co-occurring externalised behavioural problems. Finally, while Tanner et al. (2016) advanced their former work, the study was not a prospective follow-up to confirm the reliability of their original findings or to monitor behavioural change over the developmental period of adolescence. Mapping consistency and changes in functional strategy and interaction throughout adolescent development would advance the field of deliberate firesetting by informing the likelihood of continued risk into adulthood.

**The multi-trajectory theory of adult firesetting (M-TTAF; Gannon, Ó Ciardha, Doley & Alleyne, 2012).** In an endeavour to advance the field of deliberate firesetting Gannon et al. drew upon key components of former firesetting theories, typologies, fundamental psychosocial risk factors, and theoretically robust frameworks from more developed areas of forensic psychology (i.e., Ward & Siegert, 2002; the pathways model of child sexual

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offending) to develop a model of adult firesetting with clinical utility. The M-TTAF model comprises two tiers, with the first tier outlining the heterogeneous interactions between an individual's distal and proximal risk, and the second tier positing five different trajectories in which an individual's risk may manifest.

The first tier of the M-TTAF model describes firesetting behaviour by means of multiple interactions between four developmental risk factors and four key psychological vulnerabilities. The developmental factors pertain to distal risk factors such as caregiver environment (e.g., social disadvantage and insecure attachment), social learning (e.g., maladaptive core values, copying scripts, and fire experience), cultural forces (e.g., beliefs and attitudes towards fire as a result of one's culture), and biology/temperament (e.g., cognitive functioning and organic/neurochemical brain structure which influences one's capacity). The key psychological vulnerabilities proposed by M-TTAF are inappropriate fire interest, offence-supportive cognitions, self/emotional regulation issues, and communication problems. Interactions between developmental/distal risk factors and psychological vulnerabilities are theorised to contribute to the onset, maintenance, and intensification of firesetting behaviour. M-TTAF hypothesises that psychosocial vulnerability runs along a continuum, and the variability and individual differences in the interactions between psychological and social factors accounts for the varying severity of firesetting behaviour. These interactions are suggested to be activated by dynamic factors or internal states (triggers) that occur in close proximity to the firesetting event. The proximal risk factors/triggers hypothesised by M-TTAF include life events, contextual factors, internal affect or cognition, a biological problem, and cultural factors. These proximal factors/triggers elicit one or more key psychological vulnerabilities and operationalise them into critical risk factors which facilitate the onset of firesetting. It is these critical risk factors which are the key target for treatment.

The second tier of M-TTAF hypothesises that differential interactions between the

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developmental, psychological, and proximal factors give rise to five prototypical pathways towards firesetting behaviour. M-TTAF identifies these trajectories as antisocial, grievance, emotionally expressive, fire interest, and multi-faceted. The antisocial pathway towards firesetting explains the behaviour as part of general criminality and hypothesises that firesetting is attributable to offence supportive attitudes, not through fire-specific interest per se. Potential motives for firesetting are boredom, crime concealment, and vandalism. Grievance firesetting is explained by the implicit belief that fire is a powerful tool and a means to an end. Within this pathway, firesetting results from poor self-regulation, communication deficit, and inappropriate fire scripts. Plausible motivations are revenge or retribution. The emotionally expressive trajectory includes offenders who engage in firesetting because of mood dysregulation, and those who have communication deficits as a result of impulsivity or insufficient problem-solving skills. Motivations are suggested to be stress relief, a cry for help, and a need for recognition. The fire interest trajectory hypothesises firesetters hold inappropriate implicit beliefs that fire is fascinating, exciting and controllable. Fire interests can co-occur with other trajectories, with the use of fire understood to be a coping strategy to alleviate stress, boredom, or provide a thrill. The final trajectory is the multi-faceted pathway to firesetting which best defines highly complex and severe firesetters. These firesetters exhibit risk across multiple domains of functioning and hold particularly antisocial cognitions supportive of firesetting.

The theoretical trajectories of M-TTAF demonstrate that an individual can demonstrate relatively high functioning in one area (e.g., emotional regulation) but low functioning in another (e.g., offence supportive cognitions). This is akin to the action systems framework (Fritzon, 1998; Fritzon et al., 2001) which empirically documents that firesetters operate under a particular mode of action and that the act of setting a fire is fulfilling a functional purpose. This notion provides an explanation for the heterogeneity of deliberate firesetting behaviour.

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M-TTAF promotes in-depth examination of the criminogenic needs of deliberate firesetters that are changeable and amenable to treatment, such as substance abuse, antisocial personality pattern, and offence supportive attitudes. There is, however, ambiguity pertaining to the dynamic risk factors most pertinent for juvenile deliberate firesetting and why juvenile firesetters may differ from their non-firesetting counterparts across domains of dynamic risk. While an empirical classification of juvenile deliberate firesetting has been developed (Del Bove & Mackay, 2011), the authors acknowledged their classification did not include dynamic risk factors; specifically, their classification did not incorporate fire-related attitudes. Accordingly, exploration of the dynamic psychological and attitudinal factors will be of particular importance for advancing the risk-needs assessment of young firesetters who are consistently developing throughout adolescence and likely to have shifting needs.

M-TTAF is novel in that it is the first firesetting theory to explore possible factors associated with firesetting desistance, placing emphasis on protective factors that prevent the behaviour from becoming repetitive and chronic (e.g., self-esteem, mental health, supportive family network, and identify shift). In accordance with the Good Lives Model (GLM; Ward, 2002; Ward, 2010), M-TTAF hypothesises that equipping individuals with positive feelings (e.g., personal control and hope) and functional skills (e.g., communication, coping strategy, and external prosocial opportunity) increases the potential for firesetting behaviours to desist. M-TTAF places further emphasis on the explicit distinction between proximal and distal psychological and environmental antecedents that are influential in the onset and maintenance of firesetting behaviour. The inclusion of proximal and protective factors, however, is relatively new to the field with empirical investigations of juvenile firesetting.

Further research on these factors is necessary to draw inference about their influence on deliberate firesetting behaviour. While M-TTAF has attempted to address flaws in previous firesetting theory to formulate a more comprehensive framework, the application of M-TTAF

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to juveniles should proceed with caution. M-TTAF was not developed for a juvenile population. Thus it cannot be assumed juvenile firesetters are synonymous with adults, given that neuropsychological capacity, personality, and behaviour develop over the lifespan. Since the inception of M-TTAF, however, Gannon and colleagues have continued to advance the field of deliberate adult firesetting, refining their work to be of clinical relevance. While adult-specific, their empirical work follows theoretical processes which may be applicable to juveniles.

Ó Ciardha and Gannon (2012) drew upon previous empirical findings on the influence of offence-specific implicit theories among sexual and violent offenders, subsequently proposing implicit theories pertaining to the use of fire. Mann and Beech (2003) suggest implicit theories are similar to scientific theory in that they can be used to explain, predict, and interpret interpersonal phenomena. Implicit theories are of equivalence to a cognitive schema, and they serve as a psychological template to direct cognitive activity to inform the perception and inference of future events (Ward & Keenan, 1990). Ward et al. (1997) suggest that implicit theories are operationalized into a cognitive and behavioural scripts, which are psychological and behavioural patterns that can be measured by mental health practitioners. Ó Ciardha and Gannon theorise deliberate firesetting behaviour is underpinned by one of five implicit theories.

***The normalisation of violence.*** The authors align this implicit theory with the normalisation of violence observed among violent offenders (Polaschek, Calvert & Gannon, 2009). Firesetters, in the context of expressing negative affect (i.e., anger), are hypothesised to internalise fire as an acceptable response in situations/contexts of personal adversity or conflict. Over time, the use of fire in response to the activation of psychological vulnerability becomes normalised. Some firesetters have a proclivity for displaced and passive means of expression over the use of violence, whereas others will be more direct in their expression,

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such as setting an individual alight (Ó Ciardha & Gannon, 2012). Personality traits that are incongruent with violence, preference for indirect methods, or the perception that fire is merely another tool in their violent repertoire moderate this belief.

***Dangerous world.*** Individuals who internalise the belief that the world is a dangerous place view the world through a lens of hostility and harm. Ó Ciardha and Gannon (2012) refer to the work of Polascheck and Ward (2002), who suggest feelings of hostility and grievance against the world, as well as hypervigilance to threat, arise from early victimisation, namely physical and sexual abuse. This implicit theory for behavioural responding is suggested to globalise beyond an individual's firesetting behaviour. The acquisition of a victimised belief system is proposed by Ó Ciardha and Gannon to generally limit the development of altruistic tendencies among firesetters, leading to wider antisocial behaviours. Thus, the use of fire is often justified in the mind of the firesetter and used as a means of protection against perceived or real threat to self or others (Tyler et al., 2014).

***Fire is a powerful tool.*** Fire is used as a persuasive messenger with a functional purpose (Ó Ciardha & Gannon, 2012). The use of fire as a powerful tool can vary; with the authors outlining its use in the context of fear and intimidation, obtaining recognition/admiration, or as an expression of needing help. The origin of the implicit theory and what the use of fire means for the individual will determine the context of their use of fire. For some firesetters, fire may be viewed as the only way to attain their needs, for others they hold a sense of entitlement pertaining to the use of fire (Ó Ciardha & Gannon, 2012).

***Fire is fascinating/exciting.*** Maladaptive beliefs pertaining to fire interest are best considered on a continuum of fire interest to preoccupation. The use of fire elicits enjoyment, with some individual's priding themselves on their knowledge and skills pertaining to the use of fire. In more extreme forms, the use of fire can become part of an individual's self-concept and identity, including the perception he/she is good at firesetting, known for firesetting, and

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enjoy firesetting more than anything else. Additionally, the use of fire may solely be for the sake of using fire, with limited insight into the potential consequences or without criminal intent. When a preoccupation with fire arises in conjunction with other risk factors, the relevance and risk of firesetting increases.

***Fire is controllable.*** Ó Ciardha and Gannon (2012) identify the implicit theory that fire is controllable, is unique to a firesetter with no other offender internalising this view of fire. The core belief is that fire is controllable or that only they can control fire (i.e., *mastery of fire*). In this context, a lack of awareness and understanding of the impacts of fire can lead to the unintentional escalation of firesetting. The assumptions that other people will see the fire and move out of harm's way, or that only the intended target of the fire will be affected is a common misconception of firesetters holding this belief. It is not uncommon for the firesetter to be completely surprised at the consequence or attribute blame to a victim, viewing it as the victim's responsibility to evade the fire.

Ó Ciardha and Gannon (2012) acknowledge that the implicit theories they propose were formed from their academic and clinical experience with firesetters, noting other cognitive schemas around fire may exist as further research is conducted. Offence-specific cognitive processes are yet to be explored with juvenile firesetters. Cognitive schemas (i.e., implicit theories) typically develop in childhood and continually evolve into adulthood (Young, Klosko & Weishaar, 2003). Thus, it is plausible that a juvenile firesetter starts to develop preconceived ideas about the use of fire following interactions with and experiences of fire. Implicit theories proposed by Ó Ciardha and Gannon however, have not been tested and validated for a juvenile population. Empirically investigating the implicit psychological processes specific to firesetting among the juvenile population will advance the understanding of dynamic and proximal risk factors, as well as why some juveniles gravitate towards unsanctioned firesetting.



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More recent work by Gannon and colleagues has provided support for the M-TTAF model with mentally disordered firesetters (Tyler et al., 2014). In line with Fineman's work on offence sequences and fire-specific reinforcers in deliberate firesetting, Tyler et al. (2014) employed the micro-theory approach of offence chains to understand the behavioural function and associated dynamic risk factors relevant to the continuation of a behavioural problem (Ward, Polaschek & Beech, 2006). The authors describe an offence chain as a behavioural occurrence, focusing on the sequential affective, cognitive, behavioural, and contextual factors leading up to and surrounding an offence. The analysis of an individual's offence chain, in the context of a specific offence (i.e., firesetting) provides clinically informative information for the reduction of the behaviour. The offence chain model was able to differentiate between different types of firesetter, as per the M-TTAF trajectory model. Finally, the role of mental health in the offence chains of firesetters was consistent with the predictions of the M-TTAF framework that mental health moderates firesetting occurrence, rather than contributing to a specific risk factor per se. Tyler et al. (2017) encourage the application of the offence chain model in future research, as it is still in its infancy.

Lovell (2013) proposed theoretical developments in the area of juvenile firesetting; mapping the findings from a family case study examining familial, environmental, developmental, and motivational factors related to the onset and maintenance of juvenile firesetting onto the M-TTAF framework (Gannon et al., 2012). A sample of 12 mothers and their respective children ( $N=18$ , *Age*: 11.5 years, range: 7-17 years,  $n=17$  male and  $n=1$  female) referred to a local fire and rescue service for deliberate firesetting behaviour were recruited. A mixed methodology was employed to determine the risk factors most pertinent to deliberate firesetting. Lovell acknowledged the utility of the M-TTAF framework in explaining the continuation of firesetting behaviour within adulthood but highlighted limitations when applied to juvenile firesetting.

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Thematic analysis by Lovell (2013) of the family perspective on the development of juveniles' firesetting revealed two predominant themes underpinning juvenile firesetting behaviour: (1) social environment (e.g., normalisation of fire in the local area, peer pressure/learnt behaviour, relationship with neighbours, moving away, and eviction); and (2) family dynamics (e.g., issues of blame, paternal involvement, conflict within the family, and mother's description of child). Interactions between the risk factors within each of the domains were explained to have a cyclical effect on the perpetuation of firesetting behaviour. For example, where the family unit may contribute towards behavioural onset, the impact of the juvenile's behavioural problems can amplify the dysfunction within the family unit, further perpetuating the young person's behavioural problems. One of the strongest findings from Lovell's research was the impact of negative parental practices and maternal psychopathology on the child-parent relationship, resulting in prolific disruption to the quality of the relationship. This highlights the role of attenuated attachment between a child and their primary caregiver as a pertinent risk factor for deliberate firesetters.

Two neurodevelopmental conditions were found by Lovell (2013) to be prevalent among deliberate firesetters: attention deficit hyperactivity disorder (ADHD) and autism spectrum disorder (ASD). The presentation of these conditions in the context of firesetting was deemed a perpetuating factor, complicating the interactions between other psychosocial vulnerabilities contributing towards the risk of firesetting behaviour. In light of these co-occurring diagnoses, it is unsurprising that characteristics such as high-risk taking, impulsivity, low concentration, learning problems, fighting with peers, loneliness, being bullied, verbal aggression, physical violence, extreme mood swings, a need for affection, and familial conflict, were also associated with juvenile firesetting behaviour (Lovell, 2013).

Lovell (2013) concluded that the M-TTAF model might not place enough emphasis on the role of developmental context to comprehensively explain juvenile firesetting. The

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juvenile risk element of firesetting recidivism model (J-REF) was proposed by Lovell as a more appropriate framework for explaining the onset and continuation of childhood and adolescent firesetting. The J-REF model outlines four developmental domains that contribute towards the onset of juvenile firesetting behaviour: (1) family risk factors: maternal depression, parental involvement, and negative parenting practices that impact upon the child-parent relationship; (2) individual risk factors: childhood temperament of impulsivity/reduced inhibition and low concentration capacity, as well childhood diagnoses of ADHD and ASD; (3) environmental risk factors: opportunity to engage in firesetting behaviour, normalisation of fire use in the neighbourhood, living in a deprived area, associating with delinquent peers, the normalisation of criminality; and (4) school risk factors: for example special needs or exclusion from school; concerns in this domain are proposed to be influenced by individual risk factors, subsequently impacting peer relationships and resulting in an increased vulnerability to peer group influence or bullying. Lovell acknowledges the four developmental domains of a juvenile firesetter are akin to the five developmental contexts of M-TTAF, but evidence risk factors which may be more reflective of a juvenile population. Finally, Lovell determined domains of risk more specific to firesetting behaviour, including normalisation of fire in the local area, no fear for the consequences of fire, and historical exposure to firesetting behaviour (e.g., history of playing with matches, burning things, lighting fires, and having a curiosity about fire).

A key critique of Lovell (2013) is that a suitable control group was not recruited. A comparison with secondary data from the Fast Track Project (CPPRG; the conduct problems preventions research group) was conducted; however, the samples were not matched on age or environmental circumstance. Thus, the strength of any comparative conclusions was limited, as it cannot be determined if the risk factors are in fact specific to deliberate firesetting behaviour. Additionally, the age of the sample spanned a large developmental range from

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early childhood, where firesetting is regarded as a part of normal development, to late adolescence when deliberately lighting fires is regarded as criminal behaviour under Commonwealth law. Accordingly, the application of Lovell's findings to an adolescent forensic sample may vary, particularly in the form of protective factors which were not explored.

### **Situational and Contextual Factors of Behaviour**

Examining the attributes of the situation in which behaviour occurs, is regarded as pertinent to the assessment and management of offending behaviour (Jessor & Jessor, 1973). Core theoretical frameworks and models of behavioural assessment in the field of deliberate firesetting incorporate a multifaceted approach to understanding the person-situation interaction giving rise to a behavioural response (Canter & Fritzon, 1998; Gannon et al., 2012). It is this information which provides the accuracy and specificity required to determine the underlying purpose of a behavioural action, as well as inter-and intra-person variation in behaviour.

Rauthmann, Sherman and Funder (2015), outline that all behavioural analysis should include quantifiable physical cues (i.e., who was the individual with, which target/person, and the what, when, and why of it happening), qualitative characteristics (i.e., the psychological meaning behind the situation such as conflict, pleasure, social interaction, or distrust), and the similarity of cues or characteristics across independent situations. When physical cues arise (i.e., person/interactions, events/objects, and location/time), the information is processed by the individual, with a situation only having meaning after personal experience and psychological processing has occurred (i.e., qualitative characteristics). This closely aligns with the investigative process of the ASM (Canter & Fritzon, 1998; Fritzon, 1998), which incorporates characteristics of crime scene actions and the individuals' appraisals/attributions (i.e., source of action) to determine likely triggers and targets (locus of effect) of a behaviour.

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The interaction of individual traits, social or interpersonal role, and cognitive/affective state influence the processing of physical cues and information, subsequently giving rise to characteristic situational responding (Rauthmann et al., 2015). Situational and contextual factors can, therefore, explain heterogeneity in behavioural responding, even among individuals with the same higher order need, such as emotional dysregulation. For example, a juvenile firesetter underpinned by emotional dysregulation will not become emotionally triggered in every situation and not every emotionally dysregulated offender will be triggered by the same situation. Accordingly, integrating these principles into research investigating the relationship between deliberate firesetting and co-occurring problematic behaviour will provide the specificity required to determine unique and consistent components of co-occurring behaviours.

While the theoretical approaches for understanding individual situational-behavioural response responding vary (see Rauthmann et al., 2015), the influence of *trait* (Ten Berg & De Radd, 2002), *cognitive-attribution* (Edwards & Templeton, 2005), and *social/interpersonal position* (Moskowitz & Zuroff, 2008) are similar to the three core concerns associated with psychosocial maturity and continuation of antisocial behaviour among juveniles (Monahan et al., 2009): individual temperament, perspective taking ability, responsibility taking, and susceptibility to the influence of others. Ten Berg and De Raad (2002) explain how individual temperament influences an individual's behavioural response to situational contexts and cues, proposing temperament manifests problematically in response to one of four situations: (1) situations of pleasure; (2) situations of individual adversity; (3) situations of interpersonal conflict; and (4) situations of social demand.

The dynamic temperament among developmental populations however, means situational responding may be more likely to fluctuate, in addition to anticipated moderating effects of disinhibiting factors (e.g., mental health, substances, or medication). For some

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individuals their traits may manifest in only one specific situation, whereas for others their traits may be more global, being evoked in multiple situations (e.g., the implicit theory of *dangerous world*). Finally, individual differences in personality traits mean situations of unease for some will be non-problematic for others. More malleable and adaptive individuals therefore, experience less discomfort or unease.

### **Research Summary and Proposal**

A disproportionate number of juveniles are responsible for arson throughout Australia, with official figures identified to underrepresent the extent of juvenile deliberate firesetting behaviour. Theoretical models of juvenile deliberate firesetting behaviour comprehensively explain distal vulnerability, yet are relatively underdeveloped in the area of dynamic and proximal risk factors specific to deliberate firesetting behaviour. Likewise, there is limited empirical clarity pertaining to the protective factors that may reduce risk and promote desistance from deliberate firesetting. The high co-occurrence between deliberate firesetting and wider behavioural problems among juveniles is not taken into consideration by former theoretical models. Furthermore, the functional consistency and persistence of a problematic behavioural sequence across juvenile firesetting and co-occurring concerns have not undergone statistical evaluation as a potential reinforcing factor for deliberate firesetting or a prospective method of identifying risk (e.g., implicit theories, cognitive scripts, contextual factors, and situational triggers). Consequently, a clinically informative and developmentally sensitive framework for dynamic assessment and identification of treatment needs for juvenile deliberate firesetters with co-occurring behavioural concerns, accounting for inter-and intra-individual variation in functional underpinnings and contextual factors, is yet to be developed.

This thesis aimed to combine the most robust and clinically relevant components of theoretical models (Fineman, 1980; Fritzon, 1998; Gannon et al., 2012; Jackson et al. 1987), recent empirical findings on firesetting offence chains (Tyler et al., 2014; Tyler & Gannon,

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2017), and implicit theories about fire (Ó Ciardha & Gannon, 2012) and subsequently examine their applicability to juvenile firesetting. The unique addition of protective factors put forward by the M-TTAF and the incorporation of the GLM principles (Ward, Yates & Willis, 2012) provided a strength-based approach to understanding changes in behavioural style, including persistent firesetting and desistance. A functional approach (Daffern et al., 2007; Fritzon, 1998; Jackson et al., 1984) facilitated determination of relevant dynamic and proximal risk factors for both the impetus and maintenance of firesetting (Fineman, 1980; Fritzon 1998; Gannon et al., 2012). This is particularly meaningful for a juvenile population who are developmentally immature and dynamic in nature.

Investigating the most commonly co-occurring behavioural problems among juvenile deliberate firesetters, and subsequently statistically examining the offence chains of firesetting and non-firesetting behavioural problems from a functional perspective, was a more purposeful way of responding to the heterogeneity and criminal versatility of juvenile deliberate firesetters (Miller & Fritzon, 2007; Tanner et al., 2014; Tanner et al., 2016). The ASM, with incorporation of situational factors (Rauthmann et al., 2015; Ten Berg & De Raad, 2002), informed specificity in the context of heterogeneity and provided a platform for determining functional and contextual consistency between co-occurring problematic behaviours, as per OPB (Daffern et al., 2007). In combination, the findings informed the relevance of wider empirical developments in understanding deliberate firesetting and co-occurring behavioural problems among a juvenile offending population.

## CHAPTER TWO

### The Risk Factors of Juvenile Deliberate Firesetting

Identifying the aetiological and key risk factors associated with deliberate firesetting can facilitate explanation of why the behaviour occurs, predict the likelihood of its occurrence, and lead to targeted efforts to address these problematic characteristics (Putnam & Kirkpatrick, 2005). Identifying antecedents and correlates that are specific to deliberate firesetting, rather than an attribute of broader antisocial behaviour or CD is, however, a barrier to advancing our understanding of deliberate firesetting behaviour. With the exception of fire-specific variables (i.e., history of firesetting, frequency of firesetting, method of firesetting, and the act of lighting fires), the risk factors for juvenile firesetting are general to broader adolescent behavioural problems, making it difficult to predict if the observed behaviour is a fire-specific risk or risk of a broader pathology (e.g., CD).

**Antisocial behaviour and deliberate firesetting.** To discern whether firesetting is mutually exclusive from broader conduct problems, Forehand, Wierson, Frame, Kemptom, and Armistead (1991) compared the characteristics of firesetters and non-firesetters, matched on their number of CD symptoms. A sample of incarcerated male juveniles ( $N=36$ ) aged between 13 and 17 years, with a diagnosis of CD were categorised into one of three groups: (1) firesetters (CD symptoms; *range*=4-6); (2) high CD non-firesetters (CD symptoms; *range*=4-6); and (3) low CD non-firesetters (CD symptoms; *range*=all had 3). Firesetters and non-firesetters matched on CD symptoms did not significantly differ in their severity and range of psychopathology, as reported by their primary caregiver using the Child Behavioural Checklist (CBCL; Achenbach, 1991). Both these groups did, however, differ significantly from adolescents with fewer criteria for CD on the subscales of withdrawn interpersonal style, delinquency, and aggressive behaviour. These findings demonstrate that firesetting is associated with elevated antisocial behaviour and that firesetting may not be a unique



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problematic behaviour, but part of a wider antisocial repertoire (Forehand et al., 1991).

Forehand et al.'s study was not without limitation. The overall sample size is small ( $N=36$ ) and the data were derived solely from the primary caregiver's perspective, without child self-report or professional clinical judgment. Accordingly, the generalisation of their findings is problematic. Nevertheless, on the basis that the sample was differentiated on the severity of conduct disorder rather than severity of firesetting, it was inferred that the seriousness of antisocial behaviour might be a better predictor of firesetting risk than firesetting per se (Forehand et al., 1991).

Stickle and Blechman (2002) used multiple informants to examine the association between firesetting and antisocial behaviour among juvenile offenders aged 11 to 18 years ( $N=219$ ). Delinquency was measured using the self-report early delinquency scale (SRED; Moffit & Silva, 1988) and additional data gathered from police and agency reports for each juvenile. The CBCL and Youth Self Report (YSR; Achenbach, 1991) were used to measure psychopathology. Firesetting was assessed from a single-item on the CBCL and SRED, as well as recent court reports for arson charges. The study aimed to establish whether firesetters and non-firesetters are fundamentally the same in the structure of their psychopathology and level of behavioural problems. Using a three-factor model of antisocial behaviour (aggressive, nonaggressive, and oppositional) Stickle and Blechman concluded firesetters and non-firesetters fit within the same model, but juvenile firesetters are more severe in their behaviour. Firesetters were found to be significantly more aggressive, with a history of more antisocial acts, and younger age at the time of their index offence. These findings indicate problematic functioning may be more chronic and widespread among firesetters than other antisocial juveniles. Chen, Arria, and Anthony (2003) replicated the association between aggression and firesetting concluding that young firesetters (aged 12-17 years), compared to a control group with no history of firesetting, have significantly elevated levels of aggressive

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behaviour.

Stickle and Blechman (2002) retrospectively identified that their study failed to provide information on the antecedents of firesetting and how firesetting behaviour developed. No structured interviews were conducted with the juveniles, thus limiting the opportunity for further exploration of the behavioural function and associated facets of their firesetting sample. This is information that is imperative for determining risk and directing the treatment needs for a severely antisocial subgroup of juvenile offenders. Limited analysis of the firesetting behaviour means proximal risk factors and the purpose of the behaviour was indeterminate. Therefore, the findings do not illuminate why juvenile firesetters diverge towards such severe antisocial behaviour and engage in firesetting.

McCardle, Lambie, and Barker-Collo (2004) used a sample of identified adolescent firesetters ( $n=50$ ), adolescents with non-firesetting behavioural problems ( $n=33$ ), and a control group of adolescents without behavioural problems ( $n=34$ ) to determine any disparity. All participants were male adolescents, aged 12 to 18 years, with the majority of identified firesetters reportedly having lit multiple fires (76%). The sample was recruited from relevant agencies, including mental health services, community support organisations, fire and emergency services, and local high schools. Firesetting characteristics and correlates were explored via interviews with both adolescents and their primary caregivers. Five measures were used to build a profile of the adolescents: (1) Firesetting Research Questionnaire (FRQ; McCardle et al., 2004); (2) Basic Personality Inventory (BPI; Jackson, 1996); (3) Coping Response Inventory for Youth (CRI-Y; Moos, 1993); (4) CBCL (Achenbach, 1991); and (4) Family Environment Scale (FES; Moos & Moos, 1984).

McCardle et al. (2004) found that firesetters and non-firesetters with behavioural problems presented with a similar proportion of conduct disorder diagnoses; 31% and 26% respectively. There was no significant difference in their living situation; firesetters lived with

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both parents 28% of the time and the behavioural problem group 27% of the time.

Overall, adolescent firesetters and non-firesetters with behavioural problems could not be differentiated on family characteristics, behavioural problems, and the majority of personality traits. When controlling for the persistence of problem behaviours, however, firesetters were found to score significantly higher on the deviation sub-scale of the basic personality inventory (BPI; Jackson, 1996), a sub-scale intended to measure atypical behavioural patterns associated with pathological characteristics. This finding discounts antisociality alone as a sufficient explanation for all juveniles engaging in deliberate firesetting.

Additionally, significantly more firesetters (53%) than non-firesetters with behavioural problems (29%) presented with Attention Deficit Hyperactive Disorder (ADHD), a behavioural disorder associated with an earlier onset of delinquency, greater criminal versatility, and higher severity of offending, irrespective of a conduct disorder (Sibley et al., 2010). ADHD is also associated with a faster rate of recidivism when controlling for general antisocial risk (Philipp-Wiegmann et al., 2017). The presentation of significantly elevated pathology, such as ADHD and deviation patterns among the firesetting sample is indicative that firesetters are more complex than other subgroups of problematic youth. As expected, both the firesetting and behavioural problem groups significantly differed from the control group in the above domains.

McCardle et al. (2004) also examined the offence characteristics of firesetters to establish any fire-specific behavioural patterns that would assist in developing recommendations for risk assessment. A fundamental characteristic of firesetters was a history of firesetting, with almost half of the sample having engaged in firesetting during childhood (46%), and more than three-quarters of the sample having been involved in match play (84%). Firesetting rarely occurred at home (20%) or school (12%), and the target was non-specific

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with 46% of fires set against any vegetation and 28% against any structure.

Concerning, was the findings that over half of juvenile firesetters reported using accelerants when lighting fires (62%), and half the sample made no attempt to reduce the potential harm of the fire via extinguishing it or seeking help (56%). Finally, firesetting presented differently among *group firesetters* and *solitary firesetters*. Firesetters who light fires in groups appeared to be more motivated by excitement and boredom, whereas those who light fires in solitary reported doing so out of anger rather than experimentation. Solitary firesetters were less likely to be apprehensive after lighting fires or be involved with illicit substances than group firesetters. These findings illustrate that not all firesetters are primarily antisocial, some firesetters, particularly *repeat firesetters* and *solitary firesetters*, might be engaging in the behaviour to serve a functional purpose, such as to remove negative affect or elicit stimulation (Fineman, 1995).

Limitations of McCardle et al's study pertain to the clarity of group definitions. The covert nature of the firesetting makes it difficult to determine whether a single time firesetter had only set one deliberate fire. Quantifying how many fires multiple firesetters have set and if they were all for the same reason is also problematic. Self-report, however, is plausibly the most accurate way to identify undetected firesetting, with primary caregivers likely unable to provide additional insight. For example, Del Bove et al. (2008) documented that only 27.3% of parents were aware of their child's fire misuse. Moreover, motive for firesetting is only one part of a behavioural chain and is not specific enough to understand the underlying mechanism driving a maladaptive behaviour; two individuals can share the same motive and be engaging in the behaviour due to different functional deficits (Walsh & Lambie, 2013). Walsh and Lambie's research on firesetting motive has indicated that there are often several co-occurring impetuses responsible for the onset of firesetting behaviour that may not be mutually exclusive from one another, such as anger, experimentation, and boredom.

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While previous studies focused on forensic samples, Martin, Bergen, Richardson, Roeger, and Allison (2004) explored the characteristics of firesetting among a community sample. The predominant aim was to establish how best to detect firesetting risk early on utilising a cross-sectional design across the Australian education system ( $N=2596$ ; grade 8 students,  $Age=13$  years). The single item from the Diagnostic and Statistical Manual of Mental Disorders-Fourth Edition (DSM-IV; American Psychiatric Association, 2000) criteria for conduct disorder: "I have set fire to things in public places just for fun", was used to determine the history of firesetting behaviour. Other areas evaluated were antisocial behaviour (SRED), risk-taking (BART; Brief Adolescent Risk-Taking Measure), anxiety and depression (CES-D; Centre of Epidemiological Studies Depression Scale), hopelessness (BHS; Beck Hopelessness Scale), self-esteem (RSES; Rosenberg's Self-Esteem Scale), control and attributional style (Nowichi-Strickland Locus of Control Scale for Children), parenting style (Influential Relationship Questionnaire) and family functioning (FAD-GF; McMaster Family Assessment Device-General Functioning). Substance use, maltreatment, suicidal ideation, and self-rated academic performance were all measured with a brief questionnaire designed by the authors.

Martin et al. (2004) found that students who reported deliberate firesetting also self-reported more antisocial behaviour than students who did not report firesetting behaviour, including greater impulsive expression (e.g., serious drug use and risk-taking behaviour), self-depreciation (e.g., suicidal thoughts and plans), and school failure (i.e., perceived academic failure). Serious (i.e.,  $\geq 7$ ) and extreme (i.e.,  $\geq 10$ ) antisocial behaviours were also significantly associated with a history of deliberate firesetting in comparison to non-firesetting. After controlling for serious antisocial behaviour, firesetters continued to exceed the non-firesetting group across problematic behaviours. For instance, among male participants, extreme antisocial behaviour, serious and extreme drug use, and suicidal behaviour (i.e., plans and

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attempts) were significantly greater among the firesetting sample. For the female participants, however, only school failure and extreme antisocial behaviour differentiated firesetters from non-firesetters.

Martin et al. (2004) found firesetting yielded significant association with characteristics of familial dysfunction, parenting style (i.e., maternal/paternal care, criticism, and overprotection), adverse life experience (i.e., physical and sexual abuse), and internalised psychopathology (i.e., depression, hopelessness, low self-esteem, anxiety, and external attribution style). The exception being, there was no significant difference between female firesetters and non-firesetters for *overprotective mother*. After controlling for serious antisocial behaviour, however, few significant group differences were found. For males the only significant difference between firesetting and non-firesetting youth was for experience of sexual abuse, and for females, hopelessness. Overall, these findings demonstrate that extreme antisociality and poor behavioural inhibition are among the strongest predictors of deliberate firesetting, even when controlling for serious antisocial behaviour.

Regression analysis completed by Martin et al. (2004) revealed that serious substance use, risk-taking behaviour, and history of physical abuse all contributed significantly to the prediction of firesetting behaviour among males. Serious antisocial behaviour emerged as the most prominent predictor of deliberate firesetting behaviour among males, increasing the likelihood of firesetting occurrence by seven times. For females, however, risk taking and substance use and antisocial behaviour provided similar contribution to the overall model.

Antisocial behaviour may, therefore, be more pertinent for identifying firesetting risk among males, rather than females. A methodological limitation of the Martin et al. (2004) study pertains to the firesetting criteria, which was ambiguous. The single item criterion of "I have set fire to things in public places just for fun" does not take into account the context of fires, such as bonfires, barbeques, and campfires, all of which are circumstances where a fire

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may be lit in public and for fun. Additionally, the criterion does not account for fires that may have been lit on private property. Finally, the measures were all self-report without comparable data from a primary caregiver or external source to assess for the validity of juvenile self-reports.

The above studies demonstrate a strong association between firesetting and wider antisocial behavioural problems. Yet, it may be probable that juvenile firesetters are more behaviourally unstable than other antisocial juveniles who exhibit elevated psychopathology, and have more extreme antisocial tendencies than antisocial non-firesetters (Stickle & Blechman, 2002; McCardle et al., 2004; Martin et al., 2004). The reported increase in pathology among firesetters, when controlling for antisociality, indicates that antisocial behaviour alone is an insufficient explanation for firesetting; not all firesetters have conduct disorder, equally not all conduct disordered juveniles light fires (Martin et al., 2004). Relying on antisociality as a primary explanation for juvenile firesetting does not account for the complexity of the behaviour. For example, conduct disorder is an insufficient explanation for deliberately lit fires motivated by boredom (Watt et al., 2015), peer influence (Walsh & Lambie, 2013), an attempt to self-harm (Swaffer & Hollin, 1995), or as a result of disordered personality (Moore, Thomson-Pope, & Whited, 1996).

There is a large body of research spanning the juvenile age group depicting various environmental and individual deficits (e.g., cognitive, emotional and behavioural) that are significantly associated with deliberate firesetting, and are insufficiently explained by a diagnosis of conduct disorder. These factors are considered to be salient among deliberate firesetters and have guided the understanding of juvenile firesetting behaviour, and the development of assessment and treatment methods to date.

**Environmental risk factors.** An investigation into the potential risk and protective factors for general offending has highlighted mostly environmental and contextual factors.

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Qualitative semi-structured interviews with adolescent offenders have revealed that juveniles attribute offending to school problems (e.g., threats to safety, including bullying, gang affiliation, and weapon possession), the neighbourhood (e.g., surrounded by crime and marginalisation), incarceration (i.e., juvenile detention is perceived as inevitable), social pressures (e.g., peer pressure and pressured personas), and dysfunctional home environment (e.g., fighting, normalised crime, poor cohesion, and incarcerated caregivers). Adolescents perceive their social world as chaotic and unsafe, consequently describing unmet implicit needs including love, attention, support, positive guidance, and discipline (Barnert et al., 2015). Thus demonstrating that environmental dysfunction is pivotal in juvenile delinquency and further psychopathology.

*The family climate.* Kolko and Kazdin (1986) were central in the early exploration of parental and family characteristics among young firesetters, specifically child firesetters aged 6 to 12 years. The assessment of psychopathology, dyadic adjustment, and environment of child firesetters ( $n=27$ ) in comparison to non-firesetting children ( $n=27$ ), while controlling for conduct disorder, revealed that the parents of firesetters presented with significantly more dysfunction than non-firesetters. Kolko and Kazdin (1990) extended their earlier work with a larger sample ( $N=477$ ) of children aged between 6 and 13 years old. Using the Firesetting History Screen (FHS; Kolko & Kazdin, 1988), they defined three groups of children to examine the family dynamics and environmental characteristics of firesetting children. The three groups were defined as: (1) firesetters ( $n=198$ ): identified incident of firesetting in the past 12 months; (2) match players ( $n=40$ ): engaged in match play but not firesetting in the past 12 months; and (3) non-firesetters ( $n=230$ ): community control group. The firesetting sample reported greater dysfunction than non-firesetting children, with match play children scoring between the firesetters and non-firesetters on the majority of the measures.

Characteristics of concern among firesetters, in comparison to non-firesetters, were



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higher psychological distress and marital disagreement among parents, lax discipline and child monitoring, and lower child acceptance. Firesetting children reported their experiences of parental rearing practices as anxiety and guilt inducing; though this finding was not consistent with the parent self-report. However, the findings do not inform whether these characteristics are specific to deliberate firesetting or broader juvenile delinquency.

A key finding of the Kolko and Kazdin (1990) study is that child and parent self-reports pertaining to parenting behaviour and its impact, differed depending on the respondent. This indicates the importance of using multiple sources for data collection, particularly when it relates to covert behaviours and internalised psychological processes. While Kolko and Kazdin's foci were primarily in early childhood (6 to 13 years) and not extended into adolescence (14 to 17 years), their research indicates early rearing environment constitutes a significant risk factor for later life dysfunction and delinquency.

Pollinger, Samuels, and Stadolnik (2005) compared a sample of residential-treated ( $n=17$ ) and outpatient-treated ( $n=30$ ) adolescent firesetters (aged 12 to 17 years) on environmental and behavioural characteristics. Greater environmental instability was associated with firesetters requiring residential treatment, as opposed to outpatient treatment. Of the adolescents in the outpatient sample 43% ( $n=13$ ) had come from a home environment with both parents, however, none of the juveniles in the residential sample came from a living situation with both parents. Regression analyses revealed physical and verbal aggression, as well as indirect aggression (excluding hostile aggression), was significantly more predictive of residential treatment, as opposed to being treated as an outpatient. Residential firesetters were also significantly more withdrawn, depressed and delinquent, according to caregiver ratings on the CBCL. The two groups however, did not differ in their history of fire-specific characteristics (e.g., number of fires set or frequency of accelerant use). The findings demonstrate the early rearing environment of a young person and the presence of key

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attachment figures plays a critical role in the vulnerability of juvenile maladjustment. Similar firesetting severity between the two groups indicates that the functional need, such as emotional regulation, may be more important for some juveniles than the act of firesetting per se, and that firesetting may exist on a continuum of pathological dysfunction. A limitation of Pollinger et al.'s study is the concurrent nature of the data collection prevented causal interference between parent practices and child firesetting.

***Maltreatment.*** In response to the disproportionate amount of firesetters characterised by early environmental disruption (Kolko & Kazdin, 1986, 1990; Pollinger et al., 2005) and frequent reports of historical maltreatment among juvenile firesetters (see Widom, 2003), Root, MacKay, Henderson, Del Bove, and Warling (2008) explored early abuse, neglect and victimisation as a risk factor for deliberate firesetting. It was hypothesised that a history of maltreatment increases an individual's vulnerability to emotional and behavioural regulation problems, giving rise to problematic behaviours including deliberate firesetting. Emotional regulation and behavioural control are key functions that, when in deficit, are theorised to give rise to firesetting behaviour (Canter & Fritzon, 1998; Fineman, 1995; Gannon et al., 2012).

A sample of children ( $N=205$ ) aged 4 to 17 years, referred to The Arson Prevention Program in Canada (TAPP-C), were assessed with a battery of measures, along with caregiver reports (Root et al., 2008). Participants were referred to the specialised clinic following an identified incident of deliberate firesetting; all youth had lit at least one fire in the preceding 12 months. The CBCL was used to record emotional and behavioural problems, the Fire Involvement Interview (FII; MacKay, Hanson, Dickens, & Henderson, 1999) for firesetting behaviour, and the TAPP-C developmental history interview to explore maltreatment. The prevalence of maltreatment among the juvenile firesetters was 48%, and of these, 26% had experienced more than one type of maltreatment. Maltreated firesetters presented with more severe risk for deliberate firesetting than their non-maltreated counterparts, as evidenced by

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more frequent, versatile firesetting behaviour, and the use of accelerants.

Root et al. (2008) found that the mean level of emotional and behavioural dysfunction of maltreated juveniles was within the clinical range, as opposed to non-maltreated juveniles who were within the borderline clinical range. While both groups of firesetters demonstrated emotional and behavioural dysfunction, results were more elevated among the maltreated group. A comparison of firesetting motive between groups revealed that an immediate family stressor or anger was significantly more likely to be the impetus for firesetting among maltreated firesetters than non-maltreated firesetting juveniles. Root et al. concluded that rather than maltreatment having a direct influence on firesetting severity, maltreatment operates through emotional and behavioural dysfunction. These findings are akin to the M-TTAF framework of firesetting that indicates distal risk factors (e.g., maltreatment) and proximal risk factors (e.g., family stressors) interact with underlying psychological vulnerabilities (e.g., clinical range emotional dysregulation or behavioural conduct problems) to operationalise an underlying psychological vulnerability as critical risk factors for firesetting behaviour. The difference between maltreated and non-maltreated firesetters is consistent with the concept that deliberate firesetting is a heterogeneous behaviour problem with multiple pathways towards juvenile firesetting behaviour. Root et al., however, did not provide any information on what led the non-maltreated group to engage in firesetting, or how firesetters with a history of maltreatment differ from other delinquent juveniles with historical maltreatment.

Research outcomes pertaining to deliberate firesetting and childhood trauma experience are inconsistent. Becker et al. (2004) did not find a significant relationship between sexual abuse and deliberate firesetting ( $N=363$ , age range: 6 to 12 years). In contrast, Moore et al. (1996) yielded a statistically significant difference between firesetters and non-firesetters ( $N=124$ , age range: 14 to 17 years) for sexual abuse victimisation, but not for physical abuse.

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Lyons, McClelland, and Jordan (2010) however, compared a substantially larger sample ( $N=4155$ , age range: 4 to 17+ years) of firesetting and non-firesetting youth, finding trauma experience (e.g., emotional, physical, and sexual abuse) and trauma symptomology (e.g., dissociation, re-experiencing trauma, and adjustment to trauma) were among the most significant predictors of deliberate firesetting behaviour. A cumulative effect was concluded, whereby a greater number of trauma experiences or symptoms were associated with an increased likelihood of deliberate firesetting. Lyons and colleagues concluded firesetting behaviour might be most common among juveniles experiencing complex trauma.

Previous research demonstrates an increase in firesetting severity (i.e., more frequent and versatile firesetting) and pathology (i.e., dysfunctional regulation and functioning) among maltreated juveniles compared to non-maltreated juveniles. The identification that abuse and neglect may operate via a negative effect on behavioural and emotional development is of central importance to understanding the versatility, escalation, and persistence of juvenile firesetting behaviour. It remains unclear why not all juveniles with a significant trauma history go on to deliberately light fires, and why repeat firesetting can occur in the absence of childhood abuse. Thus, an exploration of adverse life experiences, rather than trauma per se, may proffer explanation (Fox, Perez, Cass, Baglivo, & Epps, 2015), with individual psychological risk plausibly mediating differential responding and vulnerability to adverse life events.

**Individual risk factors.** Over the past 30 years, juvenile firesetting has emerged as a multifaceted and heterogeneous behaviour, often entwined with psychological and pathological dysfunction (Mackay, Feldberg, Ward, & Marton, 2012). Multiple studies have explored salient psychopathology and personality traits among juvenile firesetters with the overarching aim to establish if and how different deliberate firesetters vary from their non-firesetting counterparts. Such investigation is essential for identifying relevant treatment

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targets and assessment strategies with diagnostic and prognostic utility specific to deliberate firesetting.

***Psychopathology and firesetting.*** Mackay et al. (2009) conducted an epidemiological study to evaluate the correlates specific to adolescent firesetting among a sample of 11 to 19 year olds ( $N= 3,965$ ). They compared non-firesetters, desisted firesetters (i.e., no reported firesetting in the past 12 months), low frequency firesetters (i.e., one or two deliberately lit fires in the past 12 months) and high frequency firesetters (i.e., three or more deliberately lit fires the past 12 months). More frequent firesetting behaviour was associated with an earlier onset of lighting fires (before age 10 years) and a higher number of risk factors, including elevated psychopathology, compared to non-firesetters. For example, high sensation seeking, delinquency, psychological distress, suicidal ideation, and substance abuse (e.g., binge drinking and illicit drug use) were all associated with increased firesetting frequency. Details about firesetting behaviour per se were not explored in depth. Participants were only asked about the rate of the firesetting: "In the last 12 months, how many times have you set something on fire that you weren't supposed to?" Thus, a relationship between the reported psychopathology and underlying motive or behavioural function of deliberate firesetting behaviour could not be discerned. Psychopathology is, however, shown to correlate with deliberate firesetting irrespective of behavioural severity. In particular, substance abuse was associated with all levels of firesetting. Mackay et al. reiterate the concept that firesetting runs on a continuum of pathological vulnerability; the more frequent the firesetting behaviour, the more severe psychopathology.

The link between psychopathological risk and deliberate firesetting was similarly observed by Del Bove et al. (2008). Utilising a community school sample, Del Bove and colleagues found significantly higher levels of psychopathology among adolescents aged 11 to 18 years self-reporting deliberate firesetting behaviour, compared to those who did not report

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fire involvement. Using the CBCL to obtain a mean aggression score for each juvenile and the YSR to record whether a juvenile had previously lit a deliberate fire (“I have set fires”), four mutually exclusive groups were discerned: (1) control group, who recorded scores under the 50<sup>th</sup> percentile rank for aggression and no history of firesetting ( $n=250$ ); (2) aggressive non-firesetters, who recorded scores over the 70<sup>th</sup> percentile rank for aggression and denied any firesetting ( $n=130$ ); (3) firesetting-only group, who reported under the 50<sup>th</sup> percentile rank for aggression but self-reported engaging in firesetting ( $n=92$ ); and (4) aggressive firesetter group, who recorded a score over the 70<sup>th</sup> percentile rank for aggression and self-reported engaging in firesetting ( $N=95$ ).

Del Bove et al. (2008) revealed adolescent firesetters and aggressive firesetters significantly differed from their non-firesetting counter parts across multiple self-reported behavioural characteristics. For instance, adolescent firesetters compared to aggressive non-firesetters experienced more internalising difficulty, including withdrawn behaviour and social difficulty. Aggressive firesetters reported comparable results, with higher levels of anxiety, depressive symptoms, thought problems, and attentional difficulties than aggressive non-firesetters. Juvenile firesetters and aggressive firesetters did not significantly differ on self-reported behavioural characteristics. Parent-reports, however, revealed aggressive firesetters compared to aggressive non-firesetters were perceived to be more behaviourally problematic (i.e., delinquency, animal cruelty, and sexually problematic), yet non-aggressive firesetters were not perceived to differ from controls. Parent-reports were shown to under-represent the frequency and magnitude of juvenile behaviour concerns, particularly when the behavioural presentation was more covert and non-aggressive. For example, only 27.3% of parents reported awareness of their child’s involvement in deliberate firesetting.

Del Bove and colleagues (2008) found that both firesetters and aggressive firesetters had lower self-efficacy for self-regulation, academic performance, and social competence than

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juvenile controls. Firesetters did not differ from aggressive non-firesetters across any of the self-efficacy beliefs, yet aggressive firesetters yielded significantly lower scores for regulatory self-efficacy and academic self-efficacy. Likewise, while personality characteristics including hostile rumination, irritability, and moral disengagement were determined to be significantly higher among both firesetting groups in comparison to control participants, personality characteristics did not significantly differentiate between firesetters and aggressive non-firesetters, with only moral disengagement reaching significance for the aggressive firesetter and aggressive non-firesetter comparison. The characteristic of aggression/frustration may be one impetus for firesetting behaviour (see Jackson, 1987), though it is widely documented that there are multiple pathways towards firesetting (Canter & Fritzson, 1998; Gannon et al., 2012). There is also more than one form of expression for aggression (e.g., direct, indirect, displaced), yet Del Bove et al. did not distinguish between form expression when comparing firesetters and non-firesetters to establish if their behavioural experience and expression differed. Therefore, the indistinguishable findings on self-efficacy and personality characteristics should not overshadow the observed differences in self-report behavioural characteristics.

A critique of Del Bove et al.'s study is the criteria of firesetting, which did not discern the nature and severity of the firesetting behaviour. The YSR "I have set fires" is vague and provides limited detail about the fire-specific behaviour. Overall, however, all groups engaging in firesetting behaviour exhibited both elevated pathological personality profiles and behavioural problems compared to non-firesetting groups (Del Bove et al., 2008). This indicates that those with a proclivity for lighting fires are of heightened concern.

The elevated reports of externalised (e.g., animal cruelty and problematic sexual behaviours) and internalised behavioural problems (e.g., mood dysregulation, thought problems, and attentional difficulties), as well as poor self-efficacy pertaining to self-

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regulation, social competence, and academic skill among firesetters and aggressive firesetters have emerged to be fundamental risk factors towards deliberate firesetting behaviour. These factors may plausibly be of functional relevance given the co-occurrence of internalising and externalising behavioural problems among juvenile deliberate firesetters (Tanner et al., 2014; Tanner et al., 2016). Consequently, firesetting may serve a higher functional purpose, which antisocial behaviour alone cannot explain. That is not to say some firesetters will not set a fire purely for an antisocial motive (e.g., crime concealment, vandalism, or boredom), but antisocial proclivity only explains a proportion of firesetting behaviour exhibited by the juvenile population.

Del Bove et al. (2008) conducted a four to six year follow up study (using their original sample) and found only 15% of firesetters reoffended by deliberately lighting a fire. The recidivist firesetters were those who were most fascinated with or engaged most frequently with fire at T1. Thus, demonstrating fire interest may be pivotal in recidivism for firesetting behaviour. Firesetters, compared to their non-firesetting counterparts, reported significantly more engagement in covert antisocial behaviours at T2 (e.g., shoplifting, stealing, cheating, or substance abuse as a coping strategy). Firesetters were also more significantly associated with violence (e.g., gang violence and assault) than non-firesetters; albeit violence was more common among the aggressive firesetting group than the firesetting only group.

***Salient personality traits and firesetting.*** Studies of personality in forensic samples have indicated those who set fires are more pathological and complex in their personality profiles than conduct disordered juveniles without a history of firesetting (Moore, Thompson-Pope, & Whited, 1996). Using the Minnesota Multiphasic Personality Inventory-Adolescent assessment (MMPI-A; Butcher et al., 1992), adolescent boys aged 14 to 17 years old ( $N=124$ ), with a history of firesetting ( $n=28$ ), obtained significantly higher scores than non-firesetting adolescents with conduct disorder ( $n=96$ ) on three of the clinical scales: (1) Psychasthenia:



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associated with anxiety and agitation; (2) Schizophrenia: associated with psychotic symptomology and disorientation; and (3) Mania: abnormally elevated mood and racing thoughts. Adolescents with a history of deliberate firesetting reported significantly higher rates of animal cruelty, sexual abuse victimisation, and self-injurious behaviour than adolescents without a history of firesetting. Firesetters also presented with elevated scores on eight of the MMPI-A content scales: depression, alienation, bizarre mentation, anger, conduct problems, family problems, school problems, and adverse treatment indicators. The comorbid symptomology of firesetters reflects both internalising and externalising behavioural problems, compared to the predominantly externalising behaviours exhibited by non-firesetting conduct disordered juveniles. Moore et al. concluded firesetting to be not only a reflection of disordered behaviour but an inner turmoil. Both firesetters and non-firesetters present with conduct disorder, however, the severity of CD alone is insufficient for explaining firesetting behaviour.

The early onset of delinquency, criminal versatility, and protracted co-occurrence between firesetting and serious antisocial behaviour has resulted in the empirical investigation of callous-unemotional traits (CUT) among deliberate firesetters. CUTs are a salient characteristic of psychopathic personality and a dimension closely affiliated with antisocial behaviour among forensic populations. The fusion of CUT and conduct problems is reported to pose heightened risk for persistent and severe offending and be problematic for treatment responsivity (Frick, Ray, Thornton, & Kahn, 2013). Watt et al. (2015) explored CUT among deliberate firesetters, highlighting that former research had not empirically tested this relationship.

Watt et al. (2015) formulated two hypotheses pertaining to CUT. Firstly, CUT would significantly predict firesetting behaviour in a forensic and community sample. Secondly, an interaction between CUT and antisocial behaviour would increase the prediction of deliberate

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firesetting. Two juvenile samples were recruited to explore the research hypotheses: adjudicated offenders ( $n=138$ ) and a community school sample ( $n=136$ ). Juveniles were aged between 12 and 19 years old and predominantly male (72.3%). To measure firesetting behaviours, the authors developed the Youth Fire Behaviours and Interest Scale (YFBIS). The final scale reported good to excellent internal consistency for measuring firesetting behaviour among both the forensic ( $\alpha=.79$ ) and community ( $\alpha=.90$ ) samples. CUT and antisocial behaviour were examined by a combined questionnaire consisting of the Antisocial Process Screening Device (APSD; Frick & Hare, 2001) and the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997) developed by Dadds, Frost, Fraser, and Hawes (2005).

Levels of CUT were significantly elevated among the forensic sample compared to the community sample (Watt et al., 2015). Antisocial behaviour was found to predict firesetting across both samples, with greater antisocial behaviours associated with more frequent firesetting. This supports previous findings that firesetting is associated with more frequent antisocial involvement, and that CUT is a salient personality characteristic among adolescents with conduct problems (Scheepers, Buitelaar, & Matthys, 2011). The predictive strength of antisocial behaviour, however, became less significant as fire-specific variables were introduced (e.g., fire affect, fire interest, and fire preoccupation). Of the fire-specific variables, the only factor found to predict lighting three or more fires across both samples significantly was fire affect. This demonstrates that fire may serve a different purpose among different subgroups of youth but, to some degree, the function of emotional regulation or emotional expression is of central importance in the onset and maintenance of deliberate firesetting; particularly for those with more frequent firesetting behaviour. These findings also align with implicit theories of arson which are incorporated into the M-TTAF framework and advise that firesetters are likely to hold inappropriate fire interest and scripts, as well as exhibit difficulties in emotional regulation (Gannon et al., 2012).

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Watt et al. (2015) found that CUT did not initially yield a significant relationship with firesetting behaviour. It was only when fire-specific predictors were added into the regression model that CUT became a significant predictor of firesetting; however, CUT and firesetting yielded a significant interaction. A further examination of the interaction identified that higher CUT traits among juvenile offenders only predicted firesetting for those with lower self-report antisocial behaviours. Multiple combinations of inappropriate fire scripts, offence supportive cognitions, emotional regulation issues, and/or communication problems can give rise to alternative trajectories to firesetting (M-TTAF; Gannon et al., 2012). For example, the significant finding of fire affect in a relatively low antisocial group might indicate emotional expression or dysregulation. Alternatively, an increase in CUT among a population who report low antisocial behaviour may be attributable to developing psychopathic characteristics including, a tendency to minimise, deny, or fail to take responsibility for their antisocial conduct as a means of positive impression management or manipulation. On the contrary, an increase in CUT may also represent emotional blunting from some form of neurodevelopmental deficit which mirrors CUT (Allely & Cooke, 2016). For example, symptomology of traumatic brain injury (TBI), autism spectrum disorder (ASD), and attention deficit hyperactivity disorder (ADHD) can manifest in a similar ways to the expression of CUT (e.g., disregard for others, lack of empathy, and deficient affect).

Level of cognitive and affective empathy, impulsivity, CUT, attentional bias for fire-related stimuli, and fire interest have also been assessed by Hoerold and Trannah (2014). The clinical relevance of these factors for juvenile deliberate firesetting were assessed through comparing a sample of adolescent firesetters aged between 12 and 18 years old ( $n=25$ ) with two age-matched control samples: antisocial youth with no history of firesetting in the preceding 12 months ( $n=17$ ) and school controls without antisocial behaviour or a history of firesetting in the preceding 12 months ( $n=22$ ). The Basic Empathy Scale (BES; Jolliffe &

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Farrington, 2006), Barratt Impulsivity Scale (BIS-11; Patton, Stanford, & Barratt, 1995), Inventory of Callous-Unemotional Traits (ICU; Frick, 2004), a lexical Stroop task, and the Fire Interest Questionnaire (Mackay & Hanson, 1996) were employed.

Significantly lower levels of cognitive empathy and higher levels of uncaring traits were yielded among firesetters in comparison to school controls; however, no significant difference was found between firesetters and antisocial controls (Hoerold & Trannah, 2014). Deliberate firesetters reported significantly higher impulsivity scores and CUT than the school control group. In comparison to antisocial controls, however, deliberate firesetters reported significantly higher mean scores for callousness but not impulsivity. Regression analysis revealed that self-reported impulsivity was a significant predictor of deliberate firesetting. Consequently, the inclusion of impulsivity and CUT in future research is required to improve clarity concerning temperament and personality traits pertinent to deliberate firesetting and what factors would mediate such behaviour.

With regard to fire-specific risk factors, some surprising results were determined by Hoerold and Trannah (2014). Firstly, firesetters and non-firesetters could not be significantly differentiated on self-reported fire interest, as per the FIQ. This finding opposes previous research identifying that fire interest is a critical factor for frequent and severe deliberate firesetting (Del Bove & Mackay, 2011; Mackay et al., 2006; Watt et al., 2015). In addition, firesetters, school controls, and antisocial controls did not significantly differ on frequency for carrying matches or a lighter; a variable that previous research has found to be associated with firesetting (Kolko & Kazdin, 1990) Hoerold and Trannah, therefore, queried the possession of either matches or a lighter as a risk factor for deliberate firesetting, and found that adolescents often attributed ownership to being a smoker. Finally, Hoerold and Trannah did not yield a significant difference between the three participant groups on attentional bias for fire-related stimuli. This opposes the research findings of Gallagher-Duffy et al. (2009) who yielded an

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attentional bias for fire-related stimuli among firesetters aged 13 to 16 years old. Gallagher-Duffy et al. recruited a sample of clinically referred firesetters ( $n=30$ ), clinically referred non-firesetters with behavioural problems ( $n=33$ ), and a control group ( $n=35$ ). Using a pictorial Stroop task, attentional bias for fire-specific stimuli was statistically and significantly more associated with the clinically referred firesetting sample than the two control groups. A positive relationship between firesetting frequency and attentional bias for fire-specific stimuli was also determined (Gallagher-Duffy et al., 2009). In response, Hoerold and Trannah (2014) suggested pictorial stimuli may be more sensitive to eliciting an attentional bias than lexical stimuli, thus encouraging the incorporation of both in future research studying fire interest.

