

Understanding Early Fire Learning and Experiences in Aotearoa New Zealand

By

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Abstract

The current study presents exploratory research on how people in Aotearoa New Zealand learn about fire growing up, and how they think and feel about fire as adults. The research aims to fill the empirical gap in research on fire and fire learning. An anonymous qualitative survey was conducted with 40 community participants through the crowd sharing platform Prolific Academic. Participants also answered the Fire Setting Scale, used as a descriptive measure to determine the range of fire interest scores among the sample; scores were well spread and the sample slightly negatively skewed. Thematic analysis was used and six themes comprising 13 subthemes were developed to answer the two research questions; 1. How do adults in Aotearoa NZ learn about fire growing up? and 2. How do adults in Aotearoa NZ think and feel about fire now? The first question was answered with four themes comprising ten subthemes. The first theme discussed participants' descriptions of their *notable reactions to fire memories*, the second described the *development of norms about fire and fire use*, the third *learning how and where fire can be used through direct experiences*, and the fourth discussed participants descriptions of *learning about fire mechanisms and safety*. Research question two was answered with two themes and three subthemes, the first theme discussed the idea that in regard to fire, *knowledge is power*. The second theme looked at participants' *emotional congruence with fire* and identified these emotions as existing on somewhat of a continuum. The findings determined that the current emphasis on social learning theory among the fire literature is not without basis, and that parental modelling and reinforcement, as well as sensory reinforcements, play a large role in the way individuals experience and learn about fire. It is also clear from this study that there is a wide variety in the levels of fire safety education delivered to young people in Aotearoa New Zealand. Further research is needed with comparative groups to determine how different learning and perceptions may influence an individuals' fire use in adulthood.

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Introduction

Humans' relationship with fire

Human evolution and fire use are so intertwined that one cannot be considered without the presence of the other. Natural fire existed long before humans were present on earth and the effects of these fires were notable (Pyne, 2017). However, human uses of fire determined the development of fire from a threat of natural disaster to a complex tool. These uses also influenced the development of the human species from primitive beings to an advanced, sophisticated species, and influenced the development of the earth's landscape in irreversible ways (Pyne, 2017).

Initially, fire was a source of life, providing early humans with warmth and allowing them to cook food. In turn, cooked food provided greater nutritional value than pre-fire diets and, as a result, hominids evolved to have smaller guts and larger brains which were integral to their development as a salient and advanced species. As time progressed, humans began to cultivate and control fires in more advanced ways. Humans moved from primitive hearths to sophisticated cooking fires and then to the manipulation of landscapes to best serve growing nutritional and habitation needs (Pyne, 2017).

Globally, fire has been utilised as a land management tool, typically for grass regeneration and land clearance purposes (Pyne, 2017). Aotearoa New Zealand is no exception; Māori (the indigenous people of Aotearoa New Zealand) and Pākehā (European New Zealanders) both used fires to manipulate the natural landscape to make way for cultivation and settlement (Beaglehole, 2012). Initially, Māori used fire to cultivate the land to hunt moa and grow kūmara. Later, European settlers would continue this practice on a larger scale, firing the land for extensive farming. Over time, the use of fire for land clearance has affected the natural ecology, causing the extinction of five or six plant species and 67 animal and bird species (Department of Conservation, 2005). Despite changes in attitudes,

occurring around the 1950s, in recognition of necessity to maintain the clean, green image of New Zealand, even now burn offs are relatively commonplace, and it is not unusual for these fires to get out of control (Beaglehole, 2012).

Humans' complex relationship with fire is detailed throughout history in stories and mythology, for example, the myth of Prometheus stealing fire to give to human civilisation. The theft of fire, and fire in general is a common theme among the mythologies of many nations and peoples. In many cultures fire was, or still is, revered as godlike, and in some cultures there are designated gods of fire, or fire itself is recognised as a god. In Aotearoa New Zealand Māori have their own myths about Māui-tikitiki-a-Taranga and his deception of the atua(goddess) Mahuika in his quest to retrieve fire for his people (Cowan, 1987).

There are records of indigenous cultures worldwide utilising fire to manipulate the natural landscapes (Pyne, 2015). Settlers in Australia referred to the aboriginal people as 'fire-stick farmers' due to their use of flame to cultivate the land (Jones, 2012). Such burning techniques have also been observed in the landscapes of North America, India, Greece, Mozambique, and Brazil (Pyne, 2017). European settlers too used fire to raze land for agricultural purposes and burn off culture is still present in Aotearoa New Zealand today (Clifford et al., 2016). The importance of fire to humans as a species, and the way fire has shaped our survival and functions as human beings has led to it possessing a unique place in contemporary society.

No other species uses fire as a tool the way humans do, and as time has gone on human uses for fire have changed and developed. Although fire is still used for heating, cooking, and cultural reasons today, there is far less necessity for the use of fire, at least in Western countries where many of its functions are now served by various technologies. Yet fire remains an important part of human life and is used frequently the world over. However,

which uses are socially acceptable differ between cultures; some fire uses are commonly sanctioned, whereas others are viewed as harmful, and there is little understanding of how such fire-related attitudes develop.

Fire use and misuse

Fire use by humans has been conceptualised as existing on a continuum ranging from criminalised fire use at one end, to non-criminalised, or legal, fire use at the other end (Horsley, 2020). Fire misuse behaviours, such as arson, fall towards the criminalised end of this scale, while normative fire use for cooking or heating a home fall at the non-criminalised end of the scale. Other fire use and misuse behaviours fall in varying places depending on the legality of such behaviour. The literature around the psychology of fire use has tended to focus on criminalised behaviours “yet we know little about the psychology of fire, fire learning, and the impact of culture on these factors” (Fessler, 2006, p. 448). Various terms have been used to refer to criminalised fire behaviours in the existing literature. Each of these will be briefly discussed with the view of distinguishing between problematic/unsanctioned fire behaviours and those which are more socially and culturally accepted.

Historically, the psychological literature utilised the term arson to refer to unsanctioned acts of fire lighting, however, more frequently researchers are turning towards more nuanced language such as firesetting and fire misuse to describe such behaviours. This change initially stemmed from researchers focusing on the term firesetting as distinct from arson. Particular emphasis is placed on the definition of arson as a legal term and that, as a legal term, the definition varies across international and federal jurisdictions. For instance, in Aotearoa New Zealand arson, broadly speaking, is the intentional or reckless cause of damage by fire or any explosive (Crimes Act 1961, s. 269; see Appendix A). The variance between jurisdictions means that, by utilising the term arson, researchers across jurisdictions are describing different behaviours. Another reason for the move away from using the term

arson to describe all acts of fire misuse is that the term arson only captures specific behaviours perpetrated by a small group of individuals in any population. The term arson focuses on specific criminalised behaviours that have been detected and deemed unacceptable by law, thus only capturing more extreme uses of fire (Horsley, 2020).

Due to the narrow focus of the term arson, researchers in this area have tended towards the term firesetting (see Gannon & Barrowcliffe, 2012; Kolko & Kazdin, 1986, 1990; Tyler et al., 2015). Firesetting is a term far broader than arson in that it captures any setting of a fire or explosive, regardless of the context, target, or intent. Arson does not capture unsanctioned fires set deliberately that did not result in a formal conviction, whereas firesetting includes all deliberately set fires regardless of whether they resulted in a conviction or not (Dickens & Sugarman, 2012; Gannon & Pina, 2010). Firesetting also accounts for behavioural nuances in a way that the term arson does not. However, firesetting, as commonly defined throughout the current literature, fails to fully account for societal norms and influences, and the ways these may affect the acceptability of an individual's use of fire.

Given the historical and evolutionary relationship between humans and fire for both criminalised and non-criminalised behaviours the terms fire use and misuse will therefore be used throughout this thesis to capture the broad spectrum of fire-related behaviours. Fire misuse in this context includes any use of fire that is deemed unacceptable in the relevant societal and cultural context. Fire use will be used to refer to the use of fire in socially and culturally acceptable ways. Fire misuse involves only those fires set in a manner that is not acceptable in the relevant cultural and societal context, meaning that fires that are socially acceptable are not unnecessarily pathologised. This is important especially when considering research of fire misuse in bicultural societies, such as Aotearoa New Zealand, where different cultural groups may have different norms and practices surrounding fire use.

Why is it important to understand fire use and misuse?

Despite existing research being focused primarily on criminalised fire use, it is important to recognise that there are different acceptable levels of fire use within cultures, and from the perspective of different paradigms. Pyne (2017) proposes that there are inherently good and bad fires, depending on the effects that the fire has on the ecology of the landscape that is being burned and the potential threat to humans and animal species. Fire misuse can have devastating consequences, both financial and otherwise, and could therefore be argued to represent “bad fires”. For example, between 2014 and 2018 there were approximately 50,000 deliberate fires set in Aotearoa New Zealand (Approximately 66% of all fires in this time; Fire and Emergency New Zealand, 2018), 22,507 of which were unlawful and 7,848 were suspicious (Fire and Emergency New Zealand, 2019). In deliberately lit structure fires that occurred over this time, where damage was recorded, over 50% of the property was unsalvageable in 11,750 cases, and in 515 cases over 90% of the structure was destroyed. This pattern is mirrored overseas; in England in the year ending June 2020 the Fire and Rescue Service attended 67,204 deliberately lit fire incidents, and from these incidents recorded 46 fire-related fatalities and 988 non-fatal casualties (Home Office, 2020a, 2020b). Considering these statistics only account for the fires large enough to warrant the notification of emergency services it is clear that fire misuse is a significant problem around the world and within Aotearoa New Zealand.

Although fire misuse represents a significant societal issue, those who engage in criminalised fire behaviours represent only a small proportion of the general population, with the majority of humans using fire in prescribed ways (e.g., “good fires”). Despite most humans engaging in appropriate fire use we know little about the psychology of fire (Fessler, 2006). Recently, Horsley (2020) argued that to effectively prevent fire misuse we must first understand prosocial fire use. Horsley (2020) argues that fire use is fluid and therefore we can

learn more about fire behaviours through considering both ends of the spectrum, in particular how normative and problematic fire behaviours develop and the key differences between them. Horsley likens the importance of understanding fire misuse to the understanding of sexually deviant behaviours, where deviant behaviour is considered in relation to non-deviant behaviour (Joyal et al., 2016). Horsley suggests that to fully comprehend why people misuse fire we must also have knowledge about non-criminal fire use, however, until now no research has focused on general fire use and how these uses may develop.

How do people learn how and when to use fire?

As noted above, little is known about fire use and misuse, and how people develop knowledge about and attitudes towards fire. Fessler (2006) states that overall, we know very little about human's relationship with fire, what people know about fire generally, and how people come to learn the knowledge they do possess. Instead, empirical research to date has focused heavily on motivations for engaging in criminalised fire use (e.g., Gannon et al., 2012; Jackson et al., 1987; Tyler et al., 2014) and identifying similarities and differences in the characteristics of those who misuse fire and those who do not (e.g., Barrowcliffe & Gannon, 2015; Gannon & Barrowcliffe, 2012). However, as discussed, there is an absence of empirical research examining the underlying mechanisms and process by which people learn about fire, the way people acquire this knowledge, and who from. Fire experiences and learning must be recognised as important, as they influence what behaviours may fall outside of accepted cultural norms around fire use at any one time, and thus what may be defined as fire misuse. It is also important to understand the mechanisms through which people are learning this knowledge and behaviour, and its acceptability within their culture, as this will give insight into the important developmental processes associated with a comprehensive understanding of fire and its uses.

There have been two empirical studies of note that examine how young people may learn about fire, both of which were conducted with children in the United States. Firstly, Block, Block, and Folkman (1976) conducted a study with 18 five-year-old boys and 29 six-year-old children (14 boys, 15 girls) attending the Child Study Centre at the University of Berkeley to determine their competency when faced with potentially hazardous fire-related situations. Block et al. found firstly that fire increases in salience for children between the age of 3 years and 6 years, and secondly, that there was a large range of individual differences between children in regard to the content and quantity of fire safety training they had received. Block et al. stated as a result of their study that they regard fire play among children as “common” (p. 1). The second study is one conducted by Kafry (1980), a paper often cited by later research papers as providing evidence that all children are interested in fire. Kafry conducted a study with 99 boys of kindergarten age (4-6 years old, $n = 33$), in second grade (7 years old, $n = 33$), or in fourth grade (9 years old, $n = 33$). Kafry completed interviews with the participants and concluded that among the participants interest in fire was “almost universal” (p. 48), and that there was a high prevalence of fire play among boys in these age categories.

Block et al. determined that parental teachings about fire, and reactions to fire use influence children’s fire safety competency, but that the parents in their study displayed a lack of understanding of their child’s learning process of fire safety skills. Similarly, Kafry found that parents, although competent in their own knowledge, felt that their child was not competent in fire safety skills, and worried about the potential consequences of this lack of knowledge when their child was left alone. They also expressed negative emotions associated with their child’s fire interest. Both Block et al.’s and Kafry’s conclusions outlined many gaps in the research around fire safety and children’s fire use and suggested that there needs

to be more empirical research conducted to look at general fire learning and the effectiveness of fire safety education delivered to children.

In addition to the lack of empirical research around fire use, there is a distinct absence of theory in this area, especially in regard to socially acceptable fire use and its role in the development of fire-related behaviours. However, a number of theories have been posited to explain criminalised fire misuse including single factor, multi-factor, and micro-theories. Single factor theories include Psychoanalytical Theory (Freud, 1932) and Biological Disorder theory (Barnett & Spitzer, 1994; Virkkunen, 1984; Virkkunen et al., 1987), both of which focus on historical developmental (e.g., psychosexual development) or biological factors (e.g., chromosomal disorders, increased blood glucose, and serotonin metabolite levels) that may predispose an individual to interest in, or misuse of, fire. Other single factor theories include Displaced Aggression Theory (McKerracher & Dacre, 1966) that suggests fire misuse may occur because of displaced aggressive drives, and Communicative Arson Theory (Geller, 1992) which suggest individuals misuse fire to fulfil personal needs. However, none of the aforementioned single factor theories focus on explaining fire learning in childhood and adolescence.

While some theories of fire misuse have neglected to include developmental factors in their explanation of the behaviour, there are some that have made reference to how individuals learn about fire and its functions, most notable of which is social learning theory. Social learning theory is the most developed and empirically tested single factor theory that has been applied to fire misuse (Bandura 1977; Vreeland & Levin, 1980) and, as this is the only single factor psychological theory that focuses on the way in which people develop their knowledge about fire, it will be the only one discussed in depth in this thesis. In addition to social learning theory, Fessler's (2006) evolutionary perspective on fire use and learning will be discussed, as well as three multifactor theories (Dynamic Behaviour Theory, Fineman,

1980; 1995; Functional Analysis Theory, Jackson et al., 1987; Jackson 1994; and the Multi-Trajectory Theory of Adult Firesetting, Gannon et al., 2012) and two micro-theories; the Firesetting Offence Chain for Mentally Disordered Offenders (FOC-MD; Tyler et al., 2014) and the Descriptive Model of the Offence Chain for Imprisoned Adult Male Firesetters (DMAF; Barnoux et al., 2015). Each of these theories will now be discussed with a particular focus on how they explain fire learning and knowledge acquisition.

Social learning theory (Bandura (1977))

Social learning theory was initially conceptualised by Bandura (1977) as a development on contemporary behaviourist theories. Bandura hypothesised that learning occurred through the interaction of one's cognitive abilities, their behaviour, their environment, and the role of observational learning. He stated that learning occurred through four central components: attention, retention, motor reproduction, and motivation, as a result of both internal and external influences including other people. A central tenet of social learning theory is the process of modelling – children imitating the behaviour of a model such as a parent or other adult, as famously demonstrated in the Bobo Doll experiment (Bandura et al., 1961). Modelling processes are a major component of social learning theory as they propose to explain how children adopt the behaviours they observe demonstrated by others in a given context. Reinforcement is also an integral part of social learning theory and provides the basis for component four, motivation. Bandura proposed that external, vicarious, and internal reinforcement all have the ability to influence and encourage certain behaviours. Social learning theory (Bandura, 1976; Vreeland & Levin, 1980) has been validated across a variety of behaviours and has also been determined as the most empirically valid single factor theory available to explain how people acquire attitudes towards, and behaviours with fire; forming the basis of much of the theory in this field (e.g., Fineman, 1980, 1995; Gannon et al., 2012; Jackson et al., 1987). Social learning theory explains fire use as a behavioural

product of a variety of learning experiences such as modelling and reinforcement that occur during early life stages (Bandura, 1976; Macht & Mack, 1968; Vreeland & Levin, 1980). Exposure to fire during childhood and modelling of fire use or misuse by parents or other parental figures, has been suggested to influence imitation of these behaviours by young people (Barrowcliffe & Gannon, 2016; Kolko & Kazdin, 1986; Macht & Mack, 1968; Rice & Harris, 1991). For instance, Barrowcliffe and Gannon (2016), Macht and Mack (1968), and Wolford (1972) proposed that individuals who misuse fire come from families who set fires or who are involved with fire in some way (e.g., firefighting). Barnoux et al. (2015) also discussed the role of vicarious fire experiences and how one may learn about fire use and misuse through such experiences. Social learning theory highlights learning from parents, peers, and others during childhood and adolescence as highly important in the development of fire use behaviours. To date the theory has focused on fire misuse and how this behaviour may eventuate.

Social learning theory accounts for a wide range of developmental experiences and distal influences. Hence, the existing multifactor theories of fire misuse all draw from the tenets of this theory, identifying reinforcement and modelling contingencies as playing an integral role to the development of fire misuse (Fineman, 1980; 1995; Gannon et al., 2012; Jackson, 1994; Jackson et al., 1987). Social learning theory is strengthened by its wide applicability and, due to this the tenets of the theory, could feasibly be applied to not only explaining fire misuse but also to explaining general fire use. However, despite this, social learning theory has not been utilised in such a way; while its tenets have been discussed in relation to fire misuse, often specifics of learning experiences and their possible influences are neglected. Furthermore, at this stage, theories utilising social learning theory offer no way in which to differentiate between the learning experiences of those who go on to misuse fire and those who do not. There is also no explanation of how individuals who have the same

learning experiences may continue down different trajectories of fire use and conceptualisation.

The Evolutionary Psychology of Fire Learning (Fessler, 2006)

Fessler (2006) represents one of the only authors to consider how different types of experiences might influence fire learning and individuals' thoughts, feelings, attitudes and use of fire. In this important paper, Fessler reported observational findings from ethnographic research alongside findings from an observational survey that examined interactions with fire among children in various societies, comparing how these children related and reacted to fire and fire use. Fessler posited the social transmission hypothesis for fire learning, suggesting that children learn about fire through social situations, observing and acquiring fire knowledge and behaviour possessed and demonstrated by others.

Fessler argued that children in modern Western societies may have limited opportunity to learn about fire as a result of societal advancement and technological development. Fessler also hypothesised fire learning likely occurs through minimal exposure as information regarding fire would naturally be viewed as highly salient due to its dangerous nature. He suggested that this may lead to an increased interest in fire in children in Western societies as children are not habituated to the presence of fire in the same way as children in societies that use fire for cooking, heating, and other cultural purposes may be. The 'exposure hypothesis', as this phenomenon is known, would in this case suggest that children who are raised in societies in which fire is used often by themselves, their peers, and their parents for mundane daily tasks grow accustomed to fire, and become disinterested. Fessler indeed hypothesised such an outcome, and also suggested that children in Western societies, that typically use fire less often, would hold a higher interest in fire as it is foreign and potentially dangerous. Fessler determined through anecdotal evidence collected by himself and

colleagues that this exposure hypothesis explained the fascination with fire they deemed prolific among young people living in the West.

