WARNING FATIGUE:

Insights from the Australian Bushfire Context

A thesis submitted in partial fulfilment of the requirements for the Degree

of Doctor of Philosophy in Media and Communication

in the University of Canterbury

by Brenda Mackie

University of Canterbury

2013

Abstract

Warning Fatigue or Cry-Wolf effect is a taken-for-granted phenomenon that can result from being 'over-warned'. The terms are used to describe situations where individuals who are exposed to recurring warning messages about a disaster which then does not eventuate become cynical, apathetic and 'tired' of hearing warnings. They may become desensitised to the risk thereby endangering themselves even more. The assumption by practitioners (emergency managers and governmental policy-makers for example) that warning fatigue is a problem presents emergency agencies with a conundrum: they want to avoid the accusation of panicking the public but worry they may run the risk of under-preparing them at the same time. As a result, they may be tempted to err on the side of caution, delay issuing a warning and downplay the possible severity of a potential disaster.

Examination of the literature, and an analysis of presentations and news stories have shown that policy-makers, emergency managers, academics and the public use the term 'cry wolf' or 'warning fatigue' in everyday life. They regard it as conventional wisdom and believe it can influence risk perception and warning response. Nonetheless it has been presumptively assigned by some disaster theorists to the category of a myth. A limited warning fatigue literature has examined the phenomenon in the context of rapid-onset disasters and has concluded that risk perception is not affected by warning fatigue. However, it also suggests there is a direct relationship between warning time, preparedness and response. This allows for the possibility that warning fatigue may not be a myth, but a function of the type of disaster, the frequency of warnings and warning lead