A major limitation to Hoerold and Trannah's (2014) research is the selection of their control groups, specifically the criteria of *no history of firesetting during the previous 12 months*, as opposed to no deliberate firesetting past the age of 10 (Grolnick et al., 1990). This is problematic given the upper limit of the age range was 18 years old. Thus a control participant may have engaged in deliberate firesetting until the age of 17 years old and would still be eligible for control status. This limitation was identified by Hoerold and Trannah and plausibly offers an explanation for the lack of between group difference on fire-specific variables, as well as impulsivity.

Overall, problematic personality traits and pathological makeup present as more pertinent to explaining deliberate firesetting than non-firesetting behavioural problems. The findings are, however, inconsistent. A significant association between deliberate firesetting and neurodevelopmental disorders (e.g., ADHD and ASD), as well as other domains reflecting neurodevelopmental delay or deficit (e.g., impulsivity, social problems, attentional deficit, stimulation seeking, and cognitive problems) may interact with and effect the relationship between antisocial personality traits (i.e., CUT) and deliberate firesetting behaviour (see Allely & Cooke, 2016).

### **Research Summary and Proposal**

In synthesising the literature, the most consistent differences among firesetters and non-firesetters, except for fire-specific factors, are elevated levels of behaviour problems, psychopathology, pathological personality, and family dysfunction. This suggests that adolescents with a proclivity for lighting fires are at heightened risk of chronic problematic behaviour and psychological difficulty compared to other antisocial juveniles. The juvenile firesetting literature, however, is fragmented with methodological differences in age range, sample demographics, definition, and measures used, making generalisation problematic. These methodological variations have a negative effect for yielding empirical consensus on the characteristics most pertinent to juvenile deliberate firesetters, in comparison to their non-firesetting counterparts. This thesis, therefore, commenced with a meta-analytic review of 30 years of empirical research on the correlates of juvenile deliberate firesetting in comparison to juveniles without deliberate firesetting behaviour. The aim of the study was to determine the fundamental characteristics of deliberate firesetting for juveniles. Statistically amalgamating three decades of empirical findings provided a foundation for exploring the differences between arson and non-arson offenders in subsequent chapters.

## CHAPTER THREE

### The Fundamental Characteristics of Juvenile Firesetters

Deliberate firesetting is associated with significant consequences, including financial loss, serious injury, loss of life, and devastation to the environment. These outcomes can have a significant pronounced impact on the emotional, psychological, and physical well-being of victims, families, and the broader community. Prevalence figures in Australia align with international statistics, indicating that juveniles account for between 40.60% and 63.70% of all fire-related offences (NSW BOSCAR, 2017; Statistics New Zealand, 2017). Identifying the antecedents and correlates associated with deliberate firesetting behaviour, as well as determining whether firesetters are a specific problematic group has, however, posed challenging. There are inconsistencies in the empirical literature about whether firesetting is part of a more extensive antisocial repertoire, or if antisocial behaviour alone is an insufficient explanation for the behaviour. Determining the similarities and differences between firesetters and non-firesetters will better inform risk mitigation strategies and interventions for deliberate firesetting behaviour.

#### **Behavioural Risk Factors**

To discern whether firesetting is mutually exclusive from broader conduct problems, Forehand et al. (1991) compared the characteristics of firesetters and non-firesetters, matched on their number of conduct disorder symptoms. The two groups yielded no significant difference in their severity and range of psychopathology. Likewise, Stickle and Blechman (2002), concluded firesetters fit within the same three-factor model of antisocial behaviour (aggressive, nonaggressive, and oppositional) as non-firesetting juvenile offenders. McCardle et al. (2004) also found that firesetters and non-firesetters with behavioural problems could not be significantly distinguished from one another on their overall pathological personality profile, behavioural issues, or the dysfunctional family environment. These findings

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demonstrate that firesetting may not be a unique problematic behaviour, but part of a broader antisocial repertoire (Forehand et al., 1991).

A broader range of problematic behaviours among juvenile firesetters compared to other juvenile offenders has, however, been documented in the literature, providing an impetus for exploring firesetting as a specific problematic behaviour. While Stickle and Blechman (2002) concluded firesetters fit within the same model of antisocial behaviour, juvenile firesetters compared with non-firesetting offenders were found to be significantly more aggressive, have a more extensive antisocial history, and be younger at the time of their index offence. McCardle et al. (2004) found that firesetters scored significantly higher on the deviation subscale of the Basic Personality Inventory (BPI; Jackson, 1996), measuring unusual behavioural patterns associated with elevated pathological characteristics. Firesetters compared to non-firesetters with behavioural problems also present with high rates of ADHD, a behavioural disorder associated with increased risk of criminal activity (Young & Thorne, 2011). These findings indicate problematic functioning may be more chronic and widespread among firesetters than other antisocial juveniles.

The co-occurrence of firesetting and wider antisocial behaviour was echoed by Del Bove et al. (2008); deliberate firesetters yielded a greater proclivity for antisocial behaviour and substance misuse for coping, even when controlling for history of aggression. Del Bove and colleagues conclude the act of firesetting itself may be a red flag for future violence and antisocial behaviour, as well as maladaptive emotional regulation.

In contrast to the aforementioned studies, Watt et al. (2015) found that the predictive strength of antisocial behaviour was less significant when fire-specific variables were incorporated into statistical evaluations. Three fire-specific variables were tested among a forensic and community sample of juveniles: fire affect, fire interest, and fire preoccupation. Of these variables, fire affect (i.e., positive emotions towards fire) was the only variable to



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significantly predict lighting three or more fires among the forensic sample. For the community sample, however, both fire interest and fire affect were significantly greater among firesetters than their non-firesetting peers. These findings demonstrate that fire interest is a relevant factor in the onset of deliberate firesetting behaviour, but that for some the use of fire may go beyond fire interest and serve a higher functional purpose, such as emotional regulation or expressive communication.

The studies above indicate that juvenile firesetters display multiple problems, exhibiting elevated psychopathology and extreme antisocial tendency compared with non-firesetters. When controlling for antisociality, firesetters show increased pathology, emotional dysregulation, and greater fire interest, illustrative that antisociality alone is an insufficient explanation for firesetting and does not account for the complexity of the behaviour.

### **Environmental Risk Factors**

Investigations into wider risk factors associated with deliberate firesetting have emerged as primarily environmental, with a vast amount of disruption reported in the homes of young firesetters. The early rearing environment and exposure to adverse life experiences appear elevated among deliberate firesetters in comparison to their non-firesetting counterparts, constituting a significant predisposing risk for later life dysfunction and delinquency. In fact, elevated environmental adversity among firesetters, when compared with non-firesetters, may plausibly explain the earlier onset of offending behaviour, greater number of antisocial acts, and dysfunctional emotional regulation.

Family function (McCardle et al., 2004; Moore et al., 1996), level of consistency and agreement within the family unit (Kolko & Kazdin, 1986), and level of parental psychopathology (Becker et al., 2004; Kolko & Kazdin, 1986) are reported to be more dysfunctional among youth engaging in deliberate firesetting compared to other youth. The interpersonal dynamics between parents (Kolko & Kazdin, 1990; Martin et al., 2004) and the

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strength of the parent-child relationship have been identified as significantly more dysfunctional for firesetters (McCarthy & McMahn, 2005). Lower levels of child-centeredness and child acceptance (Kolko & Kazdin, 1990; Martin et al., 2004), as well as exposure to questionable/lax discipline strategies (Kolko & Kazdin, 1989; Martin et al., 2004), differentiate firesetters from non-firesetters. In addition to the familial environment, exposure to negative life events outside of the family unit (Tanner et al., 2014), negative emotional experiences (Sakheim & Osborn, 1999), trauma, and abuse (Lyons et al., 2010; Moore et al., 1996) are pivotal in juvenile firesetting.

### **Psychopathology and Personality Risk Factors**

Mackay et al. (2012) concluded that firesetting is a multifaceted and heterogeneous behaviour, entwined with salient psychological and pathological dysfunction. A pattern of simultaneous increase in risk and symptomology as firesetting frequency increases is evident, with more frequent firesetting behaviour associated with an earlier onset of firesetting (before age 10 years old) and a higher accumulation of risk factors (Mackay et al. 2009). Likewise, Del Bove et al. (2008) found significantly higher levels of behavioural problems (e.g., animal cruelty and problematic sexual behaviours), internalisation (e.g., higher levels of anxiety, depressive symptoms, thought problems, and attentional difficulties), and poor self-efficacy among juveniles who self-reported engaging in firesetting, compared to those who did not report fire involvement.

Moore et al. (1996) concluded that juveniles who set fires might be more pathological and complicated in their personality profiles than conduct disordered juveniles without a history of firesetting. Firesetters yielded significantly higher scores for labile mood, symptomology consistent with psychosis, anxiety/agitation, paranoid/persecutory ideation, alienation/detachment, and significantly more family and school problems. Conduct problems, anger, animal cruelty, sexual abuse victimisation, self-harm, and adverse treatment indicators

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were also significantly higher among firesetters. Moore et al. concluded firesetting to be not only a reflection of disordered behaviour, but a reflection of inner turmoil.

Hoerold and Trannah (2014) identified clinically relevant correlates for adolescent firesetters among a representative community sample, concluding that firesetters and antisocial non-firesetters were characterised by lower levels of cognitive empathy, higher levels of uncaring traits, and greater impulsivity than a non-antisocial school control group. When firesetters were compared to antisocial non-firesetters, however, the results were not as conclusive. Firesetters report higher levels of callousness, but they were not differentiated from their non-firesetting counterparts on impulsivity.

### **Protective Factors**

Shepherd et al. (2014) explained that protective factors attenuate the potential for recidivism among young offenders. Studies in the field of firesetting have incorporated strength-based variables associated with deterrence and desistance from offending (Lyons et al., 2010; Martin et al., 2004; McCardle et al., 2004; Tanner et al., 2014). Problem-solving ability is reported to be lower among deliberate firesetters, though a significant difference was not yielded when investigated by McCardle et al. (2004). Conversely, Tanner et al. (2014) found non-productive coping and problem focused coping to be associated with deliberate firesetting behaviour; though, level of social support and optimism did not differentiate firesetters and non-firesetters. Tanner et al. attribute poor reliance on productive coping to firesetters' low behavioural inhibition, suggesting good inhibitory control may serve as a protective factor for deliberate firesetting and sensation seeking behaviours. Lyons et al. (2010) investigated ten individual strengths and their association with firesetting behaviour: family, interpersonal, educational, vocational, well-being, optimism, talents/interests, spiritual/religious, community life, and relationship permanence. The individual strengths investigated had a negative relationship with firesetting, reducing the likelihood of firesetting

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behaviour. These findings illustrate the assessment of protective factors and a strength-based approach to intervention may facilitate the reduction or desistance from juvenile firesetting behaviour.

The present study amalgamated findings from previous empirical studies addressing juvenile deliberate firesetting to establish the most consistent risk factors and correlates associated with deliberate firesetting behaviour. While there are reviews synthesising the literature on child and adolescent deliberate firesetting (Doley, Watt, & Perks, 2017; Lambie et al., 2013; Lambie & Randell, 2011; Mackay et al., 2012), there has been no statistical evaluation compiling empirical studies pertaining to juvenile deliberate firesetting.

Accordingly, a meta-analytic review synthesising quantitative studies comparing firesetters and non-firesetters was conducted to establish an evidence base for the development of risk mitigation strategies and treatment intervention for young deliberate firesetters. Consistent with previous research, it was hypothesised that children and adolescents identified to be engaging in deliberate firesetting behaviour would exhibit higher levels of behavioural, environmental, and psychopathological dysfunction, as well as fewer protective factors compared to those who have not engaged in deliberate firesetting behaviour.

### **Method**

#### **Inclusion Criteria**

The present study included all published and available unpublished empirical research between 1985 and 2015 that met the following criteria: (1) a community or adjudicated juvenile firesetting sample was compared with a non-offending control group or alternatively, a community or adjudicated sample of firesetters was compared with a forensic non-firesetting control group; and (2) the sample was under 18 years old. The second criteria, however, was extended to age 20 years old to allow for the inclusion of two studies with age ranges exceeding the original criteria: age 11 to 19 years (Burrows, 2013) and 15 to 20 years

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(Rasanen, Hirvenjo, Hakko, & Vaisanen, 1995). The criteria were set to maximise the internal validity of the meta-analytic review to discern risk factors and correlates explicitly associated with juvenile deliberate firesetting.

### **Selection of Studies**

Relevant research studies were sourced from electronic databases: PsycINFO, PubMed, SAGE Journals online, ScienceDirect, Google Scholar, and ProQuest Dissertations. Unpublished data from leading researchers in the field was requested to minimise potential publication bias; one author provided data meeting the inclusion criteria. The key search terms used were "juvenile" or "child" or "adolescent" and "firesetting" or "firesetters" or "arson"; all possible combinations were employed.

Studies reporting overlapping findings (e.g., longitudinal studies or multiple publications from the same dataset) were treated as one study and combined. The studies found to report larger sample size or more quantifiable data were favoured. Where a study did not specify a variable name or report a coefficient for a significant or non-significant variable, authors were contacted for the raw data. If raw data was unattainable (e.g., the data had been disposed of, due to the length of time since publication) the study was excluded from the review; this occurred for one study. Finally, where a study had more than one reporting source (e.g., parent-report and child-report; girls and boys), they were treated as independent samples.

### **Coding Procedure**

Study data were coded for publication details (i.e., publication type, date, and country of origin), the sample (i.e., sample size, population, age, ethnicity, and gender split), and the study method (i.e., reporting source, assessment of firesetting behaviour, and place of recruitment). After the extraction of the demographic information, the independent variables investigated in association with deliberate firesetting behaviour were extracted. The inclusion of both significant and non-significant variables was required to avoid bias. Variables were

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first extracted in their original form and then collapsed where an overlap occurred with similar variables in other studies, as well as where more specific variables could be subsumed into more general categories (e.g., ADHD diagnosis and ADHD symptoms were combined to form the variable of ADHD). All independent variables are presented in Table 3, and a codebook detailing the coding rules and variable categorisation is located in Appendix A.

**Inter-rater reliability.** To ensure accuracy and consistency of the data extraction and coding process, inter-rater reliability analysis for approximately 23% of the sample ( $k=7$ ) was performed by a graduate trained psychology research assistant on three occasions: (1) direct extraction of variables from the original publications; (2) calculation of effect size ( $r$ ); and (3) categorisation of variables using the codebook. Agreement between raters was excellent, with 100% concordance for variable extraction ( $k=1.00$ ) and 99% concordance for calculation of effect size ( $ICC=.99$ ). The collapse of variables into higher order categories, as well as the dichotomous coding of study characteristics (to be subsequently used as moderator variables), yielded an initial agreement of  $k=.75$  and  $k=.93$  respectively. Disagreements pertaining to the dichotomous coding of study characteristics and higher order categorisation of variables were resolved by employing a third rater, yielding 100% agreement ( $k=1.00$ ); the third rater was an Assistant Professor of Psychology.

### Calculating Effect Size

Pearson's correlation coefficient ( $r$ ) was the chosen metric for calculating the level of covariance between each independent variable and deliberate firesetting behaviour (Borenstein, Hedges, Higgins, & Rothstein, 2009; Lipsey & Wilson, 2001). Using  $r$ , the strength of association for each characteristic (independent variable) and deliberate firesetting behaviour (dependent variable) was established. To reduce the risk of bias, non-significant data where coefficients or effect sizes could not be calculated were coded as  $r=.00$ . Due to inconsistencies in methodology across the included studies, independent effect sizes with

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different units of measure (e.g.,  $t$ ,  $x^2$ , OR, %,  $F$ ,  $M$ , and  $SD$ ) were converted into a standard unit of measure ( $r$ ). The necessary formulas and effect size calculator developed by Lyons (2003) were employed for this purpose (Bas, Senturk, & Cigeci, 2017; Skeem, Edans, Camp, & Calwell, 2004; Zazo, Park, & Antshell, 2015).

Where means and standard deviations ( $SD$ ) were provided, the effect size was calculated from these, rather than the inferential statistic provided. This was to ensure consistency, as the majority of studies ( $k=21$ ) did not report inferential statistics for all variables. If standard deviations were not available for individual variables, the overall sample standard deviation was used; this occurred in two studies (Kolko, Kazdin, & Meyer, 1985; Kolko & Kazdin, 1986). Percentage and frequency data was provided for variables across 11 studies, which were converted to odds ratio using MedCalc for Windows, version 15.0 (MedCalc Software, Ostend, Belgium), and subsequently to Pearson's  $r$  (Chinn, 2000). In one study (Hoerold & Trannah, 2014) the standard error ( $SE$ ) was provided in place of  $SD$ , and visual figures (i.e.,  $SE$  bars) were provided without numerical values.  $SE$  was therefore converted to  $SD$  [ $SD=SE \times \sqrt{NN}$ ] and the best estimation was provided from the visual representation; inter-rater was conducted to examine the reliability of interpretation ( $ICC=.99$ ).

**Averaging effect sizes.** Following the coding procedure of collapsing raw variables into more general categories, if an independent sample contributed more than one variable to a specific category, the effect sizes of those variables were averaged to produce a mean effect size. This was to avoid overrepresentation of an individual study when accumulated in the meta-analysis. For example, if the same variable was measured twice by a different assessment tool (e.g., aggression, measured by the Children's Hostility Inventory [CHI] and the Children's Action Tendency Scale [CATS]) or if two variables subsequently collapsed into the same category due to similarity or overlap (e.g., Family Function: *family stress* and *family dysfunction*).

### Data Analysis

The analysis was completed using Comprehensive Meta-Analysis (CMA) Software, version 3.3.070 (CMA, 2014). Once the effect size for each variable category had been calculated ( $r$ ), a weighted mean effect was produced in CMA (Borenstein et al., 2009). Due to the fragmented methodology and diversity in the populations explored within the juvenile firesetting literature, a random effects model was selected a priori. The random-effects model allows for the assumption that the effect size may vary between studies; the extent to which the effect varies across studies can also be determined. Cochran's Q statistic was used to assess the null hypothesis that all studies share a common effect size and determine the presence of heterogeneity between studies (Veroniki et al., 2016). When Q was significant, and heterogeneity was retained, moderator analyses were conducted to examine the source of variance.

The descriptive statistic of I-squared ( $I^2$ ) was used to identify the proportion of heterogeneity (0% to 100%) in effect for a specific variable that was due to non-random factors, that is the difference in effect that is beyond sampling error (e.g., small sample size). Where a large  $I^2$  value was yielded, this was interpreted as a large proportion of inconsistency between studies for that specific variable. T-Squared ( $TT^2$ ) was computed as an estimate of true variance in effect size between studies. Where the null hypothesis of  $TT^2$  is that variance in effect size between studies is zero (i.e., homogeneity in effect), deviation from zero was interpreted as a between-study difference beyond variance in true effect (Bornstein et al., 2009; Bornstein, 2016). Consistent with Valentine, Pigott, and Rothstein (2010) the minimum number of studies/independent samples required to comprise to a variable category was two. Variables were excluded when only one study or independent sample comprised the respective category.



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**Moderator analysis.** When the null hypothesis was rejected (i.e., all studies did not yield the same effect size), and heterogeneity was retained (i.e., variance in effect between studies), the potential sources of between-study variance were explored using Q statistic as a measure of dispersion (Bornstein, 2011). Each study was coded across six study-level characteristics to examine moderation effects: Race (Caucasian vs. non-Caucasian), year of publication (1980s, 1990s, early 2000s, and  $\geq 2010$ ), age of sample (child: 6 to 13 years or adolescent/young adult:  $\leq 20$  years), sample size ( $< 100$ ,  $\geq 100$ , and  $\geq 1000$ ), sample population (clinical, community, or forensic), and country of research (USA or other).

### Results

Consistent with the inclusion criteria, the search revealed 34 studies. Upon closer inspection, it was found that three studies reported findings from overlapping samples, and one study had unattainable data, thus reducing the final number of included studies to 30. Of the 30 studies, seven had two reporting sources, and one study had three reporting sources (i.e., child, parent, combined). This yielded a total of  $N=39$  independent samples from the 30 studies included in the meta-analytic review.

The meta-analysis spans 30 years of research exploring characteristics and risk factors associated with juvenile firesetting. The earliest study included in the review was published in 1985 (Kolko et al., 1985), with the most recent study published in 2015 (Watt et al., 2015). The majority of studies were peer-reviewed publications, with the country of origin predominantly the United States of America (USA). The sample size across the 30 studies was  $N=22,292$  (*Mdn*  $N=137$ ). An overview of the sample and study characteristics included in the meta-analysis can be found in Table 1, with a summary of each independent study's characteristics presented in Table 2. The primary source of data was child self-report and almost a quarter of studies used two or more reporting sources. The majority of publications focused on an adolescent and young adult population, with less than one third comprising

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juveniles aged between 6 and 13 years. Sample compositions comprised a mixture of juveniles recruited from community, clinical, and forensic settings.

Table 1

*Overview of the Study Sample and Characteristics Included in the Meta-Analysis*

Study Sample	<i>M</i>	<i>SD</i>
Sample	743.07	1308.69
Firesetting	166.33	497.00
Control	576.73	1126.24
Males	388.10	623.76
Females	356.47	682.51
Study Characteristic	<i>K</i>	%
Publication Year		
1985-1990	5	16.60
1991-1996	6	20.00
1997-2002	2	6.70
2003-2008	9	30.00
2009-2014	6	20.00
2015-2016	2	6.70
Publication Type		
Journal article	26	88.70
Thesis or dissertation (not published)	4	13.30
Country of Research		
America	18	60.00
Australia	3	10.00
Canada	4	13.30
Finland	1	3.30
Italy	1	3.30
New Zealand	2	6.70
The United Kingdom	1	3.30
Source of Information		
Child Only	20	66.70

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Parent Only	3	10.00
Both Parent and Child	7	23.30
Ethnicity		
Predominantly Caucasian	11	36.70
Predominantly Non-Caucasian	6	20.00
Not reported	13	43.30
Population Sampled		
Community Only	13	43.30
Clinical (inpatient or outpatient sample)	9	30.00
Forensic/Psychiatric Forensic/Department Services	8	26.70

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Table 2

*Summary of the Characteristics of the Independent Samples Included In the Meta-Analysis.*

Study	Country	Source	Sample	<i>N</i>	<i>n</i> Fire	<i>n</i> Male	Age Range	Assessment of Firesetting
Kolko, Kazdin, & Meyer, (1985)	USA	Child/ Parent	Clinical*	63	31	45	6-13	Two Criteria: Child and parent report CBCL
Kazdin & Kolko (1986)	USA	Child/ Parent	Clinical*	54	27	42	6-12	Two Criteria: Child and parent report CBCL
Showers & Pickrell (1987)	USA	Child	Clinical	351	165	153	4-17	Intake interview
Kolko, & Kazdin (1989)	USA	Child/ Parent	Clinical	343	229	225	6-13	Firesetting Interview Questions and Firesetting Risk Interview (FRI).
Kolko & Kazdin (1990)	USA	Child/ Parent	Community/ Clinical	437	198	283	6-13	Firesetting History Screen (FHS)
Forehand, Wierson, Frame, Kemptom, & Armistead (1991)	USA	Parent	Forensic	36	24	36	<18	Diagnostic Interview Schedule For Children (DISC-2)

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Kolko & Kazdin (1991)	USA	Child/ Parent	Community/Clinical	273	133	187	6-13	Firesetting History Screen (FHS)
Hanson, Mackay-Soroka, Staley, & Poulton (1994)	Canada	Child	Forensic	50	25	50	9-16	Criminal charges
Holm (1995)	USA	Parent	Clinical*	57	24	57	5-12	Intake interview
Räsänen, Hirvenoja, Hakko, & Väisänen, (1995)	Finland	Child	Forensic	67	34	53	15-20	Criminal conviction
Moore, Thompson-Pope, & Whited, (1996)	USA	Child	Clinical	124	28	124	14-17	Identified history of deliberate firesetting
Sakheim, & Osborn (1999)	USA	Child	Clinical	130	75	130	<i>Mage</i> 12.5	Identified history of deliberate firesetting
Stickle & Blechman, (2002)	USA	Child/ Parent	Forensic	219	134	219	11-18	CBCL/ YSR
Chen, Arria, & Anthony (2003)	USA	Child	Community	4491	284	2269	12-17	YSR

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Gordon (2003)	USA	Child	Clinical*	40	20		12-17	Self-report/ evaluation by three psychiatrists.
Becker, Stuewig, Herrera, & McCloskey (2004)	USA	Parent	Community	363	32	184	6-12	CBCL
Martin, Bergen, Richardson, Roeger, & Allison (2004)	New Zealand	Child	Community*	2482	188	1373	Grade 8	DSM-IV criteria for CD firesetting.
McCardle, Lambie, & Barker-Collo (2004)	New Zealand	Child	Community*	84	50	84	12-18	Firesetting Research Questionnaire (FRQ)
Murphy (2004)	USA	Child	Clinical	66	33	57	6-13	Firesetting Screen (unspecified) and clinical history.
Walsh, Lambie, & Stewart (2004)	Australia	Child	Community	41	20	41	<i>Mage</i> 14	Confirmed unsanctioned firesetting.
McCarthy & McMahon, (2005)	USA	Child/ Parent	Community	361	62	182	Grade 1-6	Two Criteria: Child and parent report CBCL, Parent daily report, and DISC.

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Del Bove, Caprara, Pastorelli, & Paciello (2008)	Italy	Child/ Parent	Community*	342	92	78	11-18	CBCL/YSR
Gallagher-Duffy, MacKay, Duffy, Sullivan-Thomas, & Peterson-Badali (2009)	Canada	Child	Forensic*	59	29	59	13-16	Fire Interest Questionnaire (TAPP-CFIQ; MacKay & Hanson, 1996).
Mackay, Paglia-Boak, Henderson, Marton, & Adlaf (2009)	Canada	Child	Community	3965	2774	1768	11-19	Self-report in the past year
Lyons, McClelland, & Jordan (2010)	Canada	Child	Community	4155	56	2063	0-17 and 17+	Child and Adolescent Need and Strengths (CANS)
Bowling, Merrick, & Omar (2013)	USA	Child/ Parent/ Unspecified	Community	1158	53	610	11-18	Single item response to "I set fires."
Burrows (2013)	USA	Child	Forensic	138	63	138	11-19	Criminal conviction for arson

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Hoerold & Trannah, (2014)	United Kingdom	Child	Forensic*	47	25		12-18	Referral to The Arson Prevention Programme for Children (TAPP-C).
Tanner, Hasking, & Martin (2014)	Australia	Child	Community	2127	155	596	12-18	“How many times have you set fire to something you weren’t supposed to?” responses ranged from Never to 6+ times.
Watt, Geritz, Hasan, Harden, & Doley (2015)	Australia	Child	Community*	136*	51	100	12-19	The Youth Fire Behaviours and Interests Scale (YFBIS)

*Note.* \*10 studies yielded from the literature search also contain sub-samples comparing variations of firesetting samples and control

groups; these subsamples (e.g., aggressive firesetter vs aggressive control) were not included in the current study.



### Meta-Analytic Results

The meta-analytic findings, including the variable name, total sample size, number of samples pooled to comprise the overall effect size, 95% confidence intervals, Q statistic, significance of Q,  $I^2$  and  $T^2$  values are presented in Table 3. Of the 51 categories, 37 yielded a statistically significant relationship distinguishing deliberate firesetters from non-firesetters.

**Fire-specific variables.** The strongest association pertained to fire involvement/fire history yielding a statistically significant, moderate and positive association with deliberate firesetting. Fire fascination produced a slightly smaller, but statistically significant, positive association with firesetting, while age at first experience or misuse of fire produced a statistically significant, moderate and negative association with firesetting (i.e., firesetters were significantly younger than non-firesetters). Fire attentional bias did not reach significance, though it is plausible that statistical power was low given that the variable only comprised of a pooled study size of two.

**Behavioural risk factors.** The behavioural risk factors of conduct disorder, violent/dangerous offence, overt antisocial behaviour, and cruelty produced statistically significant, moderate and positive associations with firesetting. Property offence/theft, aggression and aggressive behaviour, criminal justice system involvement, general behavioural problems, and covert antisocial behaviour also yielded a statistical association with the firesetting sample compared to the non-firesetters, though the associations are weaker than for fire-specific factors.

Social problems, though significant and in the predicted direction, were found to yield a near negligible relationship with firesetting. Although firesetters were younger at the age of an index offence, had a more significant offence history, and were more likely to display sexually problematic behaviours, the associations were not statistically significant.

**Environmental risk factors.** The environmental risk factor most strongly associated

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with deliberate firesetting was abuse, yielding a statistically significant, moderate and positive association with deliberate firesetting. Trauma and adverse life experience produced weaker, but still statistically significant positive associations with firesetting. Sexual abuse, however, was not statistically significant. Family function variables of disruption to parent-child relationship and poor/lax parental discipline both yielded similar positive statistically significant associations with firesetting. Similarly, level of family cohesion/consensus produced a negative relationship with firesetting. Control by family (i.e., parental control over the family environment and their child's behaviour), punitive parent, parental psychopathology, and negative emotional experience all produced positive statistically significant associations with firesetting; however, the strength of associations were near negligible. Adaptive family function and parental acceptance produced negative statistically significant associations within the same range. The variable of no marriage between parents, as well as a moral/religious emphasis in the family unit, did not reach significance.

**Psychopathological risk factors.** Psychopathology was elevated among firesetters, with statistically significant and positive associations for substance misuse, health concerns, emotional dysregulation, psychological treatment or medication received, depression, self-harm/ideation, and ADHD. Anxiety and broader mental health (i.e., mental health conditions other than anxiety or depression) yielded a statistically significant, but negligible, association with firesetting.

Developmental functioning was also statistically significant for CUT/empathy, academic performance, and cognitive problems. Greater CUT, lower academic achievement, and less empathy were associated with firesetting behaviour. Developmental problems (e.g., motor, language, and learning development) and enuresis/encopresis, however, did not significantly differentiate firesetters from non-firesetters.

**Protective factors.** A negative and statistically significant association was obtained for

general protective factors and firesetting behaviour (e.g., self-esteem, optimism, problem-solving, and support from a friend, family, or significant other), although the strength of association was weak. Two additional protective factors were analysed separately due to the frequency of their exploration in the literature: (1) achievement focus; and (2) activity competence/recreational involvement. Neither variable, however, significantly differentiated firesetting from non-firesetting youth. Overall, juveniles engaging in deliberate firesetting exhibit greater fire-specific, behavioural, environmental, and psychopathological risk than their non-firesetting counterparts, as well as exhibiting fewer protective factors.

### **Heterogeneity and Moderator Analysis**

The null hypothesis of  $T2$  was accepted for five of the 37 variables yielding a significant association with deliberate firesetting, confirming the absence of heterogeneity in true effect. These findings indicate that the statistically significant effects yielded for control by family, punitive parent, adverse life experience, parental acceptance, and parental psychopathology were consistent across studies.

The degree of dispersion in effect size, as per  $Q$  statistic, was significant ( $P \leq .05$ ) across 35 variables/risk factors, indicative of heterogeneity (see Table 3). In completing post hoc analyses for the 35 variables displaying significant dispersion, the variance in effect size was explained by at least one of the six moderating characteristics (i.e., sample size, year of publication, race, age, population type, and country) for 29 of the variables. The number of studies comprising an effect size, however, was low for 24 variables with only one independent sample comprising the effect size for a sub-group. At this point, conclusions regarding the contribution of moderators cannot be proffered.

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Table 3

*Overview of the Meta-Analytic Results and Test of Homogeneity.*

Variable	Number of effect sizes	Sample Size (pooled)	Mean effect Size (r)	Confidence Intervals (95% CI)		Q	I <sup>2</sup>	T <sup>2</sup>
				Lower	Upper			
Fire-Specific Risk								
Fire (attentional) bias	2	122	.08	-.10	.26	0.85	0.00	0.00
Fire fascination	5	715	.33***	.19	.46	14.56**	72.52	0.02
Fire involvement and history	6	691	.57***	.30	.75	79.82***	93.74	0.16
Age onset of fire misuse	2	390	-.06	-.65	.58	21.00***	95.24	0.26
Behavioural Risk								
Age at index (negative younger)	2	262	-.21	-.48	.10	3.52	71.57	0.04
General behavioural problems	25	17165	.23***	.13	.32	905.16***	97.02	0.06
Cruelty	7	1166	.38***	.22	.52	48.46***	87.62	0.05
Covert antisocial behaviour	7	1558	.27**	.11	.41	56.97***	89.47	0.04

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Overt antisocial behaviour	16	12777	.39***	.29	.49	529.09***	97.17	0.05
Conduct disorder	9	5152	.47***	.28	.63	191.74***	95.83	0.11
Aggression	19	7323	.25**	.09	.39	519.30***	96.53	0.11
Social problems	12	10406	.24**	.07	.40	626.91***	98.25	0.09
Sexual problematic behaviour	4	4693	.25	-.13	.57	147.63***	97.97	0.15
Offence history	4	453	.04	-.08	.21	4.46	32.77	0.01
Offence property and theft	4	814	.30***	.14	.44	14.35**	79.10	0.02
Offence violent and dangerous	4	4871	.44*	.02	.72	258.63***	98.84	0.20
Criminal justice system contact	4	4627	.24*	.02	.44	39.79***	92.46	0.04
Environmental Risk								
Disruption to parent-child relationship	14	12752	.18**	.05	.30	568.20***	97.71	0.06
Control by family	6	3464	.06***	.03	.09	1.24	0.00	0.00
Family cohesion and consensus	4	598	-.23***	-.35	-.12	4.18	28.22	0.01
Family function	14	12296	-.18**	-.31	-.05	544.88***	97.61	0.06

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Parental acceptance	5	3700	-.13***	-.18	-.08	10.24*	60.92	0.00
Parental psychopathology	5	1535	.13**	.05	.21	9.06	55.82	0.00
Poor/lax parental discipline & monitoring	6	5650	.22*	.02	.39	159.70***	96.87	0.06
No marriage between parents	3	457	.04	-.14	.21	4.15	51.78	0.01
Punitive parent	4	3188	.11***	.08	.15	3.07	2.40	0.00
Moral and religious emphasis	5	6826	-.11	-.30	.10	172.69***	97.69	0.05
Adverse life experience	2	546	.23***	.12	.33	1.34	25.10	0.00
Abuse	7	7539	.40*	0.04	.66	1247.34***	99.52	0.26
Trauma	2	4221	.22**	.08	.36	1.92	47.90	0.01
Sexual abuse	6	3386	.08	-.01	.17	24.03***	79.19	0.01
Negative emotional experience	6	7229	.15**	.06	.24	52.46***	88.56	0.01
Psychopathology								
<i>Education/Developmental</i>								
Academic performance	14	13113	-.22**	-0.35	-.08	665.94***	98.05	0.06

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Developmental problems	4	4691	.24	-.04	.49	80.31***	96.27	0.08
Cognitive problems	8	3057	.22***	.11	.32	33.47***	76.10	0.02
<i>Health/Mental Health</i>								
Health	2	4279	.34***	.16	.50	4.77*	79.04	0.02
ADHD	16	11076	.21*	.05	.36	913.52***	98.36	0.10
Depression	8	7337	.22*	.02	.41	368.14***	98.10	0.08
Anxiety	9	7916	.15*	.03	.26	159.40***	94.98	0.03
Psychological treatment or medication received	4	4220	.25*	.11	.38	9.79*	69.35	0.01
Self-harm behaviour and ideation	9	11222	.21*	.02	.39	696.94***	98.85	0.09
Mental health	11	11438	.15*	.00	.29	459.50***	97.82	0.06
Substance-misuse	10	11461	.35***	.23	.45	292.86***	96.93	0.03
Emotional dysregulation	11	10100	.26*	.06	.44	891.96***	98.88	0.12
Enuresis and encopresis	3	215	.09	-.05	.22	1.96	0.00	0.00

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CUT, (less) empathy, and moral disengagement	5	688	.24***	.12	.35	7.57	47.17	0.01
Protective Factors								
Achievement focused	4	699	.00	-.18	.18	11.99	74.98	0.02
Activity competency and recreational involvement	5	880	-.08	-.16	-.00	5.08	21.29	0.00
General protective factors	11	9982	-.17*	-.31	-.03	435.04*	97.70	0.06

*Note.* \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$



### Discussion

The purpose of the present study was to provide a quantitative synthesis of juvenile deliberate firesetting behaviour. A meta-analytic approach was employed to determine whether deliberate firesetters have greater behavioural, environmental, and psychopathological dysfunction, as well as fewer protective factors than their non-firesetting counterparts. It was hypothesised that deliberate firesetters would exhibit greater dysfunction and fewer protective factors than non-firesetters. This premise was mostly supported, with 39 of 51 variables yielding a statistically significant relationship with deliberate firesetting behaviour.

As expected, firesetting variables (i.e., fire fascination and history of fire involvement) were among the highest predictors of firesetting behaviour, producing positive, moderate and statistically significant associations. Similar effect sizes were found for behavioural problems. Conduct disorder, violent and dangerous offending, overt antisocial behaviour, and cruelty were among the most robust behavioural predictors of deliberate firesetting. This is consistent with the evidence that deliberate firesetters are a profoundly antisocial group, more so than their non-firesetting counterparts (Del Bove et al., 2008; Forehand et al., 1991; Stickle & Blechman, 2002; Watt et al., 2015).

The personality characteristics of CUT, characterised by a disregard for others, lack of guilt and empathy, and deficient affective capacity were significantly more salient among firesetters than non-firesetters. The role of CUT in identifying early onset delinquency, as well as more persistent and severe behavioural delinquency is widely documented (Frick, Ray, Thornton, & Kahn, 2014); however, the stability of such traits over the course of adolescent development has been shown to vary (Eisenbarth, Demetriou, Kyranides, & Fanti, 2016). An increase in CUT during adolescent development among conduct disordered individuals is associated with a simultaneous decrease in self-esteem and increase in psychopathology (i.e., anxiety and depression), co-occurring problematic personality traits (i.e., narcissism), and

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proactive/reactive aggression. A further increase in proactive aggression, narcissism, and low self-esteem is associated with stability of CUT (Eisenbarth et al., 2016). Likewise, in the current study, CUT yielded statistically significant association with deliberate firesetting, as well as anxiety, depression, and aggression/aggressive behaviour. Additionally, self-esteem contributed towards the general protective factors variable, which generated a significant inverse relationship with firesetting.

A causal link between early environmental disruption (e.g., maltreatment and maternal care) and CUT is being increasingly documented, lending support to the idea that early life adversity and poor primary attachment influence the development of one of the most severe and problematic characteristics of juvenile offenders (Bisby, Kimonis, & Goulter, 2017; Kimonis, Cross, Howard, & Donoghue, 2013). Early environmental disruption explains the increased psychopathology reported among adolescents with comorbid conduct disorder and CUT (Eisenbarth et al., 2016). In the present study, abuse was the most influential environmental risk factor associated with deliberate firesetting, indicating elevated rates of maltreatment among juvenile firesetters. The role of maltreatment in the onset and maintenance of firesetting was further supported by statistically significant relationships between firesetting and adverse life experience, trauma, and disruption to the parent-child relationship. Moreover, the significant association between firesetting and punitive parenting, low parental acceptance of child, and parental psychopathology indicates greater instability with key attachment figures among deliberate firesetters; albeit the size of the effects for these variables were near negligible. Ongoing maladaptive transactions between the individual and environment are found to perpetuate the development of CUT (Bisby et al., 2017), thus offering a plausible explanation for the greater behavioural problems associated with deliberate firesetting.

An inverse relationship between deliberate firesetting and cohesion/consensus among

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family members and deliberate firesetting was also yielded. These findings are consistent with the extensive work of Kolko and Kazdin (1985; 1986; 1990; 1991) and illustrate the family climate of firesetters consists of significant discord and is often unstable and unsupportive. Firesetters are, therefore, exposed to negative and problematic vicarious learning experiences (Fineman, 1995; Jackson et al., 1987) resulting in the development of an unhealthy and maladaptive template for emotional regulation and behavioural conduct. The small effect size yielded for these variables, however, limits the weight of this finding. The strong association between deliberate firesetting behaviour and adverse life experience, along with evidence that firesetters are a high-risk antisocial population, lends support to the proposal of Lyons et al. (2010) that firesetting behaviour is most evident among youth with a history of complex trauma, secondary to early adverse life experiences. These findings highlight the importance of a trauma-informed approach to the assessment and treatment of deliberate firesetting behaviour.

The psychological vulnerability of young firesetters is illustrated in the current study by the positive and moderate association between firesetting and level of psychological treatment and medication received. In accordance with existing literature on psychopathology and firesetting, the present study shows that firesetters are significantly more emotionally dysregulated than non-firesetters, experience greater rates of depression and engage in more suicidal behaviours (i.e., self-harm and suicidal ideation). Cognitive problems (e.g., cognitive avoidance, hostile rumination, and thought disturbance) were also more prevalent among firesetters, indicating a combination of cognitive and affective deficits for juvenile firesetters.

Substance misuse among deliberate firesetters may be a maladaptive coping mechanism for the experience of negative affect, in addition to firesetting itself, as indicated by the moderate positive relationship yielded in the present study. The use of substances during adolescence, including alcohol and marijuana, is reported by Kenny (2016) to result in

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neurodevelopmental and structural changes negatively impacting on a young person's inhibitory control, executive functioning, processing speed, attentional capacity, memory, and visuospatial ability. Thus, as proposed by MacKay et al. (2009), focusing on the treatment of such maladaptive habits will plausibly reduce the risk of firesetting and future general offending. Kenny (2016) also discusses the adverse impacts of pre-natal substance use on a juvenile's neurodevelopment, including a predisposition to an addictive temperament (nicotine), attentional and memory deficits (methamphetamine), and physical and cognitive development (alcohol); predisposing youth towards subsequent offending.

ADHD was among the psychopathology variables to yield a statistically significant association with firesetting. This finding is unsurprising given the high affiliation between firesetting and antisocial behaviour (Lambie et al., 2013), and the high comorbidity between ADHD, general offending (Philipp-Wiegmann et al., 2017), and violent offending behaviour (Wojciechowski, 2017). Molina et al. (2018) reported a predictive relationship between a diagnosis of ADHD and earlier onset of illicit substance, nicotine, and alcohol use, as well as the more frequent use of marijuana and nicotine in early adulthood among those with childhood ADHD when compared to those without childhood ADHD. Moreover, ADHD increases the likelihood of suicidal behaviour among juvenile offenders (Ruchkin, Kuposov, Koyanagi, & Stickley, 2016), with comorbid ADHD and substance misuse further increasing the risk of suicidal behaviours. ADHD, substance misuse, and suicidal behaviour were all risk factors yielding a significant association with deliberate firesetting in the current study. Accordingly, the early screening of neurodevelopmental disorder (Billstedt, Anckarsäter, Wallinius, & Hofvander, 2017) may identify deliberate firesetters at risk of broader psychological and behavioural problems.

Health concerns were an area of interest in two studies, yielding a statistically significant result in the predicted direction, with more problematic health and medical

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functioning among firesetters. Considering the significant association between firesetting and dysfunctional environment, more significant health concerns are likely the by-product of poor environmental function and unhealthy habits within the family climate.

The relatively less explored area of general protective factors, being strengths that may be associated with the desistance from problematic behaviours and offending, produced a statistically significant and negative relationship with firesetting. This is plausibly attributable to the temperament and capacity of the firesetter to persist in learning and internalising adaptive alternative means of behaving (Tanner et al., 2014). Significantly more deficits across a myriad of factors and relatively less protective factors indicates that firesetters are a group with chronic and diverse needs, at risk of continued problematic behaviour.

Analyses confirmed a large degree of between-study variance among the firesetting literature, with 35 of the 51 risk and protective factors yielding significant heterogeneity. The amount of heterogeneity is unsurprising given the various samples recruited and methodologies employed over the past 30 years. The juvenile firesetting literature appears to be fragmented with methodological differences in age range (i.e., 6 to 20 years), sample demographics (e.g., geographical location, ethnicity, socio-economic status), sample characteristics (e.g., community, clinical, or forensic sample), source of reporting (i.e., child or parent), as well as the sample size and measures used.

However, the small number of studies when dividing the overall sample into moderator sub-groups precluded any inference as to the contribution for each moderator.

### **Strengths and Limitations of the Present Study**

The present study highlights the most consistent factors associated with deliberate firesetting behaviour, accounting for diverse methodologies evident throughout the empirical literature over the past 30 years. The present study has implications for the assessment and treatment of juvenile firesetters.

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Antisocial behaviour and personality traits associated with future risk for offending highlight the role of CUT in the development and maintenance of deliberate firesetting. Integrating CUT into early screening procedures may be beneficial for identifying youth at risk of firesetting and subsequent offending behaviours. The significant maltreatment evidenced in the formative years of young firesetters highlights the relevance of trauma-informed assessment and intervention. This includes abuse and neglect, trauma, and adverse life experiences or general life stressors that young persons' perceive as negatively impacting on their emotional and social functioning. However, the overlap between psychopathic personality traits and neurodevelopmental deficits (Allely & Cooke, 2016), and the influence of adverse child experience on neurocognitive/affective functioning (Vela, 2014), are likely to complicate the assessment process.

In response to the limited assessment tools available for identifying the risk of firesetting behaviour, Lambie and Krynan (2017) recently piloted the use of the SDQ (Goodman, 1997) as a tool for identifying children or juveniles in needs of further multidisciplinary assessment. The SDQ, which incorporates general conduct disorder, emotional symptoms, peer problems, hyperactivity/inattention, and prosocial behaviour, seems an appropriate screening instrument based upon the meta-analytic findings. Future assessment protocols might also consider incorporating measures of adverse life experiences, CUT, and attachment, as well as a more in-depth assessment of neurodevelopmental capacity.

The study is not without limitation. The number of independent samples ( $N=39$ ) included in the present meta-analysis is relatively small (i.e.,  $<50$  studies; American Psychological Association, 2010, p.183), as is the number of (pooled) studies contributing to the combined effect size of each variable category (range: 2-25,  $M=3.55$ ). Relying on a small number of studies can be problematic when employing a random-effects model, with the precision of  $I^2$  and  $T^2$  susceptible to error (Borenstein et al., 2009). Accordingly, given the

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strength of associations were moderate at best and the sample is small, caution should be implemented when applying weight to the present findings. The current results, however, are not redundant, with other meta-analytic reviews having been completed with a similar or smaller number of independent samples (Braga & Maia, 2017; Gini, Pozzoli, & Hymel, 2014; Mohr-Jensen, Christoph, & Steinhausen, 2016).

### **Conclusion**

The current study is the first meta-analysis to compare juvenile deliberate firesetters with those who have no history of lighting fires, providing clarity around the most fundamental characteristics associated with the behaviour. The results offer suggestions for the development of future assessment protocols and intervention packages for youth engaging in firesetting behaviour. Future research might consider a comparison between adjudicated firesetters and adjudicated non-firesetters while controlling for self-disclosed firesetting (i.e., firesetting that has occurred without coming to the attention of professional services). This will help inform whether different subgroups of offenders differ across the fundamental risk factors identified in the current study, and subsequently facilitate further development of streamlined assessment and treatment protocols for deliberate firesetting behaviour.

## CHAPTER FOUR

### The Functional Underpinnings of Juvenile Arson and Co-occurring Behavioural Problems

A review of key theoretical models in chapter one illustrates a degree of consensus pertaining to the various distal and static domains that predispose a vulnerability to deliberate firesetting behaviour. As presented in chapter three, a statistical amalgamation across three decades of empirical research on risk factors associated with deliberate firesetting yielded a summary of the most fundamental risk factors within these theoretically derived domains: (1) Psychopathological dysfunction: CD, CUT, ADHD, cognitive problems, substance abuse, low self-esteem, anxiety, depression, emotional dysregulation, and health concerns; (2) Environmental disadvantage: abuse, adverse life experience, trauma, disruptive and unsupportive family climate, and poor parent-child relationship; (3) Social and communication ineffectiveness: aggression (i.e., indirect, direct, and verbal), cruelty to animals/others, violent and dangerous externalised behaviour, self-harm/suicidal ideation, poor problem-solving skills, and limited social support; and (4) Fire specific risk: history of fire involvement and fire interest.

Researchers have proposed that the various interactions between risk domains can give rise to a series of different mechanisms underlying a problematic behaviour thus, evidencing that behaviour is heterogeneous, with individuals lighting fires for different reasons (Fritzon, 2012; Gannon et al., 2012). As Fritzon identified, however, it is the acutely dynamic factors occurring in proximity to the offence which triggers the onset of the behaviour, and influences a behavioural shift, and increase in severity. A proximal dynamic risk factor can be defined as a specific cognitive, emotional, or social/interpersonal experience, which is encoded from previous interactions between predisposing domains, and triggered either internally, or externally, to evoke a behavioural response. The M-TTAF model (Gannon et al., 2012) of



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adult firesetting behaviour outlines a series of proximal factors (i.e., life events, contextual factors, and internal affect/cognition, biology/temperament, and culture beliefs) that are hypothesised to trigger more distal psychological vulnerability and result in a problematic behavioural reaction. The proximal and contextual factors identified by the M-TTAF model, however, lack specificity; the model does not define the proposed proximal factors, identify the degree of proximity to the behaviour, or outline the situations of behavioural occurrence.

In a later publication, Ó Ciardha and Gannon (2012) hypothesised that adult firesetters hold a series of implicit theories/schemas about the use of fire. Their hypothesis aligns with the work of Doley, Fineman, Fritzon, Dolan, and McEwan (2011) who highlighted that arson offenders likely have offence specific cognitions, much like other offence types (e.g., sex offending and stalking). Accordingly, research on adult firesetting incorporated offence-specific psychological factors, in addition to historical and clinical domains associated with offending in general. The focus on fire-specific cognition and affect advanced Fineman's (1995) formative theoretical work, which identified individual cognition and affect, as well as fire-specific reinforcement (internal or external), immediately precede and perpetuate firesetting behaviour. Examples of fire-specific implicit psychological processes, however, were not provided. Ó Ciardha and Gannon (2012), however, provide conceptual examples of fire related schemas including, *fire is a powerful tool*, *fire is fascinating/exciting*, and *fire is controllable*, and purport they influence the way deliberate firesetting manifests for an individual (i.e., scripted responding). These offence-specific schemas/implicit theories offer explanation for heterogeneity within firesetting behaviour, as well as differentiating firesetters from non-firesetters. As demonstrated in study one, fire interest and historical involvement with fire, are the strongest predictors of juvenile firesetting behaviour, thus reiterating the findings of Del Bove and Mackay (2011) on correlates of recidivistic firesetting. It is the interaction between previous fire experiences and individual risk factors which shape the

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development of an individual's belief system about fire (Ó Ciardha & Gannon, 2012).

The theoretical framework of Fineman (1995), in conjunction with recent advances in the field of adult firesetting (Gannon et al., 2012; Tyler et al., 2014; Ó Ciardha & Gannon, 2012), can be used to go beyond typology and higher order categorisation of behaviour to develop an evidence base for the specific dynamic factors that directly precede and follow juvenile problematic behaviour. Identifying dynamic cognitive-emotional processes occurring in proximity to a problematic behavioural incident, regarded as fire-specific reinforcers, was proposed to help determine the underlying precipitating and maintaining factors for juvenile firesetting behaviour, and the likelihood of behavioural occurrence. This proposal was supported by empirical research in the field of aggression and violence. For instance, Low and Day (2017) identified that sub-types of (adult) violent offenders could be differentiated by their thinking styles and emotional regulation profiles; therefore, requiring different treatment approaches to reduce recidivism effectively. Dual processing models such as the *general aggression model* (GAM; Anderson & Bushman, 2002) describe aggression-specific cognitive processes as part of an aggression-related event sequence, whereby stored representations of behavioural responding guide future behaviour (Daffern, Gilbert, & Anderson, 2017). Jouriles, Grych, Rosenfield, McDonald, and Dodson (2011) have demonstrated automatic aggressive cognitive patterns (e.g., Stack & Deutsch, 2004; reflective-impulsive cognitive model) can predict dating violence among adolescence, as well as predict changes in violent occurrence over time.

Aggression scripts are explained by Gilbert and Daffern (2017) to emerge in early childhood and are encoded in memory, rehearsed, refined, and subsequently retrieved as a template for behavioural response. Identifying scripts and ascertaining the level of automaticity or enmeshment with a script is recommended, as script rehearsal even in the absence of a behavioural output is a method for reducing negative affect, providing

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reinforcement for the problematic cognitive sequence (Gilbert & Daffern, 2017). They acknowledge, however, there is limited research available for offence-specific scripts. Thus, the reliability, generalisability, and efficacy of targeting scripts to reduce recidivism is currently inconclusive. Exploring the offence-specific psychological process among juvenile deliberate firesetters in comparison to non-firesetting offenders, as well as the cognitions specifically associated with the act of deliberately lighting a fire, was proposed to inform offence-specific treatment targets to mitigate risk. This is an original contribution to the field of juvenile firesetting and draws upon the most robust theoretical frameworks and empirical developments in the field of adult firesetting and wider forensic psychology.

### **Co-occurrence of Firesetting and Wider Antisocial Behaviour**

High co-occurrences between internalising behavioural problems and externalising behavioural problems have demonstrated that internalising psychopathology does not only manifest in internalised behavioural problems (Miller & Fritzon, 2007; Tanner et al., 2014); individuals experiencing internalised psychopathology can present with both internalised and externalised behavioural problems. This has led to academics postulating that externalising behaviour may represent a higher purpose, such as a maladaptive coping strategy to regulate negative cognition or adverse emotional experience. For some individuals, two different behavioural presentations may share the same functional underpinnings (see Daffern, Lawrence, & Shine, 2010). This hypothesis aligns with the ASM (Canter & Fritzon, 1998; Fritzon, 1998) which identifies four modes of action towards externalising behavioural problems, two of which have an internal origin (i.e., expressive mode and integrative mode). As reviewed in chapter one, firesetting behaviour co-occurs with wider antisocial behavioural problems, though there is limited knowledge on what specific behavioural problems most commonly co-occur among juvenile deliberate firesetters, the primary purpose of these behaviours, and if the underlying function of additional problematic behaviours is consistent

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with the function of deliberate firesetting. Determining parallels between the dynamic cognitive-emotional processes occurring in proximity to a young person's firesetting and additional behavioural problems is proposed to advance understanding on the underlying vulnerability and processes precipitating and maintaining juvenile problematic behaviour. This is an original contribution to the field of juvenile firesetting, drawing upon approaches used within broader forensic behaviours to understand the complexity of the juvenile firesetter.

Ducat, McEwan, and Oglof (2013) purport that the high prevalence of general offending among deliberate firesetters indicates firesetters are not dissimilar from non-firesetting offenders. It remains unclear, however, why some offenders gravitate towards lighting fires and others do not. In response, Ducat et al. proposed the conceptualisation of firesetters as a specific problematic group, much like sex offenders and violent offenders, in that they have widespread criminogenic needs, but a high degree of offence-specific risk that warrants close attention. As identified by Ducat et al. and Gannon et al. (2012) this is an area with limited research, particularly among the juvenile population. Ducat et al.'s research is based on an adult population, though it seems applicable to juveniles given the limited success of the literature to date in distinguishing whether or not juvenile firesetters are inherently different from other young offenders (Martin et al., 2004; McCardle et al., 2004; Stickle & Blechman, 2002). As discussed by Lambie et al. (2015) and Del Bove et al. (2008), deliberate firesetting is predictive of both future violent and non-violent behaviour, with firesetting regarded as a precursor for serious or violent antisocial behaviour. Previous research has examined the offence chains of problematic behaviours in isolation to understand the function and associated dynamic risk factors (i.e., Tyler et al., 2014; Tyler et al., 2017). The current study proposes a comparative analysis of the offence chains of juvenile arson and non-arson offenders to inform how the two groups differ at a functional level.

### **Methodological Considerations**

When the research focus is not the criminal behaviour per se, but rather the function underlying the antisocial action, a qualitative and functional methodology is arguably the most effective approach. Functional analysis is grounded in the principles of behavioural theory (e.g., Skinner, 1953) and the approach purports that behaviour serves a functional purpose for an individual that can be determined by identifying the following sequence: (A) antecedents: the triggering stimuli (e.g., environmental, social, or interpersonal experience); (B) behaviour: observable behaviours (e.g., verbal and/or physical expression) and internal experiences (e.g., implicit cognitions and emotions); and (C) consequences: the internal or external changes that arise after the behavioural occurrence, influencing either reoccurrence or desistance.

Investigating the causation of behaviour via functional assessment is regarded as a highly effective approach to inform clinical treatment needs (Haynes, 1998; Sturmey, 1996), particularly with forensic populations who present with high levels of risk and a myriad of maladaptive behaviours (Daffern et al., 2009; Gresswell & Dawson, 2010; Long, Benyard, Fulton, & Hollin, 2014; Sampl, Wakai, Trestman, & Keeney, 2008).

Using functional analytic principles to formulate an individual's offence chain is a clinically meaningful way to determine the functional underpinnings of a behavioural problem and is a widely employed practice in forensic psychology (Day, 2017). The strength of functional analysis is that it enables the investigation of dynamic individual-environmental experiences and explores how new internal and external experiences can influence an individual's behavioural sequence. Functional analysis can, therefore, be used to ascertain if different behaviours are functionally synonymous (i.e., parallel behavioural sequence) or whether co-occurring behaviours are underpinned by a disparate chain of events (Gresswell & Dawson, 2010). An individual's psychological appraisals, beliefs, expectations, and affective experiences pertaining to an event are widely regarded to influence problematic behavioural

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responding (e.g., cognitive-behavioural approach). Thus, examining the narrative accounts of offenders is a widely employed approach for understanding the behavioural actions of forensic samples (see Daffern et al., 2009). Accordingly, for the purpose of the current study, transcribing participant narratives in a functional analytic format was regarded as an appropriate way to determine the relevant components comprising a juvenile offence chain and delineating the significance of each component in the onset and maintenance of a problematic behavioural pattern.

**Qualitative studies of juvenile firesetting.** Qualitative and functional methodologies have been employed by several researchers to understand and respond to an offender's specific risk and needs (Daffern et al., 2009; Miller & Fritzon, 2007; Swaffer & Hollin, 1995; Walsh & Lambie, 2013). Swaffer and Hollin (1995) used semi-structured functional analytic interviews and sequential functional analysis to develop an understanding of why juvenile firesetters light fires, obtaining implicit information on why they had engaged in the act. While their sample was small ( $N=17$ ), thus limiting generalisability, the novel approach was praised by Dickens and Sugarman (2012) and recommended for future research. Swaffer and Hollin used the approach of grounded theory, as described by Strauss and Corbin (1990), concluding six reasons why young people engage in the act of lighting fires: revenge, crime concealment, self-injury, peer group pressure, denial/accidental, and fascination. All but one participant reported the same reason for each fire they lit; thus demonstrating juveniles are relatively consistent in their reason for deliberate firesetting. It is plausible, however, that the degree of intra-individual variation may increase with larger sample sizes. This aligns with the findings of Fritzon (1998) who found 79% of her sample operated within one mode of function, yet 21% showed variation in mode; those showing variation are those regarded as more severe.

Swaffer and Hollin (1995) emphasised the importance of integrating situational factors into behavioural analysis, though did not examine how situational contexts contribute to

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firesetting.