Although Fessler's theory was supported by anecdotal and observational ethnographic evidence, empirical research examining his exposure hypothesis has produced contradictory results. To test Fessler's theory, Murray, Fessler, and Lupfer (2015) conducted two studies, one with a sample of 125 students (18 male, 107 female) at the University of British Columbia, Vancouver, and the second with 231 students (40 male, 191 female) enrolled in the University of Alaska, Anchorage. Both studies measured fire exposure by asking about the frequency of their exposure to fire before the age of ten and reported the percentage of participants who answered as having seen fire, 'a few times a week or more', 'a few times a month', 'a few times a year', 'a few times during my entire childhood', and 'never'. In both studies participants were also asked about their attitudes towards fire and were posed a yes/no question asking if they had ever had any negative experiences with fire. In study one it was found that there was no discernible difference between the level of positive association with fire in those with high childhood fire exposure and those with low childhood fire exposure. Study two found that those with higher fire exposure were actually more likely to possess positive associations with fire than those who had lower childhood fire exposure. These findings did not directly support Fessler's (2006) hypothesis, but they suggest that there may be variation within the types of exposure and the accompanying affects, behaviours, and cognitions that may influence the resulting associations with fire.

Dynamic Behaviour Theory (Fineman, 1980, 1995)

Fineman's Dynamic Behaviour Theory (DBT; Fineman, 1980; 1995) is a broad-based multi-factor conceptual framework developed to explain fire misuse (Gaynor, 1991). The model implicates multiple variables in the development of a propensity to misuse fire. DBT suggests that fire misuse is the result of an interaction between predisposing historical factors

(e.g., dysfunction regarding peers, family, and health) that lend themselves toward antisocial behaviours, historical environmental factors (e.g., lack of parental supervision around fire in childhood, lack of fire-safety education, and the appropriateness of a parent or significant other's response to a fire) that act as reinforcers of this behaviour, and proximal environmental factors (e.g., feelings and distortions pre-, during, and post-fire, and internal and external reinforcers) that encourage fire misuse.

Fineman's theory aims to provide an explanation of the development and maintenance of fire use through a focus on distal factors. Fineman suggests that a lack of formal learning opportunities, poor education provision from parents, a lack of appropriate response from other may increase an individual's interest in fire and propensity to misuse fire. Fineman also suggests that fire play may reinforce a natural interest in fire, teaching the child that it is acceptable behaviour to play with fire, and that this may predispose a child to misuse fire. All factors discussed draw on the tenets of social learning theory, thus have a strong theoretical basis, however the descriptions of each factor are perhaps not as detailed as they could be and leave some aspects unclear. One strength of this theory is that it does identify and name specific factors as key learning opportunities. However, a weakness of the theory is that there is a large focus on how a deficiency in a number of these factors may contribute to how one develops fire misuse behaviours, yet it provides no explanation of the flipside, for instance, how a child not deficient in these areas may build a resistance to fire misuse. The theory fails to elaborate on the factors (e.g., parental education, formal learning opportunities) as it provides only baseline descriptions, nor does it identify what may be learned from these factors and related opportunities instead, as mentioned before, focusing on the possible repercussions of not having such opportunities. Although the theory draws upon multiple variables and acknowledges the potential interrelation between different factors it does not draw contrasts with general learning about fire, or about how instead safe fire use may be

taught. This is likely in part due to the current lack of understanding of general, socially acceptable fire use, attitudes towards fire, and how these may develop.

Functional Analysis Theory (Jackson, Glass, & Hope, 1987; Jackson, 1994)

Functional Analysis Theory (FAT; Jackson et al., 1987; Jackson, 1994) is a multifactor theory of fire misuse that focuses on the antecedents, behaviours, and consequences of fire misuse. Jackson and colleagues identify that antecedent events initiate the behaviour of fire misuse, and that the consequences of this misuse serve to maintain this behaviour. They acknowledge fire misuse as a maladaptive behavioural response to antecedents such as psychosocial disadvantage, social ineffectiveness, and dissatisfaction with one's life and oneself. It is proposed that for fire misuse to occur, accompanying these antecedent variables will be an internal or external triggering state or event that motivates the individual to engage in firesetting behaviour. Jackson and colleagues suggest that the consequences of this fire misuse may act as behavioural reinforcers to develop and maintain fire misuse behaviours.

Jackson et al. suggest that an individual may learn about fire use through modelling of family members' behaviour around fire. It is also proposed that fire misuse may provide an individual with immediate internal reinforcement, and that the reactions of peers or parents may also act as reinforcers to encourage further fire misuse. Jackson et al. further suggest that social learning may increase fire interest through reinforcement in the form of parental attention and sensory stimulation, and that this increase in fire interest may further increase incidences of inappropriate fire use in the future.

Jackson and colleagues' theory draws upon aspects of social learning theory to explain fire learning, especially in reference to modelling and parental response to behaviour being reinforcing mechanisms. Jackson, Glass, and Hope refer to "normal 'fire play'" (1986,

pp. 176) and state that “fascination and experimentation with fire is a widespread feature of normal childhood development and that the responses of parents, other authority figures and peers to the fire-setting behaviour are important factors in the genesis of ‘pyromania’” (pp. 176). However, aside from citing one author (Kafry, 1980) later in their paper, they provide little empirical basis for the claim that fire use during childhood is a common phenomenon; a claim we see repeated throughout fire literature with similarly light empirical support.

Secondly, Jackson and colleagues do not address why, if most children engage in ‘fire play’ as they claim, only some find the reactions from peers and parents positively reinforcing. They state that few behaviours elicit such consistent and dramatic responses from parents, yet do not explain why it is only some children that find such reactions reinforcing, nor do they explain the behaviour of those individuals who may engage in secretive fire use or misuse. There are also gaps in this theory in terms of where a propensity to engage in initial fire use may arise from, and what general learning processes may be occurring in relation to fire for those people who do not possess the antecedent factors they propose lead to fire misuse.

The Multi-Trajectory Theory of Adult Firesetting (Gannon, Ó Ciardha, Doley, and Alleyne, 2012)

Gannon and colleagues (2012) proposed a third multifactor theory developed through theory knitting. The Multi-Trajectory Theory of Adult Firesetting (M-TTAF) is a two-tiered theory. Tier 1 combines existing theory and contemporary research knowledge and applies it within a multi-factor framework of fire misuse. Tier 2 outlines fire misuse typologies, proposing five different trajectories for fire misuse.

Tier 1 of the M-TTAF identifies five main distal factors (developmental factors, biological factors/temperament, cultural factors, learning factors, and contextual factors) and discusses how these factors may predispose an individual to developing psychological vulnerabilities (e.g., inappropriate fire interest/scripts, offense-supportive attitudes, emotional

regulation issues, and communication problems). Gannon and colleagues propose that triggers exacerbate these psychological vulnerabilities to form what they call ‘critical risk factors’, which they suggest go on to culminate in a firesetting event and may later form the presenting variables in therapy.

The M-TTAF acknowledges that each individual is part of a unique developmental context, and that there are many variables that play into their development. Gannon and colleagues draw upon Fessler’s (2006) research to suggest that a lack of exposure to fire within Western cultures may play a role in the development of fire interest that may later lead to fire misuse behaviours, again drawing on tenets of social learning theory. Through the acknowledgement of Fessler’s (2006) research, Gannon and colleagues identify that learning about fire is a part of development within society, and that learning may differ across different cultures and populations. The authors also draw upon existing theories, including social learning theory, to posit that experiences during one’s life, and personal reactions to these experiences, may shape one’s perceptions of, attitudes towards, and behaviours with fire. Gannon and colleagues hypothesise that motivations for fire misuse such as fire interest may result from positive early experiences with and exposure to fire. There is a significant acknowledgment within the M-TTAF of the possible role of social learning and social context in the development of fire misuse behaviours, and this is one of the theory’s clear strengths.

Another strength of the M-TTAF is that Gannon and colleagues provide empirical evidence regarding individuals who misuse fire, who have emotional regulation issues, and with communication deficits. However, there is no acknowledgement of how emotional regulation issues may relate to fire misuse other than a general increased likelihood of engagement with antisocial behaviours. Communication problems on the other hand are explained more explicitly in regard to fire misuse and how this may gain them attention, but

little explanation is given as to how individuals learn to misuse fire in the first place. The M-TTAF also fails to determine in what context a child is given the opportunity to learn that fire may be a means of communication, nor is there an explanation of what these early learning experiences may be, how they may differ between individuals, and what kind of effect this may have on later fire-related behaviour. The M-TTAF utilises the tenets of social learning theory but fails to provide the necessary depth to comprehensively explain how they lead to specific behaviours.

Throughout the M-TTAF the tenets of social learning theory are also tied back to the development of psychological vulnerabilities and inappropriate conceptualisations of fire. Gannon et al. discuss such concepts using language that reflects that there may be people with dissimilar or opposite thought patterns (e.g., vulnerabilities vs. strengths, inappropriate vs. appropriate) yet there is no consideration of the presence and possible impact of these opposing thought patterns. This lack of consideration of other potential cognitions, emotions, and behaviours leave the M-TTAF with little to distinguish between the experiences of those who do and do not misuse fire. This leaves the theory deficient in comprehensive explanations of the development of each of the important factors, such as inappropriate fire interest, that the theory touches on.

The M-TTAF's explanation of fire misuse is limited by the distinct lack of research about general experiences with fire during childhood and adolescence, and how these experiences may influence a person's attitudes and behaviours. It is therefore difficult to determine what sort of learning and experiences may differentiate those who come to use fire in a socially acceptable way, and those who misuse fire. As such, it does not develop upon earlier theories in this regard, and therefore still exists a lack of information about what specific experiences during a persons' childhood and adolescence may lead to their progression down any one of these trajectories. The theory acknowledges the lack of research

conducted investigating the cognitive systems of individuals who misuse fire. However, equally important is the need for research about cognitive systems regarding fire use in general, criminalised or not, as highlighted by the M-TTAF and its lack of such considerations.

In the M-TTAF Gannon and colleagues discuss how early experiences with fire may translate to the development of specific fire scripts and implicit theories relating to fire. They suggest that individuals develop cognitive scripts regarding fire use (i.e., implicit rules of how and when to use fire) as a result of exposure to fire during childhood and adolescence, drawing upon social learning theory and its explanation of formative experiences. Gannon and colleagues proposed the existence of four fire scripts *fire is a powerful messenger* and *fire is the best way to destroy evidence*, *fire-coping script*/*fire is soothing* and *fire-aggression fusion script* (Gannon et al., 2012; Butler & Gannon, 2015). They suggest that these scripts influence an individual's use of fire as they are deep-seated beliefs that individuals hold about how and when fire should be used. A strength of "script theory" (Gannon et al., in press) is that it provides explanation for how scripts may form in adults as a result of early life experiences. However, a current issue with script theory is that it is supposed that these scripts pertain to fire misuse yet there is little evidence to suggest that these scripts are not also present in individuals who do not misuse fire. Only one empirical study has been conducted so far to examine the presence of fire scripts. Butler and Gannon, (2020) compared the number and type of scripts held by community participants, fire service personnel, persons convicted of fire offences, and non-firesetting offender controls. In this study Butler and Gannon found that there was no discernible difference between the number of scripts held by Fire Safety Personnel and adults convicted of fire misuse. Furthermore, they found that the *fire is soothing* script did not differentiate between the four groups.

Implicit theories regarding fire have been discussed in much the same way as fire scripts, and it has been proposed that individuals who misuse fire hold beliefs that support these behaviours. Implicit theories are different to scripts as, while scripts represent “[a set] of rules for the interpretation, evaluation, prediction, production, or control of scenes” (Tomkins, 2008, p. 600), i.e., a knowledge structure of how to behave around fire, implicit theories are conceptualised as the motivation for such behaviour (Butler & Gannon, 2020). Three fire-specific implicit theories have been proposed that are purported to influence fire misuse including *fire is fascinating/exciting*, *fire is a powerful tool*, and *fire is controllable* (Ó Ciardha & Gannon, 2012). However, Barrowcliffe, Gannon, and Tyler (2019) examined these implicit theories in a community sample using a lexical decision task and found no difference between community fire misusers and non-misusers on the task examining implicit fire interest. The lack of differences found between those who misuse fire and those who do not, for both implicit theories and fire scripts, suggest that there may be commonalities among the fire beliefs held by different groups in the general population. The research determines that these scripts and implicit theories are indeed held by individuals, but not necessarily in the ways that we would expect based off current theory. It is therefore necessary to determine how the general population does think and feel about fire, and how these scripts and implicit theories may or may not contribute to how a person may choose to use or misuse fire.

Micro theories

In addition to the above single and multi-factor theories, there are two existing micro-theories that focus on the offence process of fire misuse. These two theories both focus on describing in detail the chain of events occurring in the lead up to the commission of a fire misuse offence, based on narrative descriptions provided by individuals who have set fires. Both micro-theories were developed with an inductive approach that worked from data collected from interviews with adults who set fires to develop the stages of each model. Each

micro-theory covers stages such as individual's background, early adulthood, and pre-offence, offence, and post-offence periods.

The first micro theory is the Firesetting Offence Chain for Mentally Disordered Offender (FOC-MD) originally posited by Tyler et al. (2014) and validated by Tyler and Gannon (2017). The FOC-MD developed three pathways: 'Fire Interest – Childhood Mental Health Approach', 'No Fire Interest – Adult Mental Health Approach', and 'Fire Interest – Adult Mental Health Approach'. In the theory Tyler and colleagues highlight the importance of early experiences with and affective responses to fire and how these experiences may shape later fire misuse. The theory also highlights the importance of the timing of the onset of mental health issues, and the significance of behaviours following a firesetting incident.

The second existing micro theory is the Descriptive Model of the Offence Chain for Imprisoned Adult Male Firesetters (DMAF; Barnoux et al., 2015). Barnoux and colleagues identified two pathways for fire misuse: approach and avoidant. Each pathway describes a distinct approach towards fire misuse characterised by different patterns of thoughts, feelings, needs and behaviours. Barnoux et al. found that individuals on each pathway were distinguished by differing early fire experiences; upbringings, and contrasting levels of engagement in antisocial behaviour, although people on both pathways used fire. These differing experiences during childhood, and the individuals' reactions to them, then influenced their approaches to using fire later in life.

The FOC-MD and DMAF add to existing theories using a data driven approach, and both highlight the role that childhood fire experiences and learning may have in later fire attitudes and use or misuse. However, neither of these theories drew upon specific instances within their participants childhood, and it was not specified what kind of fire experiences or learning had occurred for these individuals.

Studying fire use in the general population

Given the limited theoretical attention paid to explaining fire use, it is probably unsurprising that there is little research examining the widespread understanding and use of fire within the general public. Little research exists examining fire use or fire misuse with community populations, instead it mostly focuses on individuals apprehended for criminal firesetting (Barrowcliffe & Gannon, 2015, 2016). As discussed in Horsley's (2020) thesis, there is currently a focus on fire use that is conceptualised as criminal or otherwise pathological. Although it is undoubtedly important to understand these behaviours, Horsley argues that there needs to be comprehensive understanding of the entire spectrum of fire use. To gather such an understanding, it is imperative to conduct studies not only with incarcerated populations, but also with samples of the general public.

Not only has the research focused on incarcerated populations, but to date there has also been a focus on youth fire misuse, meaning there has been little research conducted with adult community samples. Barrowcliffe and Gannon (2015, 2016) have completed some of the only studies to examine psychological factors associated with fire misuse in the general population. Barrowcliffe and Gannon (2015, 2016) completed two quantitative studies with community samples in Kent, England to determine characteristics that may differ between people in the community who had misused fire and those who had not. In both their 2015 and 2016 studies Barrowcliffe and Gannon found that among the characteristics that differentiated the two groups were 'having a family member who had ignited a deliberate fire' and 'experimenting with fire before the age of 10'. Interestingly, in the 2015 survey they found that significantly more of those who reported that they did not misuse fire experimented with fire before the age of ten than those who had reported that they had misused fire, whereas they found the opposite in their 2016 study. Whilst these factors were measured potential differences in learning experiences, specific information on these

experiences, when and where they occurred, and the type of knowledge gained from them was not collected due to the quantitative nature of the research. Both factors mentioned, the presence of a parent who had misused fire, and the early experimentation with fire, suggest that it is possible that social learning with fire at a young age may influence an individual's attitudes towards and behaviour with fire.

Summary of the literature reviewed

As discussed in the opening of this thesis, humans have a longstanding, interconnected relationship with fire, each having had a large impact on the development of the other. Despite this, little is known about the relationship individuals have with fire in their daily lives, and the literature on the psychology of fire use is notably lacking in a number of areas. The literature focuses primarily on criminal fire misuse and often draws upon samples of individuals who have been convicted of such offences (e.g., Barnoux et al., 2015; Tyler et al., 2014). These theories focus on the positive responses to early fire learning and experiences that motivate people to use fire, criminally or otherwise. This focus has revolved around such aspects as fire interest and positive sensory reinforcement from fire, or a perceived sense of control over fire (Butler & Gannon, 2015). Alternatively, other theories focus on responses to fire that evoke later harmful fire use as communication methods or as part of other criminal behaviour (e.g., Gannon et al., 2012). However, when discussing the predisposing or distal factors that may influence fire misuse most theories stick to general terms with phrases such as 'early fire experiences', 'antecedent events' (Jackson et al., 1987), "learning experiences" or "cultural forces" (Gannon et al., 2012, p.112) without exploring what these experiences may represent, and how different types of 'antecedent events', 'learning experiences', or 'cultural forces' may predispose individuals to behave in different ways. Jackson, Glass and Hope state that "pathological arson may develop from normal 'fire play' when certain setting conditions are imposed" (1987, p.176) but across the literature few

suggestions are made as to either what “normal” fire play may be, or what certain setting conditions may encourage it (Jackson, 1994; Jackson et al., 1987). There has been little to no research conducted to determine what fire-related experiences people have and how they perceive these experiences. Furthermore, there has been little research examining how adults in the general population think and feel about fire. As Horsley (2020) stated, to be able to fully understand fire misuse, we must be able to comprehend a wide range of fire use behaviours, criminalised or not. Data driven theoretical research that has included some exploration of this area (e.g., Barnoux et al., 2015; Tyler et al., 2014) was conducted with individuals who were known fire misusers, but there is no research to determine how their experiences compare to the experiences of the general population.

The current study

The current theories explaining fire use are limited in scope as they fail to account for the development of complex precipitating psychological factors and experiences with fire and the way the two may predispose an individual to use fire in either a prosocial or antisocial way. It is often recognised that exposure to fire and fire-related education during childhood is likely to influence how one interacts with fire during adulthood (e.g., Block et al., 1976; Fessler, 2006; Murray et al., 2015). Indeed, most theory in the fire use literature relies heavily upon the tenets of social learning theory such as modelling, reinforcement, and the role of witnessing fire use during one’s youth. However, empirical research supporting these theories is scarce. There is little evidence as to how social learning theory contributes to later fire use behaviour, and the mechanisms by which the development of these behaviours may occur.

Despite advancements in the fire misuse literature, there is a recognised lack of empirical research regarding general fire learning, use, and understanding. Fessler (2006) acknowledged this focus on the psychopathology of fire misuse, and stated that, “fire has an impact on societies large and small, yet we know little about the psychology of fire, fire

learning, and the impact of culture on these factors. It is high time that we knew more.” (p. 448). Qualitative research has previously been used to gather information on adolescent fire misuse (Swaffer & Hollin, 1995). However, no such methods have been used to investigate individuals’ perception of their lived fire experiences from adolescence or childhood (Reilly & Johnson, 2016). Given how learning and early experiences with fire have been implicated in the development of adult scripts, interests, attitudes, and beliefs about fire, further research focusing on fire learning, perceptions, and misuse in adults is required (Gannon et al., 2012); especially as most of the research that has been conducted with adult populations looks at samples taken from institutionalised populations; either with individuals who are incarcerated or who reside in inpatient mental health facilities (e.g., Enayati et al., 2008; Tyler et al., 2014). The lack of knowledge about fire perception and use is especially pronounced in regard to the general population.

The current study aims to fill the gaps in the literature pertaining to early fire learning and experiences, and later thoughts, feelings, and attitudes about fire in the general population. This research represents one of the first direct studies of the psychology of fire use in the general population, more specifically it represents the first examination of early experiences of fire and fire learning and how adults in the general population think and feel about fire.

Although the research is exploratory, two key questions guide this study:

1. How do adults in Aotearoa New Zealand learn about fire growing up?
2. How do adults in Aotearoa New Zealand think and feel about fire now?

This will be an exploratory study in a community sample of adults within Aotearoa New Zealand. An online questionnaire will be used to gather qualitative information about individuals’ fire learning and other significant fire experiences. Qualitative surveys can

provide useful baseline knowledge about practices or experiences in an under-researched area, without delimiting the scope of response, and are good for gathering information on a wide range of views and perspectives (Braun & Clarke, 2013). Qualitative research methods were chosen as they provide the opportunity to collect a wide range of experiences and are relatively unrestricted in comparison to other formats of questionnaires such as those that utilise Likert scales and quantitative methods. This wide scope is integral as the research aim is to understand what kind of experiences people have and what they are learning, and to use the information people provide to develop a baseline understanding of community fire learning and experiences within Aotearoa New Zealand.

It is hoped that this research will provide a richer understanding of typical development with regard to fire learning, and thoughts and feelings about fire that can not only help develop a wider understanding of the psychology of fire but also provide indicators for studying criminal firesetting too.

Method

Design

This study utilised a qualitative research design and employed reflexive thematic analysis to investigate early experiences and learning about fire among 18- to 23-year-olds in Aotearoa New Zealand. The study adopted a critical realist orientation, meaning that the aim was to explain data provided by participants in a way that accurately represented their lived experiences. Data was collected anonymously to encourage participants to openly discuss their fire-related emotions, cognitions, and behaviours. Data was analysed using inductive (i.e., a data-driven, bottom-up approach), semantic thematic analysis to ensure that participants experiences were captured and that the themes generated were true the participants' learning, experiences and attitudes.

Participants

A community sample of participants were recruited through the online crowdsourcing platform Prolific Academic. The study sample included 40 participants, all currently living in Aotearoa New Zealand at the time of the survey. A sample of people living in Aotearoa New Zealand was chosen as previous community studies were conducted in the United Kingdom (Barrowcliffe & Gannon, 2015, 2016) and there is no formal knowledge about fire learning and experiences within the general population of Aotearoa New Zealand.

A sample of 40 participants was chosen to ensure that a sample representative of the population was recruited, and to increase chances of recruiting participants with a range of experiences with fire. Qualitative data generally aims to reach a level of saturation from the data; where no new information is gathered from additional participants (Bowen, 2008; Morse, 1995; Sandelowski, 1995). As we were collecting data using an online survey, we expected participant responses to provide more ‘shallow’ data than would be expected from other qualitative methods such as an interview (Braun & Clarke, 2013). To combat the potential relative ‘shallowness’ we collected a larger study sample. Forty individuals initially responded to the online survey. Data provided by one participant was excluded from analysis as they did not properly complete the qualitative survey questions which meant that this was unable to be analysed. Therefore, their data was not included in the study. All data provided by this participant, including demographic data and answers to the Fire Setting Scale, was excluded from the study. The survey was re-opened to allow another participant to respond (a total of 41 participants, with 40 participant responses included in the analysis).

Participants were all aged between 18 and 23 years, inclusive. Age was restricted to this range as previous research has found a potential effect of memory recall when asking older participants about early experiences with fire (Barrowcliffe, 2017). Further demographic information about participants can be found in the results section.

Materials

Participants answered a series of demographic questions (See Appendix B for full list of demographic questions). The demographic information collected included age, ethnicity, and level of education. This information was gathered to help describe the study sample and understand who took part in the survey.

Fire Setting Scale (FSS; Gannon & Barrowcliffe, 2012)

The Fire Setting Scale (FSS; Gannon & Barrowcliffe, 2012) was used to assess participants' level of fire interest. The FSS was developed to assess antisocial and fire interest factors associated with firesetting. In Gannon and Barrowcliffe's initial study the scale was found to have value in detecting individuals in a community sample who may benefit from preventative work addressing potential firesetting behaviour. Fire interest has been traditionally associated with positive early learning experiences with fire (e.g., Vreeland & Levin, 1980). In this study, the FSS was used as a descriptive measure to determine whether a range of attitudes and interests towards fire were reflected in the study sample, rather than just recruiting participants with a high interest in fire. This was done as Gannon and Barrowcliffe (2012) suggested that skewness may be an issue in community research on firesetting as these studies may only attract individuals with high fire interest.

The FSS is a 20-item scale containing two 10-item subscales relating to antisocial behaviour and fire interest (see full list of items in Appendix C). The antisocial behaviour subscale includes items such as *'I am a rule breaker'*. The fire interest subscale includes items such as *'I like watching fire'*. All items are presented to participants in a randomised order. Items are scored on a seven-point Likert scale from 1 (Not at all like me) to 7 (Very strongly like me). Gannon and Barrowcliffe report that the Fire Setting Scale has good internal consistency and test-retest reliability ($\alpha = .80$ and above for total and subscale scores, $r = .80$ and above for total and subscale scores). Firesetters were also found to score a

significantly higher total score on the scale than non-firesetters. For this study we focused on the scores for the fire interest subscale. The Cronbach's alpha for this study was $\alpha = .923$, indicating good internal consistency for the scale.

Qualitative Survey

An online qualitative survey was used to capture rich accounts of participants' thoughts, feelings, attitudes towards, and experiences with fire. Online qualitative surveys are useful as they are a fast way to collect a lot of data, they are also relatively cost-effective to run, and allow for the collection of sensitive information while maintaining participant anonymity (Braun & Clarke, 2013). A qualitative research method was chosen for multiple reasons. Firstly, qualitative research seeks to understand and interpret the data, in this case early fire experiences, as they exist in the context they were gathered in. Secondly, a qualitative study allows researchers to identify patterns within the data, but also allows idiosyncrasies and divergence within the data to be explored. Thirdly, qualitative research allows a researcher to be reflexive in their study and encourages ongoing analysis of the personal involvement one has in the process (Braun & Clarke, 2013). The survey explored the following areas: first fire-related memory, subsequent fire experiences, fire learning, and current fire-related thoughts/experiences. Questions were presented in four survey blocks asking participants to discuss their earliest memory of fire and any other significant fire experiences, fire-related experiences that were had growing up, fire learning, and thoughts and feelings about fire as an adult. Each section asked about the emotions, cognitions, and behaviours participants' associate with fire and their related experiences to some degree. Participants were asked to give general descriptions and were provided prompts to guide them e.g., "How do you remember feeling at the time of this memory? *For example, how did you feel about seeing the fire? Do you recall feeling any particularly strong emotions?*". (A full list of questions included in the survey can be found in Appendix D).

Procedure

Ethics approval was gained from the Psychology sub-committee of the Victoria University of Wellington Human Ethics Committee (reference: 0000027967). Participants were given an information sheet and consent form to read and were required to provide informed consent before beginning the survey. They were also provided a debrief sheet with contact details for the researchers and other support services should they have found themselves distressed during or following the survey (See Appendix E and Appendix F for the information sheet and consent form and the debrief sheet respectively).

An online crowdsourcing platform was used as it allowed participants to remain anonymous, this was important for this survey as there was a risk that participants may disclose information of a criminal nature when detailing their significant fire memories which would have posed an ethical dilemma for researchers who would be legally obliged to report this information, alongside participant details if available. Online platforms also provide samples that are more diverse than university samples while retaining data reliability (Buhrmester et al., 2016). Prolific Academic was selected over other crowd sourcing platforms as research by Peer et al. (2017) found that participants on Prolific Academic were more ‘naïve’ and less dishonest than participants found on a similar crowdsourcing platform, MTurk. Peer and colleagues also found that participants on Prolific Academic provided a comparable quality of data as those participants on MTurk, and higher quality of data than participants on another crowdsourcing platform, CrowdFlower. Participants on Prolific Academic were also found to be more diverse than those on MTurk, which in turn has been found to provide more diverse samples than other internet samples (Buhrmester et al., 2016). Prolific Academic also provided the opportunity to recruit participants from a population restricted to people in Aotearoa New Zealand, whereas the MTurk platform is United States-centric, and thus samples gathered through there would not be representative of the

population of Aotearoa New Zealand. All participants were recruited through Prolific Academic and self-selected themselves to take part in the survey.

The survey was developed using Qualtrics and comprised three main sections, demographics, the Fire Setting Scale (FSS; Gannon & Barrowcliffe, 2012), and a section of qualitative questions. Qualtrics is an online survey software that allows users to create online surveys and publish them for public participation. Participants who accessed the study on Prolific Academic were first presented with an information sheet outlining the survey. Participants were required to provide informed consent to the use of any information provided from that point onwards before they could proceed to the survey. Participants then completed the basic demographic questions, the FSS, and a series of open and closed-ended qualitative questions about their thoughts, feelings, and attitudes towards, and experiences with fire. The FSS was completed by participants before the qualitative section as we wanted to collect a baseline measure of fire interest and there was concern that posing the qualitative questions first would normalise fire use/misuse which may impact the results of the FSS.

Following the FSS, participants completed a series of open-ended questions pertaining to their fire experiences ranging from first fire memory to significant fire experiences, fire learning, and present-day fire-related emotions, cognitions, and behaviours. Questions were broad, and prompts were provided to elicit rich answers, e.g., “Please describe how you feel about fire now as an adult? *For example, how do you feel when you think about fire? how does being in the presence of fire make you feel?*” (See Appendix D for full details of the questions included in the survey). Participants received a written debrief after completing the survey and were paid approximately \$8 for their time via Prolific Academic (in line with the platform’s participant payment guidelines). Participant data was collected between 6th May and 12th May 2020.

Analysis

Participants' responses were analysed using reflexive thematic analysis (Braun & Clarke, 2006). Critical realism is a fundamental premise of thematic analysis, meaning that when the data is being analysed as part of this process it is acknowledged that each participants' experiences are a product of their personal reality and how they see the world. Critical realism acknowledges that everyone's view of reality is influenced by factors such as culture, history, and demographics, and that it is impossible for anyone to see beyond their personal reality. It is important to acknowledge that this is true for the researcher as well as participants, and that thematic analysis allows for these influences, while also acknowledging that a non-personal truth exists but that it is beyond the comprehension of any individual. As the researcher has the potential to influence the interpretation of results it is important for them, ergo myself, to reflect on their position in relation to the research and demonstrate awareness of their possible predisposition to find things within the data. An example of such a reflection, my reflection for this study, can be found in Appendix G.

Data was analysed following the six-stage process as outlined by Braun and Clarke (2006). The initial step, data familiarisation, involved reading participant responses in the SPSS file, then collating answers provided by each participant into an individual participant 'transcript'. Each transcript was then read through again, and minor notes were made on points of interest and common phrasing within and across transcripts.

The second step of the analysis involved generating codes. This process began with developing codes for each participant transcript independently from other transcripts. Coding was done by looking for units of meaning that related to either research question. Data was then recoded to account for any shift in thinking that had occurred during the initial coding phase and to align phrasing of similar codes across participants. Codes were then refined with the help of the research supervisor to capture commonalities among participants, while

remaining true to participant narrative. The research supervisor was included at this point to triangulate thinking about codes, and to improve objectivity in relation to the codes and themes generated. Codes were separated based on the section of the survey they related to; codes from the 'fire as an adult' section were kept separate from codes from the other sections pertaining to experiences in childhood/adolescence. Braun and Clarke (2013) warn against creating themes that are not reflective of the content of one's data but that are instead reflections of the answers to each survey questions. The researchers were aware of this, however the content from either section captured responses for a singular research question so the information was separated to reflect this. As the content from each section differed in context and relevance to each research question, combining them would have risked losing the meaning and the significance of quotes.

The third phase of analysis involved generating themes from the codes, this was done with the research supervisor. Again, the purpose of the supervisor's involvement was to provide objectivity and to triangulate thinking for theme generation. Themes were constructed using a bottom-up approach, meaning codes that were deemed to reflect similar points were grouped together to create subthemes. This study used semantic theme generation, meaning themes were identified from the surface level of participants' quotes, rather than from theorised underlying ideologies as would occur with latent theme generation. Subthemes were either grouped with other subthemes to create an overarching theme or, if there were no other similar subthemes, individual subthemes became themes. Eventually six main themes were generated. Four themes were generated from the codes reflecting participants' early learning and fire experiences, all of which had subthemes. Two themes were generated from the codes developed from the fire as an adult section, of which one had subthemes.

The fourth stage, checking codes against theme and subtheme labels and other codes contained within that subtheme to ensure consistency helped clarify the content of each theme which in turn made stage five, naming, and defining each theme straightforward. Essentially stages four and five occurred in tandem, as it was necessary to go back and forth between checking and naming to ensure that the essence of each assigned code matched the description of the theme it was placed into. Naming the themes was straightforward, and with careful consideration of semantics, each theme and subtheme was given a label that both researchers felt accurately represented the content of the codes contained within. At this stage a thematic map for each research question was created to display the codes, themes and the relationships between them visually (Appendix H and Appendix I). At this stage, refinements were made to the themes, sub themes and the thematic map. Once codes were found to be well-placed and no theme revision was required then stages four and five were considered complete.

The sixth and final phase of analysis involved describing themes and subthemes to accurately represent the content of the codes within them. This was done with the use of participant quotes to provide examples of the content captured within each theme and subtheme. Phase six also combined with phase four as each participant quote used in theme descriptions was rechecked against the relevant code, subtheme, and theme to ensure that it accurately represented what it was described as representing.

Results

Demographics

The mean age of participants was 20.9 years, the median age was 21 years. Over half of the participants identified as male (55%; $n = 22$), one participant (2.5%) identified as 'Other', and the remainder of participants identified as female (42.5%; $n = 17$). In terms of ethnicity, 23 participants (57.5%) identified as New Zealand European/ Pākehā, 12

participants (30%) identified as Asian, the remainder of participants identified as Māori (5%; $n = 2$), European (2.5%; $n = 1$), Latin American (2.5%; $n = 1$), or Other (2.5%; $n = 1$).

Compared to the population of Aotearoa New Zealand, people who identify as New Zealand European/ Pākehā, Māori, and Pasifika peoples were underrepresented, those who identify as Asian were overrepresented (Statistics New Zealand, 2018). Participant's level of education was reasonably varied, two participants (5%) had completed no recognised formal education, two participants (5%) had completed NCEA Level One, five participants (12.5%) NCEA Level 2, and 16 participants (40%) NCEA Level Three. Two participants (5%) had completed vocational training, 13 participants (32.5%) had completed an undergraduate university degree, and zero participants had completed education beyond undergraduate level. The employment status of participants was also relatively diverse; four participants (10%) were employed full time, seven (17.5%) were employed part-time, eight participants (20%) were unemployed and looking for work, three (7.5%) were unemployed and not looking for work, 15 participants (37.5%) were students, and three participants (7.5%) were self-employed. Full breakdown of the ethnic demographics of participants is provided in Table 1.

Table 1

Summary of participant demographics compared to New Zealand population

Ethnicity	% of population 2018	% of study sample 2020
New Zealand European/ Pākehā	70.2	57.5
Māori	16.5	5
Pasifika	8.1	0
Asian	15.1	30
Latin American	0.54	2.5
Other	2.16*	5**

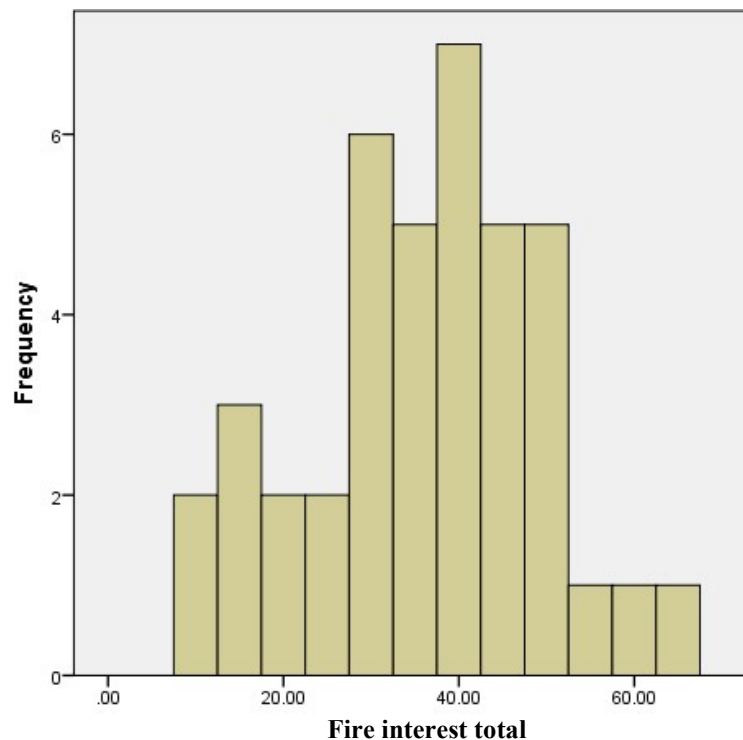
*This figure includes those who identified as ‘Other’, ‘African’, or Middle Eastern

**In this table ‘Other’ includes participants who identified as ‘European’, in our study they were recorded in the ‘Other’ category to align with census data.

The results from the Fire Setting Scale (FSS; Gannon & Barrowcliffe, 2012) determined that the sample of participants that had taken part in the research represented a wide range of fire interests. As demonstrated in Figure 1. on the next page there was a fairly well-spread distribution of fire interest scores among participants (range = 10-64, $\mu = 36.10$, $\sigma = 13.12$).

Figure 1

Fire Setting Scale fire interest subscale total scores histogram



This is supported by the statistics displayed in Table 2 demonstrating that, as opposed to the concerns voiced by Gannon and Barrowcliffe that a study of this nature may demonstrate a strong positive skew, our study actually displayed a slightly negative skew; indicative of a larger number of participants in the study sample who self-reported low levels of fire interest (i.e., the mean score is lower than the median).