Additionally, they did not recruit a control sample of non-firesetting offenders to discern what differentiates a firesetter and non-firesetter who articulate the same motivations for offending. For example, self-injury, peer-group pressure, and crime concealment are impetus for both arson and non-arson offending. Likewise, *denial* of criminal responsibility, including minimisation (i.e., *accidental*) or external attribution of blame frequently occur among forensic populations as a whole. The presence of fire interest and implicit beliefs pertaining to the use of fire over other means (e.g., violence) was not explored, nor was it clear why participants who did not present with fire fascination engaged in the misuse of fire. Swaffer and Hollin suggest the use of sequential functional analysis for understanding firesetting behaviour throughout the course of adolescent development (i.e., identifying characteristics and environmental experiences specific to a developmental stage, to delineate the types of firesetting during the course of adolescence).

However, recidivism for deliberate firesetting among juveniles is low, or undetected, with higher rates of recidivism for co-occurring and broader overt antisocial behavioural problems (Lambie et al., 2013). Currently, small sample sizes of repeat firesetters limit the generalisation of research findings.

Walsh and Lambie (2013) employed a similar methodology as Swaffer and Hollin (1995), exploring motive for deliberate firesetting with qualitative rather than quantitative methodology. The analytic approach chosen by Walsh and Lambie was grounded theory as described by Glasser (1967) to determine motivational themes among juvenile firesetters. Where possible, primary caregivers ( $N=13$ ), in addition to juveniles ( $N=18$ ), were engaged in semi-structured interviews. The sample consisted of both service referred and community-based firesetters, with all participants (age range: 10.5 to 16.5 years) successfully articulating a motive for their firesetting behaviour. Participants were first asked to rate their level of

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motivation on a three-point Likert scale ranging from 1 (*none*) to 3 (*very much*). Following this, participants were probed with open ended questions to evoke a qualitative explanation of behavioural motivation.

Consistent with Swaffer and Hollin (1995) the reasons for firesetting identified by Walsh and Lambie (2013) were heterogeneous, with five motives identified from their interview data. The content of the motives for firesetting, however, varied from the work of Swaffer and Hollin, who reported revenge, crime concealment, self-injury, peer group pressure, denial/accidental, and fascination as the fundamental motives for deliberate firesetting. Boredom was the most frequently reported motive by Walsh and Lambie, followed by anger, peer-influence, experimentation, and attention. Thus, under stimulation and emotional dysregulation appear to play a central role in the onset of firesetting and likewise comorbid behavioural problems. In fact, multiple reasons for engaging in a single firesetting incident were expressed by many of the participants. This illustrates an individual can have multiple motives and that motive can also be dynamic, therefore demonstrating the complexity of assessing deliberate firesetting behaviour.

Accordingly, as identified by Walsh and Lambie (2013), the motive of experimentation informs very little about the underlying purpose of the behaviour. For example, was the young person experimenting for fun, through boredom, or intent to harm? The study was unable to inform readers about how to work therapeutically with an experimental firesetter, and the functional purpose of experimentation was not identified. The anger motive was also reductionist, not distinguishing frustration and revenge from the motive of anger. The construct of anger and revenge are not synonymous, with anger more indicative of reactive dysregulation and revenge more associated with premeditated retaliation in response to real or perceived stimuli. When anger does not dissipate, there is potential for an act of revenge, but this cannot be assumed. Accordingly, an understanding of whether the anger is directed



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inwardly, outwardly, premeditated or reactive would be more meaningful (ASM; Fritzon, 1998).

Walsh and Lambie (2013) highlight a number of important factors for examining the behavioural actions of juvenile deliberate firesetters. Firstly, classifying young offenders under categorical motives is limiting, as there is often more than one motive articulated to underpin the behaviour. Secondly, the developmental capacity of a young person necessitates prompting to elicit enough information to identify the underlying motive of behaviour. Only when participants were probed by the researcher, did more than one motive become known. Qualitative research on juvenile deliberate firesetting thus far demonstrates the utility of qualitative research methods when exploring the purpose of juvenile offending behaviour, but highlights the importance of using methods such as Socratic questioning and probing techniques to uncover the underlying function and variations in motives.

Finally, incongruence between caregivers and juvenile responses was emphasised by Walsh and Lambie (2013). Walsh and Lambie attribute the low agreement between sources to the qualitative methodology employed, which relies upon the implicit and independent perception of a participant. This is not dissimilar to quantitative research by Del Bove et al. (2008), who found that detecting deliberate firesetting behaviour can be challenging due to its covert nature, and that less than a third of parents reported awareness of their child's firesetting behaviour. Nevertheless, including both child and caregiver accounts can still provide useful information for a more representative explanation of juvenile behavioural problems. (Walsh & Lambie, 2013).

In summary, adopting primarily functional approach and incorporating contextual factors (e.g., source of action/locus of event), situational factors (e.g., pleasure, conflict, personal adversity, or social demand), and proximal risk factors (e.g., cognitive-emotional scripts) of juvenile problematic behaviour is suggested to provide a meaningful explanation

for why a young person is engaging in a specific type of behaviour.

### **Which Qualitative Method?**

The qualitative research studies by Swaffer and Hollin (1995) and Walsh and Lambie (2013) both employed the qualitative method of grounded theory (Glaser & Strauss, 1967). According to Howard-Payne (2016), grounded theory has utility for exploratory research when little is known about a subject area, theoretical understanding lacks an explanation for a phenomenon, or the perceptions and experiences of the individual are of importance to understanding phenomena. The primary purpose of grounded theory, however, is to inductively explore and discover new theory (Howard-Payne, 2016). Braun and Clarke (2006) purport that the majority of researchers, in fact, adopt a grounded theory *lite* approach, which focuses on the description of behavioural patterns without the aim of theoretical development. Braun and Clarke (2016) suggest that in the absence of theoretical development, the process of describing behavioural patterns is akin to the qualitative method of thematic analysis. Swaffer and Hollin (1995) and Walsh and Lambie (2013) provide evidence for the critique put forward by Braun and Clarke (2006), as both qualitative research studies while adding valuable information to the field of juvenile firesetting, did not have the research aim of developing theory.

**Thematic analysis.** The qualitative method of thematic analysis is an appropriate method for exploring the lived experience, perception and understanding, and individual-environmental interactions through the lens of a participant (Braun & Clarke, 2016). The process of thematic analysis is explained by Braun and Clarke (2016) to be divided into two distinct categories: *small q* and *big Q*. True qualitative research does not seek to quantify, in any way, the data conceptualised from an individual's narrative (i.e., big Q). *Small q* adopts a more realist approach and seeks to quantify the qualitative findings in a way that can be reliably understood by other researchers operating from a quantitative standpoint. Braun and

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Clarke suggest a *small q* approach can be identified by researchers who develop frameworks or code books from their data analysis and employ empirical procedures, such as inter-rater analysis.

According to Braun and Clarke (2013), the epistemological stance of a researcher can lie on a continuum from realism (i.e., reality lies within the individual's lived experiences and can be accessed by a researcher), to critical realism (i.e., the reality of a participant may be accessible, yet certainty of reality is not determinable), and finally relativism (i.e., an individual's reality is dependent on *how* it was acquired, such as through socioeconomic construction). From a realist/essentialist stance, the key research concept underpinning the research question is more meaningful when viewed through the lens of the individual, with truth understood to arise from the perspective and reality of an individual's lived experience. Specifically, an inductive and bottom-up approach to developing themes provides a rich conceptualisation of a participant's response, providing meaning behind the behaviour. This approach allows for an epistemologically flexible approach, which is data led rather than trying to fit within a pre-existing theoretical framework (Braun & Clarke, 2006, 2013). At present, no one theory of firesetting behaviour can fully explain the onset, persistence, and desistance of juvenile firesetting behaviour, or the relationship between firesetting and co-occurring behavioural problems. Thus, exploring the offence chains of juvenile firesetters in comparison with general offenders, with a specific focus on proximal factors preceding and proceeding the behaviour, as well as determining what differentiates firesetters from non-firesetters, is best informed from an inductive perspective.

As previously alluded, the utility of sequential functional analysis for understanding offending behaviour is well documented and has been previously applied to juvenile deliberate firesetting (Swaffer & Hollin, 1995). Braun and Clarke (2006), however, argue that coding an individual's narrative within a functionally analytic framework is a theoretical thematic

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analysis, rather than a true inductive approach; the analysis is conducted on a specific aspect of a participant's account (i.e., the specific act of offending) to answer a specific question (i.e., what is the underlying function of the behaviour). The functional analytic approach, however, acknowledges holistic integration of distal, proximal, and consequential thoughts, feelings, and experiences from the perspective of the individual to explore a particular phenomenon (i.e., behavioural function). Thus, thematic data can still be inductively developed from the experiences and accounts of the young people interviewed, rather than searching for extracts which are consistent with pre-existing theory or seeking hidden ideologies beyond the data. Transcribing within a functional analytic framework permits investigation into all facets of an individual's life, to inform a contextual understanding of a behavioural function. Accordingly, coding personal narratives in a functional analytic way is inductive at a semantic level. Moreover, this coding process can be replicated and enables comparisons across samples (i.e., firesetting and non-firesetting offenders), behaviours (i.e., index offence and additional problematic behaviours), time-points/stages of development, and environments.

### **The Present Study**

To date, no studies have compared the functional accounts of juvenile firesetters and non-firesetting offenders, nor investigated the functional relationship between index offending and comorbid behavioural concerns among juvenile deliberate firesetters. Four research questions were developed in response to the gaps in the literature: (1) what is the underlying function of juvenile offending irrespective of firesetting status? (2) What are the implicit cognitive-emotional scripts of juvenile deliberate firesetters? (3) Is there functional consistency between a young person's index offence and wider behavioural problems? (4) Do arson and non-arson offenders differ in the function and process of their problematic behaviour? The first two research questions are addressed in the current chapter, with the latter two questions examined in the following chapter.

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A mixed methodology was employed to investigate the proposed research questions, with the findings presented in two separate chapters. The current chapter applies a *small q* qualitative method (Braun & Clarke, 2016) to evaluate the first two research questions. These results were subsequently analysed in the next chapter using quantitative analyses to answer the latter two research questions.

In line with research question one, it was hypothesised that identified functions would be heterogeneous for both firesetting and non-firesetting samples; thus, being akin to earlier research on multidimensional theories of adult firesetting (M-TTAF; Gannon et al., 2012) and general offending (ASM; Canter & Fritzon, 1998; ICAP; Farrington, 2008). In response to research question two, it was hypothesised that offence specific cognitive-emotional processes would be yielded for deliberate firesetters, as found in existing empirical studies on adult deliberate firesetting (Ó Ciardha & Gannon, 2012), adult violent offenders (Gilbert & Daffern, 2017), and adolescent violent offenders (Jouriles et al, 2011).

### **Method**

#### **Participants**

Participants were recruited through Australian Justice Departments across two independent jurisdictions throughout 2015 and 2016. In 2014, over three-quarters (79%) of young people in detention throughout Australia were aged 10 to 17 years and of these, 91% were male (AIHW, 2014). The upper limit of the Youth Justice system is 17 years old in all Australian jurisdictions (see Youth Justice and Other Legislation Amendment Act 2016). The sample, therefore, consisted of young persons aged between 10 and 17 years at the time of their offence, and who were still under the supervision of an Australian Justice Department at the time of recruitment.

A sample of  $N=70$  juvenile offenders ( $n=35$  firesetters and  $n=35$  non-firesetters) were recruited from community services ( $n=32$ , 45.7%) and detention centres ( $n=38$ , 54.3%);

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participants were predominantly male (91.4%). Previous studies adopting a qualitative approach to explore deliberate firesetting and non-firesetting offending behaviour have likewise used small samples (Barnert et al., 2015; Heath & Priest, 2015; Swaffer & Hollin, 1995; Tyler et al., 2014; Walsh & Lambie, 2013). Moreover, existing offender frameworks investigating behavioural function have been empirically validated using sample sizes between 35 and 50 (Daffern et al., 2009; Miller & Fritzon, 2007). I

For the firesetting sample, the key criterion was the young person had either been referred to Youth Justice Conferencing (YJC) for deliberately lighting a fire, or had been convicted for the act of arson and was serving a supervision order in either the community or detention. Of the  $N=35$  firesetters recruited, 51.43% ( $n=18$ ) self-reported multiple incidents of deliberate firesetting, which had not necessarily come to the attention of professional services. The critical criterion for the control sample was the young person met the above criteria for an offence other than arson. During the interview process,  $n=3$  control participants disclosed engaging in firesetting. The analysis was repeated with the removal of these three participants, though this made no difference to the substantive findings; the reported analysis includes these three participants.

Participants were matched on a series of demographics (see Table 4). Gender was matched precisely and there was no significant difference between groups for age at index offence ( $t(68)=-1.58, p>.05$ ), age at time of interview ( $t(68)=-.55, p>.05$ ), age at first entry to the Criminal Justice System (CJS) ( $t(68)=-1.83, p>.05$ ), ethnicity ( $\chi^2(4)=5.02, p>.05$ ), indigenous status ( $\chi^2(3)=1.90, p>.05$ ), or history of violence ( $\chi^2(1)=1.61, p>.05$ ). For the purposes of the research, history of violence was defined as having been adjudicated for a violent offence. At the time of the interview, 15 participants were living independently, and 55 were under the care of a consenting primary caregiver. Of the 55 primary caregivers that consented to participate in the research project, only eight completed an interview with the

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primary researcher, despite multiple attempts ( $n=2$  detention services and  $n=7$  community services;  $n=7$  firesetters and  $n=2$  control). Caregiver data was subsequently excluded from the thesis research.

Table 4

### *Participant Demographics for Arson and Non-Arson Juvenile Offenders*

Demographic	Arson	Non-Arson
	<i>M (SD)</i>	<i>M (SD)</i>
<b>Age</b>		
<i>M</i> age at first CJS order	13.98 (1.41)	14.56 (1.25)
<i>M</i> age at index offence	14.86 (1.33)	15.38 (1.41)
<i>M</i> age at research interview	16.67 (1.60)	16.86 (1.39)
	<i>n (%)</i>	<i>n (%)</i>
<b>Gender</b>		
Males	32 (91.40)	32 (91.40)
Females	3 (8.60)	3 (8.60)
<b>Ethnicity</b>		
Australian	32 (91.40)	31 (88.60)
Other	2 (5.70)	3 (8.60)
Unknown	1 (2.86)	1 (2.86)
<b>Indigenous Status</b>		
Indigenous	21 (60.00)	18 (51.43)
Non-indigenous	13 (37.10)	15 (42.90)
Unknown status	1 (2.86)	2 (5.70)
History of violence	27 (77.14)	31 (88.60)

*Note.* Index offence for the purposes of research was not the date a participant entered the justice system (i.e., date of first contact), but age at the time of offence used for the current research project (e.g., Arson or MSO).

### **Design**

To improve the precision and validation of the research findings a triangulation approach to data collection was originally proposed. Data was sourced from (1) semi-structured interviews with the young person; (2) interviews with a young person's caregiver; and (3) archival information from a participant's case file. However, due to the low response rate from caregivers ( $n=8$ ) and the differences in data between jurisdictions triangulation was not possible.

An identified confounding variable of the present study was the environment in which the young person resided. Accordingly, the sample was collected from both community services and detention centres across both jurisdictions to account for institutional behaviour, and opportunity for a behavioural occurrence. These methodological considerations endeavoured to enhance external validity and maximise the possibility of generalisation to the adjudicated juvenile population.

Qualitative methodology was employed to explore the functional underpinnings of deliberate firesetting and general offending behaviour. This systematically informed the development of descriptive functional pathways towards juvenile offending. Further enquiry into why a young person engages in deliberate firesetting allowed for the identification of fire-specific implicit cognitions (i.e., fire scripts).

### **Materials**

Participants were requested to complete a series of semi-structured functional analytic interviews developed for the present study. The outcome of these interviews informed a sequential analysis of offending and behavioural function interchangeably referred to as either an *offence chain* (Ward, Loudon, & Hudson, 1995) or a *behavioural sequence* (Fineman 1995). A combination of quantifiable cues and idiosyncratic qualitative experiences pertaining to distal risk factors, proximal factors occurring within 12 months of the behaviour,



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characteristics of the behaviour itself, and post offence details were derived via Socratic questioning. Participants' responses were evaluated in the context of the situation in which their behaviour arose (i.e., personal adversity, pleasure, social demand, or interpersonal conflict), as well as the origin of a proximal trigger (internal/external) and target of their behaviour (internal/external).

Sequential functional analysis (Gresswell & Hollin, 1992) of a young person's index offence was conducted, followed by a comparative functional analysis for additional problematic behaviour. The total participation time was between 60 and 120 minutes per participant. Functional analytic interviews extracted pertinent information about the purpose of a young person's deliberate firesetting and wider problematic behaviour. See Appendix B for the functional analytic coding framework. One constraining factor of the functional analysis was the expectation that juveniles as young as 10 years old, with potentially low cognitive capacity would be able to articulate thoughts, feelings, and behaviour in a reflective manner. Consequently, a number of provisions were put in place to gauge a young person's capacity and to facilitate a narrative explanation, including a brief competency assessment, the use of pictorial resources, and an opportunity for the young person to draw, to facilitate a narrative explanation. Appendix C provides an overview of ethical considerations and visual resources developed for the sample.

**Preliminary capacity session.** This session lasted for approximately 20 minutes and was important for the following reasons: (1) the interviewer could conduct a preliminary assessment of a young person's capacity to verbalise episodic events and explain his/her thoughts and feelings; (2) the process enabled rapport building so the young person became comfortable talking with the interviewer and allowed for narrative practice which assists in obtaining quality information more quickly (Roberts, Brubacher, & Powell, 2011); and (3) the session provided opportunity to introduce visual resources and to demonstrate their utility

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(e.g., photos, images of expression/emotion, visual timelines, and drawings). These visual aids were particularly beneficial for facilitating narrative explanations and reducing misinterpretation of the young person's account (See Appendix C).

The preliminary interview incorporated a protocol used for child witness testimony known as *Ground Rules*. This provides an opportunity to equip children with rules that empower them to be the expert in their storytelling and play an active role in the interview. Introducing these during the preliminary capacity session provided the young person with an opportunity to practice the rules (see Faller, 2015). Examples of these rules included telling the interviewer if they make a mistake, saying "I don't know" rather than guessing in the absence of information, saying "I don't understand" if they are asked a question that doesn't make sense, or telling the interviewer/showing them a stop sign when they feel uncomfortable. Empirical research on child witness testimony has evidenced children as young as 4 or 5 years old can provide accurate recall of events and can communicate these to others, particularly when ground rules are used (Brubacher, Poole, & Dickinson, 2015; Faller, 2015; Lamb, La Rooy, Malloy, & Katz, 2011; Marchant, 2013).

### **Functional analytic interview for index offence (FAI-IO; Perks & Watt, 2015).**

The content of the functional analysis interview schedule was derived from a preliminary review of the literature, and by drawing upon and modifying two existing functional analysis schedules: (1) *The Multi-Model BARE-PCS model* (Perkins, 1991), ordinarily used with sex offenders (see Perkins, Hammond, Coles, & Bishopp, 1998), and (2) *The Structured Aggressive Behavioural Analysis Schedule* (SABAS; Daffern et al., 2009) developed to examine OPB among adult violent offenders. The Multi-Model BARE-PCS obtains information pertaining to the acquisition and maintenance of offending via a functional analysis (antecedents, behaviour, and consequences) of multiple parameters; behaviour, attitude, relationships, emotions, cognitions, physical condition, and offence specific interests.

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The SABAS (Daffern et al., 2009) emphasises the importance of a structured method when implementing functional analytic procedures. The SABAS includes a mixture of narrative accounts and objective classifications in the following areas: index offence, victim characteristics, distal and proximal environmental triggers, affective and cognitive antecedents (thoughts, appraisals, and maladaptive schemas), psychophysiological activation, symptoms of major mental illness, disinhibitions or opportunity factors conducive to offending, use of a weapon, and function of behaviour.

The FAI-IO incorporates a brief exploration of distal risk factors to develop an overview of a young person's self-perception of background information and fundamental relationships. The primary focus of the interview, however, pertains to proximal risk factors, specifically acute dynamic risk factors. These are risk factors that change quickly, are only stable for a short period, and occur close to the problem behaviour. It is these factors that plausibly detect young persons with vulnerability for lighting fires and can explain the purpose of a behavioural occurrence. In addition to the importance of proximal risk factors, protective factors have emerged as playing an integral role in recidivism (Losel & Farrington, 2012; Shepherd et al., 2014). Consequently, potential protective factors that may prevent the behavioural onset or support the desistance from offending were explored within the interview schedule.

The interview schedule consists of 58 questions with additional probing questions depending on a participant's response. The purpose of the functional analytic interview was to explore the reasoning behind a young person's actions leading up to and surrounding their index offence. Probing and Socratic questioning were used to enhance understanding and clarification pertaining to proximal cognitions, emotions, behaviours, contextual, and environmental factors. Of the 58 questions, 16 investigated distal risk factors in the domains of background factors, self-perception, key relationships, and physical condition/disinhibitions.

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Proximal antecedents were investigated within 25 questions spanning the domains of cognition/affect, environmental triggers, offence characteristics/contextual factors, and physical condition/disinhibition risk factors. Mental health was explored more broadly via five questions and 12 questions explored protective factors. The FAI-IO is presented in Appendix D.

**Functional analytic interview for additional problematic behaviours (FAI-APB; Perks & Watt, 2015).** The FAI-APB required participant's identification with one of five problematic behaviours: (1) aggression; (2) self-harm; (3) illicit substance abuse; (4) rule-breaking; (5) risk-taking. The list of behaviours was developed as a hierarchy, with behaviour number one considered the highest ranking problematic behaviour and number five the lowest ranking problematic behaviour. The highest ranked behaviour that a young person identified as engaging in was the focus behaviour for the FAI-APB. To identify whether or not there is a functional consistency between deliberate firesetting and additional problematic behaviours, as well as whether firesetters and non-firesetters differ in their problematic behaviours, a modified version of the FAI-IO was developed. The FAI-APB, located in Appendix E, is designed to obtain information pertaining to behaviours that resemble a young person's offending behaviour. Information that had already been obtained through the FAI-IO (e.g., assessment of distal and protective factors) was omitted from the FAI-APB). The interview consists of 28 questions with additional probing questions depending on a participant's response. The time for completion was between 30 and 60 minutes. Instructions for delineating additional problematic behaviours and how to identify them are located in Appendix F.

**Functional analytic interview for the primary caregiver (FAI-PC).** In an endeavour to improve the precision and validation of the research findings, a comparative semi-structured interview schedule was developed for a young person's primary caregiver. The interview

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schedule was designed to explore caregivers' accounts of their child's behaviour leading up to and surrounding the index offence. However, due to low response rates from caregivers, there was not enough data to proceed with analysis and this section of the research design was subsequently excluded.

### **Procedure**

**Participant recruitment.** Upon receipt of ethical approvals, participants who met the inclusion criterion were identified by the relevant agencies, under the instruction of the researcher (see Appendix G). Eligible participants and their primary caregivers were provided with an age appropriate explanatory statement by service providers (see Appendix H). Prospective participants and their primary caregiver or legal guardian were required to give informed consent, indicating their agreement to participate in the study. For participants with low literacy, the consent form was read to them by their caseworker or the respective centre manager. A copy of the consent forms is provided in Appendix I. Once written consent had been obtained, the names and contact details of participants were made known to the researcher.

**Participant confidentiality.** All participant data was de-identified. While consent forms were signed and contained a participant's phone number and postal address, participants were identified only by an alphanumeric ID code (e.g., FS1-initials; Cont1-initials; FS2-initials; Cont2-initials). Any information which could reveal a participant's identity, such as name, contact details, or signature, was stored separately from participant responses which were audio recorded and later transcribed. This number was then used for each interview completed by the participant and when handling participant data at the analysis phase. In accordance with the Australian National Health and Medical Research Council (NHMRC) guidelines, all data will remain de-identified and stored in a password-protected electronic location for a minimum of five years. This location is only accessible by the researcher. After

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five years the data will be securely destroyed. Only the researcher, a research assistant (i.e., inter-rater), and the research supervisors have, and will have, access to the data.

**Interview protocol.** Each juvenile participant was requested to volunteer between 60 and 120 minutes of their time at both time-point one (T1; current chapter) and time-point two (T2; chapter six). At each time-point, a young person was requested to complete two interviews. The first interview pertained to a young person's index offence (FAI-IO); for the firesetting group this was the act of arson, for the control group, this was their most serious offence (MSO) at the time of interview. The approximate time for completion of the FAI-IO was 60 to 90 minutes. Participation in the subsequent functional analytic interview (FAI-APB) lasted approximately 30 to 45 minutes. The location for the interviews was either at the young person's community justice office or detention centre. To promote engagement in the proposed research, an incentive of a \$15 gift voucher was offered to each juvenile participant upon completion of the interview protocol. The gift voucher was non-exchangeable and for an Australian commercial store (e.g., Kmart and Big W).

### **Data Analysis**

A mixed methodology was employed, though the primary analytic method of the current chapter was the *small q* qualitative method of inductive thematic analysis, specifically a realist/essentialist method. This provided a rich conceptualisation of the underlying meaning behind juvenile offending and deliberate firesetting behaviour, which was data led rather than trying to fit within a pre-existing theoretical framework (Braun & Clarke, 2006). The six systematic steps outlined by Braun and Clarke (2006, 2016) were employed in the current chapter:

(1) Data familiarisation: the doctoral researcher conducted and transcribed all participant interviews. The immersion process lasted for over six months due to chapter six employing a prospective follow up design. A repetitive review and deep analytic

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exploration of the semantic meaning of participant's responses was conducted.

(2) Initial coding: this process involved identifying extracts and phrases that encapsulated a participant's narrative at an analytic and meaningful level, deemed relevant for answering the research questions. This process involved frequent removal and refinement as the coding process progressed.

(3) Searching for themes: this involved the higher order categorising of the codes found within the data. For the purpose of the current research program this was completed twice: searching for sub-themes and searching for themes. Higher order categories of behavioural pattern (i.e., sub-themes and themes) are determined by how prominently they align with the central organising concept (Braun & Clarke, 2013). The central organising concept in the current research is the underlying function of juvenile deliberate firesetting and wider antisocial behaviour. The theme embodies this concept, whereas a sub-theme emphasises a particular aspect of the higher order theme. For example, in the current research program multiple cognitive-emotional scripts underpinned the theme of emotional dysregulation, but each of these codes could be categorised into four behavioural patterns which explained more specifically what emotional function was dysregulated (i.e., help me, labile mood, loss of control, and grief), as well as the origin and target of the behaviour (internal/external).

(4) Reviewing codes, sub-themes and themes: Braun and Clarke (2016) advise that this is a crucial decision-making step, whereby the rigor and significance of codes, sub-themes, and themes are re-evaluated to ensure they reflect the specific research question. Braun and Clarke suggest thematic mapping to provide a visual representation of the codes, sub-themes, and themes, as well as the relationships between them. In the current chapter, visual representation was displayed in table format (see Table 5).

(5) Defining and naming themes: this step is referred to as the story telling phase,

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whereby each level of data represents a participant's experience told through the lens of the individual, while also informing the reader of a behavioural pattern that responds to the research question.

(6) Write up: while qualitative researchers will often combine their results and discussion into one section only, the current chapters retained the standard distinction between the results and discussion due to the mixed method approach and multiple research questions.

**Analytic considerations.** Lyons and Coyle (2016) identify that the role of the researcher is inextricably interlinked with the coding process. They outline a skilled researcher should, however, be able to provide an accurate account of the data, regardless of their social positioning. Though it can be argued an individual is never able to remove themselves from their position completely; even an individual's self-reflection reflects personal biases. Accordingly, while the researcher developed a functional interpretation of participants' accounts that was as accurate as possible, it is plausible that researcher bias may have occurred, as is a possibility in any qualitative and interpretative method. Openness to share instances of possible misrepresentation reduces the likelihood of the researcher's own biases from impacting on the coding process. Attempts to overcome this were achieved through the following considerations:

***Representing the other (Lyons & Coyle, 2016).*** Representing the other is the concept of misinterpretation through diversity or difference from the population under investigation. In the present study, this was a concern pertaining to the interpretation of participant responses, where the participant is developmentally immature, of another nationality, socioeconomic status, and culture. The primary researcher, therefore, took time to self-reflect on her position in the research at the time of data collection (i.e., 27 year old, British, Caucasian, middle class, female, educated at postgraduate level in forensic



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psychology) and how this may impact the interpretation of participant responses. As outlined by Lyons and Coyle though, the degree of similarity between participant and researcher does not necessarily guarantee accurate reflection either, which was concluded to be true in the current research study. See Appendix J for researcher reflections, as a personal reflection of representing the other in the present study.

***Inter-rater reliability.*** Some researchers have advised against the use of inter-rater reliability in qualitative research (Braun & Clarke, 2013), as it represents the realist assumption that there is a specific truth to be found. Morse (2015), however, recommended that the use of reliability and validity checks within qualitative research ensures rigour and evidence base in line with the scientific practitioner model. Accordingly, an independent rater was employed to check for level of agreement across researchers throughout the coding process, a method employed elsewhere (e.g., Haqanee, Peterson-Badali, & Skilling, 2015).

### **Results**

The analysis produced three inductively developed levels of data: (1) codes: the deepest level of data analysis and reflective of an offender's implicit cognitions and emotions embedded in the data; (2) sub-themes: a higher order category synthesising a series of codes representative of an offender's behavioural function; and (3) themes: the highest order category integrating the previous two levels of data providing a general overview of an offender's functional trajectory. The thematic data formed a Framework of Juvenile Offender Function (F-JOF), which is located in Table 5.

Codes were developed to the point of saturation; all transcripts were then re-checked for the presence of the developed codes before proceeding. In total, 32 codes were developed from the data across 70 participants ( $n=35$  firesetters;  $n=35$  controls), which were subsequently aggregated into nine higher order sub-themes, and four highest order themes.

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The recommended number of themes is suggested to be between two and six for thematic analysis (Braun & Clarke, 2013), which is consistent with the current findings. The frequency of implicit codes, underlying sub-themes, and overarching themes yielded for both an individual's index offence, and additional problematic behaviour, are located in Table 6.

**Inter-rater agreement.** Reliability checks were conducted at three levels: (1) the classification of behavioural descriptors (i.e., participant narratives) under one of four themes; (2) the classification of behavioural descriptors under one of nine sub-themes; and (3) classification of behavioural descriptors under one of 32 codes. Agreement between raters was substantial to near perfect at all three levels. Where inconsistency arose, the primary research supervisor was included in deliberations, resulting in three independent raters and almost perfect agreement. In accordance with Landis and Koch (1977) kappa coefficient ( $k$ ) between .61 and .80 indicates substantial agreement between independent raters, with a range between .81 and 1.00 regarded as almost perfect agreement. In the current study, an initial classification of function yielded substantial agreement with a coefficient of  $k=.71$ . This was subsequently increased to an almost perfect agreement following discussion between raters, with 96.4% concordance between raters ( $k=.96$ ).

Similarly, the level of agreement for the classification of sub-themes and codes increased after a discussion between raters. The agreement for sub-theme categorisation was initially substantial ( $k=.94$ ) and increased to almost perfect upon review ( $k=.97$ ); likewise, the categorisation of codes increased from substantial ( $k=.75$ ) to near perfect ( $k=.84$ ) agreement.

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Table 5

*The Framework of Juvenile Offending Function (F-JOF)*

Theme	Sub-theme	Code
The Antisocial Offender	Generally antisocial	Everyone did it Normalisation of violence/aggression Crime pays Just do it It felt good This is way more fun though! The damage is already done Nothing better to do It's getting too hot! It was their fault
	Anti-social peer influence	I felt like I belonged The streets Follow the leader
The Emotionally Dysregulated Offender	Help me	Cathartic symbolism Darkness Feel my pain I don't care about me Emptiness Life is too much-take it away
	Labile mood	See-saw
	The loss of control	Out of control Light switch Don't push me. I'll snap! Anger is coming I'll hurt you first so you can't hurt me
	Grief	Loss of a loved one
The Revenge and Retribution Offender	Anomic disaffection	I have nothing, and they have it all
	Even the score	Revenge
The Control and Power Offender	Supremacy is mine	I'm in control Don't disobey Control my environment

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Table 6

*Frequency of Thematic Data Irrespective of Firesetting Status*

Thematic data	FAI-IO	%	FAI-APB	%
<i>Codes</i>				
Just do it	48	68.57	42	60.00
It felt good	37	52.86	35	50.00
The streets	36	51.43	36	51.43
Emptiness	35	50.00	30	42.86
Nothing better to do	32	45.71	27	38.57
Crime pays	32	45.71	17	24.29
I'll do what I want	28	40.00	27	38.57
Everyone did it	26	37.14	30	42.86
Darkness	24	34.29	22	31.43
Out of control	24	34.29	21	30.00
This is way more fun though!	21	30.00	25	35.71
I don't care about me	20	28.57	21	30.00
Normalisation of violence/aggression	19	27.14	10	14.29
It was their fault	18	25.71	5	7.14
Light switch	17	24.29	18	25.71
It's getting too hot!	17	24.29	1	1.43
Feel my pain	15	21.43	16	22.86
Anger is coming	15	21.43	9	12.86
Follow the leader	13	18.57	7	10.00
I have nothing, and they have it all	9	12.86	5	7.14
I felt like I belonged	9	12.86	2	2.86
Loss of a loved one	8	11.40	5	7.14
I'll hurt you first so you can't hurt me	7	10.00	4	5.71
Revenge	7	10.00	4	5.71
Life is too much-take it away	6	8.57	22	31.43
Control my environment	6	8.57	3	4.29

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Don't push me. I'll snap!	5	7.14	9	12.86
Don't disobey	5	7.14	5	7.14
The damage is already done	5	7.14	4	5.71
I'm in control	4	5.71	2	2.86
See-saw	3	4.29	4	5.71
Cathartic symbolism	1	1.43	3	4.29
<i>Sub-Themes</i>				
Generally antisocial	64	91.43	56	80.00
Help me	47	67.14	45	64.29
Anti-social peer influence	43	61.43	34	48.57
The loss of control	32	45.71	26	37.14
Supremacy is mine	9	12.86	8	11.43
Anomic disaffection	9	12.86	4	5.71
Grief	8	11.43	7	10.00
Even the score	6	8.57	3	4.29
Labile mood	3	4.29	5	7.14
<i>Themes</i>				
Antisocial Offender	38	54.29	33	47.14
Emotionally Dysregulated Offender	24	34.29	35	50.00
Revenge and Retribution Offender	6	8.57	6	8.57
Control and Power Offender	2	2.86	2	2.86

*Note.* Data obtained from participants' responses to the functional analysis interview-index offence (FAI-IO) and functional analysis interview-additional problematic behaviour (FAI-APB).

### **Thematic Analysis Findings**

The underlying and functional purpose of juvenile offending behaviour, irrespective of firesetting status, was predominantly the result of antisocial distortion, followed by emotional dysregulation, a need for revenge/retribution, and an act of asserting power and control (see Table 5). Participant's narratives revealed the presence of multiple implicit codes and sub-themes, indicating the presence of intra-individual heterogeneity and multifaceted needs. Accordingly, a juvenile's most dominant/potent codes or sub-themes occurring in the context of their problematic behaviour determined their higher-order functional category membership.

**The antisocial offender.** A young person categorised under this functional category is regarded as primarily antisocial. There are, however, two sub-themes comprising the antisocial offender: (1) generally antisocial and (2) antisocial peer influence.

**Generally antisocial.** The behaviour of a *generally antisocial* offender aligns with conduct disorder criteria, including aggression to people/animals, destruction of property, deceitfulness or theft, and serious violation of rules (DSM-V; American Psychiatric Association, 2013). The behaviour of a *generally antisocial* offender has an external source of action and locus of effect, and is underpinned by one or more of the following 10 implicit codes.

*Everyone did it.* The behaviour is a learnt response (advancing to habitual), and the young persons have not developed an alternate template on how to meet their needs. Problematic or criminal behaviour is normalised due to a wider family or friendship network engaging in similar behaviours. For example, parental behaviour or the community one grew up in was surrounded by criminal activity (e.g., drugs, stealing, or imprisonment).

Always fighting in the house...they were drug users so stuff like that. Always having junkies around the house... I use to hang around all the older boys, even

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when I was like 7 and they were 14/15 y/o...because we all grew up together, no matter how old we were, we all grew up together.

Probably growing up, everywhere I went just my cousins and that, they would just walk into shops and try to con you into putting stuff in your dacks and stuff...But as I got older, I realised everyone was doing more stuff.

*Normalisation of violence and aggression.* The act of violence and aggression is a learnt response through direct exposure and experience, with no alternate template on how to get one's needs met. The following quote is a young person charged with homicide-related offences.

My house got shot up when I was younger...It didn't really affect me...it's just normal to me ...I saw someone get murdered...when I was 8 or 9 years old.

*Crime pays.* The young person is engaging in the behaviour for money, either directly for cash or stealing possessions to sell for money. The behaviour is for instrumental gain.

Yeah, I got into drugs and then obviously, I needed money for drugs. Guns...13/14 years old. I met new people, and I started hanging out with them. If they [the boys] can go out with something wrapped around their face and a weapon and come back with heaps of money and smokes and that, then like I want to be able to do that...They never got locked up for it and that, but whenever I did it I always got locked up for it because I was only young and that.

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*Just do it.* The behaviour is either preceded by no foresight for the potential consequences, or the young person considers the consequences, and may have even felt scared or anxious, but they went ahead with the actions anyway. This manifested for one of three reasons. Firstly, a young person perceives the reward to outweigh the risk, regardless of the possible consequences. Feelings of worry or nerves are quickly outweighed by the immediate gratification received from the problematic behaviour, thus perpetuating the cycle of re-offending (i.e., a problem with immediate gratification).

Yes, but some risks are worth it.

Secondly, a young person is aware of the consequences, in fact, they were even scared of the possible outcomes, but they couldn't think of an alternative solution, so they just did the behaviour (i.e., poor problem-solving).

...Driving fast, I think I went past the [police] station, I was doing burnouts and the back wheel was coming off, like the tyre, and the highway patrol must have seen me because of the sparks and that from the rim, then he tried pulling me over but I didn't stop, I tried taking off, but there was all the police after me...I was scared; I didn't plan on doing that. Then the car slid out, and it hit the paddock fence and then I set the car on fire. I tried taking off out the paddock, but the car wouldn't move, so I lit the chair beside of me, I lit it on fire, and I was trying to get out of the car but the police were coming at me [I was thinking] where am I going to go, what am I going to do...then the police started running at the car so I locked the doors, and I was in the car when it was on fire.



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Thirdly, the behaviours involved little or no thinking prior to acting. The behaviour was an impulsive action due to being “stupid” or “I wasn’t thinking”, thus unable to articulate any indication of why they engaged in the behaviour (i.e., lack of psychological appraisal). This third reason also arose in the context of intoxication, which impaired a young person’s ability to prospectively evaluate the consequences or perpetuated a lack of care for the consequences.

... I knew I was going to get caught. I had a feeling...when I'm drinking I don't like have any reasoning; I'll do anything, anything at all...Then we ended up going out, and we stole a car, with keys in it, and we were driving around, I was just drunk and didn't care, we ended up getting in a police chase (how was that?) I dunno, I didn't really care, it's just a normal thing...it doesn't really phase me, which is bad but yeah (so there is no excitement or fun?) like it literally doesn't, I don't care.

*It felt good.* The young person experiences an adrenaline rush or sense of pride that drives the continuation of the behaviour. The behavioural engagement was intrinsically driven and evoked by a physiological reaction or need for stimulation.

I had only been out 13 days since my last robbery... for the adrenaline I guess, I didn't do the armed robbery because I was angry, I wanted to do one for fun because I wanted to see what it would be like. I was going good, I wasn't stealing nothing (and then you committed armed robbery?), Oh yeah but only because I had the gun.

It [drugs] makes you feel mad, it's a mad feeling, makes ya lift up and that if the

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alcohol sends you to sleep. I just have a good time. I don't really think.

*This is way more fun though.* The important point about this function is the potency of the reinforcer. The behaviour or offence is perceived as superior to all other forms of action. The behaviour brings satisfaction, fun, and enjoyment that no prosocial activity can elicit.

Just excited for a night with the boys...Happy (What about just before you took the car?) Didn't feel any emotions, it just happened (Were you thinking about anything?) No, because we zip tied the guy so he couldn't do anything, we took his phone and his wallet [laughing]. We left him on the side of the road. (Were you thinking about him or talking about him while you were driving?) No! We just drove all night... Just ripping around the corners, it's fun...but then thought "it's getting too hot" so we decided to set it alight to hide the evidence.

...it's just normally I am in the heat of the situation, and I choose the wrong option at the time (what is it that draws you towards that option?) I dunno it could be peer pressure maybe or just seems like the more exciting thing to do.

*The damage is already done.* The behaviour was a by-product of wider antisocial activity. It is consistent with the unravelling thought process that they are going to get caught anyway, so they might as well do something else criminal or even escalate their behaviour (e.g., if they are aware there is a warrant for their arrest).

The reason we burnt it down was because some workers must have started cutting it and wrecking it, so then the other two girls I was with started lighting fires

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around it. It wasn't really a plan to burn it.

I may as well get caught for something good... what's the point in getting caught for public nuisance when you can do something better ... [I was] driving the car all day...then did the armed robbery...[I] did it for fun [I was feeling] happy!

*Nothing better to do.* The behaviour arose through a lack of stimulation; the young person articulates a sense of boredom and nothing to do. They are unable to create stimulation in their environment in a prosocial way.

It's boring following the rules; it's restrictive, can't do what you want... following the rules with no supervision is hard. [I used to just] walk around at night getting into mischief, I need to stay home at night, and live a normal person's life...it's boring.

“yeah lets go and do it”, just because there was nothing to do [I was feeling] bored---then I started getting excited about it because like there was nothing to do, so I was like "yeah let's do it" then I told them if we find a car with keys in it I'm gonna take it.

*It's getting too hot.* The behaviour was a by-product of wider antisocial activity and used to conceal the evidence (including keeping a victim quiet) when the police were “closing in” or the young person/s “just wanted to go home”. The behaviour was used to enhance their wider offending behaviour (e.g., taking drugs while on the run to keep themselves awake) or to evade detection (e.g., destroying evidence or crime concealment).

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It's getting too red hot... That's our slang for the cops are probably coming, and we are likely to get caught... a mate suggested to light it up.

I think she [the victim] was trying to call the police... I jumped through [the window]... I let the boys in [I felt] out of control. We grabbed her car keys and err we trashed her house looking for stuff... still [feeling] out of control [then we] took the car; I was telling my mates to drive... We drove the car into a school fence... to damage it... It was no use to us we didn't want it... it was her [the victim's] car [I was feeling] crazy! (Then what did you do?) Set it on fire to get our fingerprints off it.

*It wasn't my fault.* Blame is externally attributed towards the victim or a co-offender. Alternatively, the young person endorsed the belief the adjudicated offence was an accident.

Ah I got blamed for lighting stuff (do you recall lighting anything?) no, I didn't do it.

It was accidentally lit... Yeah I flicked a smoke [in the paddock], and I seen smoke, then flame and was like Fuck, I ran home told my friend to call the fire brigade and yeah. [I was thinking] Fuck smoke can do that can it, I didn't think a cigarette could make flames [I was feeling] confused.

***Antisocial peer influence.*** The second sub-theme of the antisocial offender category illustrates the role of peer affiliation in the onset and maintenance of juvenile offending. Juveniles engaging in offending behaviour due to peer influence have either an external or

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internal source of action, with an external locus of effect. The behaviour is underpinned by one or more of the following three implicit codes:

*I felt like I belonged.* The behaviour occurred due to getting in with the wrong crowd and was a way to prove oneself to others, namely because they never fitted in and desired a sense of social belonging.

I was hanging around the wrong people, wanting to fit in, never really fitted in...bullied because I wear glasses. Being with them I didn't feel lonely anymore; I had friends. I was bored, and I was doing it to fit in.

At age 15 I didn't get accepted back into the school, sent me to a behaviour school... that's where I met the wrong people, got into crime...its where all the bad people are, and we all come together!

I guess like I thought it was cool to do it, be a part of it or whatever.

*The streets.* The problematic behaviour is depicted as part of a wider lifestyle choice and association with an antisocial peer group or gang. The streets is a term articulated by young people to embody their antisocial lifestyle of disregarding rules, consuming substances, partying, and engaging in general antisocial acts in the company of criminal associates. Affiliation with the group is part of their identity; friends are considered family, and antisocial belonging bring a sense of pride.

Money and mates! ... probably hanging around with the wrong crowd...some boys moved to my school...they're all locked up now...smoking and drinking led me

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out of routine. I'm not going to blame my friends for my actions; I'm in here I'm the one locked up. But I just know that's how it started, and all, kicking back with them got me into trouble and that. (What will keep you out of trouble?) Probably see them less and stop trying to rob people.

My routine is the streets. I'm so attached to it, so when there are things that are more important than I should be doing, I just don't care... [I] hide during the daytime, keep out of sight. Then go out at night, drink, smoke, steal for money, stand over people.

*Follow the leader.* The young person is easily influenced by same age or older peers. The behaviour is the result of peer pressure and a lack of assertiveness.

I was a bit of a follower back then, but today nah, I don't let anyone tell me what to do, obviously, I do if it's the boss of a job or anything, but not if they try to lead me to something I don't want to do... back then I made a bad decision, and it went from there.

... We were just destructive when we were younger. My older cousins told me to go do this, and I thought it was good because I was getting told by the older boys and that, and if I did what they told me it be all good, but then they were always getting locked up and that.

Just like breaking the law and stuff, breaking the law and stuff, and doing stupid things. Because I just get egged on to do it (do you find it hard to say no?) Not

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anymore, but I did when I was hanging around the wrong crowd, but now I've got someone to encourage me and think about the future and that.

**The emotionally dysregulated offender.** The offence or problematic behaviour removes a negative emotional state. This can occur for one of four functional reasons which represent the underlying sub-themes: (1) Sadness or dissatisfaction (Help me); (2) Persistent oscillation of mood (Labile mood), (3) Frustration and anger (The loss of control); and (4) Bereavement (Grief). The internally triggered emotional experience can either be expressed inwardly (towards self or own possession) or outwardly (towards another person or object).

*Help me.* The behaviour can be both internalised and externalised. The behaviour represents the negative emotional states of dysphoria, helplessness, and emotional saturation. The sub-theme is comprised of seven implicit codes.

*Cathartic symbolism.* The behaviour represents an emotional purging, with the intent to make some symbolic change to their environment or situation.

I just let it burn, I didn't really care, I don't know just that room was the old me, and I wanted new me.

*Darkness.* They perceive little good in their lives and are extremely dissatisfied with their past or life course. They experience intense feelings of dysphoria; the behaviour provided internal release.

Before I came in here [detention], I was couch surfing for 4.5 years and on the street [since age 12]... my brothers would bash me and gang up on me, sometimes mum would make them bash me, and I just got sick of it...I started taking it [cannabis]...I just felt like when my brothers were beating on me I would just chill in my room and pass the time and then ya know it became an addiction (do you feel

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like it helps you cope with things?) It did at first, but then it became habit. [I felt] just depressed... just thinking about the past [then afterwards] the depression came back [I felt] angry, a bit, but like I wouldn't flip out, I just felt angry because I'm depressed and that.

... [In the context of describing recurrent rule breaking]... I just don't care what happens [after] happiness, after I have done something that lets everything out... until I start thinking, why did I do it? Then I get depressed [approximately 2 hours later]. Once the depression kicks in I normally either cry myself to sleep, I'll talk to mum about things sometimes, depends on what it is, or I'll eat real fatty foods... Nothing helps! It's pretty stupid; I don't understand why I do it in the first place. (How long has this behaviour been going on for?) Since mum and dad broke up [2.5 years].

*Feel my pain.* The (externalised) behaviour represents feelings of helplessness, with the problematic behaviour meeting the young person's emotional need for support or help. The behaviour occurred due to an inability to communicate their need and wanting others to know how much they are hurting.

I wanted to run the car into the front of his house and kill him and kill myself in the process... kill his mum; I hate his mum. I think I more wanted to kill myself and for him to see it. I wanted him to be all depressed. I was really upset and depressed!

Angry, yeah I was fuming! I went and took it out on everyone else, and abused myself with the drugs. I went and did a job (the aggravated B&E?) yeah, that's



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when it all happened.

*I don't care about me.* The young person feels inherently alone, unloved or dissatisfied, thus doesn't care for themselves or what happens to them.

I had ran away from home at the time; I was with a crew with a lot of older boys at the time...I was just a bit I dunno angry and had a lot of hurt going on at the time, I just didn't really care what was going on, and I was a bit drunk.

There was a lot going on in my life, and I wanted to go fast, I didn't really care if I hit a tree, I just didn't really care I guess, it wouldn't have bothered me if I had just, I dunno I was a bit... lost, just very lost, just very confused.

*Emptiness.* The behaviour is performed for the reason that is not overtly obvious, appearing antisocial in nature (i.e., the product of boredom), but actually, the behaviour is arising because something or someone is missing; the behaviour makes them feel better. The young person will articulate feelings such as, "confused", "lost", or "numb".

...when I was out I felt like no one cared like no one had time for me, and then it felt like it was me against the world...I'm just an old toy that gets used and used until it's ripped up and it can't go to good use anymore, and then I just get thrown out.

I don't talk to mum and I haven't talked to dad since there was an AVO was put out...I sent her a letter for Mother's Day, and I told her exactly what I thought! I

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think that she's a terrible mother and that she needs to make a choice between me and her kids or her husband. And I already know what her choice would be. Umm, she needs to make a choice of whether she is going to believe us and she's going to take care of us, or if she's going to believe him and not worry about us...Noo, like she, I don't know it's hard to explain sometimes we're close, but then other times it's just not there at all. That's how I'm used to it I guess... Well, I grew up looking after myself, taking care of myself, so it's pretty easy.

*Life is too much-take it away.* The (internalised) behaviour is to harm one's self to remove a negative emotional state. This implicit code can manifest directly or indirectly. For example, the act itself may directly remove negative affect (e.g., feel sad about adverse life experience) or alternatively, the impetus may represent a more indirect need or expression, such as to punish oneself in the context of self-loathing. The behaviour may include, though not exclusively, the act of self-harm or drug taking. The behaviour is targeted at themselves or an object belonging to them. Often anger will appear as the primary emotion, but in these instances, anger is a secondary emotion to sadness, which results in an act to harm oneself.

To take my mind off things... [I] was doing that [participant points to the self-harm card] first and then moved to drugs to get my mind off everything...it started when DOCS took me... They sent me to hospital for three days so I couldn't do it [I] was annoyed and frustrated... (Do you still self-harm?) I don't cut myself, but I do try to hang myself sometimes. [I] Tie my jumper around my neck and sit where they can't see me.

Drugs...for fun and to deal with stuff (what kind of stuff?) A lot of stuff, stuff I

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don't like talking about.

Well seeing my parents split up, that was pretty hard, then I started doing drugs and then from there my life got flipped upside down and I was pretty much a bad kid for a few years.

***Labile mood.*** The behaviour typically arises because of a persistent oscillation in mood, though the problematic behaviour can also be preceded by an experience of euphoria and antisocial personality. Labile mood is, however, more characteristic of mental health, including mood disorder or psychosis.

*See-saw.* The sub-theme of labile mood is represented by one implicit code characterised by a consistent fluctuation or rapid shift of emotional experience. The young person will express the experiences as “overwhelming” or describe themselves as “crazy”. In some instances, the young person will not articulate it per se but list a series of diverse or extremely reactive emotional experiences in close proximity, that appear erratic. See-saw often occurs independently of substance use.

Well, I smashed a window...I was walking around the house with a smile, so I don't know; probably I was confused, somewhere between happy, angry and sad. [Right before the offence] Everything just came flooding back, my whole life, I can't explain it (was that a good thing or a bad thing?) it was bad... [I was feeling] sad, scared, depressed, confused, nervous.

I'm really happy the majority of the time. But then, on the flipside, I'm really angry, and I'm really depressed, and really withdrawn. So, like Bi-polar, both!

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I dunno, just my emotions are all over the place...umm, happy sad, then I'll be angry, then I'll be happy, then I'll be angry again, then at the end of the day, I will be depressed, because I will think I had a shit day, but I didn't.

***The loss of control.*** The behaviour is the product of emotional reactivity. The feeling of anger or frustration becomes problematic when the young person is unable to self-regulate the uncomfortable emotional experiencing. This sub-theme is underpinned by one or more of the following five implicit codes:

***Out of control.*** The behaviour represents a complete loss of control. The young person describes how an emotion (e.g., anger) or antisocial cognition (e.g., "I just want to kill them") takes over their body and results in violent or enraged behaviour or even the internalised act of self-harm. In the absence of problem-solving skills, this sub-theme can be seemingly unprovoked without an intent to harm (i.e., a representation of temperament and coping style), or as a reaction to a situation they did not know how to handle or interpret. This behaviour can also include a drug-induced rage perpetuating the complete loss of control.

[I] was bailed to Dads, went to stay with him, was on the Ice with him and that, and he owed my sister money, and he wouldn't pay, so I went off my head a bit and tried to stab him...[I was feeling] annoyed, angry, out of control [I was thinking] "fuck you"...I knew he wasn't going to pay up, so I was going there to bash him and set the house on fire [while I was thinking] I'm going to kill him.

I seen this fella, he used to walk past home every day and umm he, I dunno, I just clicked and blacked out, I seen it on camera (CCTV). (Who was the guy?) I dunno (but you recognised him, the guy who walks home every day?) yeah [I just]

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blacked out [on Ice] ...It's the Ice, that's what it does to you. I looked angry...It was pretty fucking crazy. I was spinning out about how angry I looked. I've seen the [CCTV] footage but. On the footage, it shows me coming up behind, and I throw a VB bottle at him, and he took off...then apparently we chased him or something, and then the dog squad came and everything...then I just woke up in a cell...[I had] no memory. I was on the Ice.

...I was a bit angry, I was angry, but I was a bit anxious at the same time (And were angry because?) You know because he talked a lot of shit about me and bullied my mate hard core.

(And you were anxious because?) I don't know what's going to go down and I don't know what he has either because I had something [a knife] ...I attacked him, with a weapon. [During] it was sort of just like a, it wasn't even like life, like a blur, just a big blur, I didn't even know what was going on...I sort of feel like my body made me do it like it wasn't me, I know it was, but that's just sort of how it felt, it was weird.

*Light switch.* The behaviour occurred due to an abrupt switch in mood, which resulted in damaging consequence to others and property. The behaviour was the result of one's propensity to get angry very quickly.

...didn't think, just snapped...didn't know why I was doing it, but I couldn't stop now, well I could but I couldn't, so I kept going on with it...then I tried to rob him, and I chased him, but he ran into someone's house [I felt] angry and confused at the same time.

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I've always been angry. I just click it happens pretty quick... just in and out of juvie, stuff had changed, and it felt weird, hard to get into a routine, hard to be a normal person.

I could just be kicking back heaps calm talking and that and then out of nowhere someone will just say the wrong thing and I will just snap, I'll just start going off.

*Don't push me. I'll snap!* The emotional experience of anger, which resulted in harm to someone or something, was a reaction to perceived/real provocation or threat to self.

Individuals who hold this implicit cognition/affect consider themselves to be intolerant of external provocations and attribute their behavioural reaction to a persistent external provocation. This implicit code differs from *light switch*, which is characterised by an automatic response without any attempt or capacity to tolerate frustration.

I was in the shopping centre, checking Facebook when I found out (didn't you say you were banned from that shopping centre?) Yeah! I was logging out (of Facebook), and the worker turned the computer off on me...I was like let me log out my Facebook, and I'll leave, and he wouldn't let me log out, so I went to turn the computer back on, and he grabbed me by the throat and pushed me away. I told him if he grabs me by the throat one more time I'm gonna hit him [I was feeling] Angry, I was angry because he grabbed me by the throat and pushed me away. I just don't like it when people grab me by the throat...I feel weak when I'm grabbed by the throat. I don't like feeling weak... [I was thinking] I'm gonna hit him...then I hit him, and he threw me out the store.

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*Anger is coming.* The feeling of anger or frustration is ruminated on and later leads to problematic or violent behaviour. The behaviour is due to the inability to reduce the anger/frustration in an alternate way, choosing to engage in a problematic or offensive action.

It takes me a while, last time I got pissed off because it was over a couple of days and it was built right up, one day if they keep saying it to me, one day I'll just snap...so I just let them go until I just snap.

I think I had an argument the previous night with my grandma...angry and frustrated...think it was about her wanting me to do something and I really didn't want to do it, and I kept on saying no...I just like to do things by myself when I'm ready (and when you're not allowed to, is that what makes you angry?) Yeah. Anger last for the entire argument...until the next morning, I ran away from home that night for a few hours...went for a [bike] ride (did that calm you?) no not really, it calmed me a little bit, but when I got back [3-4am] it started back up again...then I eventually went to bed, didn't sleep just lay there with anger and then in the morning; I don't know why I turned to fire.

*I'll hurt you first so you can't hurt me.* The behaviour was an *attempt* to protect oneself from real or perceived threat (e.g., harm or humiliation). The young person pervasively views the actions of others and their interactions with others through a lens of hypervigilance and hostile attribution. In response, the young person becomes suspicious, enraged, or scared (unsafe) and primarily responds with violence. It is, however, plausible this implicit code may also manifest as a displaced behavioural act, such as harming self or acting unstable to deter the threat indirectly.

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...my mind, it just I dunno how to put it, probably thinking of the negative all the time... Little paranoid, people are out to get me, that's why I usually carry about weapons, a knife and that.

I went to buy drugs, they were just acting very suspicious and being like umm, what's the word like... we had words like we were in there for an hour and they wanted to wait for another two hours, there was meant to be one guy, and two cars rocked up, and yeah they just looked a bit suss...it wasn't my area, so yeah I guess... umm cautious, but I wouldn't say nervous. [I was thinking] "This is a rip" "they must think I'm some kind of mug or something". [I was feeling] cautious, frustrated, and angry...because I had been waiting so long. They wanted the money first, and I was like "nah that ain't gonna happen", so I just pulled it [gun] out. I thought they had guns too...Because if you're gonna come to a drug deal, you've got to come prepared.

If someone else picked up a weapon I would, or if they say they're going to I will just pull one out and wack them with it.... normally a knife, sometimes a gun. I would say I started using guns and knives and that when I was like 13.

...I usually just click (like rage?) yeah, when people stare at me and that it feels like I've done something to them, so I usually walk up to them and ask what the fuck is your problem [what response do you normally get from people when you stay that?] they stand up and walk towards me (how does that make you feel?) I dunno, just makes me want to fight them, I usually throw head butts, I've broken a few people's noses (do you get enjoyment out of fighting?) humm [makes a noise



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and nods to indicate yes]. (How does it make you feel?) Better, I split someone's lip in here the other day.

**Grief.** This subtheme reflects behaviour directly preceded by bereavement and the behaviour is a response to unresolved grief. Only one script, *loss of a loved one*, emerged within the context of grief.

*Loss of a loved one.* The script is strongly interlinked with the other sub-themes in the emotionally dysregulated category. It represents the context of the behaviour; the trigger for a cognitive/emotional response, underpinned by maladaptive emotional regulation, may be perpetuated by antisocial cognition.

Ah yeah [I have self-harmed], but it's faded now. I carved mum into there [pointing to his arm]; I was on drugs...when mum died, I was like if you're gonna love someone that much and then it gets taken from you it's not worth loving someone that much...I guess I felt like she abandoned me.

[I] smoke Yandi everyday...smoke my brains out...to cope with losing my cousin.