Table 2

Descriptive statistics for fire interest subscale items

	Mean	Standard deviation	Median	Score range	Skewness	Standard error of skewness	Kurtosis	Standard error of kurtosis
Fire Interest items	36.10	13.12	37.5	10-64	-.234	.374	-.329	.733

Qualitative Results

From participant's responses to the online qualitative survey six main themes were identified. Four themes reflected participants descriptions of their early learning and experiences with fire, and two themes reflected their thoughts and feelings about fire as an adult. Below each theme and subtheme is explained with the use of supporting participant quotes. Where possible quotes have been taken directly from participants' responses. In some cases, quotes may have had minor alterations to increase clarity and coherence. Words in square brackets before a quote are provided to give context and tend to be words taken from the question the quote was answering. Words in square brackets within quotes are adjustments provided to improve clarity or grammar. Ellipses within quotes are used to indicate where words from a transcript have been omitted for reasons such as the two relevant parts of the quote were interrupted by irrelevant data, or because two parts of the same quote were included in answers to two separate questions in the survey and so were interspersed between other answers.

Table 3

Summary of themes and subthemes

Research Question	Themes	Subthemes
A) Learning about fire growing up in Aotearoa New Zealand	1. Notable reaction to fire memory	1.1. Positive cognitions and affect
		1.3. Negative cognitions and affect
		1.2. Memorable context
		1.4. Fire as an undiscernible event
	2. Development of norms about fire and fire use	2.1. Fire can be used safely
		2.2. Unpredictability of fire makes it dangerous
	3. Learning how and when fire can be used through direct experiences	3.1. Context in which fire use is approved by authority figure
		3.2. Testing the boundaries of socially sanctioned fire use
B) How adults in Aotearoa New Zealand think and feel about fire now	4. Igniters and Extinguishers – learning about fire mechanisms and safety	4.1. Fire burns
		4.2. Fire safety practices
	5. Knowledge is power	
	6. Emotional congruence with fire	6.1. Rewarding
		6.2. Context dependant
		6.3. Volatile/harmful/risky

A) Learning about fire growing up in Aotearoa New Zealand

The first research question sought to examine participants' early learning and experiences with fire. Four themes were developed from the content provided by participants regarding their fire learning and their experiences with fire growing up. Participants detailed a wide range of experiences with fire, and there were notable differences in the types of experiences different participants considered significant. The ways in which participants learnt about fire, and what they learned also varied greatly. This complexity is captured in the four themes identified, as described below.

1. Notable reaction to fire memory. This theme describes memories identified by participants as being particularly vivid or emotive and consists of three subthemes distinguished by the emotional valence of the experience. Some participants remember the experiences specifically because of the strong emotional reaction had at the time, others remember the experiences because of the emotional associations of the memory, and others identify the experience as being memorable due to other contextual or environmental factors. The first subtheme '*Positive cognitions and affect*' contains descriptions provided by participants that were favourable of fire and the experiences they had. The second subtheme '*Memorable context*' includes participants who had strong recollections of their first or other significant fire memories that they recalled due to the context in which the fire was experienced in. The third subtheme '*Negative cognitions and affect*' included those participants whose descriptions of fire and their fire experiences were unfavourable. The final subtheme '*Fire as an undiscernible event*' differs from the other subthemes as it centres on participants' notable inability to recollect a memorable fire experience.

1.1. Positive cognitions and affect. Participants included in this subtheme described fire and their fire-related experiences in a positive way. Some participants described feeling

intrigue or curiosity about fire, and their enjoyment received from watching fire because of these feelings.

“I was fascinated. The fire provided light, warmth. I couldn’t stop hovering my hands over the flame.” – Participant Twenty-Nine

As demonstrated above, many participants also described their enjoyment of the sensory elements of fire, most commonly related to the heat given off by fire, or the visual entertainment of watching a flame.

“When I was 18, my friends and I would light plastic on a plate on fire for fun, I would love just watching it dance.” – Participant Seventeen

“It feels good having the heat slowly build up and feeling it get hotter. Its exciting to see the fire grow bigger and bigger” – Participant Eight

Most participants in this subtheme described fire positively due to reasons discussed above such as visual stimulation, curiosity, and the heat it provides. Almost all descriptions of fire in this subtheme acknowledged it as non-threatening, at least in the particular experience they were recalling in this instance, and that this played into the fire experience being enjoyable. However, a couple of participants acknowledged that their positive perception of fire was furthered by the element of danger they associated with it.

[the memory was] “Positive, because it was interesting to watch and had an element of danger.” – Participant Twenty-Five

Many participants also acknowledged that they had a dual conception of fire, often describing it as dangerous but also positive in some way.

[The memory was] “Positive because the bonfire felt soo good [I remember it] Pretty vividly because It’s a very pleasant memory. I felt amazing kind of like i was

floating in the warmth. I was at peace happy... [Growing up I learnt that fire is] dangerous but awesome.” – Participant Twenty-One

The emotions and cognitions about fire varied across participants in this subtheme, but in essence were all similar in the sense that fire was viewed as positive in some regard. The participants in this subtheme exhibited a tendency to learn that fire is exciting and/or interesting. Many of the descriptions of fire and related events seem to demonstrate the presence of an interest in fire, and often a strong interest.

1.2. Negative Cognitions and Affect. Whilst some participants described contextual and sensory factors as prominent features of their early experiences with fire, others associated these with negative cognitions and affective reactions. For a number of participants, negative cognitive or affective reactions to fire were related to a lack of understanding of fire, especially in the context of participants’ first fire memories.

“Seeing someone light their cigarette with a lighter around 5 years old [was a] Negative [memory] because it seemed scary and strange.” – Participant Nine

Often the negative cognitions and emotions were strongly tied to a fear of fire and the destruction it could or did cause. Fire was often described using words such as “scary”, “frightening”, and “dangerous”. Multiple participants acknowledged that an increased awareness about fire and the destruction it can cause resulted in them becoming more afraid of fire. Some participants also identified that early negative experiences may have triggered their ongoing caution or worry about fire.

[My first fire memory was] “Negative, house fires have been a worry in the back of my mind ever since.” – Participant Sixteen

One participant reported that they viewed fire as something that people need to be protected from, a feeling inspired by an experience they had watching firefighters fight a fire

on their property. The feeling described by this participant is grounded in the perception that fire is dangerous.

“Seeing the balls of fire rolling across the paddock made me feel terror.” –

Participant Thirty-Five

However, instead of making Participant Thirty-Five feel vulnerable or helpless, as has been described by other participants with similar experiences in other subthemes, this experience gave them aspirations to become involved with firefighting themselves.

“experiencing and witnessing [a wildfire on the neighbour’s property] firsthand and seeing the firefighters made me want to become involved with firefighting in the future.” – Participant Thirty-Five

1.3. Memorable context. This subtheme described strong memories of their experience but did not necessarily associate this experience with any particular emotional reaction, positive or negative. Participants in this category commonly identified the context of the situation as being a key reason the memory could be recalled. For some participants, an unfamiliar setting or situation in which fire was used meant that the memory stood out to them:

[I remember this experience] “Quite well. I’ve watched my dad cook at home before but I have never seen him cooking over a large flame.” – Participant Thirty-Four

In contrast, others identified the familiarity of the context as being the primary reason for why they recalled the memory.

[I remember this experience] “Fairly well, because it was in a place I was familiar with.” – Participant Thirty-Six

In addition to the context within which the fire experience occurred, participants also described strong sensory associations, typically to do with visual stimulation or heat from the fire, as representing salient features of their early experiences with fire.

“Watching the bonfire on Guy Fawkes, I remember how hot it was” – Participant Four

Participants still identified these memories as significant to them despite having no identified emotional connection to their memories of fire experiences. This is distinct from other participants in this main theme, whose memories of their fire experiences are strongly intertwined with the emotional connection associated with them. This theme suggests that it is not only emotional connection that is important to learning about fire, but also that significant situational and temporal contexts play a role. Additionally, the presence of personally significant individuals also seems influential in the salience of a memory, and its contribution to fire learning.

1.4. Fire as an undiscernible event. Although many participants recalled clear identifiable experiences with fire, there were some who reported no strong reaction at the time of a significant fire experience or who had an absence of memories of any significant fire experiences, either because they did not have any such experiences, or, if they did, because these experiences were not memorable. This subtheme centres on the perception that fire is unremarkable for some; something that does not warrant any notable reaction, and therefore incidents involving fire are not particularly memorable. Participants described memories of their first fire experience as “vague” and struggled to recall any specific details of the event including their emotional experience, their reaction to the fire, or the reactions of others present at the time.

“I don’t remember many specific fires but they have been around me while growing up.” – Participant Six

Some participants gave age as a reason for their vague or absent memories. This was particularly relevant for participants’ first fire memories, which many said they had a vague recollection of, but often could not recall the event in detail.

[I remember this] “Vaguely because I was so young.” – Participant Six

[I remember this] “Not very well I wasn’t particularly old” – Participant Four

The experiences captured within this subtheme differ from experiences captured in the other subthemes of this theme that were described by participants as not only memorable but vivid. Other participants associate each of their memories with strong emotional reactions or with a memorable context, whereas participants in this subtheme seem to have no such association.

2. Development of norms about fire and fire use. This theme describes the development of participants’ perceptions of fire through the way in which they have seen fire used throughout their childhood. Rather than focusing on learning about the forms and functions of fire, this theme outlines the ongoing, lasting perceptions of fire that participants developed as a result of their early experiences. The perceptions relate less to the way fire is used, and more to how it is conceptualised by the participant. Analyses identified two subthemes which reflect almost opposing views of fire these were named *‘Fire can be used safely’*, and *‘Unpredictability of fire makes it dangerous’*. Participants’ personal experiences and their interpretation of events play heavily into their perceptions of fire.

2.1. Fire can be used safely. This subtheme describes the perception that fire can be used safely and be controlled by people within certain contexts. Participants who described fire in this way tend to have had positive or neutral experiences with fire that have not

resulted in a fear of fire. Participants' descriptions in this subtheme include references to fire being a tool, fire being useful and having practical uses, as well as discussion of safe ways to use fire. The prevalent understanding of fire in this subtheme is that it serves a purpose for human beings, practical or otherwise, and can be safely manipulated by people to serve that purpose. The presence of another person who was more experienced with or knowledgeable about fire was noted by many participants as being comforting. It seemed that participants saw the presence of such individuals as protective and implied the belief that this person would be able to prevent them from harm if the fire were to get out of control.

“My next strongest memory was my friend’s 15th (?) birthday party, where out in his backyard us and a bunch of other friends sat around an outdoor fireplace to roast marshmallows. It was almost entirely contained in metal, so I didn’t feel any danger or anything, and it was a generally nice experience being surrounded by friends like that. His dad was responsible for the fire and he stayed nearby the entire time, so I never had to worry about safety much.” – Participant Thirty

Participants in this subtheme tended to discuss fire use on a small to medium scale, describing fireplaces, fire on the stove, small bonfires, and candles. Participants often described this smaller scale use of fire as being safe or responsible fire use with the implication that smaller fires were less dangerous or threatening than large fires.

2.2. Unpredictability of fire makes it dangerous. Whilst some participants reported learning that fire could be controlled or used safely, other participants described learning that fire was unpredictable and dangerous. This subtheme encapsulates attitudes that participants developed towards fire that revolve around fear and perceived threat. Fire was described by participants as inherently dangerous. The unpredictable nature of fire, and the inability to

control and prevent its spread, provided a source of great discomfort, and in some cases distress, for some.

“My earliest memory of fire was when I was 6 years old and we drove past a house that had caught on fire. It was scary for me as a six year old to see. Thankfully there was no people in it at the time... watching something burn is scary, its unpredictable.” – Participant Eleven

As opposed to subtheme one, the experiences described in this subtheme typically centred on large-scale fires that were described using words such as “threatening”, “terrifying”, or “unpredictable”. Participants in this subtheme also perceived fire as unpredictable and uncontrollable. Participants in this subtheme learned to fear fire, especially on a large scale, as a result of events experienced or witnessed during childhood. Emphasis was placed on the potential damage and destruction that may be caused by uncontrolled fires.

“I remember being fearful about the damages done to the Australian wildlife and people” – Participant Thirty

This subtheme captures participants’ learning about fire as an element that is beyond the control of people. These participants have learned that because of this uncontrollability, and related unpredictability, fire is something that is inherently dangerous and should be avoided if possible.

3. Learning how and when fire can be used through direct experiences. This theme describes the method in which participants learnt about how and when to use fire, and the level of acceptability of this within the participants’ social context. The experiences, although direct, did not necessarily involve participants lighting fires themselves; in some cases, they were simply present when a trusted person, often a parent or other relative, was using fire. Analyses identified two subthemes which were labelled ‘*Context in which fire use is*

approved by authority figure’ and *‘Testing the boundaries of socially sanctioned fire use’*.

Both subthemes describe participants’ learning about socially acceptable ways to use fire through direct fire use, either by watching someone else in close proximity to them use fire, or by using fire themselves. However, they differ by the way in which the rules and examples set by a trusted person dictated the means of fire use.

3.1. Context in which fire use is approved by authority figure. This subtheme includes participant descriptions of learning about fire use by seeing others use fire, or by using fire themselves. All fire use described occurred in an environment that suggested the fire use was viewed as socially acceptable. The learning described in this subtheme was not explicit lessons that the participant was taught, but rather learning through observation and personal experience. Learning tended to occur in a context where the participant was supervised, or in which they had knowledge that a person in authority, often a parent, would approve of the fire use due to a perceived lack of danger or a perceived necessity of use.

“I was not allowed to play with fire unless under supervision. I was allowed to light candles.” – Participant Six

Examples of fire uses included hāngi, cooking on a stove, and heating the home, which tended to be described by participants in ways that suggested that they viewed these uses of fire as normative in the context in which they were described.

“Just your average closed fireplace.” – Participant Thirteen)

This subtheme also included descriptions of traditional cultural uses of fire:

[My first fire memory was] “[I w]atched my Grandma light a match for burn incense... she used it to pray to our ancestors. She's done it for every Chinese Lunar Holiday” – Participant Ten

Familial, especially parental, guidance and approval played a large role in the experiences included in this subtheme. Participants acknowledged that their experiences with fire and their own fire use were dictated by what was approved of by the authority figures in their life whether this approval was articulated verbally, or whether it was expressed through actions and reactions to their own and others fire use. For instance;

“I didn’t feel scared at all and everything seemed to be under control...my mum was really calm throughout the whole thing and wasn’t phased at all...” – Participant Fifteen

“My dad was there with me. He made the fire so he was okay with it. He encouraged me to throw paper into the fire with him from a distance.” – Participant Nineteen

3.2. Testing the boundaries of socially sanctioned fire use. Some participants discussed using fire in a way that had the potential to cause harm to themselves or another person, or that may cause damage to property. In some cases, the participant was aware of the potential damage or harm they may cause and continued to engage in the behaviour anyway. In other cases, the participant appeared to be acting in ignorance of the danger they may be putting themselves, other people, or property, in, suggestive of a knowing disregard of social acceptability or parental boundaries set around fire use.

“I couldn’t stop hovering my hands over the flame... I was insistent on touching it so my mum put it out of my reach” – Participant Twenty-Nine

Some participants engaged in behaviour with little thought to the consequences for getting caught or the dangers of fire and realised retrospectively that their behaviour was disapproved of.

“My mum got angry. Think she was concerned about the emanation from the burning plastic.” – Participant Forty-One

Whereas other participants deliberately hid their behaviour as they knew it would be disapproved of and to avoid the measures that may have been taken by authority figures to prevent them engaging in such behaviour

“[Burning stuff] was a part of my play and I used to thoroughly enjoy it as I was doing it sneakily, so it used to double up my fun of doing the act... I wasn’t [allowed to play with fire] but I used to sneak out when my mother used to take a nap in the afternoon.” – Participant Fourteen

One participant also described using fire to destroy things that had negative connotations as it provided them with some closure on a period of their life or particular traumatic incident.

“At 18 when I finished high school I burnt all of my school papers. It felt really good to burn all of them and kind of symbolised that part of my life was over. The other [significant fire experience] was at 19 and I had a traumatising experience at a university party, so the next day I burnt the flyer.” – Participant Twenty-Five

Fire experiences described in this theme typically involved using fire for either destructive purposes, or for no practical purpose other than entertainment. Interestingly, some participants in this subtheme described watching their parents use fire for certain occasions, or for practical purposes, and then using fire in a similar way, but taking it out of the acceptable context. For instance, one participant described their parents using fire for special occasions and then the participant burning things in circumstances his parents disapproved of.

“My parents used to burn firecrackers on Diwali... Gradually my parents taught me how to burst crackers and that took me closer to fire... whenever I used to go out to burst crackers, my mother used to get worried about my safety as I was still just 9-10

years ols[sic]... I used to sneak out when my mother used to take a nap in the afternoon [to experiment with fire]” – Participant Fourteen

In another instance a participant watched their mother light candles around the home and was encouraged by his mother to engage in a campfire. However, when he burned his toys, he got in trouble for doing so.

“I had a lego lord of the rings castle and I burnt the "wooden" edges to make it look more life-like. My mum got angry.” – Participant Forty-One

The context in which the fire use occurred, and the purpose for which the fire use was intended, appeared to alter the acceptability of the fire use. No reasons were given by participants to explain the change in conceptualisation of the fire use, but as they discussed hiding their fire use, or getting in trouble for it, it was implied that in the context they were using fire it was deemed unacceptable by their parents or wider society. Although none of the participants openly discussed the learning mechanisms of these interactions, it was clear that for most participants in this subtheme these were significant points that helped them determine the socially sanctioned uses of fire. Participants demonstrated learning the boundaries of acceptable fire use through their experiences, and parental response seemed integral in teaching these participants what was permissible and what was not.

4. Igniters and extinguishers – learning about fire safety. This theme describes participants’ overt learning experiences of fire, focusing on the practical/scientific aspect of fire and how it works, and fire safety education received growing up. The two subthemes; *fire burns* and *fire safety practices*, broadly relate to the content and context of the participants’ fire learning, respectively.

4.1. Fire burns. This subtheme describes participants’ learning around how fire works, and how one can conduct themselves around fire safely. This differs from theme

three, *'Learning how and when fire can be used through direct experiences'* as participants in this subtheme focus on knowledge as the centre of the memory or experience, whereas participants in theme three did not overtly acknowledge the knowledge they were subconsciously describing. Participants varied in their understanding of fire, some felt they possessed considerable knowledge about fire,

"[I] Have always known the consequences of not being responsible with fire... How to use it responsibly and what can happen if it isn't used responsibly." – Participant Thirty-Five

[I remember learning] "How to light fires properly, that it burns you, that you can cook with it and how to safely use and experiment with it" – Participant Thirty-Three

Whereas others openly admitted that they knew very little about fire and felt that they did not have a clear understanding of the mechanisms by which fire operates.

"Not knowing the fire burns, I tried to poke the fire to see what happens... [I remember feeling] a lot of curiosity beforehand about how fire worked and why it needed to be in a fireplace and not just in the open." – Participant Five

The participants in this subtheme do not necessarily have comparative levels of knowledge about the fire and fire safety, but they are instead linked by their conceptualisation of fire as something that can be understood and learned about, and that this knowledge can serve you. As demonstrated by the quotes above, participants demonstrated learning about being cautious around fire, and how to use fire in a safe way. Other participants described learning about fire with less of an emphasis on safety. Such experiences with or descriptions of fire instead focus on the mechanisms by which fire operates.

"I was so curious about how it works and why it has colours and also why it was a bit transparent" – Participant Two

“i would see what burned well and fast, while seeing what made the brightest flame being my favorite [sic] thing to learn” – Participant Five

This differs to conceptualisations of fire articulated by participants in the other subthemes within the overarching theme, that describe fire using words such as “alive” and “powerful”, implying that fire is more complex than a sum of its components.