Dad passed away when I was 10, it's part of the reason my offences started. After my dad passed away my brother (J), who was only 17 around that time, started looking after me, but it got too much for him, and that's when I started offending... I dunno I have just been through a lot of stuff.

My nephew-in-law died...that's when I went crazy...I just kept getting on the Ice and that, just kept trying to take it and get all the feelings away from me. (Were the

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break and enters to fund your habit?) Yeah.

**The revenge and retribution offender.** The behaviour was found to arise for one of two reasons; one underpinned by a sense of injustice and subjugation, and the other an act of direct retribution.

**Anomic disaffection.** The first sub-theme represents the implicit belief that “I have nothing and they have it all”. The associated behaviour resulted from feeling or experiencing subjugation and injustice in social status, culminating in the sense of dissatisfaction with their current situation. The young person’s narrative is articulated in a manner that justifies his/her offending behaviour.

If I had money I wouldn't be doing any of this, lots of money though... we're poor we're from the missions, the housing commission, we've had a hard life. Life was fucking shit; I never had nothing growing up. Just seeing all white fellas have heaps of shit and I've got nothing I'm poor, [it made me] annoyed, about everything-it's not fair... I just go and do crime...everyone needs money true? That's how you survive, how we gonna buy food and shit, clothes anything... I wanna be rolling with the rich.

I dunno it's just not a good place to grow up...and you can't really get a job when your 11/12 and shit and we had no money, so there's only one other way to get it when your mum and dad don't work and that. Like they've looked after me and that, they fed me and put clothes on my back but they can't get me the new Nikes that are out or the labels and that (so you feel like you don't get what other kids get, you feel disadvantaged?) yeah, like there are kids coming over from Afghanistan and shit and getting jobs like that, getting houses like that [participant clicks his finger

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to imitate immediacy] and then there is us, living in housing commission and shit ...its shit, it's scummy. Then yet you've got people coming over, and in two days they have a house, a car, renting furniture and shit. Then you have my parents who try to go out and work, but they don't get the kind of stuff that others do.

...I just thought well these cunts have all this stuff and they can make money off it, why does it matter if someone who doesn't have anything comes and just takes a little bit of it...I never had anything, I never had money, nothing, so that's why I take... [I feel] bored, frustrated, angry [participant laughs and scoffs]—I'm always angry, I'm angry because I want something and I can't get it. If they get angry at you for stealing, you get angry back at them because like if it's not fair if they, that's what makes me angry, it doesn't just make me proud stealing, if someone tells me I'm not allowed to steal; I get angry (and what do you tell them?) I tell them what my situation is and I tell them to fuck off!

***Even the score.*** The second sub-theme embodies the act of *revenge*. The behaviour is because the young person was aggrieved and wanted *revenge* against a specific person or target.

There is a vindictive sense about the act (e.g., to teach someone a lesson), though the act can also be displaced. The emotional experience is not necessarily anger per se, though anger may present as the primary emotion.

There was this girl, and she cheated on me so I lit her bin on fire and then I made a bomb and blew her letterbox up. She was a bitch, so I thought fuck you. I was going to light her house on fire, but I didn't want to kill anyone or anything... just

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to be an arse hole, just to piss her off you know...Just lit the fire and walked away, thought your gonna be a bitch I'll light your bin on fire. I was going to light their car on fire, but I was too scared it might blow up [participant acknowledges his plans were influenced by movies].

Get back at grandma. I think it was. I couldn't do much else, I mean I couldn't see what else I could do ... [I] went out to the front living room, I went out there, and I started trying to light the lounge [on fire] ...I wanted to get back at her...It's weird, I planned it, I plan it all. I don't act before I think with this, think first.

He thought we were all good, so I just made out we were good with him...then I waited until the workers went.... I just said to him say what you were saying [earlier today] now, and he didn't say nothing...I just hit him.

This fella, he hit my cousin in the head with a bottle, put him in intensive care, so me and my other cousin we assaulted him and done more damage...Just umm crushed his eye socket or something, fractured his skull, that's it.

**The power and control offender.** The final theme represents behavioural acts underpinned by narcissistic characteristics such as grandiosity and entitlement, with a preference for power and dominance for personal gain.

*Supremacy is mine.* For some youth, the desire for control is less cognitive and more emotionally based, with antisocial egocentricity less potent than the need to feel good about oneself in the context of control. This subtheme is typically intertwined with a young person's self-concept and manifests as one of the following three implicit codes.

*I'm in control.* The behaviour (e.g., an act of violence or firesetting) represents power

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and when one performs that behaviour one has control over a situation or a person. The behaviour is performed not because a young person has lost control, but because they have control, they like to be in control, and they want to maintain their position of power.

Because I was crazy... because I enjoyed it. (What did you enjoy?)...Probably the destruction. Yeah, like no one can fuck around with me, so that's why I said crazy before ... [what does that mean about you if no one can fuck with you?] I hold the power. Because all the time when we go and do these kinds of things, I'm the person who... well they call me the crowd control.

I used to feel like a scary monster (rage)...violence makes me feel in control.

I'm classed as a weapon because I've learnt to fight. (What made you want to start learning martial arts?) I never really thought I would be able to look after myself properly. (Were you bullied?) Yeah! ... People don't pick on me now.

*Don't disobey.* The concept that the offence occurred because someone disobeyed them or disrespected the juvenile offender. This may be precipitated by a negative emotional state, such as anger, but the behaviour was less associated with emotional expression and more cognitive distortion. The behaviour was done to prove a point that they are in charge and will not be disrespected. The individual holds the belief that they are above others or that they have been wronged.

That they have to do, that no one can disobey my orders (and did anyone in your break and enters or home invasions ever disobey you?) No!

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People not giving me stuff, like if I ask for it, I expect it right away...and normally I would hit them... [I'm thinking] "Oi you're a weak cunt" ...and I just get real stressed out [I feel] pissed off and angry.

*Control my environment.* The act of doing the behaviour makes them feel or think that they (or their peers) are protected or in control of a situation or person (e.g., a bully, abuser, rival gang, or other). The behaviour can be reactive or proactive; though in the current study it was found to be primarily proactive, with the behaviour emerging as a means to control their external environment.

I dunno just to try and look good in front of people, just try and get your name out there a bit (so you want to build a reputation?) Yeah...people will be more scared of ya. I used to get picked on in school and that, and that's why I used to start fights and that randomly... now I do [drugs] just trying to look good in front of people, [aggression], so people don't pick on me, and [self-harm] coz I'm worthless.

... I hit a staff...and graffiti-like, I trashed my room, and I refused, and trashed a unit, just tore the bubbler off the wall and the notice boards...because I wanted to come back down here, because I was getting visits down here and mum don't live near [location], so I got my classo up [behavioural classification level] and got moved back here.

### **Thematic Analysis of Fire Specific Scripts**

The second part of the current study was a qualitative analysis to examine whether juveniles who engage in deliberate firesetting behaviour hold fire specific cognitions (i.e., script) as a result of implicit psychological processes and beliefs pertaining to fire, which

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mediate the onset and maintenance of the offending behaviour (Gilbert & Daffern, 2017; Low & Day, 2017; Ó Ciardha & Gannon, 2012). Firstly, the offence characteristics of a young person's arson offence were obtained through semi-structured interviews. The most common target of deliberate firesetting among the current sample's index offence was a motor vehicle (37.14%), which occurred in the context of wider offending behaviour, followed by bushland (22.86%), public property (22.86%), and residential property (17.14%). A lighter was the most common source of ignition (80%), followed by matches (11.43%), with three participants either unable to remember the details of their firesetting incident or categorically denying their involvement. Over half of participant's had used an accelerant (51.43%), of which 28.57% ( $n=10$ ) of cases involved a motor vehicle already containing fuel. Thus, the accelerant was not actively procured.

Similar to the process for developing general offending codes, sub-themes, and themes, the fire scripts were inductively developed from participants' accounts of why they use fire. Inter-rater reliability of the coding framework and categorisation of participants was performed, with an initial agreement of near perfect,  $k=.91$ . Where discrepancies arose, the independent raters reached consensus through discussion resulting in 100% agreement. The analysis yielded six fire specific cognitive/affective scripts, two of which were broken down further into two separate sub-categories.

Among the current juvenile firesetting sample, the cognitions specific to the use of fire were: (1) Fire is destructive; (2) Fire creates calm after the storm; (3) Fire interest; (4) Fire protects me; (5) Fire denial/accidental; and (6) Fire is controllable.

**Fire is destructive.** Juveniles with this fire script hold the implicit belief that fire will destroy everything and that there is nothing quite as destructive as fire. Two implicit codes comprise this script.

***Fire is destructive and fun.*** Just over a third of juvenile firesetters held this fire script

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(37.14%). The firesetting is deliberate and chosen because of its destructive nature, which is perceived by the individual to be fun. Individuals who hold this belief were primarily antisocial (84.62%) and held the misconception that *fire is controllable* (76.92%), expressing surprise when the fire got out of control. The perspective that fire is interesting but not fascinating was also a commonly co-occurring view. For example, all participants engaging in fire use for destructive fun perceived fire as “pretty cool”, but were not preoccupied, nor did they necessarily plan to use fire (e.g., opportunistic for crime concealment).

[I was] feeling happy, it's pretty fun. I don't remember, just made a phone call, so more mates came down...the older boys, the older mates...they all ran through the block of flats, smashing into the apartments... We turned on the gas in the building. Then [someone] lit a fire in a different room, so the gas could build up and then yeah KABOOM! I dunno it just destroys everything it's hectic...it's just fun to watch, it's fun to run from it, because it moves so quick (so you almost get an adrenaline rush from it?) yeah yeah, like it almost burnt us one time.

I like being destructive. It's fun; it feels hectic... just watching things go up in flames.

***Fire is destructive for malice or revenge.*** Fire setting is deliberate and chosen because of its destructive nature. The purpose of the behaviour, however, is to cause harm to someone or something driven by malice or revenge. This script can occur in the context of anger (e.g., personal adversity or loss of control), sadness/hurt (e.g., perceived or real injustice/maltreatment), or fear (e.g., perceived or real threat to self/others). Individuals who held this belief exhibited a functional deficit in the areas of emotional dysregulation and/or antisocial cognitive distortion. The script was held by 14.29% of the current sample. The level



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of intended damage articulated by the young person (i.e., intention for the fire to get out of control) is an indicator of behavioural severity. The most commonly co-occurring codes were *fire interest* (80%); *fire creates calm after the storm*, *fire is destructive for fun*, and *fire conceals evidence* each co-occurred at a rate of 40%, with only one participant holding the belief of *fire is controllable* (20%).

[I told him] I'm gonna blow your bike up, and then I lit it up... I gave him a turn on my bike, and he was like yeah when I get a bike I'll give you a turn, so I was like sweet can I have a turn, and he was like nah. So I was like I'm gonna blow it up... When I released the petrol fueler and threw a match in there they were inside having a sesh, then they came running out, I said I told you I would light your bike on fire (What message did that send to him?) to not be a dog and say your gonna give me a turn and then don't (when he didn't give you a turn, how did you feel towards him?) I felt hurt pretty much, because I gave him a turn, and when he came round I would always give him a lap. He was giving everyone else a lap except me, so I thought fuck you then I'm blowing it.

There was this girl; she cheated on me so I lit her bin on fire and then I made a bomb and blew her letterbox up. Fire scares everyone; it scares me. If there was a fire around the corner and I was locked in my cell, I would be scared. It can do some damage... It does a lot of damage, more damage than anything else (and did you want to cause damage?) yeah.

The following extract is an example of a participant who had deliberately lit multiple fires. As seen here, his explanation for his use of fire aligns with *fire is destructive for*

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malice/revenge, but also fire interest and fire is controllable (i.e., mastery of fire; Ó Ciardha & Gannon, 2012).

I knew he wasn't going to pay up, so I was going there to bash him and set the house on fire [I was thinking] fuck you! [I was feeling] Annoyed [on the way to his house], angry [at the house], out of control [when he locked me out], and annoyed [I couldn't light the fire properly] .... (While lighting the fire, what were you thinking?) I'm going to kill him! [I felt] Happy [when I finally set it alight], I dunno, I was proud and interested... Because it's out of control...exciting! [I] Stood back and started laughing. (What is it that you like about setting fires?) I dunno, because it's like destruction you know what I mean, and when it gets out of control and like big ya know what I mean, it gets more scary and that.

**Fire creates calm after the (emotional) storm.** The (externalised) behaviour occurred in close proximity to a negative (or erratic) emotional experience, the scripted response creates calm or alleviation. Juveniles with this fire script hold the belief that lighting a fire can alleviate a negative (dysphoric) emotional state; 20% of the current sample held this belief. The fire is a dialectic of tranquillity and destruction; it can be captivating and relaxing, but also powerful and destructive. The majority of firesetters holding this belief were categorised as emotionally dysregulated offenders (71.43%), with the remaining individuals categorised as revenge/retribution offenders. The two most commonly co-occurring fire scripts for these individuals were *fire is controllable* (57.14%) and *fire interest* (28.57%).

I was walking around the house with a smile, so I don't know; probably I was confused, somewhere between happy, angry and sad. [Before the fire] Everything

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just came flooding back, my whole life, I can't explain it...it was bad [I was], sad, scared, depressed, confused, nervous. [I was thinking] just let it burn. I was just happy; I don't know, it [the fire] was just nice, it was something to take my mind off it. I sat and watched the fire, I closed my door and went to the toilet, then came back and sat there and watched the fire [for 2-3 minutes] and then the fire alarm started going off, so I took it out of the roof and threw it...there was thick black smoke.

...Well that night, I found out that my girlfriend had cheated on me with three of my best mates, I had a lot of anger in me...and depressed and fire was the only way I knew how to get it all out. [During] I was actually feeling pretty good, because when the fire was burning it felt like all of the bullshit which was happening before was going up in flames. [I felt] happy and out of control...Well, I actually felt good, because I got all of that out, instead of taking it out on someone, so it's instead of physically laying into someone because if I start laying into to someone, I won't stop.

**Fire interest.** Juveniles with this fire script hold the belief that fire is intriguing. This occurs on a continuum from low-level developmentally appropriate fire interest to intensified interest or fascination with fire/firesetting. The important point about this script is the potency of the reinforcer. Where fire is perceived to be far superior to alternative behaviours or the young person continues to engage in that behaviour, then the behaviour was considered a fascination.

***Fire is pretty cool.*** The fire setting is deliberate, and fire is chosen because it is interesting. The young person is intrigued by what will happen and pushes the boundaries to

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see new, fun, and cool things, like an explosion (sound, sight, impact). The effects that the property of fire creates opposed to the destruction it can cause was the primary impetus for engaging in the behaviour, thus different from fire is *destructive and fun*. Just over half of juvenile firesetters (54.29%) hold this belief. Individuals with this view were predominantly categorised as antisocial (78.95%), with most commonly co-occurring fire scripts of *fire is controllable* (73.68%), *fire is destructive for fun* (63.15%), and self-protection in the context of crime concealment; *fire conceals evidence* (31.58%).

...when the boys used to come over sometimes, we used to go down the bike track in the afternoons, sometimes in the mornings or the middle of the day and used to light fires, and when the fire brigade come we used to grab rocks and throw rocks at them...I don't know because it was fun, and when the police come, we would just run. ...The last was like when I was 14, I snapped out of it then, because it wasn't a good thing to do and it was just yeah.... Well, one time, me and my cousin just went down the bike shack, and I lit a fire and just ran...the dead grass because it catches everything, we just picked out where the most dead grass was.

...because I liked fire, I was a fire bug, but I wasn't allowed, I didn't light fires in my yard, because I didn't want to kill the green grass, because it would make mum unhappy (what is it about fire that you like so much?) just cause it's red, it burns it, anything that touches it will make it vanish (anything else about it that you like?) nah that's it (how does it make you feel when you are watching it?) it's thoughtful a bit, maybe I shouldn't have done it, maybe I should have, maybe because it was fun. ...I just don't like it no more (why don't you like it anymore?) because it's bad, mum told me if you're a firebug the devil will come after you and the black fella

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spirits (and did that scare you?) yeah, I shouldn't have done that, when mum found out, we got in big trouble, and she told me that then she grounded me and stuff, and I just didn't do it anymore, she told me about the spirits.

*Fire is fascinating.* The fire setting is deliberate, and fire is chosen because it creates a great degree of excitement and fun for an individual, beyond that of novel interest. It is more of a pathological interest and goes beyond watching a fire or lighting one because it was fun. This fire script is more associated with repeat firesetting behaviour, and will likely be comorbid with another fire script. Only four young persons in the current sample (11.43%) were classified as fascinated by fire. The script occurred across three offender types: emotionally dysregulated, antisocial cognition, and revenge/retribution. *Fire is controllable* most commonly co-occurred (50%) with *fire fascination*.

I didn't really care about the evidence, just wanted to watch them burn...I just sit there having a ciggy...because it goes step by step, when you burn cars first the [audio failure] then the horn starts going beep, then there is a blowout, then it will just burn down to the shell...I get happy, because it's fun (have there been times when you have lit fires because you're sad?) ah yeah, that's probably the bushfires when I'm walking through (are there other times?) when I'm angry I guess... we'd make petrol bombs and light letterboxes...or we just go out and look for trouble... I just like fire, just makes it better than before.

... yeah, well I mean I want it to get out of control, like the ones in the bush, I set bush fires sometimes...like this one, the night before [the house fire], ya know when I used all the petrol... I walked into the bush for like two hours and I found

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this big gum tree just laying down on the ground and I sprayed it with petrol...it went huge it was like the biggest fire I had ever done.

...it's just like I've seen it done and well, it's pretty much like drinking or smoking or something, you get a thrill out of it...it's just an enjoyment you get out of it, to watch something burn. [I just] Sit and watch...it's just like it's just how, people have their own things that they enjoy, like if someone is watching I dunno what people like to enjoy, but like if you watch something you enjoy and you just feel good about it, it's pretty much like that, it's exactly the same.

**Fire conceals evidence.** Juveniles who use fire for this reason hold the belief that the fire will destroy all evidence and protect them from getting in trouble or being convicted of an offence; 40% of young people in the current study held this belief. In the context of setting cars alright, fire is also used due to its accessibility (i.e., match in the fuel tank) and the speed in which it destroys the evidence, as opposed to wiping the car down to remove fingerprints. All but one individual holding this fire script were categorised as antisocial (92.86%), with *fire interest*, but not fascination, co-occurring most frequently (42.86%).

I dunno it's just what you do, if you get a hotty, you've got to burn it [audio failure] no fingerprints (so it's to get rid of the evidence?) Yeah, pretty much, we smashed the doors off it and reversed it into a tree (why did you do that before burning it?) [Participant laughs] just for fun I guess!

We got bored...mate suggested we should burn it to get rid of the fingerprints...we ditched it and burnt it, and it exploded... I was thinking, well I haven't got my

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fingerprints done, but he told me if you do eventually get your fingerprints done then it will eventually come back on you. So, I thought, yeah! The best thing to do is burn it! If it keeps me out of jail I'll do it, but we got caught anyway, so!

We just drove all night, but then thought "it's getting too hot" so we decided to set it alight to hide the evidence.

**Fire is controllable.** Juveniles with this fire script hold the belief that fire can be controlled by the person who started it. The firesetting is deliberate but not necessarily intended to cause the resultant damage, rather they engage in the behaviour because of the faulty cognition that they are in control. When the fire got out of control, it shocked the young person and created panic resulting in the young person abandoning the fire without attempting to extinguish it. For some, however, the realisation that fire is not controllable was positively reinforcing. Nearly half of all deliberate firesetters held this script (48.57%), and of these, 76.47% were categorised as antisocial offenders; the remaining participants were emotionally dysregulated offenders. *Fire interest*, but not fascination, co-occurred for 82.15% and *fire is destructive for fun* for 58.82% the participants.

Then when it got out of control I was thinking nah it's a bad idea don't do it don't do it and then it just all fell apart [I was feeling] scared and shocked, frightened and anxious.

...it went up real quick [I was] excited and happy at first, and then I started to get a bit nervous when it got too big, and I couldn't stomp it out [I was thinking] I'm going to get in trouble.

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...and there was this big thing of leaves, a tree must have fallen down, and I lit it up, and then we all started watching it, and then it got out of control, so we tried to get out of there, there was four of us on one motorbike trying to get out, we just took off... and saw it on the news and it was really close to houses and shit [including mine], and thought fuck I didn't mean for it to do that.

**Fire denial/accidental.** Juveniles engage in the scripted response of “it wasn’t me” or “it was an accident”. Thus, this theme was divided into two sub-themes: (1) The fire was an accident, where the young person denies his/her involvement; and (2) The young person admitted to being responsible for the fire, but maintained the fire was an accident and denied any fire history/interest. All participants holding this belief were categorised as antisocial, therefore scripted denial and minimisation was not surprising, due to a failure to take responsibility for their own actions.. This script of denial/accidental firesetting was held by 22.86% of juvenile firesetters; the majority of these eight participants (62.50%) were in fact participants holding the belief that *fire is controllable*. Thus the young person’s intent may not be congruent with the severity of the fire outcome.

It was accidentally lit... Yeah I flicked a smoke, and I seen smoke, then flame and was like fuck, I ran home told my friend to call the fire brigade and yeah.

Most of my anger I just took it out on crime or hurting others [I was feeling] Bored, just planning it [the B&E] ...feeling excited [thinking] I hope no ones in here, [I'm] looking for the stuff, where's the stuff, what if someone comes, just need to get the stuff and get out. [But] There's nothing to take, [my] mate lit the fire because there



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was nothing for us. My mate didn't tell us he had lit it up until we saw the smoke. I thought I had burnt it because I had stepped on a hair dryer and left it. Then he told us he just set a bed sheet alight with a lighter because there was nothing in there [I felt] annoyed!

We were just bored, and we went down this back-alley way, and someone's big shed was open, my friend decided to go in there, so I waited out to see if anyone was coming, and he went in there, and he took a jerry can with fuel and we were walking just around ... just lighting spot fires on the road.... my friend decided to tip the jerry can out on to someone's lawn and flick his smoke on to it, so that is pretty much how it started.

**Previous firesetting.** Of the 35 deliberate firesetters,  $n=18$  (51.43%) reported prior engagement in deliberate firesetting (i.e., intentionally setting fire to something they shouldn't) during the enquiry about former engagement in their index behavioural problem. The mean age of firesetting onset, irrespective of detection, was 11 years old ( $M=11.01$ ,  $SD=2.86$ ) with previous firesetting incidents undetected for 42.86% of participants ( $n=15$ ). Calculating the mean number of previous fires deliberately lit was not possible in the current study, due to the ambiguity of participant's self-reports. For example, seven participants (38.90%) were unable to quantify the number of fires they had lit, instead stating comments such as "heaps", "too many to count", or "I used to light fires 24/7". Of the remaining 11 participants, two (11.11%) stated they had lit fires "... about 100 times!" one (5.60%) participant indicated he had set more than 10, but less than 20 fires and six (33.33%) reported lighting approximately five or fewer fires. For two participants their responses were inconclusive. Nevertheless, multiple incidents of prior firesetting were reported among the

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current sample, with all but three participants remaining undetected by parents and/or professional services for every fire they had lit prior to their index offence.

Similar to index offending, the most common form of ignition source used in previous firesetting incidents was a lighter ( $n=17$ , 94.44%); only two participants reported the use of matches for deliberate firesetting. Of the repeat firesetters, over half ( $n=12$ , 66.70%) had previously used an accelerant (i.e., petrol, gas, aerosol, or flammable liquid). The targets of prior firesetting incidents were reported to be predominantly bushland ( $n=10$ , 55.60%), followed by motor vehicle ( $n=8$ , 44.40%), materials, such as newspaper, toilet roll, junk piles, or own possessions ( $n=8$ , 44.44%), public property ( $n=5$ , 27.80%), and residential property ( $n=5$ , 27.80%). All but one participant ( $n=17$ , 94.44%) reported no negative outcomes from their previous firesetting. This one participant continued to engage in deliberate firesetting behaviours and disclosed having lit over 100 fires, despite having injured himself during a previous firesetting incident. Finally, minimisation of fire use was articulated by 61.11% ( $n=11$ ) participants. Most participants demonstrated insight into the potential consequences but disregarded the risk:

It was stupid...but I'd still light one now if I could.

They always get too big... but I like watching the flames.

I set bush fires sometimes... nothing happened, it was winter.

Whereas, others articulated minimisation without any evidence of insight into the potential consequences:

... Bins that's all [since being charged with arson]

I don't really make fires and that now... (Are you still offending?) Yeah, bigger

stuff.

Evidence of several firesetting scripts was determined from the interviews with participants about their historical firesetting incidents. The three most commonly endorsed fire-scripts were *fire is pretty cool* (83.30%;  $n=15$ ), *fire is controllable* (72.22%;  $n=13$ ), and *fire is destructive for fun* (66.70%;  $n=12$ ). Less frequent fire-scripts were *fire is destructive for malice or revenge* (22.22%,  $n=4$ ), *fire creates a calm after the storm* ( $n=3$ , 16.70%), and *fire fascination* ( $n=3$ , 16.70%). Fire fascination, rather than fire interest, is characterised by the potency of interest, enjoyment, or knowledge/experience that far exceeds that of inquisition. *Fire conceals the evidence* is a form of detection evasion and had previously occurred for 33.33% ( $n=6$ ) of participants, with *fire denial/accidental* occurring for 22.22% ( $n=4$ ) of participants.

Prior engagement in deliberate firesetting was attributed to the same reason as index offending by 83.33% ( $n=15$ ) of participants. Over half of the sample ( $n=10$ , 55.60%), however, provided narrative accounts evidencing additional fire-scripts present during their previous firesetting incidents, but not necessarily present for their index offence. Of these participants, five escalated towards emotionally expressive acts without retaining prior cognitive fire-scripts, and five escalated towards emotionally expressive acts while retaining and integrating their previously held fire-scripts and behavioural pattern.

***Differentiating fire interest from fire fascination among juveniles.*** Three of the four participants holding the internalised belief that fire is fascinating had held this belief for a protracted period prior to index offending. These participants provided detailed narratives demonstrating versatile knowledge of ignitions, methods for causing destruction, and means of evoking fear in others through the use of fire (e.g., carrying a water bottle containing fuel and squirting it in someone's face while flicking a lighter as a threat). All three of these participants held the belief that fire was controllable (i.e., by them) and articulated fire to be

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part of their self-concept (e.g., “I’m a back burner” or “I can light a fire out of anything”). Participant’s exuded either a sense of pride pertaining to their fire skill or a tone of passion when providing their narrative. Two of these three firesetting participants were also classified as serious violent offenders at the time of the index interview. These two participants both held the belief that *fire is destructive for malice or revenge* and *fire creates calm after the storm* at the time of their index. The three participants with the implicit belief that *fire is fascinating* did not articulate any negative impacts from their previous deliberate fire use, nor were they able to confidently confirm they would not light another fire again in the future.

One participant provided a detailed narrative of his firesetting, however, unlike the three participants who hold the belief that *fire is fascinating* this young person articulated fear of fire. This fear, in fact, prevented him from engaging in particular destructive acts, rather than perpetuating his firesetting against others. For example, he stated he had never lit a car on fire due to fear it would blow up and hurt him, as seen in the movies. His index offence did not involve an accelerant, nor did he express interest in the fire per se. The fire was, however, set with malice after having injured himself at another crime scene, thus leaving evidence of his presence. In a state of anger and a means of protecting himself, he set a fire against the specific public property that he perceived to have injured him, as a “fuck you”. He stated he was surprised at the extent of the damage the fire had caused. While this young person was historically interested in the use of fire and used it as a destructive means for revenge in his formative years, he was not regarded as fascinated with fire. The juvenile’s justification for the use of fire was that it was a less severe method than the use of violence and that it is a good way to achieve retribution, perceiving everyone to be scared of fire, including him. The participant attributed his former firesetting to “kid brain”; at the time of the interview, the young person was serving a sentence for a serious violent offence involving weapons charges.

Finally, a history of preoccupation with fire, irrespective of physically setting a fire

was found. One participant in the current study reported experiencing homicidal and destructive fantasies approximately 12 to 24 months before his index offence, with the use of fire as the primary source of his fantasied offence. The index offence had been cognitively rehearsed, with the young person's homicidal fantasy not acted upon per se, rather an act of violence directed towards the same source of action and locus of effect as his fantasy (i.e., threw a metal bar at the intended target). His only previous involvement with fire was camping as a child, whereby he stated he liked the warmth. This participant was not included in the analysis as a previous firesetter; however, it illustrates fantasy and cognitive rumination may precede deliberate firesetting and violence among youth. Thus, for some offences, the fantasy and action appear consistent, but for others, there is a fracture between the fantasy and the behavioural action. Plausibly a preference for displaced, rather than direct acts of aggression may be more consistent with this young person's modus operandi. The disconnect between fantasy homicide and behavioural assault, however, is something for further exploration, as this may be a protective factor for this particular young person.

### **Integration and Comparison of Current and Existing Research**

The following section provides an integration of the study findings and existing typologies, contextual factors, and situational triggers (see Table 7). Additionally, a comparative overview of the fire-specific results and existing theoretical findings on proximal dynamic risk factors is presented (see Table 8). These findings illustrate the heterogeneity of cognitive-affective processes both between and within individuals, and are explained in greater depth in the discussion section of the current chapter.

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Table 7

*An Integration of the F-JOF with Existing Typologies*

The F-JOF (Level 1)	The ASM	Situational Triggers
Emotionally Dysregulated	Integrative mode (internal/internal)	Adversity/distrust Interpersonal conflict Social demand
	Expressive mode (internal/external)	
	Conservative mode (external/internal)	
Power/Control	Adaptive mode (external/external)	Pleasure Social demand Interpersonal conflict
	Conservative mode (external/internal)	
	Expressive mode (internal/external)	
Antisocial	Adaptive mode (external/external)	Pleasure Social demand
Revenge/Retribution	Conservative mode (external/internal)	Adversity/distrust Interpersonal conflict
Cross-functional	Dynamic mode of action	Intra-individual variation

*Note.* The full F-JOF is presented in Table 5. Action systems model (ASM; Canter & Fritzon, 1998) and situational factors (Rauthman et al. 2015; Ten Berg & De Raad, 2002)

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Table 8

*A Comparative Overview of Juvenile Fire-Scripts and Existing Theoretical Findings*

Juvenile fire-scripts	Implicit fire beliefs	Instant fire reinforcers
Fire is pretty cool Fire is fascinating Fire is destructive for fun	Fire interest	Elicit stimulation
Fire is destructive for malice/revenge	Normalisation of violence Fire is a powerful tool	Remove negative affect
Fire is the calm after the storm	Dangerous world Fire is a powerful tool	
Fire conceals evidence It wasn't me	Fire is a powerful tool	Crime concealment
Fire is controllable	Fire is controllable	

*Note.* Implicit theories of firesetting (Ó Ciardha & Gannon, 2012) and instant fire reinforcers (Fineman, 1995).

### Discussion

The present chapter examined the narrative accounts of juvenile offenders to determine the functional underpinnings of juvenile offending behaviour. The focus of the research was the functional underpinnings of juvenile firesetting, a problematic behaviour co-occurring with wider antisocial risk (Lambie et al., 2015). Accordingly, the proximal cognitive, emotional, and environmental experiences of juvenile participants were pivotal in understanding the dynamic commission of offending behaviour. The primary hypothesis, that multiple functions underpin the onset and maintenance of juvenile firesetting and non-firesetting offending, was supported. Four overarching functional purposes for engaging in criminal behaviour were determined and underlying these, were sub-themes illustrating specific domains of heterogeneity within a behavioural function, as well as the dynamic implicit psychological processes that explain a problematic behavioural occurrence.

The first original contribution of the current study is the three-tier framework of juvenile offender function (F-JOF) revealing a series of dynamic implicit codes (i.e., implicit cognition/affect), sub-categories of behavioural function, and higher order trajectories informing the functional underpinnings of juvenile offending and wider problematic behaviour. The framework offers a systematic process of identifying and monitoring dynamic psychological risk factors among child and juvenile populations and accounts for functional heterogeneity and contextual variation.

Integrating existing research on contextual factors and situational triggers revealed that underlying vulnerabilities were triggered by the proximal retrieval of an implicit code, which was attributed and expressed either internally or externally (i.e., ASM; Canter & Fritzon, 1998) in the context of one of four situations: pleasure seeking, interpersonal conflict, personal adversity/distrust, and social demand (Rauthman et al., 2015; Ten Berg & de Raad, 2002). An overview of existing typologies integrated into F-JOF is presented in Table 7 of the results.



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A key finding of the current study is the importance of evaluating a young person's behaviour at a more implicit level, as demonstrated by both inter-and intra-individual variation in cognitive-emotional experiences of young people who are categorised under the same function (e.g., emotionally dysregulated). This is consistent with existing research findings identifying juvenile offending behaviour to be heterogeneous (Hillege, Brande, Mulder, Vermeiren, & Domburgh, 2017) and deliberate firesetting behaviour to be multifaceted with widespread antisocial risk (Watt et al., 2015). Categorising an offender as either antisocial or emotionally dysregulated, for example, was found to be reductionist. For instance, engaging in maladaptive behaviour to remove a negative emotional state occurred for one of four reasons in the current study (i.e., anger/frustration, sadness, mania, or grief) indicating that emotional dysregulation reflects both internalising and externalising psychopathology (Tanner et al., 2016; Watt et al., 2015). Thus, inhibiting the identification of their criminogenic and non-criminogenic needs is problematic for both risk management and psychological intervention.

Similar to research by Walsh and Lambie (2013) on motives for juvenile deliberate firesetting, the narratives of participants in the current study were frequently characterised by multiple implicit codes across more than one function (i.e., cross-functional). The limitations of classifying a young person into an overarching category, without further evaluation at a more implicit level are reiterated. The implicit codes reflected a young person's cognitive-emotional experiences in proximity to the offending behaviour (i.e. occurring between a few weeks and a few moments before, during, and after). The potency and pervasiveness of a participant's proximal cognitive and emotional experience were used to inform the overarching function of a juvenile's behavioural problems. The cognitive-emotional experiences corresponding with disparate functions may, therefore, represent a less problematic behavioural chain, a lack of relevance to the behaviour being discussed in the interview, but high relevance within another context, or an underdeveloped (dormant) implicit

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code which will likely be perpetuated with greater exposure to adverse psychosocial experience.

The presence of intra-individual variation in implicit codes among the current sample offers explanation for why some firesetters become violent and others do not. For example, in the current study firesetters were found to hold offence-specific scripts formed via individual interpretation and internalisation of childhood maladaptive experiences or offence-related exposure, resulting in the reinforcement of offence-related contingencies (Fineman, 1995; Gilbert & Daffern, 2017; Gilbert et al., 2017; Ó Ciardha & Gannon, 2012). Maladaptive childhood experiences and exposure to aggression and violence, in addition to witnessing deliberate firesetting, likely inform the development of beliefs systems and the internalisation of offence scripts. Differing forms of antisocial behaviour, however, do not necessarily indicate differing functions (OPB; Daffern et al., 2009). Gilbert and Daffern (2017) outline the sequential process of encoding, rehearsing, revising, and retrieving scripts from individual experiences of violence and aggression, which subsequently act as a template for a problematic behavioural response. The internalisation of broader problematic scripts (e.g., aggression scripts), in addition to the fire-specific scripts determined in the current study, plausibly explain why some but not all deliberate firesetters go on to develop other antisocial and violent behavioural problems.

Participant narratives revealed that implicit codes were underpinned by a series of maladaptive early life experiences, which predisposed the current sample toward a pattern of problematic thinking and emotional dysregulation (Young, Klosko, & Weishaar, 2003). Examples of early maladaptive schemas, including: abandonment/instability, emotional depression, mistrust/abuse, insufficient self-control/discipline, negativity/pessimism, and entitlement/grandiosity, were pertinent predisposing factors for each of the functional themes. The schemas of defectiveness/shame and approval seeking were also evident among those

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within the antisocial or peer influence sub-theme. The developmental nature of the current sample, however, illustrated that many participants' psychological experiences were underpinned by under arousal and impulsivity in proximity to their behaviour, rather than schematic activation. This is consistent with the neurodevelopmental process of juvenile meta-cognition and regulatory development (Kenny, 2016), and further emphasises the importance of dynamic assessment of behavioural function as the young person moves through the course of adolescence.

### **Fire-Specific Results**

The primary target for firesetters' index arson offence was a stolen motor vehicle in the context of wider criminal activity, as means to conceal evidence of another crime. This finding reiterates the prevalence of criminal versatility among juvenile firesetters (Lambie et al., 2013; Martin et al., 2004; Watt et al., 2015). The general offending code of *it's getting too hot* in the current study was expressed by over one-third of the sample, with all but one participant within this classification setting fire to a stolen motor vehicle to destroy evidence; the final young person set fire to school property to conceal evidence. The findings align with general crime statistics, specifically juveniles being responsible for a third of all motor vehicle theft in the Australian state of NSW (NSW BOSCAR, 2017). Bushland was more commonly the target of participant's previous firesetting incidents. This is plausibly a reflection of the juveniles' developmental age and subsequent access to potential targets (i.e., motor vehicle); the mean age at firesetting onset was approximately three years younger than mean age at index.

The current findings align with Fritzon et al. (2014) who found adult Australian arsonists were significantly more likely to target a motor vehicle over residential property, or cause threat to life than British arsonists. The cross-cultural variation is possibly attributed to the geographical expanse and relatively less dense population of Australia. Several

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participants in the current study described driving a stolen motor vehicle into the bush and setting it on fire because the remote location facilitated their needs being met. For instance, juveniles articulated being able to sit and watch the fire, experiment with new methods of lighting fire, enjoying open space without supervision or restriction, and concealing evidence of additional criminal activity. The juvenile firesetting sample, therefore, demonstrated both rational choice (RAT; Cornish & Clarke, 1987) and detection evasion skills (DES; Jones, 2010) in the context of their firesetting behaviour. Knowledge sharing and vicarious experiences between juvenile peers is suggested to perpetuate the development of DES in the context of deliberate firesetting behaviour (see Uhnoo, 2016), as evidenced by over half of participants lighting a fire for crime concealment in the company of peers, with the remaining participants acting alone but disclosing prior exposure to a motor vehicle being set alight for the purposes of crime concealment.

The geographical expanse of Australia combined with the developmental stage of the young person appears to perpetuate motor vehicle theft and deliberate firesetting for the purpose of crime concealment. For example, the majority of the current sample was too young to legally drive or were without the opportunity to learn legally (e.g., the absence of finance or a support person to provide transport), thus limiting the opportunities for autonomy, stimulation, and broader environmental experience. Many participants provided personal narratives about the limited opportunities near where they lived and a sense disaffection about their life circumstance; therefore, the offending behaviour is an attempt to adapt their environment (i.e., an external source of action and external locus of effect).

**Fire-specific scripts.** The second hypothesis that offence specific cognitive-emotional processes would be yielded for deliberate firesetters was confirmed. Using the same method employed to determine the underlying function of general offending behaviour (i.e., functional chain analysis and thematic analysis) the narrative accounts of juvenile firesetters determined

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six fire-scripts underpinned by implicit maladaptive beliefs about the fire. These fire-scripts arose as a result of juveniles discussing exposure to and experiences of fire; the interactions between individuals' and their environmental experiences of fire shaped the onset and maintenance of their deliberate firesetting behaviour (Ó Ciardha & Gannon, 2012).

Much like the F-JOF discussed above, fire-scripts were multi-dimensional (e.g., *fire is destructive* can occur for fun and also, *for malice/vengeance* can be underpinned by boredom, anger, sadness, or pain). Moreover, juveniles were found to hold more than one maladaptive belief about a fire. For example, in the current study, one young person articulated four fire-scripts underpinning his firesetting behaviour. This young person was charged with lighting a block of flats on fire with his friends (i.e., *fire is destructive* for fun), as well as disclosing lighting the bush on fire then running from it for an adrenaline rush and making bike jumps and setting them alright (i.e., *fire is pretty cool*). The young person also articulated lighting cars on fire, not only to conceal wider crime (i.e., *fire conceals the evidence*) but because watching the fire made him feel better than before when he was in a negative emotional state (i.e., *calm after the storm*). These findings reiterate the importance of being flexible and fluid with the treatment of fire-specific offenders, particularly when identifying a young person's wider treatment needs and context of behavioural occurrence. Moreover, this young person articulated that fighting "does the same thing" as firesetting, identifying both behaviours can alleviate a negative emotional state. The finding that different forms of behaviour may serve the same functional purpose offers initial support to the suggestion that comorbid behavioural problems among deliberate firesetters may be functionally consistent (Miller & Fritzon, 2007).

A review of participants' index and prior firesetting incidents revealed that fire interest runs on a continuum from *fire is pretty cool* to *fire is fascinating*. Three key findings were determined in relation to fire interest. Firstly, low level fire interest was determined to be a fundamental risk factor of repeat engagement in deliberate firesetting, irrespective of whether

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the young person was classified as fascinated by fire. Secondly, as per the operational definition of fire fascination, only four participants were regarded to have fire interest to this extent. Finally, persistent firesetting behaviour also occurred in the absence of fire interest. Based on the current findings, level of fire interest did not determine the frequency of behavioural engagement. Fire interest was, however, determined from the level of enmeshment between fire use and self-concept, fire use and self-efficacy, psychological appraisal of reinforcement potency, and the frequency, intensity, and duration of fire-script rehearsal. Evaluating the co-occurrence of fire-scripts and the stability of their occurrence between fire-onset to fire-index provided greater context to the significance of a participant's firesetting behaviour, thus informing those at heightened risk of re-engaging in deliberate firesetting.

A review of the current findings suggest that juvenile fire-specific risk is maintained by one of three psychological processes: (1) *re-appraisal and persistent*: juveniles will re-appraise a fire event but continue to hold the same opinion of fire (i.e., consistency); (2) *re-appraisal and shift*: juveniles will re-appraise a fire event with their opinion of firesetting subsequently shifting without retention of a previous script (i.e., variation); and (3) *re-appraisal, retain, and shift*: juveniles will re-appraise a fire event and integrate or retain a formally held script, while also developing and shifting towards the retrieval of a new script in different contexts (i.e., escalation). The latter is proposed to be associated with more serious and versatile firesetting behaviour. This is consistent with Loeber and Ahonen (2015) who found juvenile offenders retaining their previous behavioural problems are more likely to escalate towards serious and violent offending. Thus, the same process is suggested to occur for juvenile fire-scripts.

Approximately half of the firesetters disclosing prior firesetting behaviour attributed their former firesetting to the same reason as their index offending and provided narrative accounts detailing continuous retrieval of the same fire-scripts between fire-onset

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(approximately age 11 years old) and fire-index (approximately 14 years old). For example, the finding that an accidental burn injury and subsequent leg infection did not deter a young person from re-engaging in deliberate firesetting is suggested to illustrate either no re-appraisal occurred between firesetting incidents, or the potency of the reward was overriding the negative consequence. Alternatively, a bias in cognitive recall may have occurred, with the in-depth discussion of index offending prompting bias in recollection of a previous incident. Determining if a young person's persistent fire-script is an appraised choice or a deficit in meta-cognitive processes, therefore, would be the assessment focus for those demonstrating persistent fire-scripts.

The exception to underdeveloped meta-cognition would be crime concealment. The sole occurrence of this script fits with rationale choice theory (Cornish & Clarke, 1986) and indicates a potential risk for both arson and general recidivism. This script was found to occur alone and in the absence of fire interest, subsequently resulting in persistent firesetting occurrence with no change in script or modus operandi in the context of fire use. Participant accounts were matter of fact about the adaptive purpose of their firesetting and their post-offence actions of leaving the crime scene instantly, only looking back to ensure the car had set alight and concealed their involvement. The actions of these juveniles further reflected the instrumental nature of their firesetting behaviour. In addition to being caught for their index offence, these participants acknowledged having engaged in the same behaviour multiple times before without detection. For these young offenders, assessment and intervention would focus on the factors and underlying functional needs leading a juvenile to engage in wider criminal behaviour, of which fire is used to conceal their involvement.

The remaining half of participants disclosing prior firesetting described versatile firesetting histories with evidence of additional fire-scripts developed throughout the course of childhood and adolescence. The scripts of these participants appeared to follow a pattern of

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gradual escalation similar to a tolerance-dose relationship (Fritzon, 2012). The pattern of escalation, however, occurred in one of two ways. The first was a gradual escalation towards emotionally expressive acts, with prior fire-scripts such as *fire is destructive for fun* and *fire is controllable* becoming redundant and the removal of negative affect becoming the primary reinforcer. This process aligns with Watt et al. (2015) who concluded that for some juvenile firesetters the association between fire and emotional regulation (i.e., fire affect) is representative of wider pathological concern and when an emotional connection to fire arises, the degree of antisociality is less important for the reduction of risk is of. The transition from one behavioural function and gravitation towards another demonstrates retention of behaviour, but a dynamic shift in the underlying mechanism of firesetting across the course of adolescence. Thus, dynamic assessment of an individual's appraisals of fire use is necessitated. The second pattern of escalation involved the retention of former scripts (e.g., *fire is destructive for fun*) while concurrently encoding, rehearsing, and retrieving additional, more pathological, fire-scripts (i.e., *fire is destructive for malice or revenge*, *fire fascination*, and *fire creates a calm after the storm*). For these individuals, it was only when their more pathological firesetting scripts escalated that their firesetting was brought to the attention of professional services (i.e., index offence). The retrieval and rehearsal of problematic fire-scripts were occurring undetected prior to a criminal adjudication for the offence of arson.

As shown in Table 7, parallels can be drawn between the general behavioural functions developed in the present study and the empirically validated framework of the ASM (Canter & Fritzon, 1998; Fritzon, 1998). Consequently, F-JOF is consistent with empirically validated models of offending behaviour. The fire-specific scripts articulated by juvenile deliberate firesetters, to an extent, also align with previous empirical work (see Table 8); including being underpinned by implicit theories of firesetting (Ó Ciardha & Gannon, 2012) and reinforced by instant feedback via either, stimulation, reduction of negative affect, or crime concealment



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(Fineman, 1995).

The cognitive script of *fire is destructive for malice or revenge* aligns with the implicit theory that people deliberately light fires due to their beliefs that *fire is a powerful tool* and *violence* is normal (Ó Ciardha & Gannon, 2012). Respectively, these theories explain that fire is used to send a clear message (i.e., fire is used to achieve admiration, fear, or receive help) and using fire as a means for asserting retribution is a normative behavioural response. Depending on the frequency of engagement and potency of the functional reward, the fire-scripts of *fire is destructive for fun*, *fire is pretty cool*, and *fire is fascinating* align with the implicit theory of fire interest. The cognitive script of *fire is controllable* developed in the present study appears synonymous with *fire is controllable* described by Ó Ciardha and Gannon (2012). For example, firesetters hold the misconception that they can control fire or underestimate the severity of fire misuse, as well as the detrimental consequences of its misuse.

To a degree, the implicit underpinnings of the cognitive script *fire creates calm after the storm* overlaps with implicit theories of dangerous world and fire is a powerful tool; based on Ó Ciardha and Gannon's (2012) description that those who may have experienced trauma victimisation may engage in firesetting as they receive a positive sensory or affective experience. Using fire to alleviate negative affect can occur independent of fire fascination, with some participants articulating an alleviation of negative affect whilst not expressing fascination or excitement by fire. For example, one participant described lighting a fire in a dissociative state to alleviate negative affect, but this was his first time lighting a fire for this purpose, having previously self-harmed to achieve the same effects. The individual did not experience excitement or articulate fascination, just that he felt better afterwards. His only prior experience of firesetting was lighting a grass fire with friends in his backyard, at approximately 12 years old for "fun". Therefore, this young person's fire behaviour is not

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frequent, pervasive, or potent enough to be representative of fire fascination.

Finally, the cognitive script of *fire denial/accidental* aligns with the literature on denial of responsibilities. As discussed in the introduction of this chapter, this rationale for firesetting is best explained by the ASM and an adaptive mode of function and general antisocial functioning/poor problem-solving (Fritzon, 1998). For example, this script was underpinned by a young person's direct attempt to manipulate the environment (i.e., deny affiliation to avoid a penalty), or the result of affiliation with antisocial associates (i.e., peer pressure and a lack of assertiveness or desire to remove oneself from a problematic situation). Each firesetter who participated in the current study was adjudicated for the act of deliberately lighting a fire. Thus, their actions resulted in criminal responsibility. Fire by association or affiliation with peers may be more potent among juveniles than an adult, with psychosocial immaturity and the role of peers in offending contributing towards poor decision making and non-compliance with parents or figures of authority (Monahan et al., 2009).

While these fire-scripts can explain why an individual uses fire (i.e., the impetus for fire over another means), the scripts alone do not inform function of behaviour. As discussed in the introduction, a belief system about a behavioural response or motive for engaging in a behavioural act can be shared by two or more individuals, yet the context of script retrieval or the function underpinning a motive can be variable. For example, using fire because it is destructive and destroying objects is *fun* might be underpinned by normalisation of the (antisocial) behaviour, peer group influence, a desire to taunt others for their own amusement (e.g., control/power), or avoidant coping (e.g., emotional dysregulation). Alternatively, using fire because it is destructive and is a powerful tool to inflict malice or revenge will also vary depending on the precipitating impact of the perceived injustice or maltreatment. For example, the act of fire-specific revenge in the context of direct retribution or a sense of anomic disaffection may have been triggered by sadness (e.g., help me), anger (e.g., loss of control),

or a threat to the sense of self (e.g., control/power). Therefore, the thematically derived F-JOF is required in conjunction with fire-scripts to inform behavioural reduction. The development of fire-specific scripts confirms the presence of fire-specific risk among juveniles who engage in deliberate firesetting, providing clarity to why some juveniles gravitate towards the use of fire and others do not. The present study is the first to address fire-specific scripts among a juvenile population, though the findings are preliminary, requiring replication and validation.

The current findings advance the field of juvenile firesetting by proposing specific cognitive-emotional scripts within the areas of reinforcement outlined by Fineman (1995). These are also akin to empirical findings in the field of adult firesetting (Ó Ciardha & Gannon, 2012). The fire-scripts developed in the current research are contextual to the developmental experiences of a juvenile offender. For example, firesetting to cause destruction appears unique to a developmentally immature population.

### **Limitations of the current study**

The qualitative methodology employed in the current study may be viewed as a limitation, depending of the reader's school of thought. The chosen method in the current study enabled the development of a rich conceptualisation of the idiosyncratic narratives underpinning juvenile behavioural problems. However, the qualitative data was subsequently quantified to determine which proximal experiences were most prevalent and pertinent among juvenile offenders. Researchers who predominantly operate from a qualitative position, however, would oppose the quantification of qualitative information (Braun and Clarke, 2006). Australian health researcher Pyett (2003) argued this escapes the point of qualitative research, as frequency does not determine value. Though, quantifying qualitative information to assess its globalised relevance to juvenile offenders is a more pragmatic approach to informing assessment and offender management. The assessment of inter-rater reliability in qualitative studies has also been adopted by lead researchers in the field of juvenile offending

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and firesetting behaviour (Lambie & Walsh, 2013) and offers empirical rigour for the exploration of juvenile offender function. Arguable the subjective nature of qualitative methods and the barrier of accurately *reflecting the other* (Lyons & Coyle, 2016) raises questions about the validity of any qualitative findings. Though, as outlined in the method section of the current study, steps were taken in an attempt to minimise any threats of research bias, including researcher reflections and inter-rater analysis.

The cross-cultural dimension of the current methodology may have negatively impacted upon the cultural integrity and generalization of the current findings across cultures (Pelzang & Hutchinson, 2017). While understanding variation in linguistic nuances and expression between cultures was taken into consideration at the analysis stage, not all of the implicit codes, sub-themes, or themes determined in this study may be relevant cross-culturally. Thus, future studies might consider an evaluation of cultural variation to ensure the development of culturally sensitive protocols for juvenile deliberate firesetting and general offending.

Caution is advised in the generalisation of the current findings even after quantification, given the sample size was small and the findings are exploratory in nature. Moreover, the response rate from participant's primary caregivers was insufficient for analysis. As indicated by Walsh and Lambie (2013), the inconsistency between the reports of child and caregiver indicates that no one source is sufficiently reliable and the combination of sources is more robust. Nevertheless, the current findings are not redundant, as the qualitative method employed provides a representation of the internal cognitive and emotional triggers from the perspective of the individual's lived experience. These experiences are implicit and cannot be directly observed, thus had caregiver data been obtained, its utility would have been limited in informing proximal factors.

### **Conclusion**

The current study contributes original findings to the field of both juvenile offending and deliberate firesetting. This is the first study to identify the dynamic and proximal cognitive, emotional, and contextual experiences using a matched sample of juvenile firesetters and general offenders. The findings have implications for identifying treatment needs and directing treatment targets of both juvenile firesetters and general offenders. The research focus was the function driving and reinforcing the criminal action, rather than behavioural act per se. Thus the F-JOF applies to an array of behaviours, including those that did not result in an offence. However, it remains unclear what problematic behaviours most commonly co-occur with deliberate firesetting, and whether there is a functional relationship between deliberate firesetting and co-occurring behavioural problems. It is also unclear if juvenile arson and non-arson offenders differ in their functional behavioural sequence and modus operandi. Accordingly, the functional consistency of topographically different behavioural problems was formally analysed and discussed in the next chapter.

## CHAPTER FIVE

### The Functional Consistency of Proximal Psychological and Behavioural Processes Between-Groups of Juvenile Offenders

Statistical amalgamation spanning 30 years of empirical research on risk factors associated with deliberate firesetting, confirmed the heterogeneity and complexity of juvenile firesetting behaviour (see chapter two); highlighting the need for the assessment of risk across multiple domains (Stadolnik, 2015). Knowledge of the fundamental risk factors associated with deliberate firesetting behaviour will provide direction for the development of future assessment protocols. While actuarial and psychometric assessment of risk is essential to facilitate an accurate formulation of criminogenic needs, identifying the relevant domains of risk cannot fully explain the functional purpose of the problematic behaviour. The function of the behaviour needs to be assessed for the purpose of a behaviour to be fully understood. For example, two young people can exhibit the same criminogenic risk factor (e.g., family dysfunction), but it may manifest differently (e.g., externalised or internalised behaviour), and for a different purpose (e.g., frustration or sadness).

The investigation of offence motive is likewise limited, with motive better regarded as a contextual factor, rather than an explanation for the functional mechanism driving the maladaptive behaviour. The motive of anger does not discern whether the behaviour was driven by a reactive dysregulation (e.g., loss of control) or revenge underpinned with premeditated retaliation in response to real or perceived stimuli. As illustrated in chapter four there are multiple functions reinforcing juvenile deliberate firesetting and general offending, which are underpinned by a myriad of implicit beliefs. Analysing the underlying cognitive-emotional processes, as well as the context in which they arise is, therefore, essential for effectively navigating treatment and risk mitigation. It is these implicit experiences and contextual circumstances that subsequently elicit an emotional response and influence

behavioural onset.

There is a strong relationship between deliberate firesetting and broader antisocial behaviour (Watt et al., 2015) and higher rates of recidivism for general offending than deliberate firesetting (Lambie et al., 2013). The relationship between juvenile firesetting and broader antisocial problems, however, has received limited empirical attention (Lambie & Randell, 2011). Lambie et al. identified that there is a need to investigate the mechanisms underlying the relationships between firesetting and broader antisocial behaviours, in order to better understand the purpose of future offending and reduce recidivism. Considering the high co-occurrence between juvenile deliberate firesetting and broader antisocial behaviour problems, the approach of OPB is appropriate for understanding whether there is consistency in the psychological functions underpinning co-occurring behavioural problems.

### **Offence Paralleling Behaviour**

As discussed by Jones (2010) a challenging part of working with a forensic population is determining the level of ongoing risk to self and others. Ascertaining the specific areas of risk, level of risk, and future situations where that risk may arise is defied by the fact that problematic behaviours occur frequently and successfully without coming to the attention of the CJS or professional services. Reoffending is suggested by Jones to be merely an indicator of those who have lower DES and conviction evasion skills, concluding that recidivism is an unreliable indicator of risk. Evasion skills, however, are deemed lower among juvenile offenders due to developmental immaturity and higher levels of surveillance (e.g., parenting) than their adult counterparts (Jones, 2010). The absence of a problematic behaviour (e.g., violence), therefore, does not necessarily mean the behaviour has not occurred, but rather the individual has not been caught for an act of aggression or violence. Likewise, when a behaviour occurs in one environment and not another, it is not always indicative that the problematic behaviour has decreased, but instead, the opportunity to engage in the behaviour

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may be limited or muted. For example, in environments with lower surveillance (e.g., in the community) evasion skills may be more efficient, whereas in environments with increased surveillance (e.g., in custody or under formal supervision) an individual's evasion skills become less efficient (Jones, 2010).

The OPB framework was, therefore, developed to analyse recurrent behavioural sequences associated with offending. The aim is to determine the causal underpinnings of offending behaviour and how the functional needs of an individual may manifest in alternative contexts where the original offending behaviour/s may be restricted or disguised. Due to removed opportunity to directly observe or replicate offending behaviour, the foci of OPB are the identification of either proxy behaviours or direct observation of naturally occurring contingencies with a similar representative value of the offending behaviour and behavioural sequence (Jones, 2010). The OPB model facilitates the identification of individual triggers and causal processes, functionally relevant treatment targets, predictions of potential risk scenarios, and behaviours with different functional sequences (Jones, 2010). Thus, the approach is clinically informative in identifying an individual's global faulty functioning irrespective of the behavioural form (i.e., topography), as well as unique attributes which can be treated in the absence of the behaviour itself (Hart & Logan, 2011).

Daffern et al. (2007) emphasise that topographically similar behaviours do not necessarily equate to an OPB, in the same way, topographically different behaviours can represent functional consistency. For example, aggressive institutional behaviour perpetrated by a violent offender, may not be functionally consistent with their violent index offence. The context of the behavioural occurrence must, therefore, have some contextual similarity to when and how the offending behaviour occurred; seeking to pair contextually unrelated behaviours would be uninformative and invalid. To ensure relatively normal and non-problematic behaviours are not pathologised, or that functionally discrete behavioural



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problems do not go undetected, Daffern et al. provided a more stringent definition of Jones' (2004) operationalisation of OPB.

Firstly, Daffern et al. (2007) specified the behaviour must be overt and problematic to both self and others. Overt behaviour refers to the premise that there is an observable impact on the individual's functioning. Thus behaviours may have an internal locus of effect, such as deliberate self-harm or substance misuse, or an external locus of effect, such as violence or firesetting (Fritzon & Miller, 2010). An overt behavioural occurrence may be susceptible to environmental influence, making the detection of individual needs and the severity of those needs difficult. Secondly, to conclude an OPB, the individual's cognitive appraisals and expectations, implicit beliefs, emotional experiences, and behavioural scripts must resemble the original offence chain. The proxy behaviour may differ in topography and does not have to constitute an offence, but it must be similar to the offending behaviour at a *functional level* for it to be considered offence paralleling. Mental disorder and contextual factors, however, can influence a behavioural occurrence or the sequential order of a behavioural chain (Daffern et al., 2007). This is akin to the M-TTAF model of adult firesetting (Gannon et al., 2012) which outlines mental health as a moderator, rather than a causal risk factor for deliberate firesetting behaviour (Tyler et al., 2014).

Daffern et al. (2007) advise that maladaptive behaviours muted by contextual constraints may be mistaken for functionally consistent prosocial alternative behaviour (PAB; Jones, 2004). This is problematic as maladaptive behaviours which are temporarily reduced, masked, or removed due to contextual constraints may develop into an OPB in a different context if the underlying process is continually reinforced. Environmental change, DES, and receipt of pharmacological treatment for mental disorder all have the potential to mute the occurrence of a problematic behavioural sequence and functional deficit. For example, a change in environment (e.g., community or detention) or conditions within the environment

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(e.g., temporary isolation in a detention cell instead of residing in a mainstream custodial unit) can reduce exposure to a specific situational trigger or behavioural targets muting a behavioural chain (e.g., implicit cognition, affect, and appraisal, as well as temperamental attributes). However, problematic contingencies within a chain may continue. Effective DES can increase the prospect of muting and conceal maladaptive behavioural patterns; while DES can be enhanced depending on individual capacity and socio-environmental experience.