4.2. Fire safety practices. This subtheme explores the different ways participants learned about fire growing up. Participants described a wide range of learning experiences, some participants detailed numerous learning experiences, while others recalled only one. These participants typically recalled learning about fire evacuation procedures, and what to do in case of a fire-related emergency, as well as the dangers associated with using fire. However, some participants stated that they did not recall learning much, or in some cases anything, about fire during their childhood or adolescence. Often these participants noted their lack of learning in ways that suggested that they recognised that this might not be standard. Among those who did recall learning about fire, each experience tended to fall into one of three categories: structured learning about fire, unstructured learning about fire, and learning about fire through others. Structured fire learning involved education received in a formal capacity such as school.

“we had firefighters come to our primary school and teach us about fire. We learnt how to get out of a burning house and how dangerous fire is. We also learnt about how firefighters did their jobs.” – Participant Eight

Unstructured fire learning typically occurred in the home, and involved being taught informally about how fire worked, and safe ways to use fire and behave around fire, often by one’s parents.

“[my] parents taught me everything about fire and how to use it responsibly and safely.” – Participant Thirty-Five

Participants also reported learning about fire through the media. Many participants referred to seeing the Fire and Emergency New Zealand ‘Get Firewise’ advertisements on the television throughout their childhood. One participant also discussed watching an informative television show called Fireman Sam and described how the dangers of fire would be explained to the audience as part of each episode.

“I watched a kid's TV program called "Fireman Sam", in which the main character performs rescues and extinguishes fires... Often, the main character would explain the dangers of fire after having extinguished them.” – Participant Twelve

Learning about fire through others typically involved participants describing watching another person interact with fire, and then expressing that from this interaction they remember adopting their attitude towards fire or learning something about how fire works.

[I learnt about fire] “By watching others interact with it” – Participant Twenty-Five

In contrast, a few participants stated that they had received a notable lack of fire education growing up.

“No formal education on it until High School, and that was the science side of it.” – Participant Thirteen

“My parents never discussed it with me” – Participant Nineteen

The way participants discussed fire learning as a whole suggested that they viewed learning about fire as a normative part of one’s education, formal or informal, but that this education was not necessarily afforded to everyone.

B) How adults in Aotearoa New Zealand think and feel about fire now?

This research question aimed to identify how adults in the general population currently feel and think about fire as an adult. Two main themes were identified through analyses which were named: *knowledge is power* and *emotional congruence with fire*. These two themes and their subthemes are described along with corresponding quotes below.

5. Knowledge is power. This theme includes participant descriptions of attitudes toward fire that reflect the idea that knowledge about fire reduces the power of fire, and in doing so decreases the individuals' interest in fire. As adults, some participants identified having no strong affective reactions to fire or their previous fire experiences. The way participants discussed fire in this subtheme suggests that the knowledge they hold demystifies fire, and that an understanding, or perceived understanding, of the "way fire works" provides participants with a sense of confidence when in the presence of fire. An increased understanding of fire reduced the level of intrigue or curiosity participants' may feel about fire, leaving them disinterested when confronted with fire.

"I am not so interested in fire right now, because now I know how it works and what happens, the dangers of it." – Participant Two

Fire was described neither negatively nor positively but rather just as something that exists; some participants described as fire evoking no notable emotional reaction.

"I have no strong feelings about fire. I'm not scared of it and I know how to act around fires. I'm not really excited about it either – it just feels like something I need to be aware of." – Participant Fifteen

As demonstrated by the participants quoted above, knowledge about fire does not necessarily mean that it is regarded as insignificant. Indifference to fire in this subtheme centres on a lack of emotional reaction to, or affiliation with, fire. Participants still

acknowledged fire as something that could be dangerous, but that being around fire does not evoke a strong sense of fear in them.

The belief that fire exists primarily to serve a practical function for human beings was also expressed in this subtheme. Fire was described as a tool that serves a purpose, often rooted in traditional fire use informed by evolutionary fire usage. One common idea expressed by participants was the notion that fire is a component of daily life, necessary for functions such as heat and cooking, despite that in the context of the survey - contemporary Aotearoa/New Zealand - this is rarely, if ever, the case.

“[fire] plays a key part in many lives and is a useful tool.” – Participant Thirty-One

This notion of necessity often coincided with an overt acknowledgment of the role that fire played in human evolution.

“I think it's very useful, a very important part of our lives. [I]t's amazing how much humans evolved after discovering fire” – Participant Twenty-Nine

The quotes in this subtheme seem to be a product of an outdated view of fire as a necessary tool, one that people would considerably struggle to go without in their daily life, for necessities such as heating and cooking, as well as fending off wild animals. However, one reason given for the use of fire for practical means such as heating were the economic benefits of doing so, fire was quoted as being cheaper other means of heating one's house such as gas or a home ventilation system. Many participants also discussed fire as part of usual cooking routines as they had a gas stove.

Descriptions in this subtheme tended to look on fire favourably as it functioned to improve their quality of life and wellbeing. Participants' assessment of fire was characterised by positive cognitive connotations, rather than emotional ones, related to practical fire use. This subtheme also incorporated participants who stated that they only thought about fire

when they “need to” or when they were prompted by using or seeing fire. The descriptions given by participants imply that fire is not something that they think about for enjoyment or gratification purpose, but rather as and when they believe it is practical and necessary.

6. Emotional congruence with fire. This theme describes participants’ emotional identification with fire as an adult. Analyses identified three subthemes: *‘Rewarding’*, *‘Context dependant’*, and *“Volatile/harmful/risky”*. These three subthemes seem to exist as a continuum in regard to one another, with participants’ experiences sitting somewhere along the continuum from highly enjoyable or exciting at one end, to terrifying at the other extreme. The middle of the continuum seems to represent the notion that fire is multifaceted, and can exist differently in different contexts.

6.1. Rewarding. Seeing and/or using fire was described as intrinsically rewarding by some participants. The emotional reward identified differed between participants. Some identified fire as enjoyable as part of the atmospheric context, often as a background factor, others articulated feeling excitement at the sight of fire, and a small number of participants communicated a feeling of strong personal identification with fire. Participants also derived enjoyment of fire from multiple aspects; some found fire to be most enjoyable in a mellow setting and were more focused on the aesthetic or atmospheric element of the presence of fire. The pleasure received from fire and its presence seemed to occur in a more passive or calming sense for these participants, and fire was described using positive language that did not convey a sense of excitement.

“[Fire is] warm and cosy.” – Participant Twenty-Five

For other participants fire seemed to invoke more stimulating levels of rewards. Often such participants used more emotive language when describing fire, and utilised language more to convey high levels of energy.

[Fire is] “exciting and fascinating.” – Participant Twenty-Six

“the idea of fire excites me.” – Participant Sixteen

Some participants categorised in this subtheme also described fire in a way that suggested they felt a strong personal affiliation with fire and appreciated fire irrespective of the purpose of use.

“I think [fire]’s an amazing thing that can be used for cooking heating and pure enjoyment.” – Participant Twenty-One

“[Fire] makes me feel alive.” – Participant Twenty-Two

These participants tended to be more descriptive when talking about fire, and often their descriptions pertained to a power and sense of life within fire that was absent in descriptions given by participants in other subthemes.

“I find fire fascinating, how much power it holds is incredible” – Participant Twenty-Nine

All quotes in this subtheme spoke of fire positively and communicated attitudes towards fire held by these participants as being associated with positive experiences and events. Participants recognised the power of fire and saw this as a characteristic that made fire worthy of respect and praise, rather than fear.

6.2. Context dependant. This subtheme captures an idea expressed by participants that fire exists as a multi-faceted concept; that fire can fill many roles and can be interpreted several different ways in varying circumstances. How fire is perceived at any given time depended on the context participants encounter it in.

“Fire is definitely all things it can be exciting because you never know what may happen, it’s useful for cooking, toasting marshmallows and keeping warm when indoors or outside and it’s quite peaceful to watch it.” – Participant Seven

If fire is perceived to be under control or is part of a situation that is pleasant in another sense then participants tended to describe perceiving fire positively. If fire is observed to be out of control or threatening, then participants tended to describe perceiving it more negatively.

“It’s dangerous and useful, you’ve got to respect it. Only be scared of it if it’s out of control.” – Participant Thirty-Three

Participants in this subtheme acknowledged that fire is multi-dimensional, and how it should be perceived and treated depends on a number of variables including the environment the fire is in, who else is present at the time of the fire, and what previous experience one has with fire.

“I think of it as something that can be useful, but can be dangerous if you don’t take precautions to learn or act around fires.” – Participant Thirty-Seven

In this subtheme there was an emphasis on the duality of fire, and its ability to exist as interesting, pleasant, or otherwise positive, while simultaneously being recognised as dangerous and potentially life-threatening. Some participants recognised fire as existing in mainly a positive way, but that there was always a threat if it was left unsupervised or used incorrectly.

6.3. Volatile/harmful/risky. This subtheme described seeing or using fire as a fear inducing experience, where fire is perceived as unpredictable, dangerous, and threatening.

Participants' expressed discomfort around fire, and the fear it evokes in them, was commonly linked to the anticipated negative consequences of fire use or misuse. Participants described their fear of the ability of fire to injure people and destroy property.

"I get very nervous, fire is so unpredictable and that scares me so much... I think fire is extremely dangerous and scary." – Participant Eleven

"I feel scared that I will get burned." – Participant Twenty

"Fire can be much more scary now as I know how it can destroy whole houses and can kill." – Participant One

The size and unpredictable nature of the fire was often a point of concern for participants, many of them articulating that large, out of control fires were what they found particularly frightening. Multiple participants described exposure to wildfires through news coverage and other media, or thoughts about wildfires as terror-inducing.

[I feel] "terror at the thought of wild fires" – Participant Thirty-Five

"I get very nervous, fire is so unpredictable and that scares me so much. Seeing those California fires that happen every year freak me out so much." – Participant Eleven

A common thread among participants in this subtheme was a feeling of discomfort in the presence of fire, and a described caution or wariness about fire. Many participants voiced their concerns over the misuse of fire, particularly by others who are less cautious around fire, and the possible consequences of leaving fire unattended.

"[I am] Cautious of the dangers [of fire], not leaving cooking or candles unattended" – Participant Twenty-Eight

Discussion

This study explored early experiences and learning about fire during childhood and adolescence, and the way adults perceive fire in Aotearoa New Zealand. An anonymous online survey was completed by forty participants recruited via the online crowdsourcing platform Prolific Academic. Participants completed a qualitative survey, providing descriptions of their personal fire learning and experiences growing up, and their perspective of fire now as an adult. Thematic analysis identified six themes in participants' experiences, with thirteen subthemes. Four themes including ten subthemes were identified for research question one, two themes including three subthemes were identified for research question two. The following section of this thesis will summarise and discuss each of these themes and subthemes in the context of the existing literature. Limitations, strengths, directions for future research, and implications for policy and practice will also be presented.

Summary of findings

How do people in Aotearoa New Zealand learn about and experience fire growing up?

Notable reaction to fire memory. This theme involved experiences described by participants as being especially memorable due to their strong affective responses to the fire and the context that it occurred in. This theme also includes experiences described by participants as being unmemorable or unremarkable. Experiences in this theme were expressed through four subthemes; positive cognitions and affect, negative cognitions and affect, memorable context, and fire as an undiscernible event.

The first subtheme identified descriptions of *positive cognitions and affect* from participants in relation to their fire experiences. This included participant memories that were salient due to the positive reactions evoked by fire. These findings are akin to those of Tyler and colleagues (2014) who found that individuals who had engaged in fire misuse in adulthood had experienced strong affective responses to fire within childhood, and that these

responses informed how they felt and thought about fire later in life (e.g., strong fire interest in childhood coupled with poor problem-solving abilities may mean they view fire misuse as a maladaptive coping mechanism). The experiences described in this subtheme suggest that it is not only individuals who misuse fire that have strong affective responses to fire, but that such responses are important for fire learning more generally. Participants who identified positive associations with fire in their childhood memories described the experiences as enjoyable, exciting, and interesting. There were no suggestions from participants in this subtheme that their direct experiences with fire dulled their reaction to fire in any way, and some participants made it clear that instead fire continued to be thrilling for them through continual usage. It should also be noted that all the fires involved in experiences included in this subtheme were smaller, controlled fires. Therefore, these experiences held no negative consequences for the participants and thus provided no opportunity to learn about the dangers of fire, something that may persuade negative appraisal of fire. Experiences described in this subtheme suggest that some young people have experiences with fire in which the fire is controlled and is perceived positively. These perceptions may be due either to positive sensory experiences or to a general positive attribution to fire due to the role it plays in pleasant and exciting childhood memories, suggesting the presence of positive reinforcement principles, in particular sensory reinforcement, in accordance with social learning theory (Bandura, 1976). Either way, these young people learn through experience that fire is an enjoyable and exciting element that can be used for fun and entertainment.

Negative cognitions and affect were described in the second subtheme. Participants either attributed these cognitions and affect towards fire at the time of the experience, or did so retrospectively, upon reflection on the experience, with fire often being seen as dangerous as a result of a direct negative experience. For example, participants described ongoing feelings of worry and increased vigilance about fire. These reactions are consistent with

findings that suggest individuals who are victims to or witnesses of acts such as arson, or large destructive wild fires, may suffer “significant and sustained distress.” (Keane et al., 1994, p. 1055). Interestingly, one participant described their negative experience as supporting their desire to become a career firefighter as an adult. The expression of such a desire fits with the idea of a ‘hero’s journey’ approach to traumatic experiences, outlined by Smith (2020). Both the desire to become a firefighter and the direct expression of fear of fire relate to a conceptualisation of fire as something that is threatening and dangerous. Although these two reactions differ markedly, they are bound to the same root cause; a negative experience with fire through which the individual learned that fire was something that could cause damage, destruction, injury and death and required caution around.

In this subtheme participants identified their experiences as salient as they occurred in a *memorable context*. Context was noted as the most significant aspect of the experience for participants. The familiarity of the setting in which the fire was encountered was mentioned by several participants, although in opposing ways. Some participants described a familiar setting as being the reason the fire was memorable; as the same scene had been encountered numerous times it was easy to recall. Others stated that the unfamiliarity of the context made it noteworthy. One participant described remembering seeing his father cook over a large flame as he has not seen him do so before. Robin, Wynn, and Moscovitch (2016) found that events that occurred in familiar settings and with familiar people were more easily remembered than other events, but that spatial context, such as the room that the fire occurred in, played an important role in the recollection of all events. Those events that occurred in a notable context were recalled more readily than those that occurred with no contextual significance. It is to be noted that young people in Aotearoa New Zealand are encountering fire in a wide range of circumstances with varying familiarity, and that each setting may play a unique role in their fire learning and experiences.

The final subtheme involves the fire experiences of participants that described *fire as an undiscernible event*. Participants' discussions of these experiences were vague and generally non-descriptive. In participant descriptions there was an absence of emotive language and the experience was conveyed as unremarkable overall. One reason participants gave for having such vague memories of fire is that they were very young at the time of experience. This suggests that young people in Aotearoa New Zealand are exposed to fire from an early age. It would seem that some experiences are more memorable than others, or that some individuals are more cognisant of fire and their related experiences. As opposed to other participants included in this theme, participants in this subtheme held no strong recollections of fire as an important factor in their lives growing up. Their memories of fire were generally unremarkable as they were not linked to a strong emotional or behavioural reaction, either of their own or from another person. Again, these findings, especially in regard to a lack of notable response from another person, may link to modelling theory (Bandura et al., 1961) as it seems possible that individuals who viewed no strong reaction from other internalised this to mean that fire was an undiscernible event.

Development of norms about fire and fire use. This theme described participants' normative attitudes towards fire, which formed as a result of the way they had seen fire used throughout their childhood. Participants' perceptions of fire were heavily influenced by their interpretation of their personal experiences and what they took away from them. Interestingly, the two subthemes that were developed reflect two contrasting normative beliefs about fire that were identified from participant's descriptions. Perceptions described in the first subtheme involve the idea that *fire can be used safely*, usually stemming from the belief that people are able to control fire, at least in certain circumstances. The second subtheme was identified from descriptions given by participants highlighting the impression

that the *unpredictability of fire makes it dangerous*. This perception seemed to be rooted in the idea that people do not have control over fire and as a result it is threatening.

This first subtheme revolves around the perception held by participants that *fire can be used safely*. Participants' descriptions of fire in this subtheme often involved practical fire use such as cooking and controlled indoor fires to heat the home. They also involved experiences in which a trusted adult was responsible for the fire, an arrangement that participants identified as making them feel safe. Perception theory states that human beings may develop impressions on the basis on the reactions of others (Bruner & Postman, 1948). Indeed, in this subtheme we found that participants often described basing perceptions of their safety and threat of fire on the reactions of a significant individual, usually a trusted adult. This generalisation was done to varying degrees, some participants seemed to determine from their experiences that fire was controllable without distinguishing between contexts, whereas others just described it as safe when in the presence of an adult or other trusted person. Descriptions of fire within this subtheme did not necessarily identify fire as totally innocuous, but rather that it was only dangerous if used irresponsibly. The experiences recalled in this subtheme suggest that people who have experiences with fire being used in a controlled way come to see fire as something that humans can manipulate and control. It seems that they believe that as long as someone who seems confident and familiar with fire is responsible for keeping it controlled, that the fire poses little risk, and that these beliefs have been solidified by continued experiences with fire that is non-threatening. These descriptions and their implications suggest that some of these participants may hold the script '*fire is controllable*' (Butler & Gannon, 2015; Gannon et al., 2012). It is possible that some participants hold this script with the belief that it does not necessarily apply to themselves, but that it is nevertheless controllable if one possesses the knowledge or skillset to do so. As

described by Butler, Gannon, and colleagues (2012, 2015) holding this script may display propensity to misuse fire, but the script of itself is not necessarily harmful.

In contrast to the above, the second subtheme described the view of participants who considered fire to be unable to be used safely and that its *unpredictability makes fire dangerous*. Some participants expressed that being in the presence of fire caused them distress, and described learning experiences with uncontrolled fire that had unknown, or negative consequences. These experiences with, or witnessing of, uncontrolled fire led to an ongoing unease around fire, and some participants described having felt strong emotional distress in its presence. These participants learned to fear fire as a result of direct and vicarious experiences with fire. Perceptions expressed in this subtheme in some ways directly opposed those expressed in the subtheme above. In this subtheme it was not necessarily suggested that fire was entirely without use, or that it could not be used safely, but rather that it posed the constant threat of becoming uncontrolled and dangerous, and implied that there was perhaps little anyone could do to prevent this. It is possible that some of these participants may hold a script that is directly opposite to '*fire is controllable*', i.e., one that supposes that *fire is not controllable* or *fire is unpredictable and dangerous*. It is possible even that the scripts held by these participants are not necessarily subject only to fire, but rather are more general scripts that contribute to their attitudes and feelings towards fire. For example, Reynolds (2012) found in his study with inpatient fire misusers, some of them held the '*uncontrollable world*' script, which he suggested made them more likely to set fires. However, perhaps the participants in this subtheme are demonstrating this script with the opposite presentation; instead of wanting to set fires, they are instead scared of fire due to its uncontrollable and dangerous nature.

It is interesting to note the contrast of the findings from this subtheme, that suggest negative experiences with fire may cause a fear of fire, with the findings from Tyler et al.

(2014). Tyler and colleagues found that people in their study who misused fire had learnt fire was dangerous and went on to apply this learning to use fire harmfully. This, along with the results of both subthemes, *fire can be used safely*, and *unpredictability makes fire dangerous*, suggests that people learn about fire through experiences, and it is how these experiences are interpreted, rather than the content of the experiences, that is important.

Learning how and when fire can be used through direct experiences. This theme described participants' learning about fire through direct experiences they had during childhood and adolescence. Two subthemes were identified, the first subtheme described learning through directly witnessing fire being used, or personally using fire, in a socially acceptable way as *approved by an authority figure*. Subtheme one focused on fire use that was either directly supervised by an authority figure, or that was sanctioned by such a figure. Participants in subtheme one experienced responses from authority figures that encourage fire use within the social boundaries outlined either directly or indirectly through the described experiences. Subtheme one clearly reflects the tenets of modelling as described in social learning theory as the young people described imitating fire use as deemed acceptable by influential figures (Bandura et al., 1961; Bandura, 1976). The second subtheme describes learning about fire by testing the *boundaries of socially sanctioned fire use*. In subtheme two participants describe learning about acceptable fire use through the experiences of being told off, for some individuals this was a deterrent, while others subsequently described hiding their behaviour from people they knew would not approve, such as their parents.

Descriptions provided by participants suggest that learning about fire occurred as part of social experiences and that information about fire use was transmitted via these social channels. These experiences align with the conceptualisation of fire learning that Fessler (2006) described as “socially-transmitted information” (p. 433). Fessler suggests this transmission of information from parent/authority figure to young person occurs due to the

significant risks posed by trial-and-error learning with fire. He hypothesised that the parental transmission of information replaces the need for trial-and-error learning, thereby removing risk of immediate injury during this learning phase, as well as mitigating the risk of property damage, injury, or death long-term as the child is now aware of the dangers of fire and how to alleviate these. The experiences described in both subthemes, in line with Bandura's modelling theory and Fessler's information transmission theory, suggest that young people in Aotearoa New Zealand commonly learn about fire use from authority figures, typically their parents.

The first subtheme described direct experiences where participants saw fire being used by someone else, and sometimes subsequently used fire themselves, in a context *approved by an authority figure* such as a parent. Such experiences involved fire being used for practical reasons such as heating and cooking, used as an atmospheric enhancement, or used for cultural traditions. In these experiences the fire use was either directly supervised by an authority figure or was used with the knowledge that the authority figure would approve of the use. This is consistent with Fessler's discussion of guided learning, and anthropological theory relating to learning about dangerous animals (e.g., Barrett, 2005) that suggest that humans may acquire knowledge about threats by gaining "relevant experience in a safe context." (Fessler, 2006, p. 434). Fire is more easily presented in non-threatening circumstances than a predatory animal, and therefore some young people may begin to view fire as non-threatening in general or easy to control. Fessler suggests that having watched interactions with fire, young people are motivated to use it to learn through their own experiences. The experiences in this subtheme describe this replication occurring in safe and socially acceptable ways.

In the second subtheme, participants again described experiences of replicating fire use. However instead of conducting this replication in a socially acceptable way, they instead

furthered observed behaviours to determine the *boundaries of socially acceptable fire use*. Participants who tested the *boundaries of socially acceptable fire use* often did so using parental disapproval of this behaviour as a gauge of where this boundary lay. For such participants, this knowledge was developed as part of their fire experience via social transmission of information. Other participants expressed that they held this knowledge previous to the described engagement with fire and were not so much testing the boundaries as they were intentionally overstepping them. In previous research, parental disapproval has been given as a reason for not using fire (e.g., Perrin-Wallquist & Norlander, 2003). However, in this subtheme it seems that some participants were using fire despite this disapproval, suggesting that that some participants in this subtheme were intentionally misusing fire.

It was not always clear what motivated participants to test the *boundaries of socially acceptable fire use*. Some participants described the enjoyment of fire use as a motivator for their engagement in fire use, and that boundaries around safe fire use were established as a result of consequences of such actions, for example, being told off by a parent. Other participants described engaging in activities, either in a group or alone, that intentionally tested or disregarded the boundaries for fire use that had been established. These patterns appear to be consistent with previous research on youth fire misuse that suggest youth may engage in this behaviour as a result of curiosity, fire interest, or because of peer influences (e.g., Fessler, 2006; Vreeland & Levin, 1980). Similar to subtheme one, the experiences described in this subtheme drew on the social norms of fire use, however instead of participants' obeying these norms, they chose to disregard them, or intentionally go against them. This may in part due to impulsivity and/or poor decision making that is commonly observed in young people who engage in criminal and otherwise risky behaviours, potentially as a result of incomplete brain development (Bonta & Andrews, 2017; Loeber et al., 2012).

Though the learning in both subthemes were similar, experiences that followed the learning in this subtheme revolved strongly around rebellious behaviours rather than authorised experimentation. The intent behind fire use and misuse in each of the two subthemes differed greatly, however, the learning mechanisms that occurred in each subtheme were relatively similar. Participants in both subthemes described learning about fire through direct experience with fire under the supervision or instruction of authority figures, and their subsequent personal interactions with fire. Descriptions from both subthemes were consistent with ideas from both Bandura's social learning theory (1976), in particular the modelling tenets (Bandura et al., 1961), and with Fessler's (2006) description of parental teaching of fire behaviours in his social transmission of information theory.

Igniters and Extinguishers – learning about fire safety. This theme described more formal fire learning that occurred typically in settings such as school, extracurricular groups, or in the family home where participants developed a *comprehension of fire* and were taught about common *fire safety practices*. Fire learning is an important aspect of childhood and adolescence, as formal schooling offers children an environment to receive education around fire safety and the science of how fire works. However, participants detailed varying levels of learning and knowledge from these experiences (from none to some). Participants' discussion of education provision exhibited disparity across the sample, where some participants described receiving comprehensive education from FENZ/Fire Service school visits, others discussed having little to no education provided at school but received it at home instead, whereas others still discussed receiving very little fire safety education in any aspect of their lives. Interestingly there seemed a general sense among participants that fire safety learning is something that one should receive, and to not get any education on the matter was unusual and even possibly negligent and dangerous.

The first subtheme surrounded participant discussion of their *comprehension of fire*; how they understood it and how they came upon this understanding. This subtheme reflected how participants learnt about the forms and functions of fire, and how it works. Participants overtly described their knowledge about fire, and their views about how it should and should not be used. They discussed their understanding of how fire works, referring to ideas such as the ‘fire triangle’, and discussing the necessary components to fire such as fuel and oxygen. There was also discussion of knowing how to handle a fire, and how to put it out, although oftentimes such things were discussed vaguely, and participants provided little detail as to how they may do this. Some participants described receiving this knowledge in a formal educational setting such as school science class, however for most participants in this subtheme this knowledge was described as occurring as a direct result of personal experience with fire, or as an innate knowledge akin to common sense. As humans have been using fire for thousands of years, Fessler (2006) suggests that selective pressure may have meant humans developed specific learning abilities and processes dedicated to learning about fire. This would seem to support the implication from some participants that learning about fire use came as second nature. It should however be recognised that the knowledge participants described “always know[ing]” was non-descript and did not pertain to any safety procedures or specifics around safe fire use.

Although fire use has been an element of human life for a long time, *fire safety practices* have changed and developed along with societal evolution (Kobes et al., 2010). This may explain why participants made note of the formal learning they received about fire safety in school, at home, and through the media; because in contrast to *comprehension of fire* it was not necessarily knowledge that came naturally to them, but rather it was something that needs to be specifically taught. Interestingly, while a large majority of participants identified that they had received some fire safety education, the context in which this was

delivered, and the nature and quality of the information recalled was not consistent. In addition to this, some participants had noted the distinct lack of fire safety education they had received, either from their parents, their school, or both. This may relate to the findings by Block, Block and Folkman (1976) that found that while parents held adequate or comprehensive fire safety knowledge, they did not have the skills to confidently pass this knowledge onto their children and this was a cause of concern for them. It is possible parents in Aotearoa New Zealand are facing the same difficulties, and that with a lack of uniform fire safety programmes being delivered in schools, the onus falls on parents to educate their children, a task which they may not feel competent to undertake. As such, it is a valid concern whether people in Aotearoa New Zealand are adequately educated in *fire safety practices*. This somewhat echoes the findings of Lambie and colleagues (2018), whose study found that young adults themselves identified a need to receive fire safety education. These findings, in conjunction with the results of this study suggests that there are opportunities for fire safety education for a range of ages.

How do adults in Aotearoa New Zealand think and feel about fire now?

Research question two sought to determine what attitudes and beliefs are held about fire among the population of young adults in Aotearoa New Zealand. A discussion of the two dominant themes identified as resulting to this question are discussed below. The first theme explores the idea that *knowledge is power* in regard to fire, and being informed about fire may reduce its threat. The second theme discusses participants' *emotional congruence with fire* and explores three points on a possible continuum of emotions and attitudes towards fire.

Knowledge is power. The first theme describes the perception that knowledge about fire reduces or eliminates the intrigue that surrounds fire, and in doing provides the person with a feeling of power, or at least reduces their sense of powerlessness. This was generally spoken about by participants with positive regard, that the knowledge they possessed about

fire made them less frightened and more confident in their competency using fire, or in its presence. The attitudes expressed in this subtheme suggest that some adults in Aotearoa New Zealand feel their knowledge about fire removes any feelings of powerlessness and replaces them instead with a sense of some confidence with and around fire. This aligns with the findings by Lambie and colleagues (2018) suggesting young adults at university in Aotearoa New Zealand may overestimate their fire safety knowledge and skills, and that this in turn may lead to dangerous situations arising when fire is used by such individuals. The perceptions conveyed in this subtheme suggest that some adults in Aotearoa New Zealand are confident around fire, and using fire, due to their perceived understanding of fire. Understanding how fire works seems to demystify fire and in doing so also removes the sense of fear that may come from the unknown (Carleton, 2016).

Emotional congruence with fire. This theme comprised of three subthemes expressing a continuum of emotions towards fire. Attitudes towards and feelings about fire were described in a range of social and environmental contexts. Adult perspectives on fire in Aotearoa New Zealand seemingly sit somewhere on a spectrum; fire holds either strong positive or strong negative connotations, or it sits in a space as something not particularly interesting or frightening. Participants noted that different contexts changed the expectation of how one may feel about fire, and for some participants their emotions reflected these contexts and associated expectations, whereas for other participants' emotions were consistent across contexts, despite expectations. The three subthemes form a continuum of attitudes towards fire, ranging from *rewarding* as the most positive appraisal of fire, *context dependant* as something of a mid-point acknowledging fire as multi-faceted and representing multiple things to each participant, and *volatile/risky/harmful* as a more negative appraisal of fire and its uses within society.

The first subtheme described fire as *rewarding*. Participants in this subtheme described fire in a positive manner and associated it with fond memories and emotional states such as excited, relaxed, and fascinated. Positive associations with fire seem to align strongly with descriptions of fire that potentially indicated an interest in or identification with fire e.g., “[Fire] makes me feel alive” or “it’s interesting and pretty to look at”. Traditionally, fire interest and identification with fire have been associated with fire misuse (e.g., Gannon & Barrowcliffe, 2012; Murphy & Clare, 1996; Ó Ciardha et al., 2015). However, these findings suggest that such interest also exists in individuals in the community. This would align with the findings of Butler and Gannon (2020) who found that there was no significant difference between their four comparison groups (Fire Service personnel, fire misusers, offender controls, and community comparisons) on the ‘*fire is soothing*’ script. Even more so as in our study participants’ descriptions were not of fire misuse but tended instead to be using fire in socially acceptable ways. Enjoyment was often described as coming from being next to a fireplace, watching fire, and keeping warm – activities described as relaxing. The attitudes expressed in this subtheme suggest that some adults in Aotearoa New Zealand view fire very positively, and that these perceptions range in strength and type of positive emotion associated. Some adults find fire to be relaxing and associate it with warmth and a sense of calm. Other individuals attribute more high-energy positive emotions, such as excitement, to fire. Others identified a sort of sensory identification with fire and attributed it with lifelike properties. This would suggest that many adults in Aotearoa New Zealand view fire in a positive way, but that the rewarding attributes that one may associate with fire differ between individuals.

The second subtheme reflected attitudes towards fire that were identified as being *context dependant*, depending on the social and environmental context. Fire was often viewed as dangerous when “not used properly”, typically referring to fires lit around dry shrub or

unmonitored flames, and fire was viewed as useful in circumstances where it could be used for cooking and heating, and indoor fires were described as peaceful to watch by multiple participants. This study suggests that for some individuals attitudes towards fire are context dependant. This is not to say their attitudes towards fire are unpredictable, but rather that ideographically they follow quite a clear pattern dependant on the circumstances identified by the individual as evoking positive or negative emotions for their given reason. The attitudes towards fire expressed in this subtheme suggest that some adults in Aotearoa New Zealand perceive fire as multi-faceted. Fire is viewed by some individuals as capable of existing in both threatening and non-threatening forms depending on the way it is used and in what context, and that these perceptions perhaps may come as a result of multiple fire experiences and learning opportunities.

In contrast, the third subtheme expressed views that fire was *volatile/harmful/risky*. Participants in this subtheme described fire as scary, dangerous, and threatening, and perceived fire as capable of causing harm and destruction. For these participants fire held strong negative connotations and was something that they were wary of. Individuals who view fire as threatening and have negative connotations of its use are scarcely, if ever, discussed in the fire misuse literature in the field of psychology. Such perceptions are mostly discussed in terms of fire safety messaging and increasing awareness among young people and the general public of the dangers that fires may pose (e.g., Lambie et al., 2013; Williams & Jones, 2010). Such individuals may have lower scores on scales measuring interest in fire. However, our study would suggest that people with negative fire connotations do not just have a low interest in fire but that they may have a high fear of fire or hold strong negative opinions about fire and the way people use it.

Studies on adult fire behaviours have focused to date on individuals who misuse fire, and specifically those who have a high fire interest. These are likely individuals whose attitudes

and perceptions of fire are more aligned with sentiments and attitudes expressed in the *rewarding* subtheme. It is notable then that this was only one of three subthemes regarding emotional congruence with fire, and that two other distinct subthemes, *context dependant* and *volatile/risky/harmful* were also described in rich detail. This would suggest that there is variation among adult attitudes towards fire in the general population of Aotearoa New Zealand. Furthermore, it seems that these attitudes towards fire exist on a continuum, and that people do not necessarily exist at only one point on this continuum.

Theoretical Implications

Currently, there exists very little theory on how people learn about and experience fire during childhood and adolescence. Most research in the area focuses on understanding criminalised fire use (e.g., arson), including possible contributing factors such as perceived control of fire and fire interest, and how to measure these. While each of these constructs are undoubtedly of interest, and warrant further study, these factors focus solely on what may make someone more likely to engage in fire misuse. Little consideration has been given to which factors may contribute to a more generalised understanding of fire among adults outside the context of criminalised fire behaviour.

The theoretical implications of how fire learning occurs and how fire norms may develop among the population need to be given more consideration to aid in developing a strong baseline understanding of general perception of fire. The findings of this study have allowed for a more comprehensive explanation of what and how individuals learn about fire and may foster broader conceptualisations of fire, rather than just criminally focused ones. Based on our findings, it may be hypothesised that factors that would prevent an individual engaging in fire misuse, such as a strong fear of fire, may be lacking in individuals who willingly engage in fire misuse, especially if this misuse is dangerous. Current theoretical conceptualisations of fire misuse suggest that individuals either have strong positive

associations with fire, or they do not, and that these associations are strong determinants in how one will go on to use fire. Current theory also suggests that negative experiences with fire may feed into negative uses of fire (e.g., setting a fire to harm someone). While these concepts, broadly speaking, may be true of those involved in criminal firesetting, it does not account for variations that exist among those that do not have strong emotional associations with fire more generally, nor do these theories discuss the eventuality of using fire in a socially acceptable way. The results of our study show that adult attitudes towards fire vary greatly, and often within the context that the fire is encountered, and that fire is used in conceptualised in many ways.

One conceptualisation of fire that is currently overlooked in the literature is the notion that fire is dangerous and/or threatening, and therefore something to be afraid of. To date psychological literature about fire use has focused on factors that would incline an individual to engage in fire misuse. It may be assumed that a strong fear of fire is likely not such a factor, or at least would be rare among those who enjoy lighting fires. However, in the current study it was found that a fear of, or aversion to, fire was an experience shared by several participants. In some cases, this was their major emotion held towards fire, whereas for others it was one of a range of emotions that felt in reaction to fire. It is also important to note that fear of fire was not simply a lack of interest in fire, but an emotion expressed by a number of participants with varying degrees of salience. The presence of this ‘fear of fire’ highlights a notion that has been suggested throughout this thesis; there is an entire range of conceptualisations of fire that are currently being overlooked due to the current focus on fire interest and similar factors. It is also possible that until now, an individual’s fear of, or aversion to fire, has been attributed to a lack of positive associations with fire. This is important for a number of reasons, most significantly because there is currently an unfinished picture of what fire looks like to the general public. Without filling in the blanks of possible

attitudes towards, and emotions and cognitions about fire, it becomes difficult to understand, interpret, and predict behaviours with fire. While it may seem sensible to focus on the most dangerous aspects of fire misuse, without having a baseline understanding of what fire use looks like to the general public a lot of possibly vital information may be overlooked or possibly misconstrued.

The results of this study may help to expand the current research into new areas of exploration within the field of psychology and its exploration of fire use. Additionally, the result of the study may be used to build upon existing theories, such as the M-TTAF (Gannon et al., 2012). Currently the M-TTAF is one of the strongest explanations provided for fire misuse. However, as the explanation provided focuses on misuse and only misuse the scripts and trajectories described in the theory lack in generalisability to the population outside of those individuals who misuse fire. If the research from this study could be built upon, perhaps in conjunction with Horsley's (2020) continuum of fire use, then this research and general conceptualisation of fire may be combined with the basic premise of the M-TTAF to create one large, overarching theory that seeks to explain all fire use behaviour.

As the M-TTAF (Gannon et al., 2012) currently provides the strongest basis to work from to create an overarching theory, it is necessary to discuss the role of scripts and implicit theories, as they are so integral to the M-TTAF. It is important to consider the role of scripts and implicit theories in influencing thoughts and emotions about fire, and how these may develop. Scripts are an integral part of theory, not only in the M-TTAF, but also in further studies since then (e.g., Butler & Gannon, 2015; Butler & Gannon, 2020). Once again, so far much of the research dedicated to scripts and implicit theories focus on those that may predispose an individual to misuse fire (Butler & Gannon, 2015; Gannon et al., 2012; Reynolds, 2012). It seems evident from these studies, particularly Gannon and colleagues', that *fire is controllable* is a commonly held belief among fire misusers, however, we also

found a version of this belief to be present in our sample. What differentiates the two seems to be that fire misusers view fire as generally controllable; that they can set and control fires at will, whereas individuals in the community seem to believe that fire can be controlled only under certain circumstances. The difference between these two variations on the *fire is controllable* script is interesting and merits investigation as to how it may develop so the differences between the two groups may be better understood. These findings may suggest that the script '*fire is controllable*' needs to be reconceptualised as it appears to look slightly different to individuals in the community than it does to people who are known to misuse fire. It is possible that there exists a need for two separate scripts relating to the belief that *fire is controllable*, or that the existing script needs to be expanded upon to reflect a multi-faceted concept.