Daffern et al. (2007) outline the fundamental feature of a PAB is that it is underpinned by an adaptive psychological process. PABs can be distinguished from muted OPBs by their adaptive characteristics (e.g., adaptive cognition and affect) and the acquisition of prosocial skills (e.g., communication and problem-solving), which contribute towards the development of a more favourable psychological process and behavioural response. For example, individuals who are regularly non-compliant, but start to comply with rules may be doing so because they have started to develop a positive future orientation, with the implicit belief that resisting and rebelling against authority figures is incongruent with their plans to achieve skills and obtain employment, or their desire to achieve inner peace. Thus, they start to employ adaptive strategies such as self-regulation and assertive communication when feeling frustrated, irritable, bored, or unmotivated. This would be an example of a PAB. Conversely, an individual who starts to present with good emotional management and assertive communication without an adaptive motivation or purpose, which is incongruent with their presentation, would be an example of a DES.

Potentially muted OPBs and PABs are underpinned by the same core need or purpose, except PABs are the adaptive alternative to the previously occurring and potentially muted maladaptive behavioural sequence and response. The development and early execution of functionally relevant PAB's within a specific context or situation of concern is a critical goal of the OPB paradigm. A functional approach to assessment facilitates this process by

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identifying whether skill acquisition is genuinely prosocial or merely maintaining a problematic sequence. For example, an adaptive skill in the absence of an OPB sequence may represent the acquisition of DES, rather than a contextualised PAB which is developed explicitly to facilitate the reduction of a specific offending or maladaptive behavioural process. Evaluating the similarity between critical sections of the behavioural sequence can help determine the pervasiveness of an entire behavioural sequence. Identifying functional consistency across specific contingencies of behaviour (i.e., the absence of absolute OPB) also has utility for risk mitigation. This is because learning a PAB for one functional sequence may be utilised as a DES in a differing problematic sequence.

### **Dynamic Risk and Juvenile Functional Consistency**

For juveniles the intertwining maturation processes that occur within adolescence (e.g., personality, social, sexual, cognitive, emotional, and neurological change) can influence the development (Al-Attar, 2010) and continuation of OPBs, DESs, and PABs, thus complicating assessment. It is difficult to delineate which contingencies are the product of developmental immaturity and which are the products of a chronic functional deficit among the juvenile population. Accordingly, the use of the OPB framework with juveniles is relatively sparse in comparison to adults. The high rates of co-occurring behavioural concerns among juvenile deliberate firesetters, however, provides a rationale for exploring the underlying function of both deliberate firesetting and broader problematic behaviours. The OPB paradigm offers a framework for analysing the dynamic functional interactions within an individual's behavioural pattern to ascertain whether functional consistency exists across topographically different problematic behaviours. While complicated by adolescent development, the application of the OPB paradigm to a juvenile population has shown to have utility for systematic and sequential assessment of risk when determining function, rather than the form of behaviour (Al-Attar, 2010).

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Environment and peer influence further complicate the accurate assessment of chronic risk and pervasive problematic behavioural patterns among adolescents (Al-Attar, 2010). Increased exposure to environmental demands during developmental periods, such as prolonged maternal separation and poor attachment, can amplify neurobiological stress, resulting in structural changes to the emotional (i.e., limbic system) and cognitive (i.e., pre-frontal and orbital-frontal cortex) regions of the brain, as well as the connective pathways in-between (Kenny, 2016). Monahan, King, Shulman, Cauffman, and Chassin (2015) found that exposure to stress, such as witnessing violence or being a victim of violence can alter the developmental patterns of juveniles, subsequently altering normative brain development during adolescence. Consequently, the development of adaptive mental processes attributable to these brain regions, such as impulse control, tolerance of delayed gratification, self-regulation, perspective taking, empathy, and meta-cognition are restricted (Kenny, 2016).

The causal link reported between early environmental disruption and problematic personality traits (i.e., CUT) is also associated with the stability of offending behaviour (Bisby et al., 2017; Kimonis et al., 2013). The relationship between parental practices and a child's developing temperament is described to be reciprocal (Bisby et al., 2017); emerging CUT exacerbate maladaptive child-parent transactions, thus perpetuating the development of CUT. Eisenbarth et al. (2016), however, highlight heterogeneous pathways towards the development of problematic traits and behaviour. For example, comorbid CD and CUT emerging in childhood and remaining *stable* throughout adolescence are associated with lower levels of self-esteem, compared to CD or CUT in isolation. The combined effect of CD and CUT culminates in an increase in psychopathology during adolescence and protracted antisocial behaviour. Adolescent onset of comorbid CUT and CD, that is *increasing* problematic personality traits during the developmental period, however, culminates in a similar level of comorbid behavioural risk to those with a *stable* childhood-adolescent trajectory (Eisenbarth

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et al., 2016). However, greater peer relationship problems (e.g., higher peer conformity, yet lower peer pressure and popularity seeking) and internalised problems (i.e., higher anxiety, depression, sensation seeking, and narcissism) were associated with the CD/CUT *increasing* group compared to the CD/CUT *stable* group. Eisenbarth et al. conclude that adjustment to peer related problems may moderate the development of CD and CUT, negatively impacting upon future psychopathological and antisocial risk. These findings highlight early attachment between a young person and their caregivers or peers is a dynamic risk factor throughout adolescent development, with disruption perpetuating problematic attachment and behavioural conduct.

Fox et al. (2015) found a non-linear effect between adverse childhood experience (ACE) and later serious/violent offending. While ACE doesn't automatically result in chronic offending, each environmental stressor experienced throughout the course of development was found to increase the likelihood of aggressive or serious antisocial behaviour. Exposure to multiple forms of traumatic experience results in a heightened vulnerability and subsequently disproportionate behavioural problems. The cumulative effect was maintained even after controlling for general criminogenic factors, including impulsivity and peer influence; thus illustrating the potency of protracted adverse experience throughout development. The most statistically significant predictors of serious violent offending among juveniles are incarcerated household member, followed by physical abuse, physical neglect, emotional abuse, and household violence respectively (Fox et al. 2015).

As discussed in chapter one, situational responding is a combination of individual perception, becoming problematic when there is a discrepancy between the individual's reality and societal norms (Rauthman et al., 2015). The non-linear effect of adverse experience plausibly perpetuates problematic situational responding, due to the heightened and chronic incongruence between individual experience (i.e., ACE) and societal norms (e.g., intra-familial

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sexual abuse and violence to solve problems is a not a normative event). Limited or no experience of an adaptive template for situational responding provides an explanation for atypical fluctuations in self-esteem throughout adolescence (Lovell, 2013), attributable to hopelessness (e.g., a negative future is reality) and helplessness (e.g., self-efficacy to evoke change presents as an impossibility to the individual). These implicit experiences push juveniles towards society's periphery and perpetuate engagement in antisocial behaviour. Improving a young person's environmental circumstance, challenging maladaptive beliefs about self and others, and enhancing cognitive and affective control will indirectly increase a young person's self-esteem and self-efficacy. Consequently, healthy psychological functioning and self-concept will likely ensue.

The incarceration of adolescent offenders may attenuate the developmental tasks of youths. As discussed by Lambie and Randell (2013), incarceration is a particular environmental contingency found to have an additive negative impact on the development of prosocial behaviour during adolescence. This is due to a reduced opportunity for prosocial interactions and social learning within a custodial environment. Thus, the chance of encountering positive interpersonal skills, adaptive problem-solving strategies, and healthy conflict resolution in line with social reality/norms is limited. Increased affiliation with antisocial peers magnifies the exposure to antisocial coercion and provocation providing maladaptive orientation for the behavioural response, and contradicts the inherent necessity of normative social integration and autonomy (Lambie & Randell, 2013). The traumatic and isolating nature of juvenile incarceration in both youth detention facilities and, until recently, adult prison is yet another adverse experience heightening a young person's susceptibility to environmental vulnerability, and the likelihood of problematic behavioural responding.

Overall, these findings illustrate how continued exposure to adverse individual-environmental transactions during development can mediate juveniles' vulnerability to future

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environmental contingencies, and subsequently their propensity for chronic psychopathology and behavioural problems. It is, therefore, important to acquire information on dynamic environmental and contextual experiences, in addition to temperament, neurodevelopmental capacity, and psychosocial maturation, for accurate risk assessment of behavioural function with a developing population.

While it has been suggested by Daffern et al. (2009) that the OPB framework may only be useful for entrenched patterns of behaviour, consequently inconsistent with developmental theory, OPBs have been successfully determined among juvenile offenders over a time-period of up to three years (Al-Attar, 2010). For example, Al-Attar found that the association between childhood trauma and brain development influences neurobiological disposition and problematic psychological processes, thus contributing towards relatively static behavioural patterns throughout the course of development. These neurological impacts reflect the research findings of Monahan et al. (2015) and Kenny (2016), as discussed above. Neurodevelopmental disorders emerging in childhood, shaping temperament and functioning, can result in persistent and resistant responding patterns (Al-Attar, 2010). Both adverse life experiences (Tanner et al., 2014) and neurodevelopmental symptomology (Lambie & Krynan, 2017) frequently yield significant positive associations with deliberate firesetting behaviour and general offending (see study one). Therefore, predisposing risk factors (e.g., impulsive temperament) may also serve as precipitating and perpetuating risk factors influencing relatively consistent behavioural patterns among juvenile firesetters.

As discussed by Al-Attar (2010), the neuroplasticity of a developing brain offers greater opportunity for rehabilitative changes in maladaptive processes and behavioural responses. Natural maturation in the critical domains of functioning (e.g., frontal lobe, such as executive function) is, however, not sufficient for PAB to develop. Persistent intensive rehearsal and reinforcement of healthy self-concept, self-regulation, and acquisition of

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prosocial skills in the context of juvenile problematic behavioural function throughout the course of adolescence and into early adulthood is necessary among developmentally immature populations (Al-Attar, 2010).

Tanner et al. (2016) draw upon problem behaviour theory (Jessor & Jessor, 1977) as a framework for understanding how two different co-occurring behavioural problems may represent maladaptive alternatives for the same mechanism driving problematic engagement. Tanner et al. suggest a limitation of problem behavioural theory is it only focuses on the co-occurrence of behavioural problems with the same origin and effect; the theory does not take into consideration analogous relationships between internalising and externalising presentations. Moreover, simultaneously exploring internalising and externalising psychopathology is more often focused on disorders (e.g., depression and conduct disorder), rather than a particular behaviour that has a detrimental and chronic impact on a young person's life (Tanner et al. 2014). To the author's knowledge, Tanner et al. (2014) were the first to empirically investigate the relationship between co-occurring internalising and externalising behaviours among a sample of juvenile firesetters and non-firesetters. As discussed, Tanner et al. hypothesised that co-occurring behavioural problems among juveniles, whether they are internalised or externalised, may serve a similar functional purpose. The mechanism underlying the internalising problem of non-suicidal self-injurious (NSSI) behaviour (i.e., emotional dysregulation and cognitive dysfunction) was found to also exist across the externalised behavioural problem of deliberate firesetting. Thus, topographically different behaviours represented an equivalent means to cope with difficult cognition, affect, or social experiences.

Tanner et al. (2016) found that adolescents who engage in both internalising and externalising behavioural problems are at greater risk of interpersonal, behavioural, and mental health problems than those engaging in either form of behaviour in isolation. A number of



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adverse life experiences differentiated youth who exhibited co-occurring internalised (i.e., NSSI) and externalised behaviours (i.e., firesetting) from youth who exhibited either behaviour in isolation. Distressing events, parental conflict, physical abuse, relationship problems, serious arguments or fights with friends, and having a friend or family member engaging in deliberate self-harm or suicidal behaviours were found to be significantly associated with co-occurrence. However, additional analysis revealed only peer or familial engagement in suicidal behaviour could predict co-occurrence. The significant relationship of peer engagement in suicidal behaviour and co-occurrence among adolescents indicates that peer engagement in problematic behaviours not only influences engagement in the same behaviour, but the actions of other peers can expose a young person to further adverse life experience and amplify their own vulnerability and risk. The findings illustrate a complex interaction between adverse life experiences, social learning, and internalised/externalised behavioural problems.

Substance use, specifically alcohol and illicit drugs, was particularly associated with the co-occurrence of behavioural problems (Tanner et al., 2016). Accordingly, the relationship between substance misuse and firesetting behaviour may yield similar findings to NSSI and firesetting co-occurrence. The additive impact of substances on deliberate firesetting is well documented (see study one); however, it is unclear whether substance use is functionally consistent with the act of externalising behaviour per se. For example, using substances to increase stimulation and to have fun, is similar to engaging in firesetting for the thrill and for fun. Likewise, engaging in substance misuse for the removal of negative affect may be parallel to the use of firesetting for the removal of negative affect. Either way, contextual and situational factors surrounding the occurrence of a juvenile's behavioural problems will be imperative for determining if his/her behaviours are serving the same underlying purpose. For example, the removal of negative affect might occur in the context of personal adversity,

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social demand, or conflict, and manifest as an internal source of action and internal locus of effect (integrative: internal/internal), external source of action and internal locus of effect (conservative: external/internal), or internal source of action and external locus of effect (expressive: internal/external).

Exploring both unique and parallel contingencies of behaviours across co-occurring behavioural problems (e.g., firesetting and NSSI) during adolescence is an efficient way to identify the extent and pervasiveness of functional deficit among juveniles with widespread behavioural risk. The findings from Tanner et al. (2016) are characteristic of Miller and Fritzon's (2007) findings demonstrating functional consistency among adult female firesetters who engage in self-harm; a behaviour which is frequently reported as a correlate of deliberate firesetting among females. Understanding the underlying function of co-occurring behavioural problems, regardless of their locus of effect will advance the field of juvenile deliberate firesetting by informing behavioural triggers and treatment targets. Understanding whether functional consistency exists between deliberate self-harm and firesetting, substance misuse and firesetting, and as well as co-occurring externalising behavioural problems, such as risk-taking, rule-breaking, and aggression will be of clinical utility. For instance, determining the functional similarities and differences between co-occurring antisocial behaviours can identify the features that are pervasive, thus requiring a greater intensity of service delivery, opposed to the features that are more dynamic and require an adaptable and diverse approach.

### **The Present Study**

Currently, it is not known which specific behavioural problems most commonly co-occur among juvenile deliberate firesetters and whether these behavioural concerns are parallel or paradoxical in their functional purpose. It also remains unclear if arson offenders are significantly different from non-arson offenders in their criminogenic needs and behavioural function. As outlined in chapter four, to address the gaps in the field of juvenile firesetting,

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four research questions were developed and presented in two separate chapters. The first two research questions addressed the underlying functions of a juvenile offender, irrespective of firesetting status, as well as fire-specific cognitive-emotional scripts (see study two).

Functional data derived in chapter four was subsequently used to answer research questions three and four.

The third research question and first enquiry in the current chapter was: Are deliberate firesetters a specific problematic group? Accordingly, between-group comparisons across criminogenic risk factors, modus operandi, and functional processes were investigated. In line with the meta-analytic review in chapter three, it is hypothesised that juvenile arson offenders will be statistically significantly more antisocial and reckless in their general risk, modus operandi and behavioural function than non-arson offenders.

The fourth research question and final enquiry of the current chapter is: Is there functional consistency between a juvenile's index offending and broader behaviour problems? The OPB framework can be considered a holistic process as it reviews the underlying function driving problematic behaviour, irrespective of topography. Analysis of functional similarity (linkage) across topographically different behaviours and environmental changes facilitated the identification of critical maladaptive functions among juvenile offenders, thus proffering individualised interventions targets and scenarios of risk. Environmental change, however, is assessed in the subsequent chapter due to all behavioural occurrences arising in the same environment at the first time-point of the research project (current study). The novelty of the OPB approach is that it promotes sequential functional analyses of current behaviours to anticipate and monitor persistent behavioural patterns (Jones, 2010), rather than relying only on past behaviour to inform behavioural management. It was hypothesised that a statistically significant association between the functional contingencies of a young person's firesetting and additional problematic behaviours would be yielded (OPB; Daffern et al., 2007; Miller &

Fritzon, 2007; Tanner et al., 2014; Tanner et al., 2016).

### **Method**

#### **Participants**

The sample consisted of the same participants described in chapter three; adjudicated juvenile offenders recruited from Australian Departments of Justice ( $N=70$ ;  $n=35$  firesetters and  $n=35$  non-firesetters). The mean age of participants at index offence was 15.12 years ( $M_{age}=14.86$  years for firesetters and  $M_{age}=15.38$  years for controls), with a mean age of 16.34 years at the time of interview for a potential proxy behavioural problem ( $M_{age}=16.68$  years for firesetters and  $M_{age}=16.86$  years for controls). Thus, the mean age difference between behavioural problems at T1 (T1) was 14.64 months.

#### **Design**

The current study consists of both a between-group (i.e., research question three; a comparison of arson and non-arson offenders) and within-group design (e.g., research question four; an analysis across different behaviours among each group) using a quantitative methodology. Data was sourced from self-report interviews and participant case files. The data was coded categorically and analysed using univariate and bivariate analyses to determine the fundamental risk factors associated with deliberate firesetting, as well any between-group differences across the domains.

The qualitative data pertaining to the behavioural functions obtained in chapter three was also utilised in the current study. The code, sub-theme, and theme data comprising the F-JOF were coded dichotomously for each participant across both their index offence and additional problematic behaviour. Additionally, data pertaining to contextual and situational risk factors, which informed behavioural heterogeneity across the F-JOF in chapter four, were quantified and analysed. Data were analysed using bivariate and multivariate statistical analyses to determine functional consistency between behavioural problems, as well as

between-group differences in behavioural function.

### **Materials**

Daffern et al. (2009) proposed the first empirically tested method to ensure application of the OPB framework and the appraisal of behaviours for functional similarity is conducted in a consistently reliable and empirical manner. Accordingly, the method proposed by Daffern et al. was partially employed; modifications were made to address the needs of a developmental population.

**Functional Analytic Interviews of Index Offence and Additional Problematic Behaviour (FAI-IO/FAI-APB; Perks & Watt, 2015).** The FAI-IO and FAI-APB interview schedules were designed to obtain information pertinent to a young person's index offence and additional problematic behaviours, independent of offence type. This ensured data obtained was directly comparable across samples (i.e., arson and non-arson offenders) and behaviours (i.e., index offending and additional problematic behaviour). See chapter four for a full description of the interview schedules.

**Archival information.** Pertinent information was sought from archival case files of each young person to ensure the validity of a participant's self-report. Information from a participant's case file was extracted by the relevant Department of Justice. It was initially proposed that the data obtained from a young person's interview, case file, and primary caregiver would be coded and assessed for concurrent validity by the use of bivariate correlation analysis, and a comparison of means. As outlined in chapter four, this was not possible due to the low response rate from caregivers and also the inconsistency in the data collected by different jurisdictions. With 87.14% ( $n=61$ ) of the sample recruited from one jurisdiction, the data issue was ameliorated by analysing the case file of one jurisdiction only.

**Youth Level of Service/Case Management Inventory-Australian Adaption (YLS/CMI-AA; Hoge & Andrews, 1995; Thompson & Pope, 2005).** The YLS/CMI-AA is a

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structured clinical judgement risk assessment tool adapted from the original YLS/CMI (Hoge & Andrews, 2011) to improve the psychometric properties of the tool within an Australian context. Adaptions included enhancing the operational definition of existing items, reorganising item position within the domains, adding new criminogenic items, making changes to the language used, and incorporating three items to assess the presence of protective factors (Thompson & Pope, 2005). The YLS/CMI-AA is routinely administered by the respective Juvenile Justice services that comprised the research sample. Accordingly, participants had already been assessed via the adapted version, rather than the original YLS/CMI and archived participant data was provided to the researcher for the current thesis.

The YLS/CMI-AA consists of 47 items across eight (one static and seven dynamic) domains, which produces an overall estimate of recidivism (low, medium, medium-high or high): (1) prior and current offences, (2) family and living circumstances, (3) education/employment, (4) peer relationships, (5) substance abuse, (6) leisure/recreation, (7) personality/behaviour, and (8) attitudes/beliefs. The presence of three protective factors: community support, positive family relationship, and social/personal skills are also identified; however, protective factors do not contribute towards the overall risk rating. All 47 items except one are scored 0 or 1, depending on whether the item is regarded as a relevant risk factor for a young person. Age at index (domain 1: prior and current offences) is scored on a three-point scale, with more weighting applied to younger age at the time of index offence. An overall risk rating of low, medium, or high is applied at the domain level, with the addition of a medium-high risk category rating at the cumulative risk level.

Hoge and Andrews (1996) pooled the analysis of six empirical studies (sample range: 33-408 young offenders, age range: 12 to 21 years) to evaluate the reliability and validity of the YLS/CMI as a risk assessment tool for adjudicated juvenile offenders. Overall the YLS/CMI yields adequate to strong psychometric properties. Significant relationships between

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the YLS/CMI and existing measures of maladaptive behaviour were yielded ( $r=.64-.82$ ), indicative of adequate to strong construct validity (Rowe, 2002). Inter-rater reliability, with an intraclass correlation of  $ICC=.75$ , was reported to be good across individual raters (Poluchowicz, Jung, & Rawana, 2000). A significant linear relationship between risk rating and criminal disposition was confirmed, that is young persons detained in custody received higher risk ratings than young persons under supervision in the community (Hoge & Andrews, 1996). The same relationship occurred when comparing adjudicated offenders with a normative non-offending population, thus illustrative of concurrent validity in assessing criminogenic risk (Jung, 1996). The ability of the YLS/CMI to predict recidivism among juvenile offenders is moderate and significant ranging from  $r=.30$  to  $r=.41$  (Hoge & Andrews, 1996; Rowe, 2002; Schmidt, Hoge, & Robertson, 2002). McGrath and Thompson (2012) found that among an Australian sample of juvenile offenders ( $N = 3,568$ ), total scores on the YLS/CMI-AA were significantly associated with a subsequent conviction within a 12 month time-period ( $r = .26$ ).

### Data Analysis

A series of univariate, bivariate and multivariate statistical analyses were conducted, identifying the fundamental characteristics and functions of firesetting and non-firesetting offenders, and determining whether the two groups were significantly different.

**Differentiating arson from non-arson offenders.** Chi-square analyses were performed to test for significant between-group differences across 136 variables coded from participant interview schedules. These variables included the functional underpinnings of a young person's behaviour dichotomously coded (1 = *present* and 2 = *absent*) from the thematic data in chapter four, as well as categorical data coded from participant interviews (i.e., offence characteristics, environmental/contextual factors, protective factors, and psychopathology/treatment history).

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Logistic regression was subsequently conducted to inform which risk factors were uniquely predictive of arson offending, rather than non-arson offending. Finally, collateral data extracted from the YLS/CMI-AA was analysed by bivariate tests of difference; specifically, t-tests were run to determine if the criminogenic profiles of arson and non-arson offenders significantly differed.

**The appraisal of functional similarity.** Previous methodologies tested by Ellingwood, Mugford, Bennell, Melnyk, and Fritzon (2013) and Daffern et al. (2009) were combined to evaluate functional consistency for OPBs. Jaccard's coefficient of similarity ( $J$ ) was conducted to determine the level of co-occurrence for each independent variable across two separate behavioural problems (i.e., index offence and additional problematic behaviour). Jaccard's coefficient of similarity has been widely used in crime scene investigation and behavioural linkage analyse (Canter & Fritzon, 1998; Daffern et al., 2009; Fritzon, Canter, & Wilton, 2001), and is regarded as the optimal metric for calculating the degree of similarity/linkage between behaviours and behavioural occurrences (Woodhams, Grant, & Price, 2007).

The degree of similarity between two different behaviours was anticipated to be greater between behaviours committed by the same participant, than behaviours committed by different participants. When calculating  $J$ , the independent variables in the current study were codes, sub-themes, themes, contextual factors, and offence characteristics. For each participant, the dependent variable was the degree of similarity between two separate behavioural problems. The degree of similarity was run separately for arson and control participants. The following steps outline the within-group process that was completed.

Firstly, all variables contributing towards a behavioural chain were coded dichotomously as 1 = *present* or 0 = *absent* for both index offending and additional problematic behaviours. Specialised software known as B-LINK (Bennell, 2002) was used to



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calculate  $J$ . A simple and positive co-occurrence value between zero and one, where a score of 0 = *no similarity* and 1 = *perfect similarity*, was generated for all variables across linked and unlinked pairs of behaviours. Linked pairs are the same intra-individual behaviours across topographically different behavioural problems; a participant's own index and additional problematic behaviour. Unlinked pairs, conversely, are inter-individual behaviours; a participant's own behaviour compared with every other participant's behaviour. The following formula was used to calculate  $J$  within B-LINK, whereby  $a$  represents joint occurrences (1, 1), and  $b$  (0, 1) and  $c$  (1, 0) represent no joint occurrences (C. Bennell, personal communication, November 4, 2017).

$$J = \frac{aa}{aa+bb+cc}$$

Consistent with Daffern et al. (2009), to reliably confirm functional consistency across topographically different behavioural problems, linked pairs (i.e., behaviours of the same participant) were statistically compared with unlinked pairs (i.e., behaviours of different participants) to confirm the findings did not arise by chance. In the current study, the  $J$ s for unlinked pairs represented baseline similarity across different problematic behaviours. Using IBM SPSS statistics 24, bivariate tests of difference between linked and unlinked pairs for each independent variable was conducted to discern whether the distribution of Jaccard's scores for linked behaviours was significantly different from unlinked pairs of behaviour.

***Testing predictive strength.*** The variables that yielded a statistically significant difference from baseline were entered into a logistic regression model to determine unique predictors of linked behaviours (OPB) among both arson and non-arson offenders. Variables providing statistically significant contributions were further analysed using receiver operating characteristics (ROC) analysis; this tested the ability of each variable to accurately classify two behaviours as linked or unlinked (Ellington et al., 2013). According to Ellington et al. the

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area under the curve (AUC), which determines the degree of accuracy, ranges between 0 (*complete inaccuracy*) and 1 (*complete accuracy*). An AUC ranging between .5 and .7 is indicative of low accuracy, between .7 and .9 is considered good accuracy, and greater than .9 represents a high degree of accuracy (Swets, 1988 as cited in Ellington et al., 2013).

### **Results**

The results are presented in three stages: (1) the criminogenic domains most associated with juvenile firesetters and the difference between offender groups, as per YLS/CMI-AA rating and semi-structured self-report interviews; (2) differentiating deliberate arson from non-arson offenders based on functional characteristics and contingencies of their offence chains determined from self-reported narratives; and (3) functional consistency of offending behaviour and co-occurring behavioural problems among juvenile arson and non-arson offenders.

### **Criminogenic Risk Factors for Arson and Non-Arson Offenders**

The current study utilised case file data to compare arson and non-arson juvenile offenders. Risk assessment data obtained using the YLS/CMI-AA was available for 87.14% of participants ( $n=61$ ;  $n= 32$  arson offenders and  $n=29$  non-arson offenders), who were matched on age, gender, ethnicity, and age upon entry into the CJS. Participant demographics and mean scores of risk are displayed in Table 9. No significant difference across the dynamic risk factors was found, and only one static risk factor significantly differentiated the two groups. Juvenile arson offenders yielded statistically significantly higher rates of prior offending compared to juveniles without a history of deliberate firesetting.

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Table 9

*Demographics and Means Scores for Arson and Non-Arson Offenders Using YLS/CMI-AA*

Demographics	Arsonist (n=32)		Non-Arsonist (n=29)	
	n (%)		n (%)	
<b>Gender</b>				
Male	30 (93.80)		26 (89.70)	
Female	2 (6.30)		3 (10.30)	
<b>Ethnicity</b>				
Australian	9 (28.10)		10 (34.50)	
Aboriginal Australian	20 (62.50)		15 (51.70)	
Indigenous status unknown	2 (6.30)		3 (10.30)	
Other	1 (3.10)		1 (3.40)	
<b>Criminogenic Risk Factors</b>				
	<i>M (SD)</i>		<i>M (SD)</i>	
Age at date of YLS/CMI	16.80	(1.38)	17.37	(1.24)
Number of prior offences	5.19*	(1.64)	4.03	(2.04)
Family and living	2.56	(1.92)	2.66	(1.54)
Education and employment	2.69	(1.75)	1.93	(1.79)
Peer relationships	2.69	(1.47)	2.34	(1.34)
Substance abuse	2.91	(2.08)	3.14	(2.12)
Leisure and recreation	1.41	(1.16)	1.34	(1.23)
Personality and behaviour	2.56	(2.03)	2.55	(1.96)
Attitudes and beliefs	1.75	(1.83)	1.83	(2.95)
Total (cumulative) risk rating	21.75	(10.48)	18.86	(9.65)
<b>Protective factors</b>				
Community-support outside the family	0.56	(0.50)	0.34	(0.48)
Individual – social and personal skills	0.53	(0.50)	0.59	(0.50)
Family – strong, positive parent-child Relationship	0.72	(0.46)	0.59	(0.50)

*Note.* P<.05\*, p<.01\*\*, p<.001\*\*\*

**Differentiating Characteristics and Contingencies of Arson and Non-Arson Offenders**

The history of violence was statistically examined from criminal history data provided by a participant's respective jurisdiction. The majority of participants ( $n=58$ , 82.86%) were found to have either a current or historical adjudication for a violent offence; 88.57% ( $n=31$ ) of the control sample and 77.15% ( $n=27$ ) of the firesetting sample were classified as a violent offender (e.g., aggravated assault, armed robbery, sexual assault, homicide, firearms and explosives, domestic violence, attempted murder). There was no statistically significant difference between firesetters and non-firesetters for violent offence history ( $\chi^2(1) = 1.60$ ,  $p=.20$ , *Cramer's V* = .20,  $p > .05$ ), thus classification as a violent offender cannot explain the significant between-group differences yielded in this current study.

Categorical data extracted from participant interviews ( $N=70$ ) was analysed with chi-squares. An overview of the risk factors and offence chain contingencies associated with arson and non-arson offending are located in Table 10 and Table 11 respectively. Consistent with the YLS/CMI-AA data, the majority of risk factors and behavioural contingencies comprising a young person's offence chain did not yield a significant difference between firesetting and non-firesetting youth.

**Criminogenic and non-criminogenic differences.** Two criminogenic risk factors pertaining to psychopathology differentiated the two groups (Table 10). Firstly, arson offenders reported drinking alcohol significantly less frequently than non-arson offenders, with more arsonists identifying they only drink alcohol on special occasions ( $\chi^2(1)=4.88$ ,  $p=.03$ , *Cramer's V*=.26). Non-arson offenders more frequently reported drinking alcohol daily, each weekend, or a few times per week, though a significant group difference was not yielded; weekend consumption approached significance ( $p=.057$ ). Secondly, non-arson offenders were significantly more likely to self-report a mental health diagnosis compared to arson offenders ( $\chi^2(1) = 5.85$ ,  $p=.016$ , *Cramer's V*=.29), but there was no significant difference in the

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number of participants prescribed medication at the time of their offence. One non-criminogenic factor regarded as being protective from offending behaviour, was significantly less associated with the arson offending group. That is, juveniles with a history of deliberate firesetting were less likely than control participants to be able to identify an adaptive means of achieving their primary good ( $\chi^2(1) = 5.34, p = .021$ ; *Cramer's V* = .31,  $p < .05$ ).

**The differences in offence chain contingencies.** Juvenile offence chains derived from personal narratives were quantified to enable statistical comparisons between arson and non-arson offenders across each contingency within a behavioural sequence (Table 11). Group differences were yielded for three offence characteristics and five contextual factors. Firstly, arson offenders were significantly more likely than controls to have no known association with their victim or target ( $\chi^2(1) = 5.19, p = .023$ ; *Cramer's V* = .28,  $p < .05$ ). Arsonists were also significantly more likely than controls to be random (e.g., first opportunity) in their offending style ( $\chi^2(1) = 9.79, p = .002$ ; *Cramer's V* = .38,  $p < .05$ ). Conversely, non-arson offenders were significantly more likely to be selective (e.g., planned rivalry or revenge) in their offending style ( $\chi^2(1) = 13.13, p = .001$ ; *Cramer's V* = .43,  $p < .001$ ). The groups, however, did not significantly differ on emotional reactivity (e.g., distress, anger, or boredom) as a reason for targeting a person or object.

A current life stressor occurring in close proximity to offending behaviour, was significantly more likely to be reported by non-arson offenders ( $\chi^2(1) = 10.08, p = .001$ ; *Cramer's V* = .38,  $p = .001$ ). Consistent with this, control participants expressed significantly greater experience of insufficient self-control/discipline and frustration tolerance leading up to and surrounding their index offence ( $\chi^2(1) = 10.51, < .001, Cramer's V = .39, p = .001$ ). The situation of behavioural occurrence significantly differed between groups. Arsonists were more likely to offend under a situational circumstance of pleasure, whereby autonomy and enjoyment was central to the purpose of firesetting ( $\chi^2(1) = 16.97, p = .000, Cramer's V = .492,$

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$p < .001$ ). Non-arson offenders, however, were statistically significantly more likely to offend in situations of interpersonal conflict ( $\chi^2(1) = 5.19, p = .023, \text{Cramer's } V = .27, p < .05$ ).

Physiological arousal in proximity to offending was consistent with the group difference for situation; a significantly greater number of control participants reported experiencing negative physiological arousal during their index offence, than deliberate firesetters ( $\chi^2(1) = 5.24, p = .022, \text{Cramer's } V = .274, p < .05$ ). There was, however, no significant difference for the number of participants experiencing negative arousal before or after, or positive arousal before, during, and after.

Modus operandi was found to statistically significantly differentiate arson and non-arson offenders. Significantly more arsonists than controls were classified under the adaptive mode of action, with an external source of action and external locus of effect ( $\chi^2(1) = 7.124, p = .01, \text{Cramer's } V = .319, p < .01$ ), whereas significantly more controls were classified under the conservative mode of action ( $\chi^2(1) = 4.629, p = .031, \text{Cramer's } V = .257, p < .05$ ), characterised by an external source of action and internal locus of effect. Self-reported prior engagement in the same behavioural problem was statistically significantly more common among non-arson offenders than arson offenders ( $\chi^2(1) = 9.55, p = .002, \text{Cramer's } V = .37, p < .01$ ). In addition, non-arsonists were significantly more likely to attribute their prior behavioural occurrence to the same reasons as their index offence ( $\chi^2(1) = 10.189, p = .001, \text{Cramer's } V = .382, p < .01$ ).

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Table 10

*General Risk and Protective Factors among Juvenile Arson and Non-Arson Offenders*

Variable	Arsonist (n=35)		Non-Arsonist (n=35)	
	n	%	n	%
<i>Distal characteristics</i>				
Adverse life experience				
Dysfunctional family climate	26	74.30%	28	80.00%
Familial incarceration	17	48.60%	18	51.40%
Domestic violence	17	48.60%	18	51.40%
Impact of parental separation	12	34.30%	6	17.10%
Loss of a loved one	7	20.00%	13	37.10%
Abuse				
Emotional	1	2.86%	3	8.60%
Sexual	1	2.86%	0	0.00%
Physical	9	25.70%	9	25.70%
Bullying	3	8.60%	3	8.60%
More than one form of abuse	1	2.86%	3	8.60%
First exposed to crime				
Via friends	18	51.40%	12	34.30%
Via family	11	31.40%	17	48.60%
Own offence was first exposure	3	8.60%	5	14.30%
Victim of crime	3	8.60%	1	2.86%
Closest person of support				
Family member	24	68.60%	21	60.00%
Friend	8	22.90%	13	37.10%
No one identified to be close	3	8.60%	1	2.86%
Behavioural				
Trouble at school	34	97.10%	32	91.40%
Peers are all antisocial/criminal	17	48.60%	19	54.30%
Risk taker self-concept	33	94.30%	30	85.70%

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Impulsive self-concept	34	97.10%	30	85.70%
Impulsive self-concept	34	97.10%	30	85.70%
In trouble under supervision	26	74.30%	29	82.90%
<i>Psychopathology and treatment</i>				
Mental health diagnosis	21	60.00%*	30	85.70%*
Psychologist historical	26	74.30%	26	74.30%
Psychologist current	25	71.40%	20	57.10%
Positive experience of psychologist	20	57.10%	18	51.40%
Self-harm current	2	5.70%	4	11.40%
Self-harm historical	18	51.40%	16	45.70%
Illicit drugs	33	94.30%	33	94.30%
Alcohol yes	27	77.14%	29	82.90%
Daily alcohol	3	8.60%	4	11.40%
Alcohol at the weekends	3	8.60%	9	25.70%
Alcohol few times per week (3-4)	3	8.60%	7	20.00%
Alcohol special occasions only	18	51.40%*	9	25.70%*
Anger regulation is adaptive	12	34.30%	13	37.10%
Sadness regulation is adaptive	11	31.40%	9	25.70%
<i>Protective factors</i>				
Prosocial interest identified	29	82.90%	31	88.60%
Qualification or skill identified	23	65.70%	28	80.00%
Enrolled in education/vocational	22	62.90%	22	62.90%
Future plans (one realistic plan)	30	85.70%	30	85.70%
Good at something (prosocial)	30	85.70%	30	85.70%
Self-pride recalled (prosocial)	26	74.30%	23	65.70%
Someone else proud of them (prosocial)	18	51.40%	24	68.60%
Positives identified in their life	24	68.60%	20	57.10%
Support person identified	22	62.90%	24	68.60%
Primary good identified	30	85.70%	33	94.30%
Secondary good-adaptive means	21	60.00%*	31	88.60%*
<i>Highest level of education M (SD)</i>	8.81 (1.4), n=32		9.21 (1.2), n=34	

Note.  $P < .05$ \*,  $p < .01$ \*\*,  $p < .001$ \*\*\*



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Table 11

*Frequency Analysis of Offence Chain Contingencies for Juvenile Arson and Non-Arson Offenders*

Variable	Arsonist (n=35)		Non-Arsonist (n=35)	
	n	%	n	%
<i>Contextual/Situational Factors</i>				
Proximity of antecedent				
Day of the offence/behaviour	27	77.10%	26	74.30%
Within the preceding week	5	14.30%	6	17.10%
Longer than a week prior	1	2.86%	3	8.60%
Location of offence/behaviour				
Community	35	100%	34	97.14%
Custody	0	0.00%	1	2.86%
Situational trigger				
Situation of pleasure	19	54.30%*	3	8.60%*
Situation of social demand	7	20.00%	12	34.30%
Situation of conflict	4	11.40%*	12	34.30%*
Situation of personal adversity	5	14.30%	8	22.90%
Mode of function (origin/target)				
Expressive (internal/external)	5	14.30%	10	28.60%
Integrative (internal/internal)	1	2.86%	0	0.00%
Conservative (external/internal)	3	8.60%*	10	28.60%*
Adaptive (external/external)	26	74.30%*	15	42.90%*
Prior behavioural occurrence				
Self-reported prior occurrence	18	51.43%*	30	85.70%*
Self-reported same reason	15	42.90%*	28	80.00%*
Positive physiological arousal				
Before	14	40.00%	9	25.70%
During	14	40.00%	8	22.90%
After	10	28.60%	13	37.10%
Negative physiological arousal				

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Before	22	62.90%	25	71.40%
During	19	54.30%*	28	80.00%*
After	25	71.40%	22	62.90%
<i>Schema activation</i>				
Emotional deprivation	14	40.00%	14	40.00%
Mistrust/abuse	10	28.60%	8	22.90%
Defectiveness / shame	6	17.10%	4	11.40%
Emotional inhibition	3	8.60%	0	0.00%
Approval/ recognition seeking	8	22.90%	7	20.00%
Abandonment/ instability	11	31.40%	12	34.30%
Social isolation/alienation	2	5.70%	4	11.40%
Entitlement/grandiosity	2	5.70%	6	17.10%
Insufficient self-control	16	45.70%*	29	82.90%*
<i>Offence characteristics</i>				
Proximal life stressor	19	54.30%*	31	88.60%*
<i>Disinhibiting factors</i>				
Under the influence at offence/behaviour	22	62.90%	26	74.30%
Substances three days prior to offence	24	68.60%	29	82.90%
Medication prescribed at time of offence	18	51.40%	20	57.10%
Unknown association to target/victim	31	88.60%*	23	65.70%*
<i>Reason for target/victim</i>				
Selective (e.g., rivalry/vengeance)	2	5.70%*	15	42.90%*
Random (e.g., first place/person)	26	74.30%*	13	37.10%*
Emotive (e.g., sad, bored, angry)	7	20.00%	7	20.00%
Offence is planned	10	28.60%	15	42.90%
Offence/behaviour in company	22	62.90%	19	54.30%
Weapon/accelerated used/carried	11	31.40%	16	45.70%
Retrospective insight of impacts	24	68.60%	28	80.00%

Note.  $P < .05^*$ ,  $p < .01^{**}$ ,  $p < .001^{***}$

### The Function of Juvenile Arson and Non-Arson Offending

Thematic analysis results presented in chapter three revealed that the underlying function of juvenile offending behaviour, irrespective of firesetting status, was predominantly the result of antisocial distortion (54.3%), followed by emotional dysregulation (34.3%), revenge/retribution (8.6%), and an act of asserting control and power (2.9%). A comparison between arson and non-arson offenders yielded a statistically significant between-group difference. The frequencies of occurrence for the independent groups are located in Table 12.

Overall, juvenile arson offenders were statistically significantly more antisocial than non-arson offenders  $\chi^2(1) = 8.29, p=.004$ , whereas non-arson offenders were more emotionally dysregulated than arsonists,  $\chi^2(1) = 4.06, p=.044$ . Upon inspection of the implicit cognitive and emotional contingencies (i.e., sub-theme and code level), arson offenders were significantly more likely than non-arson offenders to endorse antisocial codes including, *this is way more fun though* ( $\chi^2(1)=8.231, p=.01$ ), *nothing better to do* ( $\chi^2(1) = 11.283, p=.01$ ), and *it's getting too hot!* ( $\chi^2(1) = 9.401, p=.01$ ). These specific codes are underpinned either by a propensity to feel under stimulated, with the potency of the offending behaviour satisfying the need for novel stimuli or an instrumental need, such as the use of fire for wider crime concealment.

Non-arson offenders were statistically significantly more likely than arson offenders to hold emotionally dysregulated codes including, *feel my pain* ( $\chi^2(1) = 4.16, p=.05$ ), *out of control* ( $\chi^2(1) = 9.130, p=.01$ ), and *I'll hurt you first so you can't hurt me* ( $\chi^2(1) = 7.778, p=.01$ ). These codes are characteristic of a complete loss of control often underpinned by anger. Consequently, the sub-theme of *loss of control* approached significance, however was not significant at the .05 level ( $p=.055$ ). The antisocial codes of *normalisation of violence/aggression* ( $\chi^2(1) = 8.741, p=.01$ ) and *crime pays* ( $\chi^2(1) = 5.757, p=.05$ ) were also significantly more likely to be experienced by non-arsonists offenders than arsonists. This

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illustrates the non-arson offenders may have a proclivity to engage in both reactive and proactive antisocial behaviour.

Table 12

*Between-Group Comparison of Proximal Implicit Psychological Experiences*

Cognitive-Emotional Contingencies	Full Sample (N=70)		Arsonist (n=35)		Non-Arsonist (n=35)	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
<i>Codes</i>						
Just do it	48	68.57%	27	77.14%	21	60.00%
It felt good	37	52.86%	22	62.86%	15	42.86%
The streets	36	51.43%	17	48.57%	19	54.29%
Emptiness	35	50.00%	15	42.86%	20	57.14%
Crime pays	32	45.71%	11	31.43%*	21	60.00%*
Nothing better to do	32	45.71%	23	65.71%*	9	25.71%*
I'll do what I want	28	40.00%	16	45.71%	12	34.29%
Everyone did it	26	37.14%	11	31.43%	15	42.86%
Darkness	24	34.29%	10	28.57%	14	40.00%
Out of control	24	34.29%	6	17.14%*	18	51.43%*
This is way more fun though!	21	30.00%	16	45.71%*	5	14.29%*
I don't care about me	20	28.57%	9	25.71%	11	31.43%
Normalisation of violence	19	27.14%	4	11.43%*	15	42.86%*
It was there fault	18	25.71%	8	22.86%	10	28.57%
It's getting too hot!	17	24.29%	14	40.00%*	3	8.57%*
Light switch	17	24.29%	5	14.29%	12	34.29%
Anger is coming	15	21.43%	7	20.00%	8	22.86%
Feel my pain	15	21.43%	4	11.43%*	11	31.43%*
Follow the leader	13	18.57%	9	25.71%	4	11.43%
I felt like I belonged	9	12.86%	7	20.00%	2	5.71%
I have nothing, and they have it all	9	12.86%	2	5.71%	7	20.00%
Loss of a loved one	8	11.43%	3	8.57%	5	14.29%

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I'll hurt you first, so you can't hurt me	7	10.00%	0	0.00%*	7	20.00%*
Revenge	7	10.00%	3	8.57%	4	11.43%
Life is too much-take it away	6	8.57%	2	5.71%	4	11.43%
Control my environment	6	8.57%	2	5.71%	4	11.43%
Don't disobey	5	7.14%	2	5.71%	3	8.57%
Don't push me; I'll snap!	5	7.14%	2	5.71%	3	8.57%
The damage is already done	5	7.14%	4	11.43%	1	2.86%
I'm in control	4	5.71%	1	2.86%	3	8.57%
See-saw	3	4.29%	3	8.57%	0	0.00%
Cathartic symbolism	1	1.43%	1	2.86%	0	0.00%
<i>Sub-themes</i>						
Generally antisocial	64	91.43%	32	91.43%	32	91.43%
Help me	47	67.14%	20	57.14%	27	77.14%
Anti-social peer influence	43	61.43%	24	68.57%	19	54.29%
The loss of control	32	45.71%	12	34.29%	20	57.14%
Supremacy is mine	9	12.86%	3	8.57%	6	17.14%
Anomic disaffection	9	12.86%	2	5.71%	7	20.00%
Grief	8	11.43%	3	8.57%	5	14.29%
Even the score	6	8.57%	2	5.71%	4	11.43%
Labile mood	3	4.29%	3	8.57%	0	0.00%
<i>Function</i>						
The antisocial offender	38	54.29%	26	74.29%*	13	37.14%*
Emotionally dysregulated	24	34.29%	8	22.86%*	16	45.71%*
Revenge and retribution	6	8.57%	2	5.71%	4	11.43%
The control and power offender	2	2.86%	0	0.00%	2	5.71%

Note. \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

**Functional Consistency of Offending Behaviour**

All participants self-reported engaging in additional problematic behaviours. Arsonists most frequently reported illicit drugs (31.43%) to be their most problematic behavioural concern; followed by aggression (28.57%), risk-taking (22.86%), rule-breaking (11.43%), and

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self-harm (5.71%). There was no significant difference between the self-report problematic behaviours of arson and non-arson offenders  $\chi^2(1, N=3.345, p=.50)$ , with non-arsonists also identifying illicit substance use (31.43%) as their most frequent problematic behaviour, followed closely by aggression (20.00%). Rule-breaking was positioned as more problematic (25.71%) than risk-taking (14.30%) for non-arson offenders, with self-harm identified as least problematic (8.57%) for both groups. Table 13 displays the frequency of each variable occurrence across the two behavioural problems for both samples.

Table 13

### *The Frequency of Behavioural Contingencies across Topographically Different Behaviours*

Variable	Arsonist (n=35)				Non-Arsonist (n=35)			
	Index		Proxy		Index		Proxy	
	n	%	n	%	n	%	n	%
<i>Contextual Factors</i>								
Proximal life stressor	19	54.30%	27	77.40%	31	88.60%	26	74.30%
Proximity of antecedent								
Day of the offence/proxy	30	85.70%	27	77.10%	26	74.30%	28	80.00%
Within the preceding week	4	11.40%	7	20.00%	6	17.10%	2	5.70%
Longer than a week prior	1	2.86%	1	2.86%	3	8.60%	5	14.30%
Location of offence/proxy								
Community	35	100%	35	100%	35	100%	34	97.14%
Custody	0	0.00%	0	0.00%	0	0.00%	1	2.86%
Situational Trigger								
Situation of Pleasure	19	54.30%	13	37.10%	3	8.60%	9	25.70%
Situation of Social Demand	7	20.00%	5	14.30%	12	34.30%	6	17.10%
Situation of Conflict	4	11.40%	7	20.00%	12	34.30%	9	25.70%
Personal Adversity	5	14.30%	10	28.60%	8	22.90%	11	31.40%
Mode of Function								
Expressive (Internal/External)	5	14.30%	7	20.00%	10	28.60%	9	25.70%

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Integrative (Internal/Internal)	1	2.86%	4	11.40%	0	0.00%	5	14.30%
Conservative(External/Internal)	3	8.60%	6	17.10%	10	28.60%	6	17.10%
Adaptive (External/External)	26	74.30%	18	51.40%	15	42.90%	15	42.90%
<b>Prior Behavioural Occurrence</b>								
Self-reported prior occurrence	18	51.43%	32	91.40%	30	85.70%	33	94.30%
Self-reported same reason	15	42.90%	32	91.40%	28	80.00%	34	97.10%
<b>Positive Physiological Arousal</b>								
Before	14	40.00%	11	31.40%	9	25.70%	12	34.30%
During	14	40.00%	21	60.00%	8	22.90%	19	54.30%
After	10	28.60%	17	48.60%	13	37.10%	15	42.90%
<b>Negative Physiological Arousal</b>								
Before	22	62.90%	24	68.60%	25	71.40%	24	68.60%
During	19	54.30%	14	40.00%	28	80.00%	16	45.70%
After	25	71.40%	18	51.40%	22	62.90%	20	57.10%
<b>Schema Activation</b>								
Emotional Deprivation	14	40.00%	12	34.30%	14	40.00%	10	28.60%
Mistrust/Abuse	10	28.60%	11	31.40%	8	22.90%	2	5.70%
Defectiveness / Shame	6	17.10%	9	25.70%	4	11.40%	6	17.10%
Emotional Inhibition	3	8.60%	3	8.60%	0	0.00%	1	2.86%
Approval/ Recognition	8	22.90%	4	11.40%	7	20.00%	3	8.60%
Abandonment/ Instability	11	31.43%	10	28.60%	12	34.30%	8	22.90%
Social Isolation/Alienation	2	5.70%	4	11.40%	1	2.86%	4	11.40%
Entitlement/Grandiosity	2	5.70%	3	8.60%	6	17.10%	2	5.70%
Insufficient Self-Control	16	45.70%	20	57.10%	29	82.90%	29	82.90%
<i>Offence Characteristics</i>								
<b>Disinhibiting Factors</b>								
Under the influence	22	62.90%	22	62.90%	26	74.30%	23	65.70%
Substances three days prior	24	68.60%	20	57.10%	29	82.90%	20	57.10%
Medication prescribed	7	20.00%	12	34.30%	2	5.70%	10	28.60%
<b>Association to target/victim</b>								
Unknown	31	88.60%	13	37.10%	23	65.70%	13	37.10%
<b>Reason for target/victim</b>								

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Selective (e.g., rivalry/revenge)	2	5.70%	4	11.40%	15	42.90%	4	11.40%
Random (e.g., first place/person seen)	26	74.30%	10	28.60%	13	37.10%	9	25.70%
Emotive Reason (e.g., sad, bored, angry)	7	20.00%	21	60.00%	7	20.00%	22	62.90%
Offence is planned	10	28.60%	12	34.30%	15	42.90%	13	37.10%
Offence/behaviour in company	26	74.30%	8	22.90%	19	54.30%	10	28.60
Weapon/accelerated	11	31.40%	9	25.70%	20	57.14%	6	17.10%
Retrospective insight of impacts	24	68.60%	23	65.70%	28	80.00%	25	71.40%
<i>Functional Underpinnings</i>								
Codes								
Cathartic Symbolism	1	2.86%	2	5.70%	0	0.00 %	1	2.86%
Darkness	10	28.60%	11	31.40%	14	40.00%	11	31.40%
Feel my pain	4	11.43%	7	20.00%	11	31.40%	9	25.70%
I don't care about me	9	25.70%	12	34.20%	11	31.40%	9	25.70%
Emptiness	15	42.90%	14	40.00%	20	57.10%	16	45.70%
Life is too much-take it away	2	5.71%	9	25.70%	4	11.40%	13	37.14%
See-saw	3	8.60%	4	11.40%	0	0.00 %	0	0.00%
Out of control	6	17.10%	11	31.40%	18	51.40%	10	28.60%
Light switch	5	14.30%	10	28.60%	12	34.30%	8	22.90%
Don't push me; I'll snap!	2	5.70%	5	14.30%	3	8.57%	4	11.40%
Anger is coming	7	20.00%	5	14.30%	8	22.90%	4	11.40%
I'll hurt you first so you can't hurt me	0	0.00%	1	2.86%	7	20.00%	3	8.60%
Loss of a loved one	3	8.60%	2	5.70%	5	14.30%	3	8.60%
I'm in control	1	2.86%	1	2.86%	3	8.60%	1	2.86%
Don't disobey	2	5.70%	3	8.60%	3	8.60%	2	5.70%
Control my environment	2	5.70%	1	2.86%	4	11.40%	2	5.70%
Everyone did it	11	31.40%	14	40.00%	15	42.90%	16	45.70%
Normalised violence/aggression	4	11.40%	5	14.30%	15	42.90%	5	14.30%
Crime pays	11	31.40%	8	22.90%	21	60.00%	9	25.70%
I'll do what I want	16	45.70%	14	40.00%	12	34.30%	13	37.10%



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This is way more fun though!	16	45.70%	14	40.00%	5	14.30%	11	31.40%
It felt good	22	62.90%	20	57.10%	15	42.9%	15	42.90%
The damage is already done	4	11.40%	2	5.70%	1	2.86%	2	5.70%
Nothing better to do	23	65.70%	17	48.60%	9	25.70%	10	28.60%
Just do it	27	77.10%	24	68.60%	21	60.00%	18	51.40%
It's getting too hot!	14	40.00%	0	0.00%	3	8.60%	1	2.86%
It was there fault	8	22.90%	3	8.60%	10	28.60%	3	5.70%
I felt like I belonged	7	20.00%	2	5.70%	2	5.70%	0	0.00%
The streets	17	48.60%	19	54.30%	19	54.30%	17	48.60%
Follow the leader	9	25.70%	4	11.40%	4	11.40%	3	8.60%
I have nothing, they have it all	2	5.70%	0	0.00%	7	20.00%	5	14.30%
Revenge	3	8.60%	3	8.60%	4	11.40%	1	2.86%
Sub-themes								
Help me	20	57.10%	19	54.30%	27	77.10%	26	74.30%
Labile mood	3	8.60%	4	11.40%	0	0.00%	1	2.86%
The Loss of control	12	34.30%	14	40.00%	20	57.10%	12	34.30%
Grief	3	8.60%	2	5.70%	5	14.30%	5	14.30%
Supremacy is mine	3	8.60%	3	8.60%	6	17.10%	5	14.30%
Generally Antisocial	32	91.40%	29	82.90%	32	91.40%	27	77.10%
Anti-social Peer Influence	24	68.60%	19	54.30%	19	54.30%	15	42.90%
Anomic disaffection	2	5.70%	0	0.00%	7	20.00%	4	11.40%
Even the score	2	5.70%	3	8.60%	4	11.40%	0	0.00%
Themes								
Emotionally Dysregulated	8	22.9%	16	45.70%	16	45.70%	17	48.60%
Control and Power Offender	0	0.00%	2	5.70%	2	5.70%	0	0.00%
The Antisocial Offender	25	71.40%	17	48.60%	13	37.10%	16	45.70%
Revenge and Retribution	2	5.70%	1	2.86%	4	11.40%	2	5.70%

Note. \* $p < .05$  \*\* $p < .01$ , \*\*\* $p < .001$

## FUNCTION OF JUVENILE ARSON AND CO-OCCURRING BEHAVIOURS

**Deliberate firesetting and co-occurring behaviours.** The full behavioural chain comprising the five independent contingencies was statistically examined to assess for absolute OPBs; comprising contextual factors, offence characteristics, codes, sub-themes, and themes. In addition, the five contingencies comprising a participant's behavioural chain (i.e., contextual factors, offence characteristics, codes, sub-themes, and themes) were statistically appraised to establish which segments of a young person's behavioural sequence increase the likelihood of predicting functional consistency in the absence of absolute OPB (Daffern et al., 2009). Jaccard's coefficient of similarity determined that the linked behaviours of juvenile arson offenders statistically significantly differed from baseline (unlinked pairs). This illustrates that there is a statistically significant relationship between the function of deliberate firesetting and co-occurring behavioural problems. As shown in Table 14, functional similarity between topographically different behavioural problems was yielded for participants' full offence chain; however, only four of the five independent contingencies were functionally consistent. The mean level of similarity between deliberate firesetting and co-occurring behaviour was  $J=.50$  (range=.39-.64) where 0 = *no similarity* and 1 = *absolute similarity*.

Table 14

### *Statistical Examination of Functional Consistency among Arson Offenders*

Contingency	Linked	Unlinked	Linked/Unlinked
	<i>M (SD)</i>	<i>M (SD)</i>	
Offence chain	.50 (.31)	.38 (.30)	$U=786597.50^{***}$
Theme	.54 (.51)	.48 (.50)	$U= 38972.50$
Sub-theme	.64 (.26)	.44 (.27)	$U= 24537.50^{***}$
Codes	.40 (.25)	.23 (.19)	$U= 24788.50^{***}$
Contextual factors	.39 (.19)	.28 (.13)	$U= 27771.50^{**}$
Offence characteristics	.54 (.20)	.45 (.17)	$U= 29228.50^{**}$

*Note.*  $^{**}p<.01$ ,  $^{***}p<.001$

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Regression analysis was run to establish whether the full chain and four contingencies yielding a significant difference from baseline similarity can predict the likelihood of functional consistency. The full model for offence chain was statistically significant  $\chi^2(1, N=12075) = 27.90, p < .001$ , and between 0.2% (Snell  $RR^2$ ) and 1.6% (Nagelkerke  $RR^2$ ) of variability in the functional behavioural sequence was explained (see Table 15). Thus, the model can only predict functional consistency for individual's with very small variations in behavioural sequence. The likelihood of functional similarity increased by 3.46 for every linked behavioural contingency, as opposed to unlinked contingencies, across two topographically different behaviours. ROC revealed an AUC of .62,  $p < .001$ , 95% Cis= [.58-.67] for the full behavioural chain. In accordance with Ellington et al. (2013), the full chain of arson offending yielded low predictive accuracy (.50 -.70) for OPB.

The full model for the four behavioural contingencies independently yielding functional consistency was also statistically significant,  $\chi^2(1, N=2415) = 46.93, p < .001$ , and explained a between 1.9% (Snell  $RR^2$ ) and 13.7% (Nagelkerke  $RR^2$ ) of variability in a behavioural contingency (see Table 15). While the degree of variance explained was greater for independent contingencies in comparison to the full chain, the variance explained was still small. As shown in Table 15, codes and contextual factors were significant unique predictors of functional consistency for arson and co-occurring behavioural problems. The chance of functional similarity increases by 11.80 for every code and by 142.68 for every contextual factor that is linked as opposed to unlinked. While the ROC analysis revealed an AUC of .70,  $p < .001$ , 95% Cis= [.61-.79] for codes, contextual factors produced an AUC of .67,  $p < .01$ , 95% Cis= [.57-.77]. Thus, codes yielded good levels of predictive accuracy (.70 -.90) for OPB, whereas contextual factors have low predictive accuracy (.50-.70).