Implications for policy and practice

From the responses to this research one thing is clear, people in Aotearoa New Zealand have a wide variety of fire learning and experiences growing up. The experiences and learning described in this study brought to light some of the ways in which an individuals' experiences may contribute towards a range of attitudes towards fire, including fire safety attitudes as well as more problematic attitudes. It is important to understand which experiences are important and why, so that this knowledge can then be applied to developing fire safety education programmes and other resources to promote safe behaviour with and around fire. However, the notable lack of consistent formal learning opportunities provided to young people warrants cause for concern. Fire is a dangerous, life-threatening element, and without the proper education in fire safety precautions and procedures the threat is heightened.

Therefore, the first recommendation from this study is that comprehensive fire-safety education should be compulsory in schools nation-wide. In addition to this, family-centred

education should be encouraged and resources more readily available and promoted for parents who want to be involved with their child's education. The findings in this study have suggested that currently young people in this country are receiving non-uniform education about fire and fire safety. The information provided seems not to be consistent in terms of quantity or quality and varies in terms of where and when it is received. Participants identified a number of sources of information, yet rather than each individual receiving comprehensive information from multiple organisations or individuals, it was more a case of different people receiving different information from different places. Currently Fire and Emergency New Zealand provide a wide range of resources for their fire safety education programmes for schools to deliver, and there are resources available for fire safety within the home (see Appendix J). However, these programmes are not used consistently in schools, and many participants instead described receiving education from their parents, although this too was seemingly inconsistent across cases. The findings from this study would suggest that as well as a focus on strengthening school-based education, it would be beneficial to focus on improving fire safety awareness and knowledge among parents, as they seem to play a key role in the provision of information to young people. This awareness and knowledge may come through parenting programmes, antenatal classes, community groups, and similar, and should focus on empowering parents to pass on this information to their children. A strong focus on the promotion of existing resources and the development of new, adaptable resources should be of paramount importance to FENZ and wider networks for use by parents and schools. Schools may benefit from being encouraged to deliver fire safety programmes as part of the curriculum and to maintain strong relationships with FENZ. This may be especially important as fire safety education given in collaboration with fire service personnel has been found to increase children's fire safety knowledge (Ta et al., 2006). A multiagency

approach with an emphasis on fire safety education represents best practice in this area (Lambie et al., 2006; Kolko, 2003).

However, in the meantime, large-scale public education on the dangers of fire, when it is appropriate to use fire, and what to do when fire use goes wrong are likely to be beneficial. It may also be beneficial to increase awareness of what safe fire use looks like, and how to identify when an individual is misusing fire. Resources should be made widely available for individuals who believe they themselves have misused fire, or someone else they know has done so. The lack of knowledge about fire misuse needs to be addressed by the academic field, however the public must be kept up to speed with new findings and be informed on how best they can combat such a pertinent issue in their communities.

Strengths and limitations

This study has produced some novel and interesting findings in the area of early fire learning and experiences in Aotearoa New Zealand. A main criticism of the fire misuse literature is that there is a lack of empirical literature. This study was the first empirical examination of fire learning and it therefore provides a starting point to generate further empirical study to fill the current gaps in the literature. This study is also among one of the first to be conducted with adults in the general population, and the first of this kind in Aotearoa New Zealand. Despite some similarities between Aotearoa New Zealand and other countries that community studies have been conducted in (e.g., the United Kingdom), our country has a unique cultural fabric due to our status as a bicultural nation and heavy reliance on agriculture, therefore it is necessary to conduct such research here in order to be able to discover and interpret the nuances that exist between populations. Conducting this research in many countries around the world is imperative to build a comprehensive and representative picture of fire experiences, learning and current perception.

This research appropriately applied the use of thematic analysis. The use of an anonymous online survey provided the opportunity to collect data from participants that may not have otherwise been shared to aid an understanding of fire experiences and learning that may occur during one's upbringing. It also provided honest answers relating to how participants felt about fire at the time of the survey and their interest in fire. One concern with conducting a study of this sort was that only participants with high fire interest may self-select into the survey (Gannon & Barrowcliffe, 2012). However, our study was representative of a wide range of fire interest scores as measured by the FSS (Gannon & Barrowcliffe, 2012). Therefore, we did not only collect experiences and learning reflective of a development of a strong interest in fire, but a wide range of experiences that lead to a wide range of perceptions of fire.

However, the study does have several methodological limitations that should be taken into consideration when interpreting the results. Firstly, to recruit our participants for the online survey we used an online crowdsourcing platform. Crowdsourcing as a method of recruitment has been critiqued in previous literature. Goodman and Poalacci (2017) acknowledge the limitations of crowdsourcing platforms as threefold. Firstly, researchers cannot observe their participant while they take the online survey or questionnaire. This means that participants may be distracted, interrupted, or multitasking while completing the study. This could result in low data quality, and poses the risk that a participant unknowingly answers questions dishonestly, not to their entirety, or miss some questions altogether. Secondly, participants self-select into these online surveys based on their interests or expertise. For this study, this may mean that our participants had a higher baseline interest in fire than the general population of Aotearoa New Zealand; their interest piqued by the mention of "fire" in the survey title and description. It is also possible that individuals with particularly traumatic fire memories and aversion to fire avoided the survey. Had this been

the case we may have expected an underrepresentation of individuals with negative associations with fire and a positive skew of the data for the FSS (Gannon & Barrowcliffe, 2012). However, participants provided accounts of a wide range of experiences, their attitudes towards fire varied significantly, and the skew of the data was slightly negative.

Secondly, Goodman and Paolacci (2017) reported participants' ability to drop out of studies as and when they wish as a pertinent issue with crowdsourcing platforms such as MTurk. Participant attrition is a limitation for studies as it limits generalisability to only those individuals who would complete the study. Attrition also means that researchers may have to work with incomplete answers and in extreme cases may be left with entire research questions unanswered or answered only partially. Although we cannot be sure how many people viewed the study information and then did not commence the survey, Prolific Academic allowed us to view participant's completion rates and times, which enabled us to account for participant attrition rates. For this study there was one individual who completed the survey providing nonsensical information, so this information was removed from the data set and another individual was allowed to participate. Additionally, two people read the information and consent form and then did not proceed any further with the survey. Although non-completion was not an issue with this sample, had some participants left the survey incomplete other participants would have been allowed to opt-in until we had forty participants.

One further limitation of crowdsourcing platforms is the potential for low quality data as participants may feel no responsibility or accountability for their completion as they have not met the researcher or because they have "growing... non-naivety" (Peer et al., 2017, p. 153). This issue was encountered with one participant, who seemingly filled out the survey as quickly as possible, typing nonsensical letters and numbers into the answer text boxes in order to receive compensation for completing the survey without providing useful answers.

However, Prolific Academic allows researchers to quality check their survey data before providing compensation. This meant that it was possible to withhold compensation from Participant Forty, delete their nonsensical response from our data, and reopen the survey to allow for collection of adequate data from another participant. Previous research investigating crowdsourcing platforms has determined Prolific Academic provides higher quality data than other platforms such as MTurk and Crowdfunder and that this data came from more naïve and less dishonest participants than found on MTurk (Peer et al., 2017).

As pointed out by Frith and Gleeson (2008), a qualitative survey does not allow the researcher to extend beyond the survey to follow up with participant answers to dig deeper on points of interest. Using an online qualitative survey meant that the study lacked the ability to apply an iterative approach, and points brought up by participants that were determined to be of interest to the research question could not be followed up with further individualised questions by the researchers. While there were a couple of participants who did not answer some questions as fully as would have been preferred, overall neither data quality nor quantity was a notable issue for our survey as most participants provided lengthy answers to all questions, and those who did not still provided sufficient information for our analytic process. Future studies may benefit from conducting in-person interviews with participants to allow for more follow-up with answers provided. However, it should be noted that this may come at the cost of participant honesty and candidness as interviewees would be unable to remain anonymous to the research team. This could negatively impact the quality of information collected. It is also possible that participants are too honest and provide information to researchers that put them in a position of responsibility to report their participant which is problematic as it breaks the interviewer-interviewee relationship, means that the information may be unusable, and could have serious emotional and legal repercussions for both the participant and the researcher. Braun and Clarke (2020) in fact

posit that for research projects such as this one, in which anonymity, time pressure, and data quality need to be balanced, qualitative surveys are the ideal research method. The survey was also designed with the proposed limitations in mind, and questions were designed accordingly to mitigate any issues as much as possible and to gather the richest, most informative data in a way that allowed us to capture the participants experiences, thoughts, and feelings in their own words.

We did face some limitations in regard to participant demographics and memory recall. Firstly, the demographic characteristics of participants, particularly ethnic identity, were not wholly representative of the general population (Statistics New Zealand, 2018). As discussed in the results section among our sample there was an underrepresentation of people who identify as New Zealand European/ Pākehā, Māori, and Pasifika and an overrepresentation of those who identify as Asian. There was no ethnic group that was not represented. It is difficult to determine what effects this may have had on our study, other than to say that our findings would have been more generalisable had they been exactly matched to the population demographic breakdown.

In terms of memory recall, subtheme 1.4 *'fire as an undiscernible event'* may indicate that due to age at time of first/significant memory and time since this had occurred, participants may have felt the effects of time on their ability to recall their early memories with fire strongly. This may also give reason to believe that other participants may not have recalled their experiences entirely or accurately. While this is possible there is little that could be done about such an issue for a study of this kind. It is also important to consider that the way an individual conceptualises their memory may play a large part in their current perception of fire, perhaps even more so than the actual event itself. A longitudinal study looking at the early experiences with and learning about fire that occurs in young people and

how these experiences and learning affects their perceptions later on would give more insight and counter this issue.

Future directions for research

The current study conducted exploratory qualitative research on early fire learning and experiences and perceptions of fire as adults with a community sample of people in Aotearoa New Zealand. This study therefore represents a first step in developing empirical and theoretical research in this area. Future research would benefit from the ability to draw theories on development of attitudes towards fire through the timeline of each participant, noting how their early experiences impacted their later perceptions of fire. As we used thematic analysis and asked questions about specific instances of fire experiences and learning rather than about learning processes, we could not assume any developmental trajectories between participant experiences and their current thoughts and feelings about fire (Braun & Clarke, 2020). If we had used another analytic approach, for example a grounded theory model, and developed questions examining the development of attitudes towards fire from early experiences we may have been able to establish learning processes. It would be useful to determine how different fire learning and experiences in childhood may interact with and/or influence later adult perceptions of fire. To do so one may endeavour to develop a grounded theory model as such models are rooted in the idea that one's perception of an object, or in this case fire, informs how we behave towards it (Blumer, 1986). Therefore, by developing a grounded theory examining the cognitions and emotions that develop toward fire through childhood learning and experiences we may begin to understand how and why adults in the general population behave certain ways toward fire. Understanding how perceptions develop would potentially allow the prevention of the development of potentially problematic fire perceptions and enable public health policy campaigns and direct therapeutic

treatment problems that can target problematic ideas regarding fire use and misuse (Ó Ciardha, et al., 2015).

Although the current study focused on understanding fire learning in the general population one thing that was not captured was whether participants had ever used fire for criminalised or non-criminalised purposes. Given existing research suggests that individuals who engage in criminalised fire use may take different messages away from early fire experiences, it would have been interesting to have compared these between the two groups, as well as other groups such convicted fire misusers, offender controls, and fire service personnel. Future research may benefit from replicating the current study and asking participants if they had ever misused fire. By identifying if someone had misused fire, we could have compared attitudes and experiences held by adults, their scores on the FSS (Gannon & Barrowcliffe, 2012), and their history of fire misuse. This may have allowed the identification of patterns between groups and allowed for similarities and differences to be identified.

Future research would also benefit from conducting comparative studies between samples of people who have not set any fires, those who have set prosocial fires, and those who have set criminal fires to understand similarities and differences in the early fire learnings and experiences and their current thoughts feelings and attitudes towards fire. This research may also be generalised further to other groups of potential interest such as Fire Service/FENZ personnel and possibly people who have engaged in other criminal activity not involving fire.

Finally, based upon the findings of this study, future research would benefit from considering the entire spectrum of emotions regarding fire, and how these all may uniquely contribute to an individual's propensity to use or misuse fire. Research so far has focused

largely on the role of factors such as fire interest and social learning in the development of a motivation to misuse fire (e.g., Gannon et al., 2012). However, our research suggests that there are also factors such as a strong fear of fire which may play a role in mitigating motivational factors and potentially preventing an individual from engaging in any kind of fire use, especially dangerous fire misuse. Future research would benefit from examining the possible mitigating role that these factors may play. Such research may also shed light on how adult perceptions of fire may be influenced and developed to prevent fire misuse. Learning more about why people feel strongly negatively towards fire may inform the education of young people and the treatment of adults who currently engage in fire misuse.

Conclusion

This study aimed to assess early learning and experiences with fire in and normative thoughts and feelings about fire in young adults in Aotearoa New Zealand. Research addressing fire learning, experiences and attitudes is sparse, especially in the context of Aotearoa New Zealand. As such, this study was exploratory, completed with the aim of adding to the literature in this field and furthering current understanding. It is hoped that by gaining an understanding of how individuals perceive and learn about fire, knowledge can be garnered about fire misuse and how this might develop. The study findings suggest that currently there is no uniform learning that is occurring across the country and that there is also a wide range of perceptions of fire that exist among the adult population. Further research is required to build upon the findings of this thesis; however, these findings provide a basis for understanding typical fire learning experiences and fire attitudes in the Aotearoa NZ community context.

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Appendices

Appendix A: Crimes Act, Section 267

Arson, damage, and waste

Heading: inserted, on 1 October 2003, by section 15 of the Crimes Amendment Act 2003 (2003 No 39).

267 Arson

(1)

Every one commits arson and is liable to imprisonment for a term not exceeding 14 years who—

(a)

intentionally or recklessly damages by fire or by means of any explosive any property if he or she knows or ought to know that danger to life is likely to ensue; or

(b)

intentionally or recklessly, and without claim of right, damages by fire or by means of any explosive any immovable property, or any vehicle, ship, or aircraft, in which that person has no interest; or

(c)

intentionally damages by fire or by means of any explosive any immovable property, or any vehicle, ship or aircraft, with intent to obtain any benefit, or to cause loss to any other person.

(2)

Every one commits arson and is liable to imprisonment for a term not exceeding 7 years who—

(a)

intentionally or recklessly, and without claim of right, damages by fire or by means of any explosive any property in which that person has no interest (other than property referred to in subsection (1)); or

(b)

intentionally or recklessly damages by fire or by means of any explosive any property (other than property referred to in subsection (1)) with intent to obtain any benefit, or with intent to cause loss to any other person.

(3)

Every one is liable to imprisonment for a term not exceeding 5 years who intentionally damages by fire or by means of any explosive any property with reckless disregard for the safety of any other property.

(4)

In this section and in section 269, **benefit** means any benefit, pecuniary advantage, privilege, property, service, or valuable consideration.

Compare: 1961 No 43 ss 294, 296

Section 267: replaced, on 1 October 2003, by section 15 of the Crimes Amendment Act 2003 (2003 No 39).

Appendix B: Demographic questions

Q1

1. What age are you?

- ☐ 18 years old
- ☐ 19 years old
- ☐ 20 years old
- ☐ 21 years old
- ☐ 22 years old
- ☐ 23 years old

Q2

2. With which gender do you most strongly identify?

- ☐ Male
- ☐ Female
- ☐ Other
- ☐ Prefer not to say

Q3

3. With which ethnicity do you most strongly identify?

- ☐ New Zealand European/Pākehā
- ☐ Māori
- ☐ Pasifika
- ☐ Asian
- ☐ European
- ☐ Middle Eastern
- ☐ African
- ☐ Latin American
- ☐ Other

Q4

4. To the best of your knowledge, what is your current total household annual income?

- ☐ Under \$29,999
- ☐ \$30,000 - \$49,999
- ☐ \$50,000 - \$74,999
- ☐ \$75,000 - \$99,999
- ☐ \$100,000 - \$149,999
- ☐ \$150,000 - \$199,999
- ☐ \$200,000+

Q5

5. What is the highest level of education you have completed?

- ☐ No Formal Education
- ☐ NCEA Level 1
- ☐ NCEA Level 2
- ☐ NCEA Level 3
- ☐ Vocational Training
- ☐ University Degree
- ☐ University Degree with Honours
- ☐ Masters
- ☐ PhD/Doctorate

Q6

6. Which option best describes your current employment status?

- ☐ Employed Full Time
- ☐ Employed Part Time
- ☐ Unemployed (looking for work)
- ☐ Unemployed (not looking for work)
- ☐ Student
- ☐ Self-employed
- ☐ Unable to work

Q7

7. Which option best describes your current marital status?

- ☐ Single and/or not married
- ☐ Living with partner
- ☐ Married
- ☐ Separated
- ☐ Divorced
- ☐ Widowed

Q8

8. Which option best describes your current living situation?

- ☐ Living with parents
- ☐ Renting (alone)
- ☐ Renting (with others)
- ☐ Own Home/Unit
- ☐ University Residence

Q9

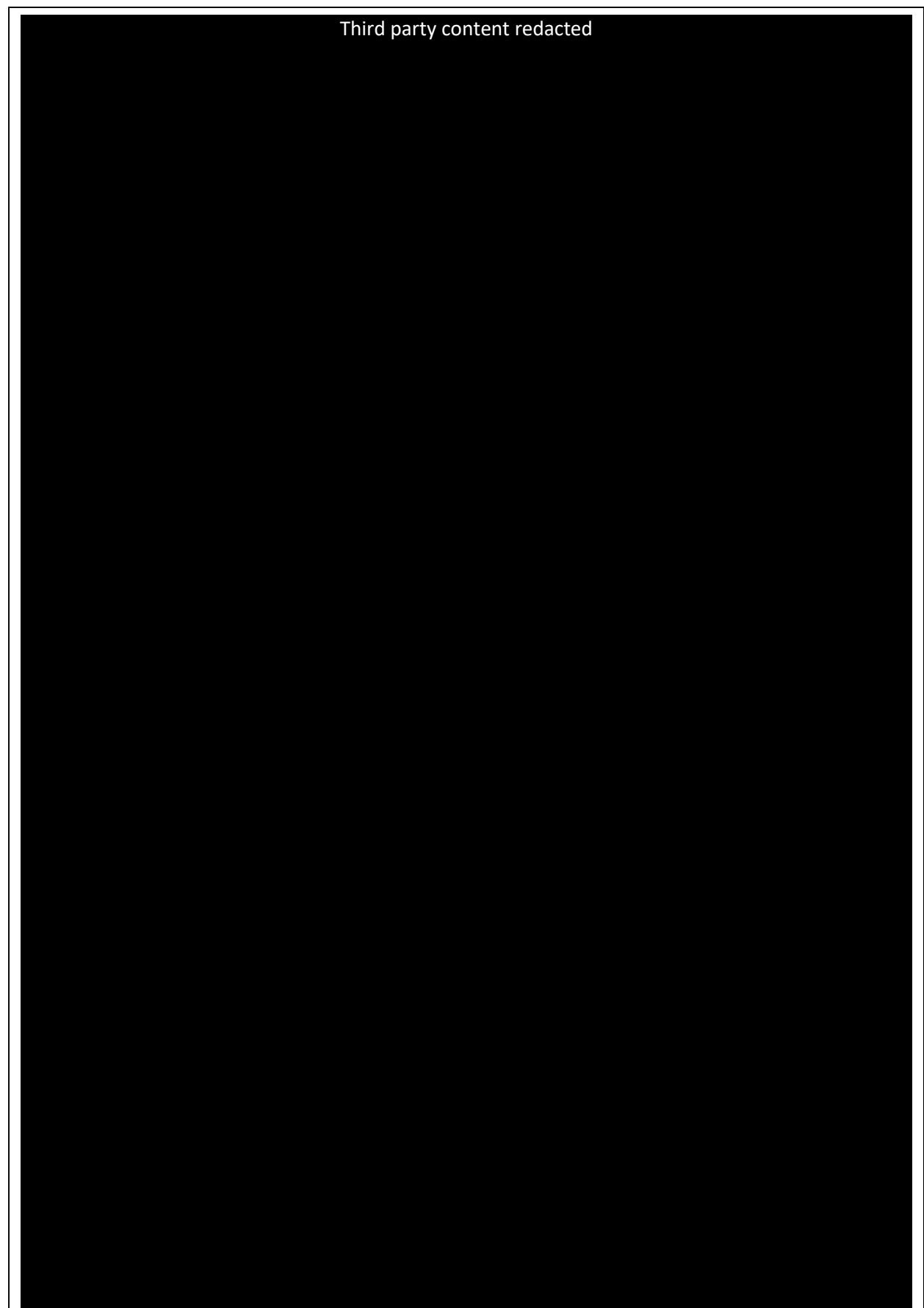
9. Do you have children under the age of 18 living in your household?