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Table 15

*Logistic Regression Predicting the Likelihood of Functional Consistency between Arson Offending and Co-occurring Behavioural Problems*

Contingency	B	S.E.	Wald	Exp (B)
Full chain	1.20	0.23	29.27***	3.46
Codes	2.47	1.00	6.05*	11.83
Sub-theme	1.03	0.79	1.70	2.81
Offence characteristics	1.92	1.08	3.15	6.84
Contextual factors	4.96	1.12	19.60***	142.68

*Note.* \* $p < .05$  \*\* $p < .01$  \*\*\* $p < .001$ .

**Non-arson offending and co-occurring behaviours.** Jaccard's coefficient of similarity determined that linked behaviours of non-arson offenders statistically significantly differed from a baseline level of similarity. Similar to arson offenders, a statistically significant relationship between the full offence chain of index offending and co-occurring behavioural problems was determined. All five independent variables comprising a participant's behavioural chain also yielded significant similarity across topographically different behavioural problems. As shown in Table 16 the mean level of similarity between non-arson offending and co-occurring behavioural problems, as per  $J$ , was also  $J = .50$  (range: .37-.59).

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Table 16

*Statistical Examination of Functional Consistency among Non-Arson Offenders*

Contingency	Linked	Unlinked	Linked/ Unlinked
	<i>M (SD)</i>	<i>M (SD)</i>	
Full chain	.50 (.29)	.36 (.29)	<i>U=748670.50***</i>
Codes	.37 (.20)	.20 (.17)	<i>U= 21593.50***</i>
Sub-theme	.54 (.24)	.43 (.23)	<i>U=30892.50**</i>
Theme	.59 (.48)	.38 (.48)	<i>U= 32261.00**</i>
Contextual factors	.42 (.15)	.31 (.11)	<i>U= 23029.50***</i>
Offence characteristics	.56 (.19)	.50 (.19)	<i>U= 32691.50*</i>

*Note.* \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

The regression model for the full offence chain was statistically significance  $\chi^2 (1, N=12075) = 34.62, p < .001$ , with between 1.9% (Snell  $RR^2$ ) and 13.8% (Nagelkerke  $RR^2$ ) of variance in functional behavioural sequence explained by the model (Table 17). The likelihood of functional similarity increased by 4.25 for every linked, as opposed to unlinked, contingency of a young person’s behavioural chain across different problematic behaviours. The ROC revealed an AUC of .64,  $p < .001$ , 95% Cis= [.60-.68], indicating low predictive accuracy (<.70) of OPB (Ellington et al., 2013).

The full model for all five independent contingencies was statistically significant,  $\chi^2 (5, N=2415) = 47.26, p < .001$ , demonstrating a significant likelihood of accurately predicting functional consistency between topographically different behavioural problems. However, only a small amount of variance in a behavioural contingency was explained by the regression model; between 1.90% (Snell  $RR^2$ ) to 13.80% (Nagelkerke  $RR^2$ ). As shown in Table 17, codes and contextual factors were significant unique predictors of functional consistency. The chance of functional similarity increases by 76.1 for every code that is linked as opposed to unlinked, and by 643.40 for every contextual factor that is linked. The accuracy of implicit codes and contextual factors as pertinent predictors of functional consistency was determined by ROC to

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be good among non-arson offenders, with an AUC of .74 for codes,  $p < .001$ , 95% Cis= [.66-.82] and AUC of .72 for contextual factors,  $p < .001$ , 95% Cis= [.63-.81].

Table 17

*Logistic Regression Predicting the Likelihood of Functional Consistency between Non-Arson Offending and Co-occurring Behavioural Problems*

Contingency	B	S.E.	Wald	Exp (B)
Theme	-0.24	0.42	0.320	0.79
Sub-theme	-1.29	0.94	1.87	0.28
Codes	4.33	1.01	15.54***	76.09
Contextual factors	6.47	1.50	18.54***	643.43
Offence characteristics	0.20	0.95	0.04	1.22

*Note.* \* $p < .05$  \*\* $p < .01$  \*\*\* $p < .001$ .

### **Discussion**

The current chapter expanded upon the findings in chapter four to determine whether criminogenic and functional differences exist between juvenile arson and non-arson offenders. Functional consistency between an offender's index offence and additional problematic behaviour was also explored to ascertain whether there is a functional relationship between the co-occurring behavioural problems of juvenile arson offenders, as well as between the co-occurring behavioural problems of non-arson offenders.

The hypothesis that significant between-group differences would arise was partially supported; limited criminogenic differences were found, but statistically significant differences in functional behavioural style and psychological process was determined. The functional and contextual differences in behavioural sequence yielded between arson and non-arson offenders are a novel contribution to the field of juvenile deliberate firesetting. Additionally, the hypothesis that a within-group functional relationship between index offending and co-occurring behavioural problems would arise for both juvenile arson and non-arson was also partially supported. This is the first study to investigate the underlying functional mechanism of juvenile arson and co-occurring behavioural concerns in comparison to a matched control sample of non-arson offenders.

### **Between-Group Difference**

The current study found limited significant difference across the criminogenic and non-criminogenic domains of the YLS/CMI-AA. This finding highlights the empirical challenge of determining if and how juvenile arson and non-arson offenders differ across dynamic domains of risk, which are amenable to treatment. These results reflect the challenges of previous empirical studies, which was discussed in chapter three (i.e., the meta-analysis). Between-group analysis across a series of discrete characteristics, without contextual understanding offers limited meaningful insight. This was also not the primary focus of the study, rather the

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focus was the sequential process of a juvenile's behaviour and modus operandi. Typically, a much larger sample and statistical power would be required to draw any generalisable conclusions about differences in discrete domains of risk.

The YLS/CMI-AA results did, however, highlight a statistically significant difference for the static domain of offence history. Arson offenders recorded significantly more prior offences than their non-firesetting counterparts. Greater criminality among the deliberate firesetting group cannot be attributed to age, as participants were matched on both ages upon entry into the justice system and age at the time of assessment. This is consistent with existing literature, which shows that juveniles engaging in deliberate firesetting are a highly antisocial group, with criminal versatility, and a greater history of antisocial behaviours than non-firesetting youth (Stickle & Blechman, 2002; Watt et al., 2015).

Statistically significant between-group differences were yielded from the semi-structured interviews with juvenile participants. The characteristics and contingencies yielding statistical significance indicate differences in offending style and psychological processes surrounding index offending. Arsonists were determined to be relatively more unpredictable in their behavioural style and more antisocial in their intent than non-arsonists. The context of arson offending was significantly more likely to be underpinned by situations of stimulation and pleasure seeking as means to adapt their external environment than non-arsonists. This finding is consistent with an arson offender's greater proclivity to target victims/objects opportunistically with no known association. Moreover, an adaptive mode of action (i.e., instrumental-object; Canter & Fritzon, 1998), attributed to under stimulation and desire for environmental change, was also statistically significantly more associated with arsonists. This is the first statistical comparison of contextual (Fritzon, 1998) and situational (Jessor & Jessor 1973) crime scene features between juvenile arson and non-arson offenders, with previous studies primarily focused on within-group analyses (Santilla et al., 2003).



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The potency of antisocial engagement for juvenile arsonists is evidenced by the statistically significant group difference across the domains of the F-JOF. Arson offenders were statistically significantly more likely to engage in offending behaviour for the primary reason that the behaviour elicits a more potent and superior reward than any other action. The implicit codes statistically significantly associated with deliberate firesetting are characterised by the potency of reward (*this is way more fun though!*), a need for stimulation (*nothing better to do*) and a propensity to protect themselves in the context of wider criminal activity (*it's getting too hot!*). The need for novel *stimulation* is further demonstrated by significantly less prior engagement in the same behaviour (i.e., firesetting) among arson participants. Arsonists were also significantly less likely to identify with an adaptive way of achieving their self-reported core value. This demonstrates the proclivity of a juvenile arsonist to utilise illegitimate means to meet their needs, illustrating less protective skill (e.g., poorer social skills or coping capacity).

The significantly greater number of offences and greater criminal versatility associated with arson offending was not explained by proximal life stressors (i.e., familial or environment). The arson group were statistically significantly less likely to need a trigger to elicit offending behaviour compared to the non-arson group. This indicates there may be a greater intrinsic force behind the behaviours of deliberate firesetters. When a proximal trigger did arise, however, there was no significant difference in the proximity of a trigger for behavioural occurrence between the two groups. For both groups, antecedent implicit codes were predominantly activated on the day of their offence. This is unsurprising given that both arson and non-arson offenders principally operated under an adaptive mode of action. Thus, the baseline for tolerance of immediate gratification and impulse-control among juvenile offenders seems low, with youth engaging in deliberate firesetting behaviours plausibly more deficient in these areas (McCardle et al., 2004). This is supported by the finding that the self-

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concept of being impulsive and/or a risk-taker was more frequently reported by firesetters. A reduced likelihood of planning an offence and an increased likelihood of experiencing positive physiological arousal before and during offending was also more frequent among firesetters. While these characteristics did not reach significance, they reiterate the heightened delinquent presentation and uninhibited processes of juvenile firesetters compared to juveniles who do not deliberately light fires.

The psychological and behavioural process of deliberate firesetters indicates they are intrinsically driven by novel stimuli, under-arousal, impulsiveness, and a propensity to be unperturbed by negative consequence. The temperament of juvenile deliberate firesetters is, therefore, suggested to negatively impact upon the efficacy of supports provided to them and be a responsivity issue for learning and implementing adaptive prosocial behaviours. For some juvenile firesetters, the potency of their underlying functional need may be more important than their interest in fire per se, consequently resulting in versatile behaviour. Environmental factors restricting a juvenile firesetters opportunistic offending style likely moderate their engagement in deliberate firesetting. The fire-scripts identified in chapter four offer a novel way to assess the functional importance of fire for a juvenile, as well as identifying functional and contextually specific treatment targets to mitigate the risk of using fire.

Arson and non-arson offenders were both predominantly found to operate under an adaptive mode of action, yet arson offenders were statistically significantly more likely to do so than non-arson offenders. While an adaptive *modus operandi* predominantly occurred within a situation of pleasure for arson offenders, it was more likely to occur under a situation of social demand for non-arson offenders. The findings may reflect a relative difference in psychosocial maturity between arson and non-arson offenders. For instance, engaging in behaviours characteristics of younger age groups (Loeber & Ahonen, 2015), underpinned by impulsive temperament, present-oriented thinking, and low personal responsibility (Monahan

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et al., 2009). Non-arsonist, however, appear to struggle with demands reflective of future oriented thinking and a movement from pleasure-seeking to utilitarian motive, which is more common later on in the age-crime curve and psychosocial development (Farrington, 2008). For the arson group, the next predominant mode of action was expressive (internal/external), which also frequently occurred within the control group. Thus the two groups did not significantly differ for this mode of action. This finding aligns with Santilla et al. (2003) who found adaptive (i.e., instrumental-object), followed by expressive (i.e., expressive person-object) modes of action most commonly associated with juvenile deliberate firesetting.

For non-arsonist, however, the conservative (external/internal) mode of action occurred at an equal rate to the expressive mode of action. In fact, statistically significantly more non-firesetters than firesetters operated under a conservative mode of action. The conservative mode of action is characterised by inflexible cognition and maladaptive problem-solving within the context of interpersonal conflict, which is attributed by the individual to be caused by an external source (Fritzon, 2012). Thus, it is unsurprising that situations of interpersonal conflict yielded a statistically greater significant association with the control group. Accordingly, non-arson offenders were significantly more likely to be selective in choosing their target or victim for the reason of responding to perceived/real threat or provocation, as well as have a known affiliation as their target or victim.

The behaviour of non-arson offenders was more often characterised by an inability to tolerate and inhibit a negative emotional experience or expression, as evidenced by significantly more activation of the insufficient self-control/discipline schema compared to arson offenders. Across the domains of the F-JOF non-arson participants were significantly more emotionally dysregulated in their behavioural function than arson offenders. The implicit psychological processes and scripts (codes) significantly differentiating non-arsonists from arsonists within the function of emotional dysregulation were characterised by personal

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distress or grievance (*feel my pain*), as well as a cognitive bias towards perceived or real threat (*I'll hurt you first so you can't hurt me*). The implicit codes of *loss of control* approached significance, in line with a significant between-group difference for the *insufficient self-control/discipline* schema activation. These findings indicate non-arson offenders have a greater propensity to operate under the conservative mode than arson offenders.

Some of the antisocial implicit codes were significantly more common among non-arsonists, compared to arsonists. The normalised belief that aggression and violence is an acceptable way to respond behaviourally was significantly more frequent among non-arson offenders. Moreover, significantly more antisocial engagement for financial gain (i.e., *crime pays*) was reported by non-arsonists than arsonists. In light of these specific differences between the two groups, it is plausible that the greater likelihood of being triggered by a situation of social demand, rather than pleasure seeking in the context of adaptive antisocial behaviour, may be more reflective of hostile attribution bias and low self-efficacy. Their normalised belief of aggression/violence as a template for responding may, therefore, result in violence being the primary tool of the control sample, employed for both expressive (conservative) and instrumental (adaptive) purposes.

Despite the finding of no significant between-group difference in violent offender classification being determined (i.e., previously charged for a violent offence-yes/no), the mean number of violent offences within each group was unknown. It is conceivable that non-arsonists may have a greater predisposition for acts of violence and aggression, due to more entrenched beliefs around normalised aggression and violence, which acts as a template for behavioural responding. Conversely, for arsonists the misuse of fire becomes normalised a priori, opposed to the use of aggression and violence. The normalised misuse of fire as a predisposing factor for deliberate firesetting behaviour among juveniles has been reported elsewhere (Lovell, 2013).

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The suggestion that arsonists and non-arsonists hold different scripts is further informed by the work of Gilbert et al. (2017), who highlight the entrenchment of a script informs its significance to an offender's behavioural pattern. This was demonstrated for arson offenders through the development of fire-specific scripts in study two, with persistent or versatile fire-scripts associated with repeat firesetting. Therefore, the same logic can plausibly be applied to understanding the behavioural pattern of non-arson offenders for three reasons: (1) non-arsonists reported significantly greater negative arousal during their offending behaviour when compared to firesetters; (2) the schema of insufficient self-control/discipline is positively associated with general aggression (Gilbert & Daffern, 2013); and (3) individuals operating under a conservative mode of action also typically hold cognitive distortions underpinned by hypervigilance to harm and provocation (Fritzon, 2012).

Versatility in maladaptive learning and opportunity to internalise a mental representation of both firesetting and violence predisposes the possibility that violence and deliberate firesetting may co-occur. This understanding can provide an explanation for why some deliberate firesetters go on to engage in violent acts, whereas others do not. It is, however, the frequency, intensity, and chronicity of fire-related or aggressive cognitive rehearsal, revision, and retrieval that influences the likelihood of violence and aggression being internalised as a normal template for responding (Gilbert & Daffern, 2017). In chapter four, prior firesetting incidents of arson offender's revealed some youth integrated their former cognitive and behavioural codes into broader offending behaviour; for example, the use of verbal or physical threats to use fire or the use fire for the purpose of crime concealment in the context of wider offending. This demonstrates not only the ongoing appraisal and retrieval of fire-scripts, but also the retention of prior behavioural patterns while simultaneously developing criminal versatility. This process of integration is associated with an escalation towards severe and violent offending (Loeber & Ahonen, 2015). Accordingly, dynamic

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assessment of fire-specific scripts, as well as psychological appraisal and beliefs pertaining to aggression and violence will plausibly facilitate determining firesetters at risk of violence.

### **Functional Consistency of Juvenile Behavioural Problems**

The final goal of the current chapter was to explore the functional consistency of co-occurring behavioural concerns among both arson and non-arson offenders independently. Illicit substance misuse and aggression were the two most prominent additional behavioural concerns for juvenile offenders, irrespective of firesetting status. Engagement in risk-taking, rule-breaking, and self-harm was appraised as relatively less problematic by juveniles across both groups. The most frequently reported co-occurring behavioural problems were consistent with the meta-analytic findings in chapter three. While the between-group difference was not the focus for the final research question, the finding that firesetters and non-firesetting offenders did not significantly differ in their self-reported additional behavioural problems increase the generalisability of the findings to other juvenile offending samples.

As predicted, functional consistency between co-occurring behavioural problems (i.e., index offence and additional problematic behaviour) was determined for both arson and non-arson offenders over a mean time lapse of 14.64 months. The specificity of information used to draw a parallel between two behaviours, however, significantly impacted on whether an OPB link could be determined.

For both arson and non-arson offenders, the full behavioural chain comprising the sum of all contingencies was the most accurate and significant predictor of functional similarity. Further analyses, however, demonstrated that only the implicit psychological appraisals and attributions of the young person (i.e., codes) and contextual information could inform significant unique predictors of functional consistency. Thus, broader independent variables, including themes and sub-themes, were less pertinent and unlikely to yield a unique link that was greater than chance. These findings reiterate discussion points raised in chapter four

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pertaining to the limited utility of higher order categorisation for informing accurate risk management and treatment.

Overall, the findings clarify that juvenile deliberate firesetting and co-occurring behavioural problems are not mutually exclusive in their function. This was evident for both arson and non-arson offenders. These results guide the specific type of information required to monitor risk among co-occurring juvenile behavioural problems, irrespective of firesetting status. The implicit cognitive-emotional appraisals, attributions, and beliefs of a young person leading up to and surrounding a problematic behavioural occurrence were most predictive of their globalised functional deficit. Thus, the implicit codes identified in the current thesis and presented in chapter four (see the F-JOF) represent areas of persistent risk requiring intervention. The additional information of contextual and situational factors allows for the formulation of future scenarios of risk to be tested.

The integration of empirically validated contextual factors across participants' co-occurring behaviours also revealed that for both samples of offenders, additional problematic behaviour was predominantly classified under an adaptive mode of action, which was consistent with participants' primary modus operandi for index offending. Across both groups, the number of participants classified under each mode of action for a behavioural problem followed the same order of frequency, with adaptive, expressive, conservative, and integrative the most common mode of action respectively. There were no significant between-group difference for the mode of action or situational trigger across participants' additional problematic behaviours, though the situational factors did differ slightly for the additional problematic behaviours; arsonists continued to primarily operate under circumstances of pleasure-seeking, whereas the control group mainly operated under circumstances of personal adversity. These results highlight the most fundamental contextual and situational risks associated with general juvenile behavioural problems, and further illustrate the functional

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differences between juvenile arson and non-arson offenders.

In conclusion, these findings demonstrate the utility of the OPB framework for identifying functionally relevant contingencies of concern for juvenile firesetters and general offenders with co-occurring behavioural problems. The ASM is considered a useful framework for monitoring dynamic risk among juvenile firesetters and general offenders, as well as informing functional treatment needs over the developmental period of adolescence. The addition of modus operandi (source of action/locus of effect) and situational factors provided a specific explanation for heterogeneity within a behavioural function, across behaviours, and between groups of offenders.

The current findings provide a novel understanding of the fundamental differences between arson and non-arson offenders, as well as the functional processes which remain consistent across co-occurring behavioural problems. Examining the consistency of the psychological and behavioural processes determined from study two and the current study over a further period of adolescent development was considered to be developmentally appropriate. This would advance existing theory by examining the utility of the OPB framework for the assessment and treatment of juvenile arsonists, a sub-group of juvenile offenders with versatile and severe behavioural problems throughout adolescence. Accordingly, the next chapter reports a prospective follow up study to test the temporal stability of juvenile offence/behavioural chains over time.



CHAPTER SIX

Functional Consistency throughout Adolescence

In the previous chapters, the functional underpinnings of juvenile offending behaviour and deliberate firesetting behaviour were determined. The foci of the research were identifying the proximal and dynamic risk factors that trigger an individual's underlying psychosocial vulnerability, as well as identifying the core functional purpose of the behavioural occurrence. The behavioural principle of functional analysis and the qualitative method of thematic analysis informed the development of the functional framework of juvenile offending behaviour (F-JOF). The studies that comprise this thesis have primarily had a fire-specific focus with the aim of determining if deliberate firesetters are functionally disparate from non-firesetting offenders. Accordingly, the framework of juvenile offending function was developed across both arson and non-arson offending behaviour and further used to inform the functional underpinnings of additional behavioural problems. The F-JOF is, therefore, applicable to multiple problematic behavioural presentations, irrespective of firesetting status or criminal adjudication.

Study two determined that three levels of data comprise the functional framework of juvenile offending behaviour: implicit cognitive-emotional scripts and maladaptive beliefs (i.e., codes), higher order functional categories differentiating between individuals for a particular function (i.e., sub-themes), and the highest order category representing the primary functional trajectory of an offender (i.e., themes). Evaluating a young person's behaviour at a more implicit level was established to be the most informative method to identify behavioural function. Study three illustrates that ascertaining a young person's offence-specific and general psychological appraisals, attributions, and belief system arising in proximity to a problem behavioural occurrence, statistically significantly differentiated groups of offenders and topographically different behavioural problems at a functional level. In conjunction with a

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young person's narrative, the ASM (Fritzon, 1998) informed the attributional and behavioural style (i.e., internal or external) of a juvenile when integrated with situational factors (Ten Berg & De Raad, 2002) highlighting problematic scenarios characteristic of a juvenile's problematic coping or responding patterns. The implicit psychological experiences of juveniles provided context to their personal narrative, proffering functionally relevant treatment targets.

In study two, cross-functional needs were found to occur within a single problematic behavioural incident demonstrating the importance of obtaining information at the implicit level with contextual detail. The co-occurrences of psychological and behavioural scripts across different functional domains, such as *generally antisocial* scripts with the addition of *revenge, control/power, or emotionally dysregulated* scripts highlight a young person's primary functional need for a specific behavioural action, as well as dormant psychological vulnerabilities. In study three, less dominant functional needs were shown to arise as problematic across different situations or at a later point in a young person's development (i.e., T1 index and T1 additional, with a mean time-lapse of 14.64 months). This illustrated the importance of monitoring the young person's cognitive-emotional, contextual, and situational factors on a regular basis during adolescence, and was the premise for the final study of the current thesis.

The highest order categories referred to as themes, including the *emotionally dysregulated offender, power and control offender, antisocial offender, and revenge offender* did not provide the contextualised information necessary to inform a young person's specific treatment needs accurately. For example, offenders categorised under the same offender type, such as emotionally dysregulated offenders, expressed different reasons for their behaviour, attributed their cognitive-emotional experiences to different sources, and their behaviour manifested in different ways. An emotionally dysregulated offender was found to behave in a

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maladaptive way due to one of four emotional experiences: dysphoria/emotional saturation, oscillation in mood, unregulated frustration/anger, or grief. Additionally, the emotional discomfort experienced by an emotionally dysregulated young person were attributed to either external or internal sources, with the target of the behaviour also varying between internal and external targets. Treating all offenders who present with emotional dysregulation in the same way, will, therefore, lack specificity and context, and likely reduce the efficacy of treatment (Low & Day, 2017).

Restricted or limited exposure to a proximal trigger, and the continued relevance of a trigger, are integral to the onset, maintenance, and intensification of problematic behaviours. A change in circumstance or environment can elicit, permit, or prohibit a behavioural occurrence (Daffern et al., 2009; Jones, 2004). As a result of proximal risk in an individual's life, the behavioural concerns of individuals' have shown to shift in function (i.e., mode of action) and in the direction of severity (Fritzon, 1998). Proximal triggers, such as life events, contextual factors, internal affect/cognition, biology, and cultural norms are reported to operationalise individual underlying psychological vulnerability (Gannon et al., 2012), manifesting in problematic behaviour. The previous chapters have provided specificity within these areas of proximal risk for a juvenile offending sample using statistical evaluations of functional behavioural sequences and the application of existing research findings. The developmentally immature state of a juvenile, however, necessitates a more dynamic approach to determine the function of problematic behaviour, so as to avoid pathologising typical or functionally dissimilar behaviours as functionally consistent (Daffern et al. 2009).

In study three, the environment of behavioural occurrence for a young person's index offending and additional problematic behaviour was the same, therefore could not be statistically examined as an independent variable and may moderate functional consistency. The similarity between the segments of participants' behavioural sequences for

topographically different behavioural problems was regarded as evidence for functional consistency, when environmental constraints that can mute behavioural occurrence were controlled for (Daffern et al., 2007). For example, the opportunity to experience or be exposed to situational triggers, weapons, peer group, illicit substances, physiological arousal, and functionally relevant cognitive-emotional scripts, appraisals, and attributions was possible for both index offending and additional behavioural problems.

The developmental nature of a juvenile population, however, complicates the interpretation of OPB findings. As previously alluded throughout this thesis, developmental psychological principles, including misalignment between chronological age and maturation stage (i.e., puberty), evolving social opportunity and autonomy, cultural rites of passage, and neurological growth throughout the course of adolescence (Newman & Newman, 2017) may impact upon the temporal stability of the current research findings. Persistent reinforcement of maladaptive psychological and behavioural processes can, however, lead to entrenched functional deficits and negatively impact upon a young person's opportunity for healthy development and adaptive change. Accordingly, a second time-point (T2) of research was designed, to investigate the functional consistency of behavioural concerns over time.

### **The Present Study**

The final study is a prospective follow-up study of behavioural function, mapping a young person's dynamic risk and behavioural function over a further period of adolescent development, as well as evaluating the effects of different environment on the functional consistency of juvenile behavioural problems. In line with the statistically significant findings of functional consistency between index offending and co-occurring behavioural problems in study three, it was hypothesised that functional consistency would occur over an additional time-lapse during the course of adolescence. The absence of functional consistency, however, cannot be concluded purely on the basis that a functional relationship between *T1index*

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*behaviour* and *T2 index behaviour*, or *T1 additional* and *T2additional behaviour* is not yielded. For example, *T1 index behaviour* may be functionally consistent with *T2 additional problematic behaviour*. Changes in chronological age and psychosocial development are anticipated to elicit changes in proximal experiences and evoke underlying vulnerabilities specific to some, but not all behavioural problems. Thus, all possible combinations of behavioural problems across the two time-points were compared in order to conclude the presence or absence of functional consistency. Due to intra-individual cross-functional needs evidenced in study two and three, a cross-comparison effect was anticipated. For instance, functional consistency between the T1 index and T2 index offence; T1index offence and T2 additional problematic behaviour; T1 additional problematic behaviour and T2 index behaviour; and T1 additional problematic behaviour and T2 additional problematic behaviour.

Functional consistency was hypothesised to occur at the individual level across all possible behavioural combinations.

The final study occurred, on average, 25.80 months after participants' index offending. Participants were, therefore, expected to be within the upper end of the adolescent age bracket based upon the length of time that had passed. In response to juvenile offending, the criminal justice system tends to enforce diversionary alternatives to younger and non-repeat offenders (Crime Statistics Agency, 2017). Repeat offenders who are entering late adolescence or approaching early adulthood, however, often receive more frequent and longer custodial sentences. The very nature of a custodial environment is expected to restrict the occurrence of an offending behaviour and therefore, may restrict a young person's behavioural sequence. This is consistent with the concept of muted behaviour as discussed in chapter five. Conversely, being released back to the community may provide greater opportunity, due to exposure to the necessary contingencies underpinning an individual's behavioural sequence. Accordingly, it was hypothesised that participants experiencing a change in the environment

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would have less functional consistency over time, compared to participants with environmental consistency over time.

### Method

#### Participants

The final study comprised the same group of participants recruited for T1 (i.e.,  $N=70$ ,  $n=35$  firesetting offenders and  $n=35$  non-firesetting offenders). Following a mean time lapse of 6.48 months between T1 and T2, there was a 60 % attrition rate; 87.14% ( $n=61$ ) participants were still under supervision by Australian justice departments, of which 40% ( $N=28$ ) agreed to participate in a follow up interview. Of the 28 juveniles willing to participate, four had no new criminal charges, nor did they identify engaging in any problematic behaviour; these participants were excluded from the analyses. The sample at T2, therefore, consisted of 24 juvenile offenders and of these, 12.5% ( $n=3$ ) identified only one behavioural concern at T2 of the research. These participants were, therefore, excluded from two of the four behavioural comparisons that required an additional problematic behaviour at T2 (i.e., T1 index/ T2 additional and T2 additional/T1 additional). Thus, the sample size for two behavioural comparisons comprised of 24 participants and two comprised of 21 participants. The majority of participants were male (91.6%;  $n=22$  male), Aboriginal Australian (45.8%;  $n=11$ ), classified as a violent offender ( $n=23$ , 95.83%), and situated in custody at the time of interview (62.5%;  $n=15$ ). Of the 21 participants, all but one participant had either a current or historical adjudication for a violent offence. The sample at T2 was comprised of 14 firesetters and 10 non-firesetters from the original sample; however, the sample was combined for the current study.

**Age of participants.** On average, participants were 25.8 months older at T2 ( $Mage=17.46$  years) than when they committed their T1 index offence ( $Mage =15.31$  years), and 6.48 months older than when they engaged in their T1 additional problematic behaviour

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(*Age* =16.92 years). Thus, functional consistency of behavioural problems was assessed at three different mean age points during adolescence: aged 15-years, 16-years, and 17 years-old.

**Environment of participants.** The majority of the  $N=24$  participants in the final study were situated in detention for their T1 interviews ( $n=20$ , 83.33%). At time-point two, 14 (58.33%) were situated in the community and 10 (41.67%) participants in custody. In the current study, the problematic behaviours of 10 participants (41.67%) occurred in a different environment to their T1 behavioural problem. Thus, two behavioural groups were developed to examine the stability of behavioural contingencies across environmental change: (1) ‘change’ in behavioural environment and (2) ‘no change’ in behavioural environment. Of the 10 participants comprising the ‘change’ group, 90% ( $n=9$ ) had moved to a location of greater restriction (i.e., from the community into custody or rehab) and one moved to a location of reduced restriction (i.e., from custody into the community). Among the ‘no change’ group, both behaviours at T1 occurred in the community and at T2, problem behaviours also occurred in the community.

### **Design**

The final study employed a prospective follow up design with a mixed methodology. Both qualitative and quantitative analyses were used to evaluate whether a young person’s risk and treatment needs remained consistent across time. Sequential functional analysis of offending behaviour was conducted using the FAI-IO and FAI-APB that was employed in chapter four.

### **Materials**

The same materials employed at T1 (i.e., FAI-IO and FAI-APB) were used in the current study to ensure the behavioural analyses were directly comparable. See chapter three for a description of the materials used.

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### **Procedure**

The current study is sequential to study two and three, thus semi-structured interviews were conducted with participants between six to eight months after T1. Participants were contacted by their respective caseworkers to determine if they were interested in re-engaging. Each young person was offered a non-exchangeable \$15 gift voucher for their re-engagement in the research program. Each participant was questioned about additional criminal charges they had received and problematic behaviours they had engaged in since T1.

Where a young person had received an additional criminal charge at T2, they were interviewed about the behaviour using the FAI-IO. Consistent with T1, participants were subsequently requested to identify whether they engaged in one of five problematic behaviours: (1) aggression; (2) self-harm; (3) illicit substance misuse; (4) rule breaking; and (5) risk taking. If a young person had not received an additional criminal charge at T2, they were asked to rank the list of additional behavioural problems (i.e., rule breaking, aggression, risk-taking, illicit substances, and self-harm). The young person was subsequently questioned on the two behaviours he or she perceived to be most problematic for them. The two behaviours selected by a young person were required to be topographically different, as the research focus was the functional similarity of co-occurring behavioural problems. For example, if behaviour one was aggression, behaviour two could not be aggression. Therefore, the top ranking behaviour was assessed using the FAI-IO and the second behavioural concern was assessed using the FAI-APB.

### **Data Analysis**

The research question of the current study pertained specifically to whether the function of problematic behaviour was consistent across time, regardless of offender type. Thus, the current study did not involve between-group analyses for arson and non-arson offenders. Between-group analyses, however, were conducted for environmental location (i.e.,



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community or detention). The data analyses employed at T2, therefore, followed a similar protocol as study two and three to statistically examine functional consistency of behaviours across the two time-points.

**Qualitative analysis.** Consistent with T1, participant interviews were transcribed as functional analyses. The inductive functional framework developed at T1 (Table 5, Chapter four) was applied to participant responses. The framework included three levels of data: (1) codes; the deepest level of data analysis and reflective of an offender's implicit cognitions and emotions embedded in the data; (2) sub-themes; a higher order category synthesising a series of codes representative of an offender's behavioural function; and (3) themes; the highest order category, which provides a general overview of an offender's functional trajectory. Each participant transcript was coded dichotomously (i.e., present or absent) across all levels of data. The assignment of contextual and situational factors to a young person's narrative was also coded dichotomously across participant behavioural problems for statistical examination.

At T2, 11 variables within the F-JOF became redundant; six codes, two sub-themes, and one theme were not endorsed by any of the participants at T2. This was attributed to the attrition rate between time-points (i.e., the variables were relevant to participants who participated at T1 only) and/or functional variation (i.e., the implicit codes, sub-themes, or themes were no longer relevant for participants at time-point two). Consequently, where all participant responses were *no (absent)* or *yes (present)* for a variable across both behaviours, the variable was excluded from any further analysis.

**Quantitative analysis.** Firstly, frequency analysis was conducted for psychosocial and protective factors, situational and contextual factors, offence/behavioural characteristics, and implicit psychological processes (codes, sub-themes, and themes) underpinning a juvenile's behavioural occurrence at T2. Chi-square 2 x 2 contingency analyses were subsequently performed across all variables that did not comprise a young person's behavioural sequence

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(i.e., psychosocial and protective factors) to test the null hypothesis that there is no relationship between time-points. Therefore, yielding a non-significant difference between these variables illustrates there is no significant difference between the two time-points.

***Analysis of functional behavioural sequence.*** A matrix of all possible behavioural comparisons was determined from T1 (T1) and time-points two (T2) behaviours: T1 index behaviour vs. T2 index behaviour; T1 index behaviour vs. T2 additional problematic behaviour; T1 additional problematic behaviour vs T2 index behaviour; and T1 additional problematic behaviour vs. T2 additional problematic behaviour. The purpose of the four analyses was to test all possibilities of functional similarity across the two time-points. All variables comprising a participant's functional behavioural sequence (i.e., codes, sub-themes, themes, context/situation, and offence characteristics) were coded dichotomously as 1=*present* or 0=*absent*, as per the method described in study three. Jaccard's coefficient of similarity was employed to evaluate functional consistency between behaviours across the two time-points. The appraisal of similarity was repeated for the four behavioural comparisons.

Bivariate tests of difference were calculated to determine if the distribution of Jaccard's scores for linked behaviours (i.e., the level of similarity between a participant's behavioural problems across two time-points) were significantly different from unlinked behaviours (i.e., the level of similarity between a participant's own behaviour and all other participant behavioural problems across two time-points). Where a statistically significant difference was yielded, a significant variation from baseline was determined, and functional similarity across time-points was concluded. Logistic regressions were run to determine the ability of the behavioural contingencies (independent variables) to predict linked vs unlinked behaviour across time (dependant variable).

For each of the four behavioural combinations, only the contingencies that were significantly different from baseline, as per the bivariate analyses, were entered into a

regression model.

Variables that significantly contributed to the regression model were determined to be significant unique predictors of functional consistency across time. The final stage of analysis was to test the predictive accuracy of functional consistency across time. To achieve this, Receiver Operator Characteristics (ROC) analysis was conducted and the area under the curve (AUC) was assessed. This process was repeated for the between-group comparison of the environment of behavioural occurrence; the independent variable was linked/unlinked behaviours and the dependant variable was functional consistency.

### **Results**

#### **Juvenile Behavioural Problems**

Overall, seven participants were either remanded or convicted for new criminal charges between T1 and T2 of the research project. These offences included break and enter, aggravated assault, motor vehicle theft, aggravated drink driving, weapons and explosives, or public order offences. Criminal conviction, however, is not a pre-requisite for the examination of OPB. Accordingly, problematic behaviours, irrespective of a criminal charge were examined for functional similarity.

The index behaviour most commonly identified by participants at T2 was rule breaking; 58.33% ( $n=14$ ) of participants identified breaking detention centre rules, school rules, or having breached their parole or bail. This was followed by violence towards another person ( $n=5$ ; 20.83%) and malicious damage/property damage ( $n=2$ , 8.33%). Risk taking, firesetting, and drug related charges were each identified by only one participant. Of the 21 participants engaging in an additional problematic behaviour at T2, the majority identified aggression as their most problematic behaviour ( $n=8$ ; 38.1%), followed by risk taking ( $n=5$ ; 23.8%), rule breaking ( $n=5$ ; 23.8%), and illicit drug taking ( $n=3$ ; 14.3%).

### **Psychosocial and Protective Factors**

Over the mean time frame of 6.48 months, only one variable yielded a statistically significant difference across the two time-points. The change in medical status was statistically significant, according to Fisher's Exact Test (FET,  $p=.04$ ). Caution should, however, be taken when applying weight to this finding, as the standardised residuals were above the .05 probability; this may be attributed to the small sample size ( $N=24$ ). Of the 14 participants taking prescription medication at T1, 64.29% ( $n=9$ ) continued to take medication at T2, and 35.71% of participants ( $n=5$ ) were no longer prescribed medication. Conversely, of those who were not taking medication at T1 (41.70%;  $n=10$ ), two participants (20%) commenced medication at T2. The other eight of these ten participants (80%), however, was not prescribed medication at either time-point. Overall the psychosocial and protective factors did not significantly change over the course of research timeframe, thus demonstrating relatively limited adaptive development among juveniles still engaged in the criminal justice system at the second time-point.

### **Functional, Contextual, and Behavioural Characteristic Contingencies over Time**

Consistent with T1, the index and additional problematic behaviours at time-point two were predominantly underpinned by antisocial and emotionally dysregulated cognitions and affect. The frequency of the functional themes, sub-themes, and codes underpinning index and additional behavioural problems across the two time-points are located in Table 18. The frequency of contextual contingencies and behavioural characteristics comprising participants' behavioural chains are located in Table 19.

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Table 18

*Frequency of Functional Codes, Sub-Themes, and Themes across Time-Points*

Thematic Analysis Outcome	Index T1 (N=24)		Index T2 (N=24)		Proxy T1 (N=24)		Proxy T2 (N=21)	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
<b>Codes</b>								
Cathartic Symbolism	1	4.20%	0	0.00%	2	8.30%	0	0.00%
Darkness	9	37.50%	6	25.00%	9	37.50%	1	4.80%
Feel my pain	7	29.20%	5	20.80%	4	16.70%	4	19.00%
I don't care about me	8	33.30%	1	4.20%	7	29.20%	0	0.00%
Emptiness	11	45.80%	3	12.50%	10	41.70%	3	14.30%
Life is too much-take it away	2	8.30%	0	0.00%	9	37.50%	1	4.80%
See-saw	1	4.20%	1	4.20%	1	4.20%	1	4.80%
Out of control	8	33.30%	4	16.70%	8	33.30%	2	9.50%
Light switch	4	16.70%	3	12.50%	8	33.30%	2	9.50%
Don't push me; I'll snap!	5	20.80%	5	20.80%	3	12.50%	5	23.80%
Anger is coming	4	16.70%	2	8.30%	3	12.50%	2	9.50%
I'll hurt you first so you can't hurt me	3	12.50%	2	8.30%	1	4.20%	0	0.00%
Loss of a loved one	3	12.50%	1	4.20%	2	8.30%	0	0.00%
I'm in control	3	12.50%	0	0.00%	1	4.20%	1	4.80%
Don't disobey	3	12.50%	0	0.00%	2	8.30%	0	0.00%
Control my environment	3	12.50%	2	8.30%	3	12.50%	0	0.00%
Everyone did it	6	25.00%	4	16.70%	10	41.70%	1	4.80%
Normalisation of violence/aggression	9	37.50%	1	4.20%	5	20.80%	1	4.80%
Crime pays	11	45.80%	6	25.00%	4	16.70%	3	14.30%
I'll do what I want	10	41.70%	7	29.20%	9	37.50%	6	28.60%
This is way more fun though!	7	29.20%	9	37.50%	11	45.80%	7	33.30%
It felt good	13	54.20%	12	50.00%	13	54.20%	9	42.90%
The damage is already done	0	0.00%	3	12.50%	1	4.20%	0	0.00%
Nothing better to do	11	45.00%	5	20.80%	10	41.70%	3	14.30%

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Just do it	6	25.00%	8	33.30%	12	50.00%	8	38.10%
It's getting too hot!	8	33.30%	0	0.00%	1	4.20%	0	0.00%
It was there fault	6	25.00%	3	12.50%	0	0.00%	4	19.00%
I felt like I belonged	2	8.30%	2	8.30%	0	0.00%	1	4.80%
The streets	12	50.00%	5	20.80%	12	50.00%	3	14.30%
Follow the leader	2	8.30%	3	12.50%	2	8.30%	1	4.80%
I have nothing, they have it all	2	8.30%	0	0.00%	0	0.00%	0	0.00%
Revenge	3	12.50%	0	0.00%	2	8.30%	0	0.00%
Sub-themes								
Help me	18	75.00%	9	37.50%	17	70.80%	6	28.60%
Labile mood	1	4.20%	1	4.20%	1	4.20%	1	4.80%
The Loss of control	10	41.70%	7	29.20%	10	41.70%	7	33.30%
Grief	1	4.20%	1	4.20%	1	4.20%	0	0.00%
Supremacy is mine	4	16.70%	1	4.20%	5	20.80%	1	4.80%
Generally Antisocial	22	91.70%	18	75.00%	16	66.70%	17	81.00%
Anti-social Peer Influence	13	54.20%	10	41.70%	12	50.00%	4	19.00%
Anomic disaffection	3	12.50%	0	0.00%	0	0.00%	0	0.00%
Even the score	3	12.50%	0	0.00%	1	4.20%	0	0.00%
Themes								
Emotionally Dysregulated	6	25.00%	9	37.50%	12	50.00%	9	42.90%
Control and Power Offender	2	8.30%	1	4.20%	1	4.20%	1	4.80%
The Antisocial Offender	13	54.20%	14	58.30%	10	41.70%	11	52.40%
Revenge and Retribution	3	12.50%	0	0.00%	1	4.20%	0	0.00%

Note. \* $p < .05$  \*\* $p < .01$ , \*\*\* $p < .001$

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Table 19

*Frequency of Contextual and Characteristic Contingencies of Participants' Behavioural Chains*

Behavioural Contingencies	T1 Index (N=24)		T2 Index (N=24)		T1 Proxy (N=24)		T2 Proxy (N=21)	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
<i>Contextual/Situational Factors</i>								
Proximity of antecedent								
Same day	22	91.70%	19	79.20%	19	79.20%	17	81.00%
Preceding week	2	8.30%	3	12.50%	2	8.30%	2	9.50%
Longer than a week prior	0	0.00%	2	8.3%	2	8.30%	2	9.50%
Situational trigger								
Pleasure	8	33.30%	10	41.70%	11	45.80%	11	52.40%
Social demand	7	29.20%	1	4.20%	5	20.80%	4	19.00%
Conflict	6	25.00%	8	33.30%	6	25.00%	3	14.30%
Personal adversity	3	12.50%	5	20.80%	3	12.50%	3	14.30%
Mode of function (origin/target)								
Expressive (internal/external)	3	12.50%	4	16.70%	4	16.70%	2	9.50%
Integrative (internal/internal)	1	4.20%	4	16.70%	1	4.20%	1	4.80%
Conservative (external/internal)	5	20.80%	5	20.80%	5	20.80%	3	14.30%
Adaptive (external/external)	15	62.50%	11	45.80%	14	58.30%	15	71.40%
Positive physiological arousal								
Before	8	33.33%	14	58.3%	4	16.16%	10	47.60%
During	9	37.50%	13	54.2%	14	58.30%	11	52.40%
After	8	33.33%	12	50.00%	12	50.00%	10	47.60%
Negative physiological arousal								
Before	16	66.70%	9	37.50%	19	79.20%	11	52.40%
During	16	66.70%	10	41.70%	10	41.70%	10	47.60%
After	16	66.70%	12	50.00%	12	50.00%	11	52.40%

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Schema activation								
Emotional deprivation	10	41.70%	10	41.70%	6	25.00%	4	19.00%
Mistrust/abuse	6	25.00%	7	29.20%	1	4.20%	2	9.50%
Defectiveness / shame	6	25.00%	6	25.00%	2	8.30%	0	0.00%
Emotional inhibition	2	8.30%	2	8.30%	0	0.00%	0	0.00%
Approval/ recognition	7	29.20%	3	12.50%	4	16.70%	2	9.50%
Abandonment/ instability	6	25.00%	8	33.30%	2	8.30%	3	14.30%
Social isolation/alienation	3	12.50%	3	12.50%	2	8.30%	0	0.00%
Entitlement/grandiosity	3	12.50%	0	0.00%	2	8.30%	2	9.50%
Insufficient self-control	17	70.80%	17	70.80%	8	33.30%	9	42.90%
<i>Offence Characteristics</i>								
Disinhibiting factors								
Under the influence	17	70.80%	8	33.30%	10	41.70%	11	52.40%
Substances three days prior	16	66.70%	8	33.30%	12	50.00%	11	52.40%
Medication prescribed	7	29.20%	15	62.50%	3	12.50%	2	9.50%
Reason for target/victim								
Selective	7	29.20%	1	4.20%	4	16.70%	4	19.00%
Random/opportunistic	9	37.50%	9	37.50%	7	29.20%	4	19.00%
Emotive reason	8	33.30%	14	58.30%	13	54.20%	13	61.90%
Unknown association to target/victim	15	62.50%	14	58.30%	8	33.30%	5	23.80%
Proximal life stressor	18	75.00%	8	33.30%	11	45.80%	9	42.90%
Offence is planned	12	50.00%	9	37.50%	10	41.70%	6	28.60%
Offence/behaviour in company	11	45.80%	11	45.80%	9	37.50%	6	28.60%
Weapon/accelerant used or carried	9	37.50%	4	16.70%	3	12.50%	5	23.80%
Prosocial reaction	9	37.50%	10	41.70%	13	54.20%	10	47.60%
Retrospective insight of impacts	17	70.80%	5	20.80%	18	75.00%	13	61.90%
Risk taker	22	91.70%	23	95.80%	23	95.80%	20	95.20%
Impulsive	22	91.70%	21	87.50%	20	83.30%	17	81.00%

Note. \* $p < .05$  \*\* $p < .01$ , \*\*\* $p < .001$



### **Functional Consistency over Time**

Jaccard's coefficient was used to appraise the level of similarity between participants' behaviours over time. Bivariate tests of difference were used to determine if linked behaviours significantly differed from a baseline level of similarity (i.e., unlinked behaviours) for four behavioural comparisons across two time-points. The results of each behavioural comparison for all contingencies comprising a young person's behavioural chain are presented in Table 20. Three contingencies yielded statistically significant consistency across time-points: codes, context, and offence/behavioural characteristics. The significant effects, however, only occurred for two of the four behavioural comparisons: T1 index (T1 index) compared with T2 index (T2 index), and T1 additional behaviour (T1 additional) compared with time-point two index (T2 index). T1 index and T2 additional, and T1 additional and T2 additional were not significantly different from baseline ( $p > .05$ ). Due to only three of the five individual contingencies across two of the four comparisons reaching significance, the functional consistency of the full behavioural chain was not statistically examined in the current study. This decision aligns with the work of Daffern et al. (2009), who outline that seeking to appraise functionally unrelated behaviours can result in false positives and over pathologised behaviour.

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Table 20

*Statistical Examination of Functional and Behavioural Contingencies across Time-Points*

Contingency	Linked	Unlinked	Linked/ Unlinked
	<i>M (SD)</i>	<i>M (SD)</i>	
<b>Implicit Codes</b>			
T1 index/ T2 index	.26 (.2)	.17 (.16)	<i>U</i> =9234.00*
T1 additional/ T2 index	.24 (.16)	.15 (.18)	<i>U</i> =8789.50**
T1 index/ T2 additional	.20 (.19)	.17 (.18)	<i>U</i> =7878.50
T1 additional/ T2 additional	.15 (.18)	.17 (.22)	<i>U</i> =8765.00
<b>Sub-Themes</b>			
T1 index/ T2 index	.50 (.25)	.41 (.27)	<i>U</i> =11424.00
T1 additional/ T2 index	.35 (.26)	.36 (.29)	<i>U</i> =13104.00
T1 index/ T2 additional	.45 (.21)	.42 (.28)	<i>U</i> =8358.00
T1 additional/ T2 additional	.35 (.23)	.36 (.29)	<i>U</i> =7885.50
<b>Themes</b>			
T1 index/ T2 index	.54 (.50)	.40 (.49)	<i>U</i> =11424.00
T1 additional/ T2 index	.54 (.51)	.43 (.50)	<i>U</i> =11760.00
T1 index/ T2 additional	.43 (.51)	.38 (.48)	<i>U</i> =8358.00
T1 additional/ T2 additional	.52 (.51)	.42 (.50)	<i>U</i> =7885.50
<b>Contextual Factors</b>			
T1 index/ T2 index	.29 (.15)	.21 (.11)	<i>U</i> =9252.50*
T1 additional/ T2 index	.27 (.15)	.21 (.13)	<i>U</i> =9816.00*
T1 index/ T2 additional	.24 (.08)	.22 (.13)	<i>U</i> =749.00
T1 additional/ T2 additional	.24 (.15)	.24 (.16)	<i>U</i> =8527.00
<b>Offence/ Behavioural Characteristics</b>			
T1 index/ T2 index	.43 (.16)	.44 (.18)	<i>U</i> =12591.00
T1 additional/ T2 index	.61 (.21)	.40 (.18)	<i>U</i> =5744.00**
T1 index/ T2 additional	.47 (.18)	.44 (.17)	<i>U</i> =9173.50
T1 additional/ T2 additional	.48 (.21)	.40 (.18)	<i>U</i> =6877.00

*Note.* \**p*<.05 \*\**p*<.01 \*\*\**p*<.001.

**T1 Index and T2 Index Comparison.** As evidenced by a significant difference between linked and unlinked behaviours in Table 20, both codes and contextual factors remained consistent across a mean time-lapse 25.8 months. Regression analysis was run to establish whether codes and contextual factors could predict the likelihood of functional consistency. The full model was statistically significant,  $\chi^2(2, N=1128)=15.99, p < .001$ , and explained between 1.4% (Snell  $RR^2$ ) and 7.6% (Nagelkerke  $RR^2$ ) of the variability in the experience of implicit codes and contextual factors.

Predicting functional consistency throughout adolescence only accounted for small amounts of variation in implicit experience and behavioural profile. As shown in Table 21, codes and contextual factors were unique significant predictors of functional consistency. The chance of functional similarity increases by 157.01 for every contextual factor and by 13.22 for every code that is linked, as opposed to unlinked. ROC revealed an AUC of .65,  $p < .05$ , 95% CIs= [.54-.77] for contextual factors and an AUC of .65,  $p < .05$ , 95% CIs= [.54-.76] for codes. Both contingencies sit below the .70 threshold for good sensitivity for predicting offence paralleling behaviours (Ellington et al., 2013).

The most frequently co-occurring contextual factors comprising this effect were proximity of trigger/activation: same day ( $n=17, 70.83\%$ ), environment of behavioural occurrence ( $n=14, 58.33\%$ ), adaptive mode of action ( $n=12, 50\%$ ), insufficient control/discipline schema ( $n=7, 29.17\%$ ), retrospective insight ( $n=6, 25\%$ ), situation of pleasure ( $n=5, 20.83\%$ ), situation of conflict ( $n=4; 16.67\%$ ), emotional deprivation ( $n=4, 16.67\%$ ), situations of social demand ( $n=3, 12.5\%$ ), and conservative mode of action ( $n=3, 12.5\%$ ). For six contextual factors, consistency occurred for less than 10% of participants: expressive mode of action, situation of adversity, and *entitlement/grandiosity*, *defectiveness/shame*, *approval-seeking/recognition seeking*, and *abandonment/instability* schemas; the remaining four contextual factors did not yield consistency for T1 index and T2

index over time.

The codes which frequently co-occurred across T1 and T2 were, *it felt good* ( $n=7$ , 29.20%), *just do it* ( $n=6$ , 25.00%), and *this is way more fun though* ( $n=5$ , 20.80%). The codes of *everyone did it*, *crime pays*, *darkness*, *feel my pain*, and *out of control*, each co-occurred for 12.50% of participants ( $n=3$ ) across the two behaviours. For 12 codes, consistency across the two behaviours occurred for less than 10% of participants: *Emptiness*, *I don't care about me*, *see-saw*, *light switch*, *don't push me I'll snap*, *anger is coming*, *I'll hurt you first*, *loss of a loved one*, *everyone does it*, *normalisation of aggression/violence*, *crime pays*, and *follow the leader*. However, of the 26 codes to arise at time-point two, six codes did not remain consistent across behaviours for any of the participants.

**T1 Additional Behaviour and T2 Index.** The contingencies of implicit codes, contextual factors, and offence/behavioural characteristics both reached statistical significance; linked behaviours indicated significantly greater consistency across a mean time period of 6.48 months than unlinked pairs. As shown in Table 21, regression analyses revealed implicit codes, contextual factors, and offence/behavioural characteristics significantly and uniquely predicted functional consistency,  $\chi^2(1, N=1128)=37.296, p < .001$ , explaining between 3.30% (Snell  $RR^2$ ) and 17.50% (Nagelkerke  $RR^2$ ) of variability in implicit codes, contextual factors, and behavioural characteristics over the two time-points. The chance of functional similarity increases by 8.75 for every code, by 17.46 for every contextual factor, and by 262.33 for every behavioural characteristic that is linked, rather than unlinked. The ROC analyses revealed implicit codes and contextual factors have a low level of accuracy ( $<.70$ ) for predicting offence paralleling behaviour across a mean time-lapse of 6.48 months, with an AUC of .67,  $p < .01$ , 95% CIs= [.56-.78] for implicit codes and an AUC of .63,  $p < .05$ , 95% CIs= [.52-.74] for contextual factors. In accordance with Ellington et al. (2013), offence/behavioural characteristics yielded good levels of predictive accuracy with an AUC of

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.78,  $p < .01$ , 95% CIs = [.68-.89].

The codes most frequently co-occurring across time-point one and T2 were *just do it* and *this is way more fun though* ( $n=6$ ; 25.00 %). The codes of *everyone did it, I'll do what I want, it felt good*, and *darkness* each co-occurred for 16.70% of participants across two behavioural problems over time. For nine codes, consistency across the two behaviours over time occurred for less than 10% of participants: *Feel my pain, nothing better to do, I don't care about me, emptiness, see-saw, light switch, crime pays, anger is coming*, and *loss of a loved one*. Of the 26 codes relevant at time-point two, 11 codes did not remain consistent across behaviours for any of the participants.

For contextual factors, *same day* proximity of an antecedent co-occurred most frequently across the two time-points ( $n=17$ ; 70.80%), followed by being in the community at the time of an offence/behavioural occurrence ( $n=15$ ; 62.50%), adaptive mode of action ( $n=8$ ; 33.30%), situation of pleasure seeking ( $n=7$ ; 29.20%), *insufficient self-control and discipline* schema activation ( $n=6$ ; 25.00%), and prosocial retrospective insight of behavioural impact ( $n=5$ ; 20.80%). Situations of conflict and *emotional deprivation* schema activation each co-occurred for 16.70% of participants ( $n=4$ ). For seven contextual factors, consistency occurred for less than 10% of participants: situations of social demand, situations of adversity, conservative mode of action, proximity of antecedent is *within the preceding week*, and *defectiveness/shame, approval/recognition seeking, abandonment/instability* schema activation. The remaining contextual factors did not co-occur across participant behavioural problems over time.

All behavioural characteristics occurring at T1 co-occurred at least once at time-point two. The behavioural characteristics found to co-occur most frequently between participant's T1 additional and T2 index behaviours were, self-reported impulsivity ( $n=19$ ; 79.20%) or risk taking ( $n=22$ ; 91.70%), and offending/behavioural occurrence for an emotive reason ( $n=11$ ;

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45.80%). Committing an offence/behaviour in company, selecting the target or victim at random, and consuming substances within three days of an offence/behavioural occurrence each co-occurred for 33.30% ( $n=8$ ) of participants. Lastly, *opportunistic* offending/behavioural responding, being intoxicated at the time of an offence/behaviour, and planning an offence/behaviour each co-occurred 29.20% ( $n=7$ ) of participants.

Table 21

*Logistic Regression Predicting the Likelihood of Functional Consistency over Time*

Contingency	B	SE	Wald	Exp (B)
T1 Index vs T2 Index				
Implicit Codes	2.60	1.02	6.39*	13.22
Contextual Factors	5.06	1.59	10.17*	157.01
T1 Additional vs. T2 Index				
Implicit Codes	2.17	0.98	4.92*	8.75
Contextual Factors	2.86	1.42	4.04*	17.46
Offence/Behaviour Characteristics	5.57	1.06	27.80***	262.33

Note. \* $p<.05$  \*\* $p<.01$ .

### Change in Environment of Behavioural Occurrence

The environment of a participant's behavioural occurrence was statistically examined to determine any effects on predicting functional constancy. Juveniles who had engaged in two different behaviours across two different environments (e.g., community or custody), were compared with those who had engaged in two behaviours within the same environment (i.e., no change in environment). The sample sizes comprising each group were small; between 7 and 10 participants comprising the environmental change group, and between 13 and 15 participants had no variation in the environment of behavioural occurrence. The environment of the *no change* group was the community, whereas a shift in the environment for the *change* group was in the direction of greater restriction (e.g., detention or rehabilitation)

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Offence/behavioural characteristics were the only contingency yielding a between-group difference (i.e., change vs no change) for linked behavioural occurrences. Significance was yielded for two of the four behavioural comparisons: T1 index/ T2 index and T1 index/T2 Additional. The statistical appraisal of linked vs unlinked behaviour at the within-group level for both the *change* and *no change* group are displayed in Table 22, along with the between-group findings. The consistency of behavioural characteristics between T1 index and T2 index was statistically significantly greater ( $U=18.00, p=.003$ ) for participants with no change in the environment of their behavioural occurrence. Likewise, a significant group difference ( $U=20.00, p=.031$ ) was yielded for the T1 index and T2 additional behaviour comparison. The significant effect was in the direction of greater consistency for behaviours occurring in the same environment. These findings illustrate the significant influence that environment has on a young persons' problematic behavioural style. When a juvenile's environment changes over time, their problematic behavioural style becomes less consistent. Conversely, when the environment of a juvenile remains the same over time, greater consistency in problematic behavioural style arises.

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Table 22

*Statistical Examination of Functional Consistency and Environment of Behavioural Occurrence*

Behavioural Comparison	Environmental change	No-environmental change	Between-group difference
<b>T1 Index/T2 index</b>			
Linked <i>M</i> (SD)	.31 (.07)	.49 (.16)	<i>U</i> =18.00**
Unlinked <i>M</i> (SD)	.46 (.20)	.44 (.18)	
Linked/Unlinked	<i>U</i> =338.50**	<i>U</i> =2591.50	
<b>T1 Index/T2 Additional</b>			
Linked <i>M</i> (SD)	.34 (.09)	.53 (.17)	<i>U</i> =20.00*
Unlinked <i>M</i> (SD)	.43 (.17)	.42 (.18)	
Linked/Unlinked	<i>U</i> = 188.50	<i>U</i> =1612.500*	
<b>T1 Additional/T2 Index</b>			
Linked <i>M</i> (SD)	.55 (.29)	.65 (.10)	<i>U</i> =49.00
Unlinked <i>M</i> (SD)	.45 (.20)	.44 (.17)	
Linked/Unlinked	<i>U</i> =757.00	<i>U</i> =752.00	
<b>T1 Additional/T2 Additional</b>			
Linked <i>M</i> (SD)	.42 (.27)	.52 (.16)	<i>U</i> =33.50
Unlinked <i>M</i> (SD)	.40 (.19)	.43 (.16)	
Linked/Unlinked	<i>U</i> =434.00	<i>U</i> =1433.50	

*Note.* \**p*<.05 \*\**p*<.01.