- ☐ Yes
- ☐ No

Q10

10. If yes, how many?

Appendix C: Fire Setting Scale (FSS; Gannon & Barrowcliffe, 2012)



Third party content redacted

Appendix D: Qualitative survey

Section 1

This section will ask you questions about your earliest memory of fire. We are interested in your experience of this fire and how it made you think, act, and feel.

Remember, if this memory involves you or somebody else setting a fire do not include specific details such as dates, names or places.

12. Please describe your earliest memory of fire. This can be any memory of any type of fire. (e.g., watching a bonfire, playing with matches, burning rubbish, seeing an open fireplace, burning yourself on an open flame, or seeing fire on a television programme).

If possible, please include information about your age at the time of your earliest memory, whether or not anyone else was present, and a general description of the memory itself, as well as any other information you feel may be relevant.

13. Is this memory of fire a positive or negative memory, and why?

14. How well do you remember this experience, and why?

15. How do you remember feeling at the time of this memory?

For example, how did you feel about seeing the fire? Do you recall feeling any particularly strong emotions?

16. Do you remember having any specific thoughts about the fire in your earliest memory?

17. Does your earliest memory of fire involve other people being present? If so, how did they react and what did you think of their reaction?

18. Other than your earliest memory of fire, do you have any other significant memories of fire either growing up or as an adult?

Yes/No

19. If yes, please provide a description of each of your two strongest memories of fire.

For each experience think about how old you were, what happened, how you were involved, and your thoughts and feelings at the time.

Section 2

This section will ask you about any fire-related experiences you may have had throughout your childhood and adolescence. We are interested in your level of exposure, and what type of fires you were exposed to. You will also be asked about any other significant fire memories you may have from any time point in your life.

Remember, if any memory involves you or somebody else setting a fire do not include specific details such as dates, names or places.

20. How was fire used in your family/neighbourhood?

21. How many fires do you recall seeing in childhood/adolescence?

22. What types of fires do you recall seeing in childhood/adolescence? (e.g. campfire, burning rubbish, candles)

23. On average, how often do you think you saw a fire in childhood/adolescence? (e.g., daily, weekly, monthly, a few times a year, less than once a year)

24. Were you ever allowed to experiment with fire growing up? If so, how often? And in what form? (e.g., matches burning rubbish etc.)

25. Did you ever get in trouble for playing with fire? If so, what for?

Section 3

This section will ask you questions about how and what you learnt about fire growing up and any formal education you may have received about fire as you were growing up. We are interested in knowing what you learnt about fire, and how you learned these things.

Remember, if any learning experience involved you or somebody else setting a fire do not include specific details such as dates, names or places.

26. How did you learn about fire growing up?

27. What things did you learn about fire growing up?

28. Did you receive any fire safety education growing up? If yes, what did this consist of?

For example, was this in a formal setting (e.g., school, scouts) or an informal one (e.g., parents, extended family, on the news, family friends, advertisements)?

29. If you did receive education about fire, formally or informally, please describe what you remember learning from this.

Section 4

This section will ask you questions about the thoughts and feelings you have about fire now as an adult.

30. Please describe how you feel about fire now as an adult?

For example, how do you feel when you think about fire? how does being in the presence of fire make you feel?

31. How do you think about fire now as an adult?

For example, do you think of it as dangerous, useful, exciting etc.?

32. How often do you think about fire?

For example, are there any times when you think about fire more than others?

Appendix E: Information sheet and consent form

UNDERSTANDING EARLY EXPERIENCES AND LEARNING ABOUT FIRE IN NEW ZEALAND

INFORMATION FOR PARTICIPANTS

You are invited to take part in this online survey. Please read this information carefully before deciding whether or not to take part. If you decide to participate, thank you. If you decide not to participate, thank you for considering this request.

Who is doing this research?

My name is Amelia Rhodes and I am a Masters student in the Forensic Psychology programme at Victoria University of Wellington. This research project is being completed as part of my thesis, under the supervision of Dr Nichola Tyler.

What is the aim of the project?

This project aims to examine people's early experiences with fire in New Zealand. The majority of people will have some early experiences with fire, we are interested in learning what these experiences may be, and how these may relate to how you think, feel, and behave around fire now as an adult. Your participation will support this research by helping us to develop our understanding of early fire experiences that are common in New Zealand which may in turn be helpful for informing educational work in this area. This research has been approved by the Victoria University of Wellington Human Ethics Committee (ResearchMaster Reference: 0000027967).

What does your participation involve?

All users registered with the Prolific Academic platform who are aged between 18 and 23 years and living in New Zealand are being invited to participate. If you agree to take part, you will complete an online survey which consists of a series of closed and open-ended questions. The survey will ask you a few questions about yourself (e.g., age, ethnicity, level of education) and then a series of questions about your early fire experiences and your thoughts, feelings, attitudes, and behaviours towards fire (e.g., were you ever allowed to experiment with fire growing up? How do you think and feel about fire now as an adult?). The survey will take you approximately 30 minutes to complete.

Do you have to take part?

Participation in this research is completely voluntary. If you feel uncomfortable answering a particular question then please leave it blank. You also have the right to cease your participation in the survey at any point without giving a reason. However, you should be aware that it will not be possible to retract any answers or information you provide prior to your withdrawal as the survey is anonymous and we cannot link participants with their responses. You should also be aware that if you do not complete the survey you will not qualify to receive participant payment.

If you do not wish to participate in this study please do not click yes on the consent form, as this will begin the study.

What will happen to the information you give?

Your participation in this research is anonymous and strictly confidential. This means that nobody, including the researchers will be aware of your identity. By completing the survey, you are giving consent for us to use your responses to the survey for research and educational purposes. You will be paid through Prolific Academic for your participation.

Anonymous quotes from your responses to the open-ended questions may be used in publications and presentations arising from this research (e.g., thesis, reports for stakeholders, educational and training activities, journal articles, and book chapters). Your answers will remain completely anonymous and unidentifiable.

When completing the questionnaire, please only answer the questions we ask, answer them with as much detail as you deem necessary, but do not provide information that is not relevant to the question. **Please do not include any personal identifiable information in your responses about either yourself or others.**

Your anonymous data will be stored securely at Victoria University of Wellington and retained for approximately 5 years following any publication of the research. The data you provide will be held confidentially and will not be disclosed to anyone outside the research team (except where governed by law).

What will happen to the results of the study?

The information collected as part of the research will be analysed and written up as part of a Masters thesis in Forensic Psychology. The findings may also be written up for publication in professional publications (e.g., academic journal, professional magazine, and book chapters) or reports to key stakeholders, presented at professional and/or academic conferences or as part of training/educational activities/events. A summary of the results of the study will also be posted on the lab website <https://ffmhlab.wordpress.com>

Following completion of the Masters thesis, the research team and designated students at Victoria University of Wellington may conduct additional analysis of the anonymous research data as part of teaching and research exercises. This is so we can maximise the output from the data to further our understanding of fire-related experiences and increase knowledge in the area.

If you have any questions or problems, who can you contact?

If you have any questions, either now or in the future, please feel free to contact either:

Student:

Name: Amelia Rhodes
MSc Student

Personal details redacted

Supervisor:

Name: Nichola Tyler
Lecturer in Forensic Psychology

Personal details redacted

We understand that fire may be a sensitive topic for some people, if you find that any of the questions in the survey evoke difficult feelings for you please do not continue. Should you need support, you may find the following organisations helpful:

Need to Talk?: Free Call or Txt 1737

Samaritans: 0800 726 666

Lifeline Aotearoa: 0800 54 33 54

Suicide Crisis Helpline: 0508 828 865

Human Ethics Committee information

If you have any concerns about the ethical conduct of the research, you may contact the Victoria University HEC Convenor: Dr Judith Loveridge.

Email: hec@vuw.ac.nz

Telephone: +64-4-463 6028.

If you would like to keep a copy of this information for your future records please take a screen shot and save it somewhere accessible to you now, and/or print a copy of this window now.

O I have read and understand the terms of the information sheet

CONSENT TO PARTICIPATE

This consent statement will be held for five years.

Researchers: Amelia Rhodes, School of Psychology, Victoria University of Wellington.

Dr Nichola Tyler, School of Psychology Victoria University of Wellington

- I have read the Information Sheet and understand the project as it has been explained.

- I agree to take part in an online survey.

I understand that:

- By participating I confirm that I am 18 years or over.

- This survey is anonymous so I cannot be identified by researchers or anyone who may read the resulting publications.

- I have the right to withdraw from the survey at any stage without giving a reason. However, once I have started the survey any information I have provided may be withheld and used in the study.

- I have been asked not to provide any identifiable information about myself or others.

- Information I provide may be used in the form of anonymised quotes.
- My data will be held securely and confidentially.
- Findings may be used for a Masters thesis and/or professional publications (e.g., academic journal, professional magazine, and book chapters), reports to key stakeholders, presented at professional and/or academic conferences or as part of training/educational activities/events.
- The anonymous data from this project will be retained for up to 5 years following any publication of the data. The research team and designated students at Victoria University of Wellington may conduct additional analysis of the anonymous research data as part of teaching and research exercises.
- By clicking next, and answering the survey that follows I consent to participate in this study and for the information that I provide to be used in the Masters thesis and any related publications or presentations

Appendix F: Debrief Sheet

Understanding early experiences and learning about fire in New Zealand

Thank you for participating in this research.

As part of this study we asked you to tell us a little bit about yourself. We then asked you to complete a series of open and close-ended questions about your early experiences, thoughts, feelings, behaviours and attitudes towards fire. This included the Fire Setting Scales (FSS; Gannon and Barrowcliffe, 2012) which looks at people's attitudes, interests, and identification with fire, as well as a series of open-ended questions about your experiences, memories, and learning about fire.

We asked you to complete these questions as we are interested in learning about different types of experiences with fire and how these experiences influence thoughts, feelings, and behaviours with fire as an adult. Previous studies have suggested that having a strong interest in fire may influence how people think, feel, and act around fire as an adult (Doley, 2009; Tyler et al., 2014). There is also some theoretical research that suggests that how we learn about fire may be related to the development of an interest in fire (e.g., Gannon et al., 2012; Fessler, 2006; MacKay et al., 2009). We hope that this research will help us to further understand how thoughts, feelings, and attitudes towards fire develop and influence behaviour, and if there are any differences in people's experiences which may affect this. If you have any questions regarding the study, please contact us at the following:

Student:

Name: Amelia Rhodes
MSc Student

Supervisor:

Name: Nichola Tyler
Lecturer in Forensic Psychology

Personal details redacted

Personal details redacted

Once again, we thank you for the time you have spent completing the survey. We are grateful that you participated in our research, which we hope will be important in helping us understand more about fire-related thoughts, feelings, and behaviours in the future.

If any questions, or any of your answers to these have raised difficult feelings, you may find the following free services helpful:

Need to Talk?: Free Call or Txt 1737

Samaritans: 0800 726 666

Lifeline Aotearoa: 0800 54 33 54

Suicide Crisis Helpline: 0508 828 865

If you have any serious concerns about the ethical conduct of the research, you may contact the Victoria University HEC Convenor: Dr Judith Loveridge.

Email: hec@vuw.ac.nz

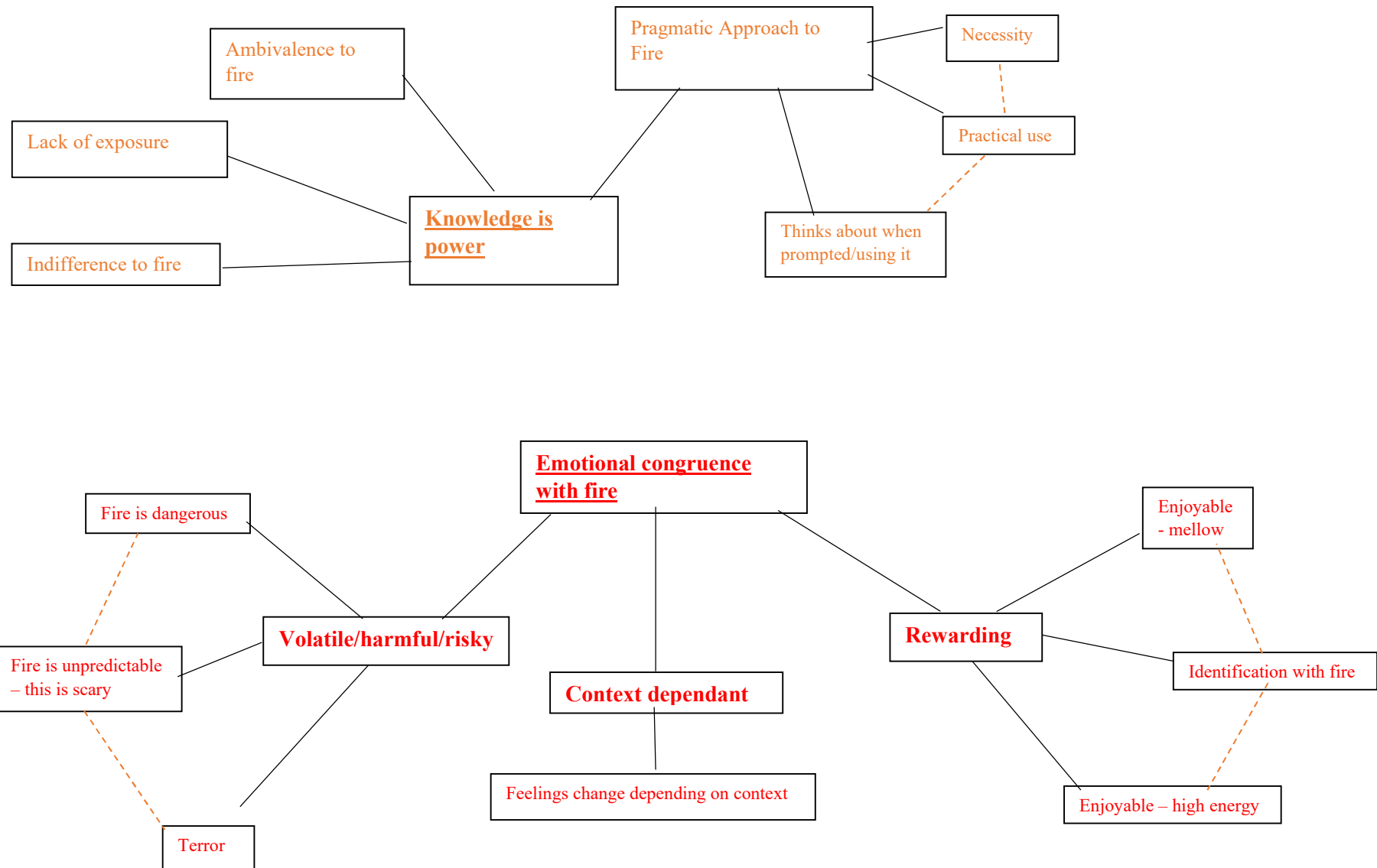
If you would like to keep a copy of this debrief information for your future records please take a screen shot and save it somewhere accessible to you now, and/or print a copy of this window now.

Appendix G: Study personal reflection

My position in the research is one of a first-time qualitative researcher. Not only was I new to qualitative research, but prior to this study I had little-to-no knowledge of the study of fire misuse, nor was I familiar with the behaviour of fire misuse beyond occasional media coverage of ‘arson’. I believe the novelty of both the content and the methodology of this research proved challenging but also beneficial, as it meant that I did not come to analyse participants’ data with any predisposed idea of what the process should look like, how it usually works, or what I ‘expected’ to find. My position as a young adult who has grown up in Aotearoa New Zealand meant that some of the experiences and learning described by participants was familiar to me, mostly in regard to descriptions of FENZ school visits and ‘Get Firewise’ adverts on television. I had mid-to-low levels of exposure to fire growing up, as I saw it sometimes when camping or tramping, and saw fireworks at least once annually for Guy Fawkes. I hold no strong feelings about fire now, and rarely see or use it myself. I felt that I related to participants who described fire as being multifaceted, as I also enjoy being around fire in some contexts, but I am conscious that it is dangerous, especially when used irresponsibly. I think because of this I found that insight on data from such participants came more easily to me than for other participants who described strong solely positive or negative experiences with or attitudes towards fire. In saying that, participants who described such strong emotions or salient experiences stood out to me more and I was particularly interested in their perspective as it differed from mine. I believe having my supervisor, Nichola, to triangulate throughout the research process allowed for these differences between participants to be accurately represented and meant that patterns in the data were not solely drawn from my viewpoint but were corroborated by somebody who has had different experiences with fire and holds a greater level of knowledge of the fire research.



Appendix I: Question two thematic map




Appendix J: Examples of Fire Emergency New Zealand (FENZ) fire safety education resources

1. Escape My House – interactive plan for fire escape from your home. Can be found at:
https://www.escapemyhouse.co.nz/?gclid=EAIaIQobChMIptyc5diY6QIVwzUrCh2dmwTzEAAYASAAEgLR0fD_BwE
2. Tools and Toys activity – Cut each picture out and decide whether they are tools or toys.

44 Tools and toys



3. Fire Safety Checklist:



A FIRE-SAFETY CHECK TO DO AT NIGHT

- ☐ Do a fire check every night before you put out the light.
- ☐ Is all cooking off the stove and is it turned off?
- ☐ Is the fire in the fireplace out?
- ☐ Are all electrical appliances, including televisions, DVD's, computers and hairdryers turned off at the wall?
- ☐ Are all heaters turned off?
- ☐ Are all electric blankets turned off before you go to bed?
- ☐ Are all cigarettes stubbed out in a safe container?
- ☐ Are all candles out?
- ☐ Are all doors closed to slow the speed of fire?
- ☐ Are all doors secure, with keys in deadlocks?
- ☐ Are all ways out of the house clear, so people can get out FAST?
- ☐ Is all your family secure and safe?