### Discussion

The final study was a prospective follow-up of juvenile arson and non-arson offenders to test the utility of the OPB framework for juvenile offending over time. The rapid development of a juvenile population was the impetus for examining functional consistency across an additional time-point. The research focused on topographically different behavioural problems to inform the functional relevance of comorbid behavioural problems among juvenile offenders (Lambie et al., 2013), the relationship between co-occurring externalising and internalising behavioural problems (Tanner et al., 2016), and to develop research in line with the recommendation that appraisal of functional similarity should not only focus on behaviours of the same form (Daffern et al., 2009). The primary aim of the current study was to determine if the function of different behavioural problems remain consistent during adolescence and between discrete environments.

The hypothesis that functional consistency would occur for juvenile behavioural problems over an additional period of adolescence was partially supported. There was, however, a reasonable amount of dissimilarity between the individual contingencies comprising a young person's behavioural sequences at the second time-point. Only two of the four behavioural comparisons, T1 index/ T2 index and T1 additional/T2 index, yielded a statistically significant functional relationship. Moreover, consistency was only found for implicit codes, contextual factors, and offence/behavioural characteristics. Controlling for similarity between other behaviours beyond a young person's index offence was integrated into the study design (Daffern et al., 2009), as per the four behavioural comparisons. Behavioural consistency was, however, only yielded when at least one of a participant's highest ranked behaviours comprised the behavioural comparison (i.e., T1 index or T2 index). The T1 additional/T2 additional pair of behaviours did not yield significant consistency for any of the examined contingencies. This illustrates that it is the primary behavioural problems

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self-reported by a young person which reflect functional consistency, with a minimum and maximum temporal stability between 6.48 months and 25.80 months.

The significant findings in the current study are consistent with study three, illustrating that implicit cognitive-emotional experience and contextual factors underpinning a young person's behavioural repertoire are the strongest predictors of functional consistency. For the comparison of T1 index and T2 index, no other contingencies comprising a participant's functional behavioural sequence yielded statistically significant linkage between behaviours, despite reaching significance in study three. The behavioural style of a young person, as per the contextual factors, yielded the strongest and most significant contribution to the prediction of functional consistency over the course of the research timeline. The chance of prospectively predicting functional consistency from a young person's implicit cognitive-emotional experiences or contextual factors, however, was slightly below the threshold of good predictive accuracy. Nevertheless, at least for some juvenile offenders, maladaptive psychological processes and behavioural styles arising in early childhood/adolescence appear to persist throughout adolescent development, as well as across a range of different behavioural problems.

For the T1 additional and T2 index comparison, in addition to implicit codes and contextual factors, offence characteristics yielded statistically significant linkage between juvenile behavioural problems over time. Offence characteristics exceeded both implicit codes and contextual factors as the strongest predictor of functional consistency when all three contingencies were entered into the regression model together. Offence/behavioural characteristics yielded good predictive accuracy over the mean time period of 6.48 months. The most frequently co-occurring characteristics, however, closely resembled a juvenile's developmental stage, including impulsivity and an emotive rationale for selecting a target or victim.

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Daffern et al. (2009) identified that a high baseline agreement between contingencies of behavioural sequences could result in an overrepresentation of functional consistency. For example, the developmental stage of a juvenile attenuates capacity for meta-cognitive processes and regulatory control (Kenny, 2016). Thus, consistency across domains consistent with typical developmental stage, including low impulse control, limited prospective insight, being in company with peers, external attribution style, or lack of prospective appraisal, seem most important for linked function over time. A closer evaluation of specifically what comprised the effect of functional consistency illustrates that the two most frequently co-occurring implicit codes reflect the pleasure seeking, impulsive, and under-aroused temperament discussed in depth in study three (i.e., *it felt good*, and *this is way more fun*). Moreover, the close proximity of a trigger or implicit experience (i.e., same day), as well as a consistent proclivity to operate under an adaptive mode of action (external/external) were among the most commonly co-occurring contextual factors over the time-points. Consistent activation of the insufficient self-control schema was also found to contribute towards the significant effect of context.

To a degree, the behavioural style of participants in the current study is not atypical of adolescent development (Newman & Newman, 2017). Thus the contingencies yielding functional consistency across time-points are likely a combined reflection of developmental stage and functional deficit. Psychosocial immaturity itself, however, is a risk factor for persistent offending, particularly the continuation of impulse and aggression dyscontrol (Monahan et al., 2009). As discussed in chapter five the formative adverse life experiences of a juvenile forensic cohort, as well as the maladaptive behaviours they pursue (e.g., illicit substance use), can cause neurological damage and negatively impact upon the capacity for change. Maturation in the areas of fundamental functional deficit, however, may be insufficient to replace maladaptive behaviours and psychological processes with prosocial

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alternatives (Al-Attar, 2010).

The repetitive antisocial manifestation of functional needs and the severity of violence involved in some of the research participants' offences are not normative adolescent behaviours. For example, the majority of the current sample was violent offenders, with a protracted criminal history, and persistent offending over the course of this research thesis. Accordingly, the specific functional contingencies and associated characteristics yielding significant effects in the current research programme are suggested to be representative of persistent recidivist offending and problematic behaviour emerging in early adolescents (12-15 years old) and continuing through to late adolescence (17-21 years old). The current findings illustrate participants comprising the research thesis retained problematic psychological processes and behavioural characteristics throughout adolescence. Reduced consistency between co-occurring behavioural problems at time-point two in comparison to T1 was, however, yielded. Daffern et al. (2009) highlights that in the absence of absolute OPB, the identification of specific contingencies that may parallel behavioural problems has utility for intervention purposes. In light of the reduced consistency and the developmental nature of the current sample it is, therefore, recommended that the current findings be interpreted as consistency between specific segments of a juvenile's behavioural sequence, rather than absolute OPB over time (Daffern et al., 2009).

The emergence of additional needs and a dynamic shift in psychological and behavioural processes is acknowledged to occur not only throughout adolescent development but over life course as an offender's behavioural repertoire and the contingencies that comprise an individual's behavioural chain evolve (Daffern et al. 2009). This, however, doesn't mean functional consistency cannot arise, as evidenced by the current thesis and the former work of Al-Attar (2010). The absence of functional consistency for participant's second-ranked behavioural concern in the current study (i.e., T1 additional/T2 additional at

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T2) may, in-fact, represent the emergence of a formerly dormant functional deficit or progressive development of a new functional need. The cross-functional needs of juvenile firesetting and non-firesetting offenders determined in study two provide support for this interpretation. Likewise, the M-TTAF model differentiates between psychological vulnerabilities and critical risk factors, with a psychological vulnerability remaining dormant until proximal events operationalise the underlying risk (Gannon et al., 2012).

Fritzon (1998) contended that a subsequent shift in modus operandi occurs in response to a proximal or persistent change in environmental circumstance. Thus, it is plausible that dormant vulnerabilities will arise and dynamic shifts in behavioural style will occur for juveniles who are not only susceptible to environmental changes but also biopsychosocial growth. While environment can limit exposure to functionally specific provocations, implicit experiences such as individual cognition and affect, schema activation, internal/external attribution and locus of effect and psychological appraisal of a situation (i.e., pleasure, social demand, conflict, and personal adversity) are less likely to be impacted by external environment, as these contingencies originate from within the individual. Therefore, functional consistency of implicit codes and contextual factors over other contingencies, such as offence characteristics, may be more representative of less situationally dependent behavioural problems (Daffern et al., 2009). Alternately, disparate functional underpinnings may not have been captured by the research, due to participants being interviewed on only four behaviours over the course of 25.80 months.

Finally, there was limited difference in the psychosocial and protective factors of participants between time-points; thus dissimilarity could not be attributed to a shift within these domains. Other proximal domains that were not explored in the current study may, therefore, have contributed to the high number of unlinked behaviours attenuating support for consistency over time. For example, in the current study, the assessment of a young person's

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stage of maturation (i.e., puberty) in addition to their chronological age would have reduced functional consistency between unlinked pairs. Other precipitating factors may have been the systemic effect of criminal justice system involvement (CSA, 2017), a non-linear impact of adverse life experience (Fox et al., 2015), the acquisition of new and varied antisocial skills via peers (Unhoo, 2016), parental practices/ attachment (Bisby et al., 2017), and identification of mental health issues. These are all possible confounding variables to be considered in future research.

In conclusion, the current study expands upon the previous study, which informed specific functional contingencies yielding statistically significant consistency between juvenile offending and co-occurring behavioural problems, by identifying contingencies yielding temporal consistency throughout the dynamic phase of adolescent development. While delineation between typical and atypical behavioural responding during adolescence is important, the developmental status of juvenile offenders does not attenuate the utility of the OPB paradigm for identifying and monitoring functional behavioural deficits. However, greater care pertaining to the level of emphasis placed on the functional pervasiveness, and the discourse used when explaining consistency of behaviour function for juveniles may mitigate pathologising psychological and behavioural processes typical of adolescent development. In combination, the studies in this thesis provide preliminary support for the utility of the OPB paradigm with complex juvenile presentations. The identification of similar contingencies is beneficial for identifying specific treatment targets and predicting scenarios of risk.

## CHAPTER SEVEN

### Integration of the Thesis Findings and Concluding Comments

The criminal versatility and pervasive needs of juvenile arsonists make it challenging to distinguish them from non-arson offenders and is a major barrier to advancing offence-specific assessment and targeted intervention. Determining the fundamental risk factors and functional underpinnings of juvenile arson offenders in comparison to non-arson offenders was the primary focus of this thesis. Identifying the most common co-occurring behavioural difficulties among arson offenders, and subsequently examining the relationship between arson offending and problematic behaviour was an additional focus of this thesis. Establishing analogous segments across the functional behavioural sequences of topographically different behavioural problems was anticipated to be an effective way of streamlining assessment and treatment practices for young persons with widespread risk. Natural maturation, however, complicates prospective identification of risk. Thus, temporal consistency of behavioural function throughout adolescence was examined to identify the most pertinent domains of persistent risk. This thesis responds to previous methodological limitations and integrates the most robust aspects of existing theory to advance clinical understanding of juvenile deliberate firesetters with co-occurring behavioural problems.

### **Summary of Research Findings**

This thesis commenced with a meta-analytic review comprising 30 years of empirical research on the correlates of juvenile deliberate firesetting in comparison to juveniles without a history of deliberate firesetting. Fire-specific factors (e.g., fire interest) and antisocial behaviour were the strongest correlates of deliberate firesetting, followed by environmental and psychopathology factors. The second study identified the functioning underpinnings and dynamic psychological processes of juvenile index offending and co-occurring behavioural problems. A qualitative methodology was employed to determine the sequential behavioural

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chains and psychological experiences of arson and non-arson offenders. A series of thematically derived themes, sub-themes, and codes (i.e., cognitive/affective scripts) informed the underlying function of juvenile problematic behaviour, with the addition of contextual and situational factors determining participants' modus operandi (ASM; Canter & Fritzon, 1998). A series of cognitive fire scripts and a framework of juvenile offender function (F-JOF) revealing dynamic cognitive/affective scripts, sub-categories, and higher order trajectories informing behavioural function were subsequently developed.

The third study utilised the findings from study two and statistically examined the differences in offence scene actions and dynamic psychological factors of juvenile arson and non-arson offenders. Arson offenders were found to be significantly more antisocial and impulsive in their psychological process and behavioural style, with non-arson offenders significantly more emotionally dysregulated, particularly in the context of interpersonal conflict. In addition, participants' co-occurring behavioural problems were statistically appraised for similarity to determine the shared and unique characteristics. Functional consistency of co-occurring behavioural problems was partially supported for both arson and non-arson offenders (OPB; Daffern et al., 2009). The final study was a prospective follow-up designed to examine the consistency of behavioural function across time and environment during adolescent development. Temporal stability of dynamic psychological processes and behavioural actions were partially supported; however, absolute OPB was not concluded. A juvenile's primary ranked behavioural problems yielded the greatest functional consistency across time (i.e., T1 index and T2 index behaviour). For participants primary ranked problematic behaviours, though, thematically derived codes (i.e., cognitive-emotional scripts) and contextual/situational factors were the strongest predictors of functional consistency over time (e.g., origin/target of behaviour, situational trigger, physiological arousal, and schema activation).



### **Integration of Research Findings**

The statistical amalgamation comprising three decades of empirical research determined the fundamental characteristics associated with deliberate firesetting risk and provided the foundation for the subsequent studies. Fire-specific risk factors, including exposure to fire, the experience of fire, and interest in fire were found to be the strongest predictors of deliberate firesetting behaviour. This was evidenced by the meta-analytic review and qualitative findings that juveniles who engage in deliberate firesetting retain memories of former maladaptive or poignant encounters with fire, subsequently forming offence-specific psychological and behavioural processes pertaining to the use of fire. The empirical evaluation of implicit psychological appraisals of fire, attribution of behavioural occurrence, and propensity to engage in deliberate firesetting demonstrated that inter-and intra-individual variation of implicit beliefs and scripts occurs among juveniles. These scripts were underpinned by various cognitive processes and affective states, including dysphoria, labile mood, grief, disinhibition, dominance, deviance, and injustice. In combination, these results provide an explanation of how individuals who engage in deliberate firesetting differ from their non-firesetting counterparts and why antisociality alone is unable to explain deliberate firesetting behaviour.

Beyond fire-specific factors, conduct disorder and violent/dangerous offending yielded the strongest association with deliberate firesetting, as shown in study one. This was further supported by the YLS/CMI-AA results in study three, leading to the conclusion that arson offenders have significantly greater criminal histories than non-arson offenders. Archival data detailing juvenile criminal history revealed high rates of adjudicated violence and general offending among the firesetting sample. Illicit substance misuse and aggression were self-reported as the most problematic co-occurring behavioural concerns by juvenile firesetters in study two. All juvenile firesetters participating in the prospective study had also engaged in

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violent offending. Implicit cognition and affect (i.e., F-JOF) illustrate compensatory coping (i.e., dominance/excessive self-assertion, aggression/hostility, and peer recognition-seeking) characterising juveniles with a proclivity to be violent. These findings align with the conceptualisation that deliberate firesetting is a marker for prospective violence (Lambie et al., 2015) and juveniles engaging in deliberate firesetting are more likely to be versatile than exclusive in their offending behaviour (Doley et al., 2011; Lambie et al., 2013).

Psychopathology and environmental risk factors provided less distinction between firesetters and non-firesetters than fire-specific and antisocial risk factors. As shown in study three, distal adverse experiences of arson and non-arson offenders did not significantly differ between the samples, and only criminal history differentiated the two groups on the YLS/CMI-AA. These findings reiterate the complexity of determining group membership from individual risk factors in isolation.

The proclivity of juvenile offenders to gravitate towards deliberate firesetting, combined with wider problematic functioning, and significantly greater criminal history was explained through an examination of functional behavioural sequence between arson and non-arson offenders, as shown in study three. Juvenile arson was primarily underpinned by antisociality, characterised by implicit cognition and affect representative of general social deviance and pleasure-seeking temperament. While emotional dysregulation and mental illness were associated with deliberate firesetting behaviour, they were determined to be a secondary functional concern. Contrary to this, non-arson offenders were significantly more likely to offend due to emotional dysregulation, namely insufficient anger control and implicit psychological processes activated in the context of interpersonal conflict. Proximal adversity and psychopathological complaints were more pertinent for non-arson offenders than arson offenders. The predominant modus operandi, including locus of effect, target/object, and situation of behavioural action for each group strengthens these findings.

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For instance, arson offenders exhibit an external attribution style and pervasively externalise their behavioural response (i.e., adaptive mode of action: external/external), they primarily offended under circumstances of pleasure and positive physiological arousal, and were less systematic and more opportunistic in their behaviour. Non-arson offenders, however, were more often triggered by the characteristics of situations, targeted a specific victim or object, and were frequently found to externally attribute their internal discomfort, with the purpose of their behavioural action being the reduction of internal distress (i.e., conservative mode of action: external/internal).

Examination of the relationship between deliberate firesetting and topographically different behavioural problems provided partial support for consistency at a functional level. Functional consistency was determined for all contingencies comprising a young person's behavioural chain, except for the higher order functional category (i.e., theme) among the firesetting group. Only the implicit psychological appraisals and attributions of the young person (i.e., codes) and contextual information, however, were significant unique predictors of functional consistency. A longitudinal examination of functional consistency among juvenile offenders, irrespective of deliberate firesetting, provides preliminary support for the retention of particular contingencies of a behavioural sequence throughout adolescence, opposed to absolute offence paralleling behaviour. The thematically derived higher-order categories, as well as sub-categories within a function, lack the specificity to predict persistent risk. At T2, implicit codes and contextual factors remained among the strongest predictors of functional consistency between index and wider problematic behaviour, and were the most stable predictors across time.

Offence/behavioural characteristics were an additional unique predictor of functional consistency across the two time-points. Finally, a greater environmental restriction via incarceration was found to significantly reduce the level of functional similarity between

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different juvenile behavioural problems, when compared to those remaining in the community. The environment of behavioural occurrence, however, did not significantly contribute towards the degree of functional consistency for implicit psychological processes and contextual factors (e.g., codes and modus operandi).

As shown in study three, problematic psychological and behavioural functioning characterised by under arousal and poor inhibitory self-control was significantly more characteristic of deliberate firesetting, whereas cognitive and emotional inflexibility (i.e., poor perspective taking and bias towards harm/threat) was significantly more associated with non-firesetters. For firesetters, a greater bias for novel stimuli and positive arousal, the absence of needing an environmental trigger for behavioural activation, and their opportunistic behavioural style may increase the potential for engagement in and reinforcement of problematic behavioural processes at a greater rate than non-firesetters, who require specific situational or contextual factors for behavioural activation. The process of more frequent and diverse engagement in problematic behaviour among firesetters may be attributable to the specific neurodevelopmental vulnerabilities of a juvenile engaging in deliberate firesetting. Heightened neurodevelopmental vulnerability offers a plausible explanation for the gravitation towards stimulating sensory sources such as fire, subsequently interacting with problematic and poignant experiences of fire and evoking deliberate firesetting behaviour. In fact, the potency of reward was found to be of greater importance than the behaviour per se, as evidenced by the greater behavioural versatility and criminal history of arson offenders.

The recurrent and protracted engagement of externalised behavioural problems among juvenile firesetters emerging purely for pleasure with disregard for punishment or consequences for others is, however, also reflective of early antisocial personality traits (i.e., CUT). As shown in study one of this thesis, CUT are a statistically significant correlate of deliberate firesetting.

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Comorbid conduct disorder and CUT is associated with characteristics of fearless temperament (i.e., low reactivity to startling or distressing stimuli), reduced sensitivity to punishment, low responsiveness to distress, and lack of behavioural inhibition (Fanti, Panayiotou, Lazarou, Michael, & Georgiou, 2016; Frick et al., 2014). Moreover, fearless temperament, specifically limited fear of fire consequence, is suggested to be a fire-specific risk factor in former research (Lovell, 2013). Accordingly, CUT and associated characteristics offer plausible explanation for the greater antisociality associated with arson offenders. Byrd, Hawes, Burke, Loeber, and Pardini (2018), however, recently demonstrated that reduced neural activation to reward and punishment cannot significantly differentiate conduct disordered youth with high CUT from those with low CUT (Byrd et al., 2018). Reduced sensitivity within these domains is suggested by Byrd and colleagues to be associated with severe and early onset conduct problems, irrespective of CUT and after controlling for confounding variables (e.g., intelligence and ADHD). Accordingly, elevated CUT among deliberate firesetters may not explain why they are a more antisocial and criminally versatile group of offenders, but a deficit in neural activation to reward and punishment might.

Significantly greater association between CUT and firesetting, opposed to CUT and non-firesetting, is the interaction of internalised psychopathology. Internalised psychopathology, as discussed by Byrd et al. (2018), can reduce neural sensitivity to reward. Watt et al. (2015) found CUT traits among juvenile offenders only predicted firesetting for those with lower self-report antisocial behaviours, thus elevations in CUT among deliberate firesetters may represent the presence of internalised psychopathology, rather than severe antisociality. As shown in both study one and three, psychopathology is significantly associated with deliberate firesetting, yet in the current sample was secondary to antisociality characterised by pleasure seeking and positive physiological arousal. This aligns with Eisenbarth et al. (2016) who found stable levels of conduct disorder are comprised of both

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emotional dysregulation (e.g., reactive aggression and anxiety) and sensation seeking when controlling for CUT.

For the majority of arson offenders presenting as significantly more antisocial than non-arson offenders in this thesis, however, possible reduced neural activation may be better explained by symptomology consistent with neurodevelopmental disorders, such as inattention, under arousal, and hyperactivity (Lambie & Krynan, 2017). This suggestion is supported by the findings of Forslund, Brocki, Bohlin, Granqvist, and Eninger (2016) who reported cognitive disinhibition, poor emotional regulation, and positive emotionality (i.e., regulating enthusiasm) to be statistically and independently associated with ADHD and pre-frontal functioning, whereas disorganised attachment and negative emotionality was independently associated with conduct disorder and limbic structures. The proclivity of juvenile firesetters to be inattentive to less stimulating alternatives and persistently engage in antisocial conduct despite adverse consequences may perpetuate the assumption that deliberate firesetters have greater CUT than non-firesetting offenders.

Additionally, the conceptualisation that firesetters are more inattentive and have poorer associative learning provides understanding for why not all firesetters exhibit fearlessness of fire. Rather than fearless temperament per se, a firesetters proclivity to engage with fire increases exposure to fire-specific stimuli, potentially resulting in a tolerance-dose relationship. This process aligns with the social learning and functional analytic principles of firesetting theory (Fineman 1995; Jackson et al., 1987); fire is a conditioned response leading to the development of fire-specific bias, based on the potency of reward. While fear of fire was not specifically examined in this thesis, the narrative accounts of two participants can be used to demonstrate heterogeneity in fear of fire among juvenile deliberate firesetters. For example, fear of fire prevented one young person from engaging in particular destructive acts due to a fear of hurting himself, but his fear of fire precipitated the use of fire against others. A second

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example is a young person who continued to engage in deliberate firesetting despite suffering burns and a leg infection. These two cases highlight how fear of fire may have different associations with persistent firesetting.

The presence of CUT is, however, reported to have an additive effect on the functioning of conduct disordered youth exhibiting neurodevelopmental conditions. Haas, Waschbush, King, and Walsh (2015) found youth with comorbid ADHD and CUT more strongly attributed their behavioural outcomes to external factors, whether positive or negative. Such youth demonstrate difficulty with self-regulatory behaviour, therefore relying on environmental contingencies. Lower global self-worth, not including a young person's appraisal of their antisocial competence, was also more associated with a co-occurrence of CUT and ADHD (Haas et al., 2015). Juveniles subsequently report an absence of feeling negative affect in response to their own behaviour and a lack of motivation to change. The pattern of globalised external attribution and subsequent low self-worth was observed in study three and suggested to be more consistent with the behavioural profile of firesetters than non-firesetters. For instance, the problematic externalised acts of firesetters were underpinned by both positive affect (i.e., pleasure-seeking) and negative affect (i.e., adversity-conflict) in the context of external attribution; the attributed source of action is external for both an adaptive and conservative modus operandi (ASM; Canter & Fritzon, 1998). This contrasts with non-firesetters who were significantly less likely to externalise problematically within the context of pleasure, and significantly more likely to offend under negative circumstance (i.e., conflict and conservative modus operandi). Non-firesetters may, therefore, exhibit relatively more functional strength in disparate domains, specifically attributing their successes to internal causes, resulting in greater levels of self-worth than firesetters. Consequently, a greater amalgamation of neurodevelopmental symptomology and antisocial personality traits, moderated by atypical fluctuations in self-esteem throughout adolescence (Lovell, 2013) and

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attributional style, plausibly explain the greater criminal history and antisocial risk associated with deliberate firesetters throughout this thesis.

The distal risk factors and variables of adverse life experience examined in study three of this thesis did not significantly differentiate arson and non-arson offenders. The extensiveness of arson offenders' problematic functioning, however, plausibly precipitates persistent maladaptive transactions between juveniles and their environment, including key attachment figures, peers, and wider societal relationships. This is evidenced by significantly more contact with the CJS, as well as significantly more disruption to the parent-child relationship and social problems, as shown in study one. This explanation for the greater versatility offending among juvenile firesetters, as well as greater behavioural severity has been reported in earlier research (Martin et al., 2004; Stickle & Blechmann, 2002). Inter-individual variation in the interactions between fire-specific factors, neurodevelopmental deficit, and subsequent maladaptive transactions explain heterogeneity in deliberate firesetting.

Greater criminal history among juvenile firesetters in this thesis means juvenile firesetters had greater exposure to the CJS than their non-firesetting counterparts, which is predictive of greater recidivism when compared to diversionary tactics or police caution (Crime Statistics Agency, 2017). Clarke, Peterson-Badali, and Skilling (2017) advocate diverting juveniles below the peak of the age-crime curve (i.e., 15-19 years; Loeber & Farrington, 2014) towards community interventions rather than towards custodial sentences, due to the faster rate of recidivism among the younger age group. The age-crime curve in the current sample, however, offers little explanation for the significant between-group difference, as participants were matched on chronological age and age upon entry into the CJS. Clarke et al. (2017) attribute the significant relationship between increased dynamic risk over time and recidivism to a lack of suitable service provision available to meet the needs of the young person. While this is not disputed, an increase in dynamic risk and significantly greater



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criminal justice experience, as per the YLS/CMI-AA, may also be attributable to the systemic effect of being involved with the CJS (i.e., the greater chance of being socially ostracised, deprecated, and punitively reprimanded). This is supported by Fox et al.'s (2015) findings of non-linear effects on the likelihood of serious and aggressive antisocial behaviour even after controlling for impulsivity and general criminogenic factors.

Additionally, positive parenting practices, defined by warmth, responsiveness, and consistency are significantly negatively associated with adolescents diagnosed with comorbid ADHD and CUT (Grazino et al., 2016). Grazino et al. found that CUT moderates the effect of the parent-child interaction, which is pivotal in an adolescent developing positive self-worth (McAdams et al., 2017). Furthermore, low maternal warmth is suggested to partially contribute towards the development of CUT via maladaptive experiences of emotionality (Bisby et al., 2017). Therefore, the presence of these temperament characteristics among juvenile firesetters may impede parenting practices, and adverse parenting practice may contribute towards the comorbid CUT and neurodevelopmental symptomology consistent with ADHD.

Antisocial personality traits characterised by an incongruence in social and personal reality (CUT; Fanti & Centifanti, 2014), and borderline traits underpinned by deficit co-regulation/social communication and invalidation of individual needs developing throughout childhood and adolescence (BPD; Winsper, 2018) are underpinned by deficits in neurocognitive function (see McEwan & Ducat, 2015). In fact, borderline, antisocial, and schizoaffective personality traits emerging in adolescence, due to adverse experience and/or maladaptive transactions, are associated with high rates of general recidivism among young firesetters (Repo & Virkkunen, 1997). It is, therefore, possible that juvenile firesetters, as result of comorbid neurodevelopmental symptomology and disruptive behavioural problems, experience higher rates of disorganised attachment than non-firesetting juvenile offenders

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(Forslund et al., 2016). This interpretation is consistent with the findings of Lyons et al. (2010), as well as the outcome of the meta-analytic review presented in chapter three, yielding a statistically significant positive relationship between deliberate firesetting and a disrupted child-parent relationship, ADHD, and CUT.

From the thesis findings, it is inferred that juvenile firesetters may be more susceptible to a non-linear effect of adverse life experience (Fox et al., 2015), attributable to the early onset and pervasiveness of maladaptive individual-environmental transactions. Each subsequent adverse individual-environmental interaction experienced by juvenile firesetters, therefore, heightens their vulnerability to future adverse experiences. This aligns with Lyons et al. (2010) who found trauma experience has a cumulative effect among deliberate firesetters, subsequently resulting in significantly greater disruption to attachment and emotional regulation. Problematic parent-child relationship, negative appraisal by peers and school teachers, and external judgement from society/community in response to greater CJS involvement, are factors suggested to have a potential impact on a firesetters risk for future serious offending.

Finally, these findings also align with developmental theories, such as the ICAP (Farrington, 2008) and pathway model (Loeber & Ahonen, 2015). Specifically, the developmental capacity and routine activities of a juvenile offer explanation for why juveniles gravitate towards lighting fires, but that this proclivity is likely moderated by impulsive temperament and life events, as well as an interaction between them. Thus, juveniles engaging in the behaviour are likely doing so due to high rates of long term antisocial potential and greater susceptibility to strain, boredom, anger, substances, peer influence (ICAP; Farrington, 2008). Accordingly, in conjunction with integrated developmental and life course theories of general offending, the findings of this thesis offer a strong foundation for the development of an evidence based theory of juvenile deliberate firesetting.

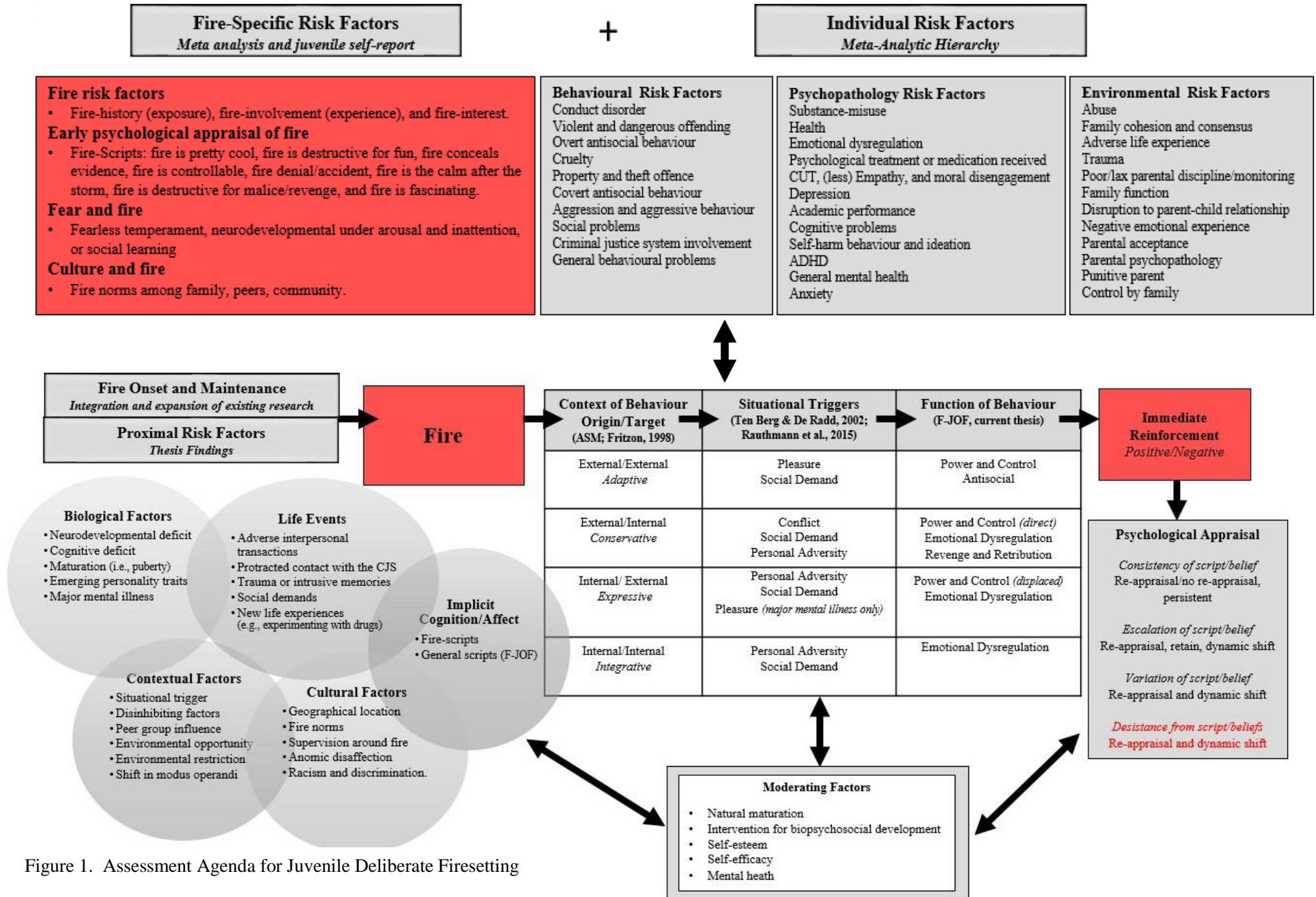


Figure 1. Assessment Agenda for Juvenile Deliberate Firesetting

### **Assessment Agenda for Firesetting and Co-occurring Risk**

Overall, the findings of this thesis, in conjunction with existing theory and empirical research, collectively informed the development of an assessment agenda for juvenile deliberate firesetters with additional problematic behaviours (see Figure 1). This unified process aligns with the recommendation of Farrington (2008) that an integrated developmental and life course theory of offending behaviour is more useful than comparing theories and empirical findings against one another. The assessment agenda comprises 30 years of empirical findings and newly established dynamic cognitive processes characteristic of deliberate firesetters, who were found to have a relatively more diverse and extensive antisocial history than non-firesetters. The M-TTAF contributed towards the structural components of the framework, with the contextual components of the ASM and the addition of situational factors explaining the versatility in offending behaviour, which is predominant among juvenile populations.

The assessment agenda includes the fire-specific risk factors determined from study one and the fire-specific scripts and cultural norms pertaining to the use of fire determined in study three. In addition to the thesis findings, the possibility of fearlessness of and inattention to fire are suggested areas for assessment among juvenile firesetters, thus aligning with research findings discussed earlier in this chapter. The individual risk factors were divided into three domains: behavioural, psychopathological, and environmental. These risk factors are listed in hierarchical order and were determined from the meta-analytic review. The fire-specific risk factors in combination with the individual risk factors formed the basis of a young person's psychological vulnerability for offending behaviour. The proximal risk factors were determined from participants' narrative accounts in study two and four, and are the factors triggering juvenile problematic behaviour and informing the purpose of a problematic behavioural occurrence.

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Determining the underlying function of a behavioural action requires the assessment across each of these domains, as well as the integration of the ASM, situational triggers, and the F-JOF developed from participant's narratives in study two. Functional reinforcement can take one of three pathways depending on the young person's psychological appraisal of his/her behavioural action, and moderating factors relevant to juvenile offending.

### **Fire-Specific Risk**

Consistent with leading theories of juvenile deliberate firesetting (Fineman, 1995; Jackson et al., 1987) offence-related experiences predisposed psychological vulnerability specific to deliberate firesetting. The narratives of juvenile firesetters contain evidence of fire-specific interest, experience, and knowledge which manifest within a specific context to meet a functional need. Juvenile fire-specific scripts and functional differences in the behavioural sequence of arson and non-arson offenders provided greater offence-specificity to former firesetting theory. The development of dynamic fire-specific scripts corresponds with previous recommendations for advancing offence-specific protocols (Doley et al., 2011) and aligns with implicit theories of adult firesetting (Ó Ciardha & Gannon, 2012).

A preliminary explanation for consistency, variation, and escalation in deliberate firesetting scripts is provided according to the retrospective psychological appraisal of the juvenile (see chapter four). Consistency of an implicit script was suggested to follow two pathways, each resulting in the retention of the same script; *reappraisal-persistent* or *no reappraisal-persistent*. Variation of a script also included active reappraisal, though the young person shifted to the internalisation of an alternative script/s after reappraisal (i.e., reappraisal-shift). Finally, an escalation in implicit script involved the retention and integration of former scripts, in addition to the internalisation of new scripts (i.e., reappraisal-retain-shift).

Consistent with other areas of forensic psychology (Gilbert et al., 2017; Gilbert & Daffern, 2017), assessing the intensity, frequency, and duration of script rehearsal, revision, and

retrieval is required. In addition, the assessment for script rehearsal in the absence of a behavioural occurrence is advised (see Gilbert & Daffern, 2017). This is consistent with the finding that fire-specific rumination may persist for up to 24 months prior to the index arson offending.

An impetus or implicit script pertaining to deliberate firesetting can be shared by two individuals, yet the underlying function and context in which a script is retrieved can vary. For example, fire-scripts of *calm after the storm* and *destructive for malice or revenge* both culminate in the removal of negative affect, yet can be underpinned by different emotional states or needs (e.g., emotional saturation, labile mood, grief, disinhibition, dominance, deviance, and injustice), and distinct sources of action and locus of effect (ASM; internal or external). Heterogeneity occurs both within and between fire-scripts. The F-JOF and integration of contextual factors is required to inform the functional underpinnings and context of behavioural occurrence.

### **Individual Risk Factors**

General risk factors precipitating and perpetuating deliberate firesetting behaviour are advanced in this thesis through statistical amalgamation of previous empirical work. The meta-analytic findings of study one provide an overview of the risk factors most pertinent to deliberate firesetting behaviour and have clinical utility for streamlining the multi-faceted assessment of deliberate firesetting behaviour.

**Proximal risk factors.** The proximal factors highlighted in Figure 1. are determined to trigger a young person's underlying vulnerability correspond with the five categories of proximal risk outlined by the M-TAFF model (Gannon et al., 2012): biological factors, life events, contextual factors, cultural factors, internal cognition/affect. This aligns with Watt and Ong's (2015) suggestion that the M-TAFF structure may have utility for guiding risk assessment. The M-TTAF framework, however, lacks developmental specificity to completely

and comprehensively explain the dynamic and multi-faceted needs of juvenile firesetting (Lovell, 2013) and general offending.

Juvenile narrative accounts illustrate that neurodevelopment (e.g., neuro-cognitive/neuro-affective functioning), psychological capacity (e.g., psychological adaptability and perceptive taking), childhood specific environmental experiences (e.g., parent-child interactions, school experiences, and peer influence), proximity of childhood trauma (e.g., involvement of child protective services or abuse), and maturation stage (i.e., puberty) are of heightened importance to a juvenile population, particularly for those involved in firesetting.

Variation in the psychological origin of action and locus of effect arise between individuals with similar presenting problems and domains of risk (Fritzon, 2012). The integration of empirically supported contextual factors is regarded as essential for accurate assessment and case specificity (Dolan & Doyle, 2002). High occurrences of inter-and intra-individual variation in function and behavioural manifestation are illustrated in this thesis. These variations can be more comprehensively understood when principles of investigative psychology are integrated into the clinical assessment process. The ASM (Canter & Fritzon 1998) was integral in accurately determining the functional underpinnings of problematic behaviours in this thesis. The model provides a systematic approach for contextualising the cross-functional needs of a young person manifesting differently under separate circumstances, as well as for differentiating between categories of juvenile offenders. Preliminary support is provided for the ASM as a framework for monitoring dynamic psychological processes and behavioural functions across groups, behaviours, and adolescent development.

Fritzon (2001) discusses similarities between different modes of action, explaining adaptive and integrative, as well as conservative and expressive to be polarities of one another (Shye, 1985). The affinity between action system modes with the same attributed source of

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action for a behavioural occurrence is more common than those opposing one another. For example, *adaptive* and *conservative* (external source) or *integrative* and *expressive* (internal source) would be more likely to co-occur than *conservative* and *integrative* or *adaptive* and *expressive*, which have an external and internal source of action respectively. In the current thesis, however, both groups were recorded to operate under an expressive (internal/external) mode of action, also referred to as expressive-object, over the expected polarity of a conservative mode of action (external/internal), often referred to as instrumental-person. The frequency of the expressive mode did not significantly exceed the conservative mode for arson or non-arson offenders, however, which was plausibly a reflection of the additional behaviours under examination (i.e., primarily illicit drugs, followed secondly by aggression). The co-occurrence of adaptive and conservative acts among juvenile deliberate firesetters, as opposed to the co-occurrence of adaptive and expressive acts, may, therefore, highlight deliberate firesetters are at risk of escalating towards interpersonal violence, rather than engaging in displaced expressive acts. Accordingly, in addition to identifying and monitoring variation in modus operandi (source of action/locus of effect), examining the implicit cognitions pertaining to aggression and violence among juvenile offenders (e.g., Jouriles et al., 2011) may predict a young person's behavioural tendency, as well as differentiate violent from non-violent juvenile firesetters.

**Biological factors.** Deficits in neurodevelopmental functioning may precipitate both index offending and comorbid behavioural concerns, as discussed in the context of between-group differences found in study three. The significant association between firesetting and ADHD, cognitive problems, and emotional dysregulation in the meta-analysis provides support for neurodevelopmental deficit as a risk factor for deliberate firesetting behaviour. Parental psychopathology was also found to yield a significantly stronger association with juvenile firesetting, opposed to juveniles who do not engage in deliberate firesetting. Recent



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research shows that parental mental health and substance use significantly increases the likelihood of an ADHD diagnosis and negative emotionality among juvenile offenders (Baglivio, Wolff, Piquero, Delisi, & Vaughn, 2017). In addition, natural maturation is a developmentally specific domain influencing biological fluctuation and moderating behavioural occurrence; though maturation was not assessed in this thesis.

The development of personality and emerging problematic traits are regarded as a dynamic proximal factor during adolescence. Monitoring implicit beliefs and psychological appraisals, as per the F-JOF, offers guidance for identifying persistent patterns of problematic responding, which may highlight maladaptive trait development. In study three, a diagnosed mental illness was found to be significantly more associated with non-arson offenders than arson offenders. This is, however, inconsistent with the findings of study one, which concluded substance abuse, depression, anxiety, and general mental health conditions (excluding anxiety and depression) are more associated with deliberate firesetting. The findings in study three, however, were juvenile self-report only; therefore, dependant on the young person's recall, knowledge, and awareness of their mental health status. Individual risk factors may, therefore, have contributed towards an underrepresentation of mental health diagnoses among juvenile arsonists in this thesis. When participants were questioned about their mental health, though, their responses suggested mental illness has a precipitating and moderating effect on offending and co-occurring behavioural problems (Tyler et al., 2014). Juveniles reported symptoms of ADHD, mood disorder (e.g., bi-polar, depression, and anxiety), psychosis, and post-traumatic stress disorder (PTSD) manifesting in proximity to problematic behavioural occurrences. For many participants, however, their responses pertaining to mental health were ambiguous; juveniles indicated they have received diagnoses, but were unable to provide specificity or clarity about what their diagnosis was. Accordingly, only presence of mental health, rather than data for specific diagnostic categories were

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analysed in this thesis. Substance related disorders, including alcohol and illicit drugs, were evidenced by self-reported substance misuse resulting in impaired cognitive, physiological, and behavioural functioning in the context of offending and wider daily functioning. Overall, substance misuse was the most frequently reported problematic behaviour for both arson and non-arson offenders.

*Life events.* The finding that arson offenders are more vulnerable to minor changes in their environment is consistent with Fox et al. (2015), concluding a cumulative effect of adverse life experience among serious, violent and chronic juvenile offenders. With this in mind, the high frequency offending among juvenile arson offenders may reflect a maladaptive coping style characteristic of persistent *avoidance*, such as *compulsive stimulation-seeking* and *additive self-soothing*, perhaps due to low tolerance and resilience of daily events, rather than proximal major events per se. This is illustrated by the findings that both arson and non-arson offenders recalled *distal* adverse life experiences, which have continuous and globalised impact upon their life circumstance, yet juvenile arsonists were significantly less likely to be triggered by a *specific* life stressor in proximity to their offending. Juvenile arsonists were more often triggered by unsatisfactory environmental interaction (e.g., under stimulation or external influence) with no specific stressor identified. This explanation is in line with the earlier suggestion that juveniles engaging in deliberate firesetting and broader problematic behaviours may have greater neurological vulnerability than non-arson offenders.

The proximal experiences informed by juvenile narratives and the meta-analytic findings included adverse transactions with peers, parents, and the CJS, and consequential effect of childhood adversity or proximal trauma. Diverse precipitating factors were identified in study two and four, including bereavement, domestic violence, physical abuse, bullying, child-safety involvement, and parental incarceration. The consumption of alcohol or illicit substances was a disinhibiting factor frequently reported to occur in proximity, such as first

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time-consuming substances, experimenting with a novel substance, or consuming too much of a substance. Abiding with or responding in a prosocial manner to social demands, including peer influence, school expectations/rules, gaining employment, conditions of a CJS order, such as weekly reporting, curfew, or program attendance, and restricted independence via person, finance, transport, or geographical location were also self-reported proximal events. Self-efficacy for prosocial responding is incorporated as a moderating factor, due to juvenile narratives often reflecting a sense of helplessness and situational attribution.

*Contextual factors.* The source of action and locus of effects, situational circumstances, and offence/behavioural characteristics inform heterogeneity within and between behavioural functions. For example, emotionally expressive or dysregulated offending can be underpinned by multiple cognitions and affective states, which may arise under various situational circumstances (e.g., conflict, adversity, and social demand), and present in one of four ways depending on the source of action (internal/external) and locus of effect (internal/external). The contributions of different contextual factors necessitate different means of management and treatment.

The offence characteristics of a young person provide information on how risk and functional needs are operationalised. These factors offer insight into the temperament, deficit, and typical behavioural style of a young person. Consumption of substances in proximity to offending, or to finance an addiction was highly prolific. Substance misuse was ranked as the greatest behavioural problem among both groups of juveniles, indicating juveniles have insight into the impacts of substances on their adaptive functioning. The neurobiological and neuropsychological impacts of substances, inhibiting adaptive or routine functioning, can elicit a change in implicit cognition/affect and overall modus operandi. Substances are regarded as a proximal moderating factor for functional consistency, as well as a moderator for re-offending in general (Fineman, 1995; Mackey et al., 2009).

*Cultural factors.* The Australian context and environment contribute towards the onset and maintenance of juvenile deliberate firesetting and co-occurring concerns, much like adult arson offenders (Fritzon et al., 2014). This is evidenced by juvenile self-reports of utilising the vast bushland for crime concealment and seclusion for other forms of deliberate firesetting. Impromptu questioning pertaining to the bushfire risk in Australia with participants disclosing setting bushfires indicated that some juvenile firesetters have little or no knowledge of what a fire ban is. While this indicates a need for wider education pertaining to the risk of deliberate firesetting and bushfires in Australia, it is also entirely possible that these participants may have reported ignorance as a means of evading detection (i.e., minimisation and failure to accept responsibility for one's own behaviour). Individual characteristics such as the ability to engage in socially desirable responding may, therefore, have influenced a young person's tendency to report an ignorance to fire bans.

Limited prosocial opportunity and stimulation in geographical proximity to a young person's home is reported to precipitate and perpetuate offending behaviour (e.g., motor vehicle theft for transport and undetected crime concealment via arson). In addition, cultural discrimination, inequality, and disadvantage experienced by Aboriginal Australian and Torres Strait Islander youth were found to culminate in the sense of disaffection and hopelessness, subsequently influencing the formation of implicit beliefs and behavioural response patterns. Juveniles participating in this thesis described a crime concentration effect and revolving door involvement with the CJS due to greater vulnerability, attributable to their ethnicity or prior involvement with the justice system. For example, juveniles' spoke about the high rates of crime in the areas that they live and the racial discrimination they encountered by law enforcement, particularly if they or their family members had prior involvement with the CJS. Juveniles recounted examples of differential treatment, including excessive force, physical assault, verbal abuse, and false accusations.

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The experiences of ethnic minorities illustrated that the distal and proximal risk factors, as well as protective factors (e.g., cultural connection) may, therefore, differ between indigenous and non-indigenous deliberate firesetters with co-occurring behavioural problems. Culturally specific risk factors for general offending have previously been explored among indigenous Australians across the life span, with several commonalities and differences found between indigenous and non-indigenous individuals (Ferrante, 2013), as well as between different Aboriginal communities (McCausland & Vivian, 2010). While the cultural difference in offending and behavioural actions was not the foci of the current research, Aboriginal youth were engaged through an enquiry about their culture or yearning for cultural contact/learning, guided by the Acculturation Scale for Aboriginal Australians-Youth (ASAA-Y: Westerman, 2003). The majority of youth expressed a desire to learn more about their Aboriginal culture either a *fair bit of the time* or *all of the time*; very few youth reported being taught about their culture by their family and the amount of time youth reportedly spent learning about their culture was rated as much lower than they desired. While cultural connection was not desired by all Aboriginal youth, this process highlighted two main points. Firstly, many Aboriginal youth yearned for cultural learning and connection, which if facilitated may enhance their sense of self and function as a protective factor for mental health and offending behaviour (Colquhoun, & Dockery, 2012). Secondly, as demonstrated in this thesis, engaging Aboriginal youth at a cultural level facilitated engagement is important, despite the cultural disparity between the participant and researcher (Westerman, 2012).

Independent of Australian culture, and consistent with Uhnnoo (2016), firesetting may be normalised within a young person's social environment. The absence of supervision and socialising with peers or cousins creates an opportunity to learn maladaptive fire skills, and subsequently, teach these skills to other peers or younger family members. Moreover, many of the cultural risk factors discussed precipitated and perpetuated non-firesetting offending and

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reflect the experiences of other cultures. For example, juveniles of other ethnicities expressed a cultural disconnect, racism, and disaffection (e.g., Pacific Islanders) in association with their offending. Problematic behaviours such as illicit drugs, use of violence, general criminality, and incarceration are frequently normalised among peers and family. Peer group offending was also rife for juveniles, regardless of firesetting status. This was also found for the acquisition of offence-specific skills via peers, siblings, or cousins, and routine attribution of general offending to the geographical expanse of Australia.

***Internal cognitive and affect.*** The implicit scripts of a young person were found to be the most functionally consistent contingency across co-occurring behavioural problems. In this thesis, deprivation of psychological and physical freedom, dominance and self-assertion, and restriction of autonomy were the undertone of juvenile offending function, as outlined in the F-JOF. Developing an understanding of a young person's belief system in the context of deliberate firesetting and wider behavioural problems is consequently recommended. Contextual and environmental factors, natural maturation, and cross-functional needs can elicit a dynamic shift in implicit cognition/affect and behavioural style, as shown throughout this thesis. In response, the F-JOF offers a developmentally sensitive approach for identifying, triaging, and monitoring psychological processes which are likely to precipitate a problematic behavioural occurrence, irrespective of behavioural form or adjudication. The F-JOF highlights an offender's primary functional needs and additional areas of potential risk which can be clinically explored; latency cannot be assumed to resolve with natural maturation. This means the risk of further offending may remain even if the young person has abstained from offending for a period of time. Assessment should focus on the functional underpinnings of multiple problem behaviours, not only offending behaviour per se. Juveniles participating in the current studies were confident in identifying their broader behavioural concerns, illustrating self-awareness that their actions that may cause harm to self and others.

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For visual simplicity, only the higher order categories of F-JOF are listed in Figure 1; however identifying a young person's implicit scripts (codes) and sub-category (subtheme) within a function (theme) is fundamental for accurate assessment, as evidenced by the findings in study three and four. Without implicit information and a dynamic approach to assessment, the function driving a maladaptive behaviour and the pervasiveness of deficit cannot be determined.

Classifying a young person according to one category, *generally antisocial, power and control, or emotionally dysregulated*, will likely be under-representative of his/her treatment needs. The treatment needs of juveniles in this thesis were shown to be multifaceted, requiring fluid and flexible use of the F-JOF and ASM. Treatment should focus on the core beliefs and implicit scripts underpinning the emergence of a functional deficit. For example, a juvenile firesetter with criminal versatility and offending in line with *generally antisocial and antisocial peer influence* themes (e.g., motor vehicle theft and arson), as well as behavioural actions underpinned by *control and power* (e.g., home invasions with excessive use of violence) would require a multifaceted approach to treatment. In this example, treatment should focus on general antisocial affiliation with peers, as well as self-concept pertaining to power and dominance, and desire/proclivity to assert control over others or a situation. While peer group affiliation is likely moderated by developmental stage, a desire for status and respect from others suggests group membership may be of particular importance. Determining if the violence is reactive or instrumental is also of importance for treatment. Should this young person experience aggression in the context of perceived failure to achieve control/power then an additional treatment focus would be a prosocial means of coping with and expressing anger in situations of social demand or conflict. Finally, a need for brief fire-specific intervention is required, the integration of firesetting into wider criminal activity (i.e., fire conceals the evidence) highlights the possibility for future offence integration. For

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example, using fire as a means for intimation, should not be discounted based on the need for power/control.

**Protective Factors.** No significant changes in protective factors occurred among youth who had reoffended or remained in the CJS at the prospective follow up. Data on juveniles no longer involved in the CJS was not available. Therefore a tentative conclusion is suggested. The findings of the thesis culminate in the suggestion that greater neurodevelopmental vulnerability may be associated with deliberate firesetting behaviour, subsequently perpetuating more problematic attachment with caregivers, peers, and wider community relationships (e.g., school) due to their behavioural style. The comparison of arson and non-arson offenders illustrated that juvenile arsonists were statistically significantly less likely to report an adaptive means of achieving their core values and priorities; thus, contributing to the conclusion that juvenile deliberate firesetters are less motivated or have greater difficulty attending to and integrating prosocial alternatives into their behavioural repertoire. Moreover, the temperament, attitudes, and inferred attachments significantly differentiating deliberate arson offenders from non-arson offenders in the current studies indicated limited protective factors highlighted by Losel and Farrington (2012) for adolescent antisociality and violence.

While limited protective factors can be proffered from the current findings, prosocial interests linked with positive self-efficacy were identified by juveniles participating in the current thesis. For example, participants strongly identified with practical based tasks and activities, including woodwork and construction, sports (e.g., rugby league), motorbike riding, nature and animals, fishing and camping, art, drawing, and music. Consistent with the GLM (see Ward, Yates, & Willis, 2012), the interests and strengths of juveniles can be utilised to facilitate the development of a healthy self-concept and adaptive approaches to achieve their core values and life priorities.

Fortune (2017) recently reviewed the application of the strength based approach to



juvenile offenders and outlined the importance of ascertaining the psychological, social, and material resources available to assist juveniles in achieving their primary needs, in the context of their environment. The current findings highlight activities which juvenile offenders strongly identify with, as well as cultural factors requiring consideration when developing a *good lives plan* with juvenile offenders. The narratives of juveniles participating in this thesis illustrate that young offenders yearn for the opportunity and life fulfilment, which Fortune highlights is a commonality between offending and non-offending youth.

### **Practical Implications and Recommendations**

The findings of this thesis have implications for offence-specific assessment and targeted intervention for juvenile deliberate firesetting behaviour. The findings also have clinical utility for a broad range of problematic functioning and behaviour arising through adolescence. The identification of offence-specific psychological and behavioural scripts highlights treatment targets for the reduction of maladaptive fire beliefs and deliberate firesetting behaviour. In addition, the F-JOF enables the identification of latent and cross-functional needs, which may contribute towards a dynamic shift in fire-scripts, general scripts, function, or behaviour style across adolescence.

The functional differences between arson and non-arson offenders have implications for treatment responsiveness (Bonta & Andrews, 2003). For instance, motivation to engage with professional services and capacity to self-direct attention, inhibit impulses, and integrate new skills is likely to be more problematic for juvenile deliberate firesetters. Higher frequency and intensity of service provision for juvenile offenders currently engaging in deliberate firesetting or with a history of firesetting behaviour is advised. This likewise applies to the dynamic monitoring of a juvenile firesetter's individual-environmental transactions and the adverse effects on the young person's self-concept and psychopathology. The therapeutic approach will likely influence the efficacy of intervention with juvenile deliberate firesetters, principally

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attributable to their implicit need for stimulation and proclivity to engage in novelty seeking behaviour.

In line with the recent review of Fortune (2017), the strength based approach of the GLM is suggested to be a beneficial treatment framework for addressing the complex needs of a juvenile deliberate firesetter with co-occurring behavioural problems. While the GLM may prove beneficial in the treatment of juvenile deliberate firesetters with additional behavioural problems there is, however, considerable ongoing debate as to whether the GLM advances the empirically validated Risk Need Responsivity (RNR) model (Andrews, Bonta, & Wormith, 2011; Ward, Yates, & Willis, 2011). Owing to the fact that the GLM is a novel and untested approach, caution in its application to the treatment of juvenile deliberate firesetters is advised until the reliability and validity of the treatment framework is produced.

Multisystemic support pertaining to the young person's presentation, psychological process, and the impact of external influences on the young person's response pattern is recommended. Multisystemic therapy (MST), in comparison to individual juvenile therapy, has also shown to have broader benefits for the family system (Johnides, Borduin, Wagner, & Dopp, 2017). The longitudinal benefits of MST for the caregivers of serious juvenile offenders include, lower caregiver criminality, reduced caregiver incarceration, and fewer legal family matters (e.g., divorce or child support), which was mediated by MST improvements to the child-parent relationship (i.e., Johnides et al., 2017).

The OPB paradigm (Daffern et al., 2007) was found in the current research to have utility for identifying functionally relevant contingencies of a global concern among juvenile firesetters with co-occurring behavioural problems. Moreover, the F-JOF offers a flexible structure for dynamic clinical judgement to determine the implicit psychological and behavioural processes of a young person's firesetting and co-occurring behavioural problems. In line with best practice, empirically supported contextual factors are incorporated into the

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assessment process (Dolan & Doyle, 2002). The integration of the ASM (Fritzon, 1998) and situational information ensures case-specificity for assessment and treatment purposes. The contextual factors examined in this thesis can also inform the development of hypothetical risk scenarios to facilitate case management.

The empirically derived hierarchy of characteristics most pertinent to deliberate firesetting risk (i.e., behavioural, environmental, and psychopathological), as shown in Figure 1, provides an efficient process for multifaceted assessment of juvenile firesetters (Stadolnik, 2015). The sequential functional analysis of juvenile arson and non-arson offenders, yielding between-group differences in temperament, attitude, and behavioural style, indicate that using neurodevelopmental capacity and maturation stage (i.e., puberty) as a benchmark for assessing risk and treatment progression among juvenile firesetters may be more accurate than chronological age.

A greater emphasis on the assessment of neurodevelopmental capacity among juvenile firesetters is recommended. The significant overlap between neurodevelopmental disorders in childhood, however, warrants an assessment focus on symptomology rather than discrete diagnostic categories (e.g., ADHD), as co-occurring traits across different neurodevelopmental disorders are associated with greater antisocial behaviour (Billstedt et al., 2017). Moreover, Allely and Cooke (2016) found a comorbid relationship between neurodevelopmental symptomology and psychopathic traits (e.g., Factor 1: callousness/uncaring and lack of empathy; Factor 2: impulsivity and sensation seeking).

A greater emphasis on early symptoms of neurodevelopmental syndromes which intertwine with various diagnostic criteria, as opposed to attending only to characteristics that cluster together to form a compartmentalised diagnostic criteria may better explain the difference between firesetting and non-firesetting juveniles, as well as the heterogeneity among deliberate firesetters. The early delineation between neurodevelopmental deficit and

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antisocial personality traits (e.g., CUT) can mitigate against the stigma of poor amenability to treatment, ensue early intervention, and ensure appropriate prescription of psychostimulant medication if warranted (Allely & Cooke, 2016). The co-occurrence of neurodevelopmental deficit and fire experiences offers a plausible explanation for deliberate firesetting in the absence of childhood trauma, and presence of fire scripts identified from juvenile narratives can explain deliberate firesetting in the absence of antisociality.

Finally, prevalent reports of comorbid substance misuse inform a need for routine substance-specific assessment and intervention with juveniles engaging in deliberate firesetting behaviour. The predictive relationship between neurodevelopmental disorder and adolescent substance use (Molina et al., 2018), the additive effect of comorbid ADHD and substance use on suicidal behaviours (Runckin et al., 2016), and the damaging effects of substances on brain development and frontal lobe functioning in adolescence (see Kenny, 2016) offers support for this recommendation.

The findings from this thesis can contribute towards the mitigation of firesetting risk in Australia as followed: (1) advance existing government programs such as FFF and IFAP by publishing the current thesis in conjunction with practical guidelines for implementation; (2) inform the development of workshops to educate fire service personal, youth/juvenile justice services, child and youth mental health services, educational providers, and local communities on the pertinent risk factors, ‘types’ of firesetters, function of firesetting behaviour, and the association between firesetting and wider conduct problems; (3) enhance Youth Justice assessment protocols to screen for undetected deliberate firesetting; and (4) inform the development of intervention protocols and referral pathways for juveniles at risk of, or engaging in, deliberate firesetting and additional behavioural problems.

### **Limitations of the Thesis**

The sample demographic of the current studies has implications for the generalisability

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of the research findings. Firstly, the findings were derived from a sample of repeat juvenile offenders. Thus, the implicit scripts comprising the F-JOF and the hierarchy of co-occurring behavioural problems may not be generalisable to less severe presentations. Secondly, the majority of the research sample comprising the development of juvenile fire-scripts and the F-JOF were male, therefore, limiting the specificity of these findings for female offenders. Finally, while participants were matched on ethnicity for the empirical comparison of arson and non-arson offenders, cultural background was not an independent variable in this thesis. Any functional differences or culturally specific needs, therefore, cannot be determined from the overall findings.

Triangulation of the research findings was not possible due to limited caregiver interest in the research program. Caregiver participation would have been particularly advantageous for verifying mental health diagnoses and prescription medication/compliance. The research focus, however, was the proximal implicit psychological processes of offending behaviour, and juveniles themselves are regarded to be the most reliable source for this information (Del Bove & Mackay, 2011). Moreover, the inclusion of a structured assessment (e.g., Watt et al., 2015; Youth Fire Behaviours and Interests Scale) for gathering historical firesetting information would have supported the narrative accounts of juvenile firesetters and improved the consistency of information reported. Administering a standardised assessment of deliberate firesetting to all participants, irrespective of detection or adjudication for firesetting, may also have enhanced the current findings by capturing data on undetected firesetting behaviour among the control participants.

The expectation of participants to retrospectively recall their offending behaviour, with a mean time-lapse of 25.80 months between T1 index offending and the prospective follow up study is a limitation of the research design; particularly due to the number of participants identifying being under the influence of an intoxicating substance in proximity to offending.

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Moreover, while the control sample responded to questioning pertaining to their current MSO, the majority of juvenile firesetters were either on remand or adjudicated for a more serious criminal charge than their index arson offence at the time of research (e.g., violent offences with longer sentences, including armed robbery or aggravated assault).

The sample was of moderate size only ( $N=70$ ) and from two of six jurisdictions in Australia, with a 60% attrition rate at the prospective follow up. Interviewing juvenile participants who had been discharged or not returned to the juvenile justice system at the second time-point would have provided greater insight into the protective factors associated with juveniles who do not return to the CJS. Additionally, ethical approval was not obtained from adult corrective services. Thus juveniles who were transferred to the adult system from the juvenile system, or discharged from juvenile services and subsequently under the supervision of adult services could not be re-interviewed.

### **Future Directions**

The use of the OPB framework with juvenile offenders is in its infancy, which is attributed to the complex and dynamic nature of adolescence. Nevertheless, the current findings illustrate the preliminary utility of the OPB framework for evaluating co-occurring behavioural problems among juvenile offenders. Future research might consider a longer prospective research design spanning the course of adolescence and early adulthood (e.g., ages 12-24 years) to evaluate the temporal stability of functional consistency across development. Neurodevelopmental capacity, in addition to chronological age, is also an important variable to consider in future research in light of the thesis findings.

It currently remains unclear if there is a statistically significant difference in the neurodevelopmental functioning of juvenile firesetters and non-firesetters, and more specifically which areas of functioning are most predictive of firesetting risk. Previous research has reported neurodevelopmental conditions (e.g., learning disability and Asperger's)

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and substance misuse to be the only differences between adult arsonists and violent offenders (Enayati, Grann, Lubbe, & Fazel, 2008). Accordingly, a neuropsychological focus is recommended for future research. Recent empirical studies on attentional bias for fire (Gallaher-Duffy et al., 2009; Hoerold & Trannah, 2014) and foetal alcohol spectrum disorder among deliberate firesetters (Brown, Wartnik, Herrick, Osmonson, Wimberley, & Jones, 2018) are a positive movement in this direction. In addition, examining *fearlessness of fire* has been previously suggested as an area for empirical exploration (Del Bove & Mackay, 2011; Lovell, 2013), yet the area remains relatively under-researched. Further investigation is required to ascertain if *fearlessness of fire* is a characteristic predictive of deliberate firesetting and whether it is attributed to temperament, neurodevelopmental deficit (e.g., attentional deficit), neural and socio-cognitive deficit (e.g., threat detection), poor insight due to stage of development, or is instrumentally learnt.

Examining the parenting style and attachment between child and caregiver among a sample of firesetting and non-firesetting youth is a further direction for future research. In light of Johnides et al.'s (2017) findings illustrating the positive impacts of MST on the caregivers of serious juvenile offenders, parental adaptability may be a protective factor for the elevated risk associated with juvenile firesetting. For example, there may be a greater opportunity for healthy attachment among juveniles with less neurocognitive and affective problems, mediated by less maladaptive individual-environmental transactions. Thus, examining the effects of neurodevelopmental delay or deficit on the child-parent relationship among firesetting and non-firesetting youth is recommended. The reciprocal relationship between CUT and the child-parent relationship (Bisby et al., 2017) would need to be controlled, due to the overlap between neurodevelopmental symptomology and psychopathic traits (Allely & Cooke, 2016).

With regards to the relationship between juvenile deliberate firesetting and violent offending future investigations may benefit from research developments pertaining to

aggressive-scripts with violent adult offenders (Gilbert & Daffern, 2017; Gilbert et al., 2017). Wilpert, Van Horn, and Eisenberg (2015) found no significant difference in violent recidivism (i.e., physical or domestic violence) between adult arsonists and non-arson violent offenders, despite a significantly greater history of violent offending reported for the violent offender sample. Accordingly, future research might consider the difference in offending pathways between arson and violent offenders; neurodevelopmental immaturity or deficit among arsonists' may result in a different trajectory towards violence with different needs earlier on in development. The ASM (Fritzon, 1998) may also be of value for examining any differences in the modus operandi among violent and non-violent deliberate firesetters. Finally, statistical evaluation and verification of the fire-scripts and F-JOF developed in this thesis is recommended. Subject to validation, these findings can provide guidance for the identification of treatment needs and situations of concern for juvenile offenders. Examining external and content validity with an independent sample of juvenile offenders, and the temporal stability and predictive validity across multiple behaviours and time points throughout adolescence would be an efficient and accurate way of reducing juvenile offending risk.

### **Concluding Comments**

The current thesis examined the fundamental characteristics and functional underpinnings of juvenile deliberate firesetting and co-occurring behavioural problems, in comparison to juveniles with no adjudicated or self-reported firesetting behaviour. Consistent with previous empirical findings juvenile deliberate firesetters are a heterogeneous group of youth with criminal versatility and widespread risk. Juvenile arson offenders were found to significantly differ from non-arson offenders in their functional underpinnings and behavioural style. Deliberate firesetting, greater criminal history, and versatile offending among arson offenders were attributed to greater biopsychosocial immaturity in neurodevelopmental functioning, psychological appraisal, and behavioural style when compared to non-arson



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offenders. The relationship between deliberate firesetting and co-occurring behaviours were explained by employing the paradigm of offence-paralleling behaviour. A functionally consistent relationship between juvenile firesetters and co-occurring behavioural problems was evidenced for some, but not all juveniles. Implicit cognition/affect and contextual factors of a behavioural sequence yielded the greatest predictive accuracy for functional consistency. Determining offence-specific scripts of juvenile firesetters, functional differences between arson and non-arson offenders, and uncovering the relationship between deliberate firesetting and co-occurring behavioural problems are original contributions to the field of juvenile firesetting. The findings of this thesis have clinical implications for offender-specific assessment and treatment, with a framework (i.e., the F-JOF) provided to guide intervention targets for offence-specific risk and broader behavioural concerns.

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## Appendix A

### Meta-Analysis Codebook

Meta-Analysis Category	Meta-Analysis Variable	Variables
Environmental Risk Factors	Control by family	Control through guilt by dad Control through guilt by mum Control via guilt Control Overprotective mother Overprotective father
	Disruption to parent-child relationship	Absent father Child welfare involvement Live with biological parents Family constellation (single parent) Live away from mum Live with both biological parents Live with adoptive/other Change to living situation Live with either bio parent Live with foster care Live with other Lived out of home in past 12months Live with step parent Live with biological other Out of home placement Parents live apart Prolonged separation from both parents Prolonged separation from dad Prolonged separation from mum Rejection from mum Social service involvement Warmth/involvement
	Family cohesion and consensus	Affiliation Cohesion Consensus
	Family function	Family affect expression Family change Family conflict Domestic violence Family satisfaction Familial dysfunction

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	Family expressiveness Actionable family function Family not intact Family stress Family independence Family intellectual curiosity Interparental hostility Family IQ orientation Marital violence Family organisation Personal development Family relationship Family relationship adjustment Smoking in family Family sociability Family style Family System Maintenance Dyadic adjustment
Parental acceptance	Child acceptance by dad Child acceptance by mum Child acceptance Parental awareness Care_dad Care_dad Care_mum Child centred dad Child centred mum Child centred
Parental psychopathology	Alcohol and drugs dad Frequency mother drinks Frequency partner drinks Parental depression Partner pet abuse Total symptoms (PBI) Quantity mother drink Quantity partner drink Total depression score Total parental psychopathology
Poor/lax parental discipline & monitoring	Appropriate discipline Disciplining Non-enforcement by dad Non-enforcement by mum Harsh discipline Lax discipline

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	Lax discipline mum Lax discipline dad Low parental monitoring Monitoring Non-enforcement Harsh punishment efficacy Mild punishment efficacy Supervision/discipline Supervision/monitoring Never married Separated Married
No marriage between parents	
Punitive parent	Critical Dad Critical Mum Harsh parenting mum Harsh parenting partner Harsh punishment frequency Mild punishment frequency
Moral and religious emphasis	Moral religious emphasis Religious
Adverse life experience	Negative life experience Total number of events Number of current events Current stressor
Abuse	Physical Emotional Physical neglect
Trauma	Community violence Family violence Neglect Trauma Witness to offence/violence School violence Trauma adjustment Trauma_Anger Trauma_anxiety Trauma_avoidance Trauma_depression Trauma_dissociation Trauma_fantasy Trauma_hyper Trauma_medical Trauma_num

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		Trauma_overdis Trauma_PTSD Trauma_reexperian ce Trauma_under Traumatic grief
	Sexual abuse	Sexual abuse
	Negative emotional experience	Emotional Neglect Fear of OBH Guilt Hopelessness Rejection by peers Longing for a reunion with dad
Psychopathology	Academic performance	Academic performance Academic self- efficacy Academic aspirations Academic achievement WIAT_age WIAT_score Academic efficacy WISC_FSIQ WISC_VCI Special education unit School competency School failure Lower school performance Education strength
	Developmental problems	Birth complications Developmental function Language development Learning disability Motor development Physical development Physical function Prenatal drug use Social development Superego development

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Cognitive problems	Affect tone of relationship paradigms Capacity for emotional investment in relationships and moral standards Cognitive avoidance Counter cognition Cognitive problems Problem focused cognition Repetitive cognitions Complexity of representations of people Revenge fantasy Homicidal cognition Hostile rumination Negative cognitions Persecutory ideas Pictorial vocabulary Psychologically differentiated Resentment Understanding of social causality Thought problems Thought disturbance
Health	Health competence Medical Function Wellbeing
ADHD and ADHD Criteria	ADHD ADHD diagnosis ADHD symptoms Attention Impulsive Attention problems Attention seeking Reward seeking Impulsivity Hyperactivity Impulsivity/hyperactivity Impulsive expression
Depression	Depression
Anxiety	Anxiety Anxiety/depression combination Anxiety instilled by dad Anxiety instilled by mum Anxiety related Separation anxiety Instilling anxiety
Psychological treatment or	Day treatment

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medication received	Psychological treatment Inpatient treatment Outpatient treatment Prior inpatient treatment Prior outpatient treatment Residential treatment No psychological treatment Medication upon admission Medication upon discharge Psychiatric hospital Ritalin
Self-harm behaviour and ideation	Self-harm self-injury self-mutilation Suicidal Attempt Suicidal Ideation Suicidal Cognition Suicidal Thoughts Suicidal Plan Suicidal Risk Suicidal Threat Suicidal/homicidal thoughts
Mental health	Eating disorder Elevated psychological distress Axis I other Hypochondria Mood Disorder OCD Physical Function Psychological distress Psychosis Schizoid Somatic complaints <i>MMPI-A subscales</i> Bizarre mentation (Biz) Cynicism (Cyn) Hysteria (Hy) Low aspirations (Las) Hypomania (Ma) Masculinity / Femininity (Mf) Paranoia (Pa) Psychopathic deviate (Pd) Psychasthenia (pt) Schizophrenia (Sc)

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Substance-misuse	Alcohol abuse Alcohol problems Binge drinking Daily smoking Drug abuse Drugs and alcohol to cope Drug use Drunk at offence Extreme drug use Frequent cannabis use Illicit drug use Serious drug use Smoking Substance use
Emotional dysregulation	Affect dysregulation anger Anger awareness Cognitive reappraisal Non-productive coping emotionality (EASI) Expression Negative Expression Positive Expression suppression Locus Control Rage at humiliation Self-regulation
Enuresis and encopresis	Encopresis Enuresis
CUT/Empathy/Moral Disengagement	Callous CUT Uncaring trait Unemotional trait Affect empathy Cognitive empathy Empathy Lacks empathy Moral disengagement
Cruelty	Animal cruelty Sibling cruelty Cruelty
Protective Factors	Activity-competency and recreational involvement Activity recreation Activity competence Activity

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	Achievement focused	Achievement Achievement orientation
	General protective Factors	Appropriate Behaviour Assertive Community involvement Problem-solving coping Family protective factors Full time employment Guidance seeking Low self-esteem (reverse scored) Optimism Positive reappraisal Prosocial Problem-solving Relationship permanence Self esteem Support from a friend Support from family Support from significant other Talents and interests Competence Vocational strength
Behavioural Risk Factors	Aggression and aggressive behaviour	Aggressive factor Aggression total score Aggressive antisocial behaviour Aggression Indirect aggression Verbal aggression Aggression verbal physical Aggressive behaviour Anger rejection Direct aggression Fighting Fighting/arguing Indiscriminate aggression
	Overt antisocial behaviour	Antisocial behaviour Extreme Antisocial Behaviour (10+) Serious Antisocial Behaviour (7+) Assaultive Behaviour Delinquency Non-violent delinquency
	Social problems	Interpersonal problems

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	lower social status Peer preference Peer relationships Recreational functioning Shy Social discomfort Social anticipation Sociability Social competence Social preference Social behaviour Social functioning Social introvert Social judgement Social problems Social self-efficacy Submissive
Sexual problematic behaviour	Sexual aggression Sexual conflict Sexually reactive Sexual problems Sexuality Sexually harmful behaviour
General behavioural problems	Alienation BAS_drive BAS_fun BAS_reward BIS_impulse inhibition Behavioural problems (external) Behavioural problems (internal) Behavioural problems (total) Behavioural regulation Careless Complaint Cumulative risk factors Deviate Disobedient Disruptive behaviour outbursts Environment unable to contain child Externalising High risk taking High sensations seeking Hostility Inappropriate behaviour Internalising

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	Irritability Jealousy withdrawal Judgement (risk) Miscellaneous (messy) Non-aggression (absence of aggression) Non-delinquent covert behaviour Odd Truancy Oppositional behaviour Oppositional factor Out of control behaviour Power struggle Runaway Sadistic destruction School behavioural problems School attendance Suspicious (mistrust and suspicion) Total behavioural problems Uncommunicative Withdrawal
Conduct disorder	Conduct disorder Primary diagnosis of conduct disorder Conduct related
Covert antisocial behaviour	Covert antisocial behaviour Lying Non-aggressive factor (covert) Offence alone Secretiveness Self-advancement
Cruelty	Animal cruelty Sibling cruelty
Criminal justice system contact	Legal history Prior probation Referral for violent arrest Referral to juvenile court
Offence history	Arrest history Total charges Prior crime
Offence property/theft	Break and Enter Destruction Stealing Property infractions

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	Offence violent/dangerous	Dangerous offence Violent offence Violent delinquency
	Age at index (negative indicates younger)	Age at index offence Age at first charge
Fire-Specific Risk	Age onset of fire misuse/experience with fire	Age onset of firesetting Age onset of matchplay
	Fire (attentional) bias	Stroop Accuracy Stroop Reaction time
	Fire fascination	Fire preoccupation Fire interest other Fire interest Fire curiosity
	Fire involvement/history	Fire activity Fire before age 8 Carrying Matches in the past 12 months Fire exposure Fire history Life time fire misuse History of match use match play

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Appendix B

Functional Analysis Coding Template-Example

Participant ID	Transcribed data	Codes	Sub-themes	Theme
FS-1 Index	<p style="text-align: center;"><b>Background</b></p> Self-concept: Life Growing up: School Experiences/Trouble: In trouble while completing supervision/control order: Earliest experience to crime: Self-perception of what gets them into trouble: Relationship: Family: Friends: Mental Health: Impulsive: Risk taker:			

	<p style="text-align: center;"><b>Behaviour</b></p> <p><b>Functional Analysis</b></p> <p>Before Thoughts and Emotions:</p> <p>Proximal Thought:</p> <p>Proximal Emotion:</p> <p>During Thoughts:</p> <p>During Emotion:</p> <p>After Thought:</p> <p>After Emotion:</p> <p>After Behaviour:</p> <p><b>Physiological Activation</b></p> <p>Before:</p> <p>During:</p> <p>After:</p> <p>Now:</p> <p>Now (retrospective reflection)</p> <p>Previous firesetting/ other times engaging in the behaviour? (enquiry)</p>			
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Appendix C  
Ethical Considerations and Visual Resources for the Sample  
Demographic

Ethical Concern	Concern Raised By	Response from the researcher
Is the benefit of interviewing individuals under the age of 15 years old justifiable?	BUHREC	<p>In accordance with the National Health and Medical Research Committee (NHMRC) guidelines, Section 1.1 (a) Justifiable by its potential benefit juveniles at the age of criminal responsibility (10-16 years) only comprise 11% of the QLD population. Juveniles, however, are responsible for 38% of all arson offences in QLD. Of these juvenile arsonists, 60% are aged 10-14 years old (Queensland Police Statistics, 2015). These figures are echoed interstate, in New South Wales 36% of all arson is committed by juveniles (BOSCAR, 2015). Moreover, research by Watt, Geritz, Hasan, Harden, and Doley (2014) has demonstrated a significantly high prevalence of deliberate firesetting behaviour among offending and non-offending youth; 67.4% and 37.5%</p>

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respectively. Of these young firesetters, 41.6% admitted to lighting 10 or more fires deliberately, and 19 % of the sample reported they were likely to continue the firesetting behaviour.

The developmental nature and immaturity of youth, in comparison to their adult counterparts, means diverting youth from the correctional system has, for a long time, been a priority of Australian youth justice (AIHW 2014). This is achieved by providing alternatives to detention, such as community supervision, mental health services, youth justice conferencing, and specialised community-based programs (AIHW, 2014).

In 2014, however, a controversial amendment was made to the Youth Justice Act 1992 (QLD) which saw the removal of the legislative principle that detention is a last resort for young offenders. While the amendments to the youth justice act are not supported by evidence or considered best practice for working

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with young offenders (see O’Leary, 2014), there is insufficient provision of community based intervention and professional support available in community services. For example, there is currently no community/ detention based intervention available for juvenile arson in the state of Queensland (Department of Community Safety Annual Report 2012-13; Queensland Corrective Services, 2015). What is more, there is no empirically validated treatment program available in Australia (Fritzon et al., 2011) or risk assessment protocols with predictive validity available cross nationally (Stadolnik, 2015) for juvenile firesetting. Thus, the research program endeavours to contribute to the development of functionally specific risk mitigation strategies and intervention models for young people, at the age of criminal responsibility, with a proclivity for lighting fires.

Is the proposed method appropriate for

BUHREC

In accordance with the National Health and Medical Research

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achieving the aims of the proposal?

Committee (NHMRC) guidelines, Section 1.1 (b) Designed using methods appropriate for achieving the aims of the proposal, and Section 1.1 (c) Based on thorough study of the current literature, as well as previous studies. The methodology is designed in accordance with empirical research employing a functional approach to understanding and responding to an offender's risk and needs (Daffern, Howells, Manion, & Tonkin, 2009; Fritzon, 2012; Jones, 2004; Miller & Fritzon, 2007; Swaffer & Hollin, 1995). The methodology is not focused on the criminal behaviour per se, rather it is focused on the psychosocial function underlying the antisocial action. A semi-structured functional analysis interview with young offenders will provide meaningful data and the flexibility to focus on the fundamental factors relevant to the young person and their offending. A study conducted by Swaffer and Hollin (1995) used semi-structured functional analysis interviews to develop an understanding of

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why firesetters light fires. The novel approach was praised by Dickens and Sugarman (2012) and recommended for future research. A qualitative approach to understanding juvenile offending is frequently employed in psychological research with children as young as 10 years old and classified as the age of criminal responsibility (Lambie, Seymour, & Popaduk, 2012; Walsh & Lambie, 2013).

The methodology is designed in accordance with empirical research employing a functional approach to understanding and responding to an offender's risk and needs (Daffern, Howells, Manion, & Tonkin, 2009; Fritzon, 2012; Jones, 2004; Miller & Fritzon, 2007; Swaffer & Hollin, 1995). The methodology is not focused on the criminal behaviour per se, rather it is focused on the psychosocial function underlying the antisocial action. A semi-structured functional analysis interview with young

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offenders will provide meaningful data and the flexibility to focus on the fundamental factors relevant to the young person and their offending. A study conducted by Swaffer and Hollin (1995) used semi-structured functional analysis interviews to develop an understanding of why firesetters light fires. The novel approach was praised by Dickens and Sugarman (2012) and recommended for future research. A qualitative approach to understanding juvenile offending is frequently employed in psychological research with children as young as 10 years old and classified as the age of criminal responsibility (Lambie, Seymour, & Popaduk, 2012; Walsh & Lambie, 2013).

Are the participants, children and young people, at risk of being exposed to a dependant or unequal relationship by the researcher? BUHREC

In accordance with the National Health and Medical Research Committee (NHMRC) guidelines, Section 4.2: Children and Young People/ Section 4.3: People in Dependiant or Unequal Relationships In accordance with section 4.2 (c) and (d) consent

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was obtained by both the young person and his/her legal guardian; this covers section 2.2.7 pertaining to respect for a child's capacity to consent. Capacity to consent was clarified by a young person's case worker after the young person has read, or been read, the explanatory statement and consent form. Rather than asking "Do you understand?" The young person was asked to demonstrate their understanding to their case worker. They will answer a series of questions such as: "Tell me what the researcher was talking to you about?" "Who will know what you tell the researcher?" "Is it okay to stop taking part in the interview if you change your mind?"

In response to section 4.2.4 (a) and (b), the inclusion of children age 10-14 years is indispensable to the research and was of benefit to the Australian community.

Under section 4.2.13 and 2.2.14 there is no reason why

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participation in the proposed research is against best interests for the child. The young person is able to withdraw at any time without negative consequence. Under section 4.3.1 the young person is under no obligation to participate; participant details will not be made available to the researcher until consent is obtained by both the young person and their legal guardian. The further provision of section 4.3.2 allows the young person the opportunity to discuss participation with their legal guardian and caseworker, who was able to support/advocate their decision to consent to participate. Finally, the proposed methodology (i.e., semi-structured interviews) is a recommended research method with vulnerable participants as it is said to minimise researcher control over a participant's expression of their experience (see Cridland, Jones, Caputi, & Magee, 2014).

Will participants with cognitive impairment or a BUHREC

In accordance with the National Health and Medical Research

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Mental Illness be able to successfully participate  
without being at risk of harm?

Committee (NHMRC) guidelines, Section 4.5 People with Cognitive Impairment, an Intellectual Disability, or a Mental Illness. The assumption of Doli Incapax has been taken into consideration in designing the proposed research. Doli Incapax is, however, a rebuttable assumption and therefore, under Australian federal law young persons aged 10-14 years can be found criminally culpable for their actions. The proposed research sample is specifically interested in adjudicated offenders, and thus, only those who have been found capable of committing a crime, and have demonstrated knowing right from wrong was eligible to participate in the proposed study. Due to the vulnerability and reduced capacity of children, the research procedure incorporates best practice protocols for conducting interviews with young children (see Lamb et al., 2007; Lamb, La Rooy, Malloy, & Katz, 2011; Marchant, 2013). This will include a series of steps:

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1. The explanatory statement is developed as an age appropriate leaflet, including a photo of the researcher, and simplified language explaining the proposed research.
  2. The research was conducted in a familiar setting. The interview room was comfortable and set up to minimise any power imbalance between the young person and the interviewer (e.g., comfortable chairs in the programs/educational room at a young person's youth justice facility). Please note this environment was safe for both young person and interviewer as CCTV was operational and a duress button available at all community/detention services.
  3. A preliminary session with each participant was conducted prior to the interview. This will last approximately 15-20 minutes and is important for the following reasons:
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- a. The interviewer can conduct a preliminary assessment of a young person's capacity to verbalise episodic events and explain his/her thoughts and feelings.
  - b. It enables rapport building, so the young person becomes comfortable talking with the interviewer and allows for narrative practice which assists in obtaining quality information more quickly (Roberts et al., 2011).
  - c. It provides an opportunity to introduce visual resources and to demonstrate their utility (e.g., photos, images of expression/emotion, visual timelines, and drawings). These visual aids will facilitate narrative explanations and reduce misinterpretation of a young person's account.\*

4. The Interview will incorporate a protocol used for child

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witness testimony known as “Ground Rules”. This is an opportunity to equip children with rules that empower them to be the expert in their story telling, and play an active role in the interview. This process occurs before the interview and provides the young person with an opportunity to practice them (see Faller, 2015). Examples of these rules include telling the interviewer if they make a mistake, saying “I don’t know” rather than guessing in the absence of information, saying “I don’t understand” if they are asked a question that doesn’t make sense, or telling the interviewer/showing them a stop sign when they feel uncomfortable. Empirical research on child witness testimony has evidenced children as young as 4 or 5 years old can provide accurate recall of events and can communicate these to others, particularly when ground rules are used (Brubacher et al., 2015; Faller, 2015; Lamb

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et al., 2011;Marchant, 2013).

Researchers working with Aboriginal and Torres Strait Islander peoples need to account for ethical issues specific to their culture and communities.

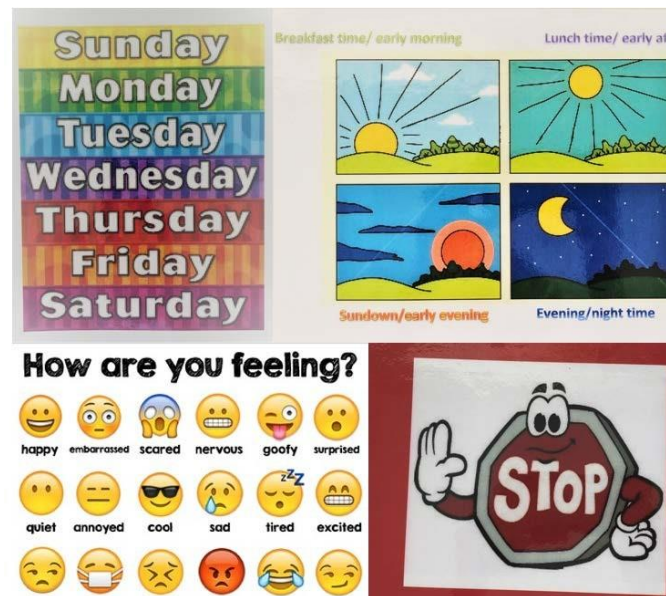
NSW Juvenile Justice  
Executive Committee

Working with Aboriginal and Torres Strait Islander Youth  
The researcher completed professional training in mental health assessment of Aboriginal clients with Dr Tracy Westerman (Indigenous Psychological Services), as well as online training for working with aboriginal children.

1. The researcher will spend time with the young person validating their experience, assessing any risk to themselves or others, and assist in reducing the immediate discomfort the young person is experiencing.
2. The researcher will explore with the young person the support options available to them and assist with that connection. If the young person identifies no available support the research team will liaise with the young person's case worker/conference co-ordinator to ensure the necessary support is made available.

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3. The research team will uphold the registration standards of the Australian Health Practitioner Regulation Agency (AHPRA), as well as abide by the professional and ethical standards outlined by the Australian Psychological Society (APS). The psychological wellbeing of a young person is the foremost concern of the researchers.
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*\*Note.* The pictorial emotions card is not the exact version used with participants. The final version had more emotions for participants to choose from.



## Appendix D

### Functional Analysis Interview-Index Offence

#### **Interview Schedule for Index Offence**

*The preliminary capacity session is to be conducted prior to the administration of the interview schedule. One constraining factor of the FA interview is the expectation that the young person will be able to articulate thoughts, feelings, and actions in a reflective manner. Accordingly, the wording in the interview schedule may need to be adapted by the researcher depending on the young person's cognitive capacity and level of understanding. The use of visual resources to facilitate narrative explanations and reduce misinterpretation of a young person's account is encouraged with youth who have a lower capacity. The nature of the functional analytic interview is to explore the reasoning behind a young person's actions and therefore, probing and Socratic questioning will be required to enhance understanding and clarification of a young person's account. The interview schedule is approximately 40 minutes; however, the length of time for completion will depend on the individual participant. A participant may take a break if needed or withdraw from the interview indefinitely without negative consequence.*

#### **Participant Number: [INSERT HERE]**

Thank you for agreeing to an interview with me. As you know, I am a graduate student at Bond University on the Gold Coast, and I am researching offending behaviour in young persons aged 10-17 years of age. To start, I am going to ask you to confirm some personal information (i.e., age, gender, relationship status, and ethnic background); I will then ask you a series of questions about your background and what life was like for you growing up. After this, I would then like to talk to you about your offending. All information you share with me is confidential and will not have a negative effect on your progress through the youth/juvenile justice system.

## **Background and Self-Perception**

1. Tell me a little bit about yourself?
2. Prior to your conviction/community order, what was your typical daily routine like? (e.g. Breakfast time, lunch time, dinner time, evening)

*At this point, remind participants that all information is confidential and will not impact on their progress through the justice system.*

3. Were you ever in trouble at school, at home, or with other people growing up?
  - Tell me a little about what you use to get in trouble for?
4. Is this the first time you have been in trouble with the law?
  - Tell me about when you first found yourself in trouble with the law?
  - Were there any other times?
5. Have you been in trouble for anything whilst carrying out your current sentence/supervision order?
  - Tell me a little bit about what you have found yourself in trouble for?
6. What do you think leads you to get in trouble?
7. Tell me about the first time you were exposed to crime as either a victim or bystander?

## **Relationships**

8. Who would you say is the closest person to you?
  - Tell me a little more about this person?
9. Do you have any friends?
  - Tell me about your friends?
10. How would you describe your relationship with your family?
11. Have you ever/ do you have a girlfriend or boyfriend?
  - Tell me a little bit about the relationship?



## **Cognition, Affect, and Appraisal**

I would now like you to talk to me about your offence that has brought you to youth detention/resulted in a community service order.

12. Tell me about the circumstances that led you to be sentenced to youth detention/supervision order?

- What happened?

13. Was your daily routine the same as normal on the day of your offence?

- If no, what was different?

14. What were you thinking/feeling/doing at the time of the offence?

- How long did you think/feel/ behave that way?

(e.g., a few seconds, minutes, entire time of the offence)

15. Was anyone with you at the time of the offence?

16. Tell me about what was going on before the offence.

- What were you thinking/feeling/ doing before?
- How long were you thinking/feeling/behaving like that?

(e.g., a few seconds, minutes, hours, Days, or weeks)

- Who was with you?

17. Tell me about what were you thinking/feeling after the offence

- How long did those thoughts/feelings last for?

(e.g., a few seconds, minutes, hours, days, or weeks)

- Who was with you?

18. What did you do after the offence?

(i.e., immediately, a few minutes later, an hour later, the next day)

19. Is this the first time you have behaved like this?

- Tell me about the other times?
- How many other times?
- What was the outcome?
- Did you think/feel differently (before/during/after) on previous occasions?

20. What are your thoughts and feelings about your behaviour now you have been sentenced/  
received a supervision order?

### **Psychophysiological Activation**

I am now going to ask you some questions about your feelings towards your offence. I would like you to identify how you felt leading up to, during, and after your offence. I would like you to rate the intensity of your feelings on a scale of 1-10; 1= really calm/relaxed and 10= very worried/irritable. After you have rated the intensity of your feelings on a scale of 1-10 I am going to show you a list of faces, each face is expressing a different emotion. I would like you to point to the face that looks most like the emotion you experienced leading up to, during, and after your offence.

21. How did you feel in the few minutes before the offence?

**1 2 3 4 5 6 7 8 9 10**

22. How did you feel during the offence?

**1 2 3 4 5 6 7 8 9 10**

23. How did you feel after the offence?

**1 2 3 4 5 6 7 8 9 10**

24. How do you feel about the offence now?

**1 2 3 4 5 6 7 8 9 10**

## **Victim or Target of Offence**

*The wording of the following questions will depend on the nature of the young person's offence. For example, if the young person has committed arson against property, then the questions will focus on target characteristics. If the young person has committed assault to a person, then the questions will focus on victim characteristics.*

25. Tell me a little about the victim/target of your offence?
26. Did you use a weapon/accelerant to commit the offence?
  - Describe the weapon/accelerant you used?
  - Where did you get this from?
  - Have you used a weapon or accelerant before?
  - Have you seen someone else use this weapon/accelerant before?
  - Was your offence planned?
  - Was anyone else with you at the time of the offence?
27. Explain to me why that person/thing was targeted?
28. What was your relationship/association with the victim/target?
29. What do you think the impact of your behaviour was on others?
30. What are your thoughts/feelings about your behaviour now?

## **Environmental Triggers**

31. Tell me what was going on in your life the year(s) /month/week/day/hour leading up to the offence?
32. Where were you when you committed the offence?
  - Have you been there before?
  - Is the place important to you?
33. Tell me about what was going on around you immediately before the offence?

*Cognitive antecedents need to be determined from a young person's narrative account. Each young person is to be scored present or absent on whether a common early maladaptive schema was activated prior to the offence. The eight identified schemas are: (1) Emotional Deprivation(ED); (2) Abandonment (AB); (3) Mistrust/Abuse (MA); (4) Social Isolation/Alienation(SI); (5) Defectiveness/shame (DS); (6) Emotional Inhibition (EI); (7) Approval-seeking/Recognition-seeking (AS); (8) Failure to Achieve (FA) . In addition, young persons who engage in firesetting will be scored as present/absent for one of the five implicit firesetting theories/schemas (Ó Ciardha & Gannon, 2010): (1) Dangerous World; (2) Normalization of Violence; (3) Fire is a powerful tool; (4) Fire is Fascinating; (5) Fire is Controllable.*

### **Mental Health and Self-Esteem**

34. Have you ever had any (mental) health concerns?
  - Have you been prescribed medication for any (mental) health issues?
35. Have you ever seen a psychologist or psychiatrist?
36. Do you ever experience any thoughts/ feelings that either worry or frustrate you?
37. Have you ever tried to harm yourself?
38. Has anyone ever tried to hurt you?

### **Physical Condition and Disinhibitions**

39. Have you ever taken any illicit drugs? (*present young person with a list of illicit drugs*)
40. Had you taken any drugs in the three days leading up to the offence?
41. Were you under the influence of drugs at the time of your offence?
42. Do you drink alcohol?
  - How often?
  - How much?
43. Were you under the influence of alcohol at the time of your offence?

44. Were you on any medication at the time of the offence?
- If yes, what was the medication and what was it for?
45. Would you describe yourself as someone who likes to take risks?
46. Would you describe yourself as someone who thinks before they act, of acts before thinking about it?
- Give me an example of a time when you have behaved like this?

### **Exploring Strengths and Protective factors**

47. What do you enjoy doing?
48. Do you have any qualifications/skills/hobbies?
49. Tell me about what you are good at?
50. What would you like to achieve in the future?
51. Tell me about a time when you were proud of yourself?
52. Tell me about a time when someone else was proud of you?
53. Tell me some positive things about your lifestyle?
54. Are you currently enrolled in/participating in any educational programs or activities?
- If yes, tell me a little bit about it?
55. Who do you turn to when you need support?
56. When you are sad or angry how do you cope with this feeling? What do you do?
57. What do you value most in life?
58. How do you achieve what you value most?

## Appendix E

### Functional Analysis Interview-Additional Problematic Behaviour

#### **Interview Schedule for Additional Problematic Behaviours**

*The wording in the interview schedule for Additional Problematic Behaviours may also need to be adapted by the researcher depending on the young person's cognitive capacity and level of understanding. The use of visual resources to facilitate narrative explanations, and reduce misinterpretation of a young person's account, is encouraged with youth who have a lower capacity. The nature of the functional analytic interview is to explore the reasoning behind a young person's actions and therefore, probing and Socratic questioning will be required to enhance understanding and clarification of a young person's account. The interview schedule is approximately 20 minutes; however, the length of time for completion will depend on the individual participant. Participants may take a break if needed or withdraw from the interview indefinitely without negative consequence.*

#### **Participant Number: [INSERT HERE]**

We previously discussed your background, what life was like for you growing up, and your offending behaviour. I would now like to talk to you about **[INSERT BEHAVIOUR HERE]**.

Same as before, all information you provide to me is confidential and will not impact negatively on your progress in the youth/juvenile justice system.

## **Cognition, Affect, and Appraisal**

1. Talk to me about INSERT BEHAVIOUR HERE that you engage in?
2. Why do you think you behave this way?
3. Do you INSERT BEHAVIOUR HERE on your own, around others, or both?
4. What were you thinking about at the time of INSERT BEHAVIOUR?
  - How long did those thoughts last?  
(e.g., a few seconds, minutes, or entire time of the offence)
5. What were you feeling at the time of INSERT BEHAVIOUR?
  - How long did you feel that way?  
(e.g., a few seconds, minutes, or the entire time)
6. Tell me about what was going on before the INSERT BEHAVIOUR.
  - What were you thinking/feeling/ doing before?
  - How long had you been thinking/feeling/behaving like that?  
(e.g., a few seconds, minutes, hours, days, or weeks)
7. Tell me about what were you thinking/feeling after INSERT BEHAVIOUR?
  - How long did those thoughts/feelings last for?  
(e.g., a few seconds, minutes, hours, days, or weeks)
8. What did you do after INSERT BEHAVIOUR?  
(i.e., immediately, a few minutes later, an hour later, or the next day)
9. Did you use anything to help you with INSERT BEHAVIOUR?  
(e.g., an object, item, or person)
  - Describe the object/item/person you used?
  - Where did you get this from?
  - Have you used this before?
  - Have you seen someone else use/do this before?

-Was the INSERT BEHAVIOUR planned?

-was anyone else with you at the time of the INSERT BEHAVIOUR?

10. Is this the first time you have behaved in this way?

-Tell me about the other times?

-How many other times?

-What was the outcome?

-Did you think/feel differently (before/during/after) on previous occasions?

11. What are your thoughts and feelings about your behaviour now?

### **Psychophysiological Activation**

I am now going to ask you some questions about your feelings towards INSERT BEHAVIOUR HERE. I would like you to identify how you felt leading up to, during, and after INSERT BEHAVIOUR HERE. I would like you to rate the intensity of your feelings on a scale of 1-10; 1= really calm/relaxed and 10= very worried/irritable. After you have rated the intensity of your feelings on a scale of 1-10 I am going to show you a list of faces, each face is expressing a different emotion. I would like you to point to the face that looks most like the emotion you experienced leading up to, during, and after INSERT BEHAVIOUR HERE.

12. How did you feel in the few minutes before INSERT BEHAVIOUR HERE?

**1 2 3 4 5 6 7 8 9 10**

13. How did you feel during INSERT BEHAVIOUR HERE?

**1 2 3 4 5 6 7 8 9 10**

14. How did you feel after INSERT BEHAVIOUR HERE?

**1 2 3 4 5 6 7 8 9 10**

15. How do you feel about INSERT BEHAVIOUR HERE now?

**1 2 3 4 5 6 7 8 9 10**



### **Victim or target of behaviour**

*The wording of the following questions will depend on the nature of the young person's behaviour.*

16. Tell me a little about the victim/target of your INSERT BEHAVIOUR?
17. Explain to me why that person/thing was targeted?
18. What was your relationship/association with the victim/target?
19. What do you think the impact of your behaviour was on others/things?
20. What are your thoughts/feelings about your behaviour now?

### **Environmental Triggers**

21. Tell me what was going on in your life the year(s) /month/week/day/hour leading up to the  
INSERT BEHAVIOUR?
22. Where were you when you INSERT BEHAVIOUR?
  - Have you ever been there before?
  - If yes, why?
23. Tell me about what was going on around you immediately before the INSERT  
BEHAVIOUR? (i.e., the hour, minutes, seconds before)

*Cognitive antecedents need to be determined from a young person's narrative account.*

*Each young person is to be scored present or absent on whether a common early maladaptive schema was activated prior to the offence. The eight identified schemas are:*

*(1) Emotional Deprivation(ED); (2) Abandonment (AB); (3) Mistrust/Abuse (MA); (4) Social Isolation/Alienation(SI); (5) Defectiveness/shame (DS); (6) Emotional Inhibition (EI); (7) Approval-seeking/Recognition-seeking (AS); (8) Failure to Achieve (FA).*

### **Physical condition and Disinhibitions**

24. Have you ever taken any illicit drugs? *(present young person with a list of illicit drugs)*
25. Had you taken any drugs in the three days leading up to INSERT BEHAVIOUR?

26. Were you under the influence of drugs at the time of INSERT BEHAVIOUR?

27. Do you drink alcohol?

- How often?

- How much?

28. Were you under the influence of alcohol at the time of INSERT BEHAVIOUR?

29. Were you on any medication at the time of the INSERT BEHAVIOUR?

- If yes, what was the medication and what was it for?

## Appendix F

### **Identifying Offence Paralleling Behaviours (OPB)**

I am going to hand you six cards. Each card has a behaviour listed on one side and a brief description of the behaviour on the other side. I would like you to arrange the cards into two piles:

1. Pile one indicates behaviours you have done
2. Pile two indicates behaviours you have never done

Next, I would like you to arrange the pile of behaviours that you have done in order from most frequently done to least often done.

*Remind participants that all information is confidential and will not impact on their progress through the justice system. Demonstrate to the participant how to complete the task and then present the six cards to the participant. If a participant has low literacy read the description on the back of each card verbatim and clarify the description is understood by asking for an example of that behaviour. Additionally, a picture demonstrating the behaviour may also be provided. The completion time is approximately 5 minutes.*

The six cards are as follows:

1. Aggression: “a feeling of anger, frustration, or unfriendliness that resulted in harm to another thing or person.”
2. Self-harm: “hurting yourself on purpose/deliberately resulting in injury, damage, or impairment to yourself”
3. Illicit substance use: “the use of banned or illegal drugs that will get you into trouble with the police, such as marijuana (weed), heroin (smack), cocaine (coke or crack), MDMA (ecstasy or E), Methamphetamine (Ice or crystal meth).”
4. Rule-breaking: “ignoring rules, instructions, or regulations, being disobedient to authorities and legal persons”

5. Risk-taking: “thrill seeking behaviours, behaviours that involve a gamble, behaviours that are potentially dangerous, threatening, and may have a negative outcome.”
6. Other: “Please identify the behaviour you most frequently engage in if none of the others applies to you”.

*The list of behaviours above is developed as a hierarchy, with behaviour number one considered the highest ranking problematic behaviour and number six the lowest ranking problematic behaviour. The highest ranked behaviour that a young person identifies as engaging in will be the behaviour discussed in the Functional Analysis of Additional Problematic Behaviours. Primary caregivers will be asked to identify which of the six behaviours is most characteristic of their child.*



## Appendix G

### Explanatory Statement-Case Worker

THE CENTRE FOR FORENSIC  
AND INTERPERSONAL RISK  
MANAGEMENT (C-FIRM)

Bond University  
Faculty of Society & Design  
School of Psychology

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University Drive Robina QLD 4229

Phone: +61 7 559 51344

ABN 88 010 694 121  
CRICOS Provider Code 00017B

Case Manager Name

Youth/Juvenile Justice Centre

Street Address and Suburb

QLD/NSW

Postcode

Date: D/M/2015

Dear (Case Worker)

My name is Danielle Perks, and I am currently completing a Doctor of Philosophy (PhD) in Psychology (Forensic) at Bond University under the supervision of Dr Bruce Watt and Dr Rebekah Doley. I am conducting research on offending behaviour among young persons aged 10-17 years in order to determine the underlying function of juvenile offending. The research findings will assist in identifying treatment needs and developing risk mitigation strategies for reducing offending behavior.

I am specifically interested in determining whether juveniles who deliberately set fires are a particular category of offender and whether additional problematic behaviors serve an offence paralleling purpose. For this to be determined, I will need to interview both juveniles who have committed an offence of arson and juveniles who have no history of deliberate firesetting. In addition to interviewing a young person and their primary caregiver, I will also be collecting information from a young person's Youth/Juvenile Justice case file. I would, therefore, appreciate it if case workers could facilitate the research by identifying: a) Young persons who have committed an offence of arson; b) Young persons with no history of deliberate firesetting.

Upon identifying eligible individuals, prospective participants and their caregivers will be provided with an explanatory statement and consent form detailing the research procedure, and what is required of them as a participant in the study. If a young person has difficulty reading or understanding this information, it is requested that case managers help participants to gain an informed understanding prior to providing consent. Participation in this study is **completely voluntary**, and participants may withdraw at any time without any negative consequences.

Participation in the study will have no impact on a young person's progress through the Youth/ Juvenile Justice System.

Case workers will be provided with self-addressed envelopes so that signed consent forms can be returned to me. The identity of participants will only be made known to myself and Dr Watt after written consent has been obtained, and participants will be treated with **complete confidentiality**.

Your help in facilitating the study would be greatly appreciated. Thank you in advance for taking the time to assist me with my research. If you have any questions regarding the research, please do not hesitate to contact me directly, my contact details are listed below. I will be contacting your Centre in due course to discuss the research proceedings further and answer any questions you and your team may have.

Thank you in advance,

**Ms Danielle LC Perks, BSc (Hons), MSc (Forensic Psyc) PhD Candidate**

Centre for Forensic and Interpersonal Risk Management (C-FIRM)

*Incorporating the Australian Centre for Arson Research and Treatment*

School of Psychology, Faculty of Society & Design

Bond University

Queensland, 4229

Telephone: +61 7 559 52690

Email: [dperks@bond.edu.au](mailto:dperks@bond.edu.au)

**Complaints concerning this research can be directed to-**

Bond University Human Research Ethics Committee quoting the following application number: 15300

Bond University Human Research Ethics Committee

BUHREC, Bond University, Gold Coast QLD 4229.

Phone: 07 5595 4194; Fax: 07 5595 1120; E-mail: [buhrec@bond.edu.au](mailto:buhrec@bond.edu.au)



## Appendix H

### Explanatory Statement-Primary Caregiver

THE CENTRE FOR FORENSIC  
AND INTERPERSONAL RISK  
MANAGEMENT (C-FIRM)

Bond University  
Faculty of Society & Design  
School of Psychology

Office 22, Level 3, Building 1A,  
University Drive Robina QLD 4229

Phone: +61 7 559 51344

ABN 88 010 694 121  
CRICOS Provider Code 00017B

Dear Participant (Primary Caregiver)

My name is Danielle Perks, and I am currently completing a Doctor of Philosophy (PhD) in Psychology (Forensic) at Bond University under the supervision of Dr Bruce Watt and Dr Rebekah Doley. I am conducting research on offending behaviour among young persons aged 10-17 years in order to determine why young people offend and identify how best to help them, and reduce the risk of further offending.

In order to identify how best to help young people, I must determine the reasons behind why young people get into trouble with the law. I would, therefore, like to talk to you about what was going on in your child's life at the time of their index offence (the most serious offence for which they have been convicted). I would like to talk with you about your child's thoughts, feelings, and behaviors leading up to, and surrounding the offence. You will be requested to answer series of questions to the best of your knowledge, all information will remain **completely confidential**; your responses will not be shared with anyone beyond my supervisors and I. Additionally, I will ask you to identify from a list of six behaviors if your child has ever engaged in any other problematic behaviors. These behaviors may not have resulted in legal action (e.g., a police caution or criminal justice adjudication) but they are associated with a risk of getting them into trouble or causing harm to themselves, or others (e.g., rule breaking or self-harm). Discussing these behaviors, thoughts, and feelings will help me better understand the reasons behind a young person's behavior and how best to help them. These questions can be completed over the telephone and will take approximately 40 minutes.

Our conversations will be recorded to ensure a high degree of accuracy and that I do not miss any important information; however, only my supervisors and I will have access to these recordings. Participation is **completely voluntary**, and you may withdraw at any point without negative consequence for you or your child's progress through the Youth/Juvenile Justice System.

In addition to talking with you, I will also be talking with your child and collecting information from your child's Youth/Juvenile Justice case file since they entered the Criminal Justice System for their index offence. Any information you share with me will not be shared with your child,

neither will the information they provide be shared with you. Your name and other identifying information are kept separate from the responses you provide to me during our discussions to guarantee your privacy. I will not discuss anything you tell me with anyone other than my supervisors unless you disclose information that identifies your child is at risk of causing harm to themselves or to others. Under this circumstance, your child's case worker will be notified. All information you provide to me is confidential, and all data collected from the study is kept in a secure location at Bond University.

If you are interested in participating in my research, please tell your child's case worker, and he/she will provide you with a written consent form. This form provides you with information about the confidentiality procedure and asks you to sign your name if you agree to participate in the study.

Thank you in advance,

Miss Danielle LC Perks

Principal Investigator

**Complaints concerning this research can be directed to-**

Bond University Human Research Ethics Committee quoting the following application number: 15300.

Bond University Human Research Ethics Committee

BUHREC, Bond University, Gold Coast QLD 4229.

Phone: 07 5595 4194; Fax: 07 5595 1120; E-mail: [buhrcc@bond.edu.au](mailto:buhrcc@bond.edu.au)



## Appendix H

### Explanatory Statement-Young Person

#### Information Sheet

**Hello!**

**Will you talk to me about your offending?**



**My Name:** Danielle Perks

**Where I Live:** Gold Coast, Queensland

**What I do:** I am researching offending behaviour as part of my degree at Bond University

**Why I do it:** I want to know how to best help young offenders. To be able to help them I must find out the reasons why young people get into trouble with the law

#### **I would like to know:**

- What life was like for you growing up
- Who is important to you
- What you like doing
- Your offence: what happened?
- Your thoughts and feelings about your offence
- Other behaviours you do that are unsafe and may have ended in trouble or harm to you, or others.

#### **I would like to meet with you three times:**

**1<sup>st</sup> time:** We can talk to each other and talk about what we will do the next time we meet. This will be for 30 minutes.

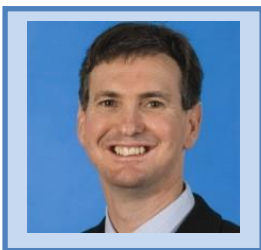
**2<sup>nd</sup> time:** I would like to ask you questions about your offence and other behaviors you regularly do. This will be for 60 minutes.

**3<sup>rd</sup> time:** This will be around six months later. You might be living somewhere else then. I would like to speak with you over the telephone or meet with you in person to talk about what has changed in your life since we last met.

## Things you should know

- Talking with me is completely voluntary. That means it is a choice. You don't have to tell me anything you don't want to.
- You may stop taking part in the research at any point. This will have no effect on your progress through the Youth/Juvenile Justice System.
- Everything we talk about is confidential. That means everything you tell me is private. Only my supervisors and I will know what you say.
- If you meet with me three times and help me with my research, as a way of saying thank you, I will give you a \$15 gift voucher after the 2<sup>nd</sup> time we meet and a \$15 voucher after the 3<sup>rd</sup> time we meet.
- I will also be getting information from your case file.
- I will also be talking to your primary caregiver. Anything you tell me will not be told to your primary caregiver, neither will anything they tell me be shared with you. Everything is private.
- I would like to voice record our talks, so I don't miss anything you say and to make sure I record everything you tell me. This is a choice, so if you don't want me to record our talks-I won't!
- Any personal information you give me will be locked in a secure place at Bond University. It will only be seen by me and my supervisors Dr Bruce Watt and Dr Rebekah Doley.

Dr Bruce Watt



Dr Rebekah Doley



**If you would like to be a part of my research and talk with me, please tell your caseworker  
Your case worker will talk to you and ask you to sign a consent form.**

**This is so I know you are happy to take part in my research and talk with me.  
Thank you for taking the time to help me with my research.**

Appendix I

Consent Form-Primary Caregiver

**Participant Consent Form (Primary Caregiver)**

**The Fundamental Characteristics and Functional Underpinning of Juvenile Offending**

I understand what is required of me as a participant in this research study. I have been provided with a copy of the explanatory statement outlining the conditions of the research study, and I have had the opportunity to ask any questions about the research prior to providing my consent for participation.

**YES**, I consent to participate in the research as outlined in the explanatory statement. I understand that at any stage I am able to withdraw my consent to participate in the research, without any negative effect, including on my child's progress through the Youth/Juvenile Justice System.

<p><b>Participant's Name (Primary Caregiver):</b> .....</p> <p><b>Young Person's Name:</b> .....</p> <p><b>Young Person's Location and Case Manager's Name:</b> ..... ..... .....</p> <p><b>Contact Number:</b> .....</p> <p><b>Signature:</b> .....</p> <p><b>Date:</b> .....</p>
--

**Please mail to: Ms Danielle LC Perks**  
*Centre for Forensic and Interpersonal Risk Management (C-FIRM)*  
School of Psychology, Faculty of Society & Design  
Bond University, Queensland, 4229  
Telephone: +61 7 559 52690  
Email: [dperks@bond.edu.au](mailto:dperks@bond.edu.au)

**Withdrawal of Consent-Primary Caregiver**

**The Fundamental Characteristics and Functional Underpinning of Juvenile Offending**

I understand that withdrawing my consent to participate in the research will have no negative effect, including on my child’s progress through the Youth/Juvenile Justice System.

- YES**, I wish to **withdraw** my consent to participate in the research project.

<p><b>Participant’s Name (Primary Caregiver):</b> .....</p> <p><b>Young Person’s Name:</b> .....</p> <p><b>Young Person’s Location and Case Manager’s Name:</b> ..... ..... .....</p> <p><b>Contact Number:</b> .....</p> <p><b>Signature:</b> .....</p> <p><b>Date:</b> .....</p>
--

**Please mail to: Ms Danielle LC Perks**  
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Email: [dperks@bond.edu.au](mailto:dperks@bond.edu.au)



Appendix I  
Consent Form-Young Person

**Participant Consent Form**

- I understand what is required of me as a participant in this research study.
- I have been provided with a copy of the research information sheet.
- I have had opportunity to ask any questions about the research prior to providing my consent.

- YES**, I consent to participate in the research as outlined in the information sheet.
- YES**, I give permission for the researchers to access my case file and use it for the research project.
- YES**, I understand that at any stage I am able to withdraw my consent to participate in the research.

**Participant's Name:**

.....

**Case Managers Name and Location:**

.....

.....

**Guardian or Primary Caregiver's Name:**

.....

**Contact Number:**

.....

**Signature:**

.....

**Date:**

.....

**Please mail to: Ms Danielle LC Perks**  
*Centre for Forensic and Interpersonal Risk Management (C-FIRM)*  
School of Psychology, Faculty of Society & Design  
Bond University, Queensland, 4229  
Telephone: +61 7 559 52690  
Email: [dperks@bond.edu.au](mailto:dperks@bond.edu.au)

## Withdrawal of Consent

I understand that withdrawing my consent to participate in the research will have no negative effect or influence on my progress through the Youth/Juvenile Justice System.

**YES**, I wish to **withdraw** my consent to participate in the research.

<b>Participant's Name:</b> .....
<b>Case Managers Name and Location:</b> ..... ..... .....
<b>Guardian or Primary Caregiver's Name:</b> .....
<b>Contact Number:</b> .....
<b>Signature:</b>  .....
<b>Date:</b> .....

**Please mail to: Ms Danielle LC Perks**  
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## Appendix J -Researcher Reflections

### Reflective Box 1

I had a preconception that it might be more difficult for juvenile males from different ethnic backgrounds to open up about their formative years and trust me with intricate information about their offences. My experience was quite the opposite; one young person processed their offence in the interview in more detail and depth than they had achieved in their four year sentence. The young person was grateful for the opportunity to speak with me and requested that I update his psychologist on how much he had spoken about during the research interview. Another young person thanked me for the opportunity, expressing I was the right person, asking the right questions, at the right time.

Additionally, I received a mixed response from participants about being given a \$15 gift voucher for their participation in the research. I had the view that being of a lower socioeconomic status to me, financial remuneration for participating in an interview would be accepted. This perception was not conceived on the idea that a young person needs the money more than I might, but that it is nice to be remunerated for your time, and I would accept the offer should it be offered to me. However, in some instances participants turned down the gift card, this occurred for two reasons: (1) the participant was grateful for the opportunity to be heard and did not want to accept my payment; and (2) the young person did not feel the voucher would be of use to them, indicating they would never personally shop at the specific stores the voucher was intended for. The experience of interviewing young persons of different ethnic and socioeconomic backgrounds to myself has taught me two things; firstly and quite importantly, the qualitative research process was therapeutic for many of those involved. Secondly, the impetus for participating can be beyond financial incentive, regardless on socioeconomic status.

## Reflective Box 2

This reflection contains information pertaining to the ethical concerns raised by the ethics committees involved in the approval of the present study (see Appendix C.) The mean age of participants was 14 years old, thus interviewing those under the age of 15 years was essential for the success of the research. Participants engaged well in the process and provided meaningful data to answer the research questions. The utility of visual aids to facilitate responses, specifically pertaining to emotional experience, was paramount to the obtaining relevant information. I had thought participants might find some of the visual aids condescending, but all 70 participants utilised the pictorial emotions card, with others making use of the times of day card, and weekly timeline. Two expressions were actually added to the visual aid by participants, where no emotion could truly represent their emotional response. These included: black hole and lost.

The utility of visual resources should not be underestimated when conducting research with juveniles; it was of my opinion that access to a white board/flip chart for every participant interview would have facilitated the interviews further, by means of drawing and visual explanation. While age, capacity, and trauma were raised and responded to accordingly, the issue of legal status was not (remand vs. control order). It became apparent that the status of an offender can influence the level of information a participant is willing to share. This only came to my attention at time T2 of data collection (Chapter Six), when two participants who had successfully engaged with me at time-point one (6-8months prior) were now on remand for new offences and increasingly suspicious of discussing matters with me, as well as being more concerned with who would hear/see their interview responses. The legal status of a participant also became problematic in the context of substance withdrawal, when recently remanded in custody. A young person I had successfully engaged at time-point one, had re-offended at the time of his second interview; he had only recently been remanded in custody (72 hours) and was experiencing withdrawal from substances (e.g., paranoia, memory loss, and distress). The interview was terminated and the participant was withdrawn from the study in accordance with ethical guidelines. Controlling for legal status in future research is a methodological recommendation to enhance the quality of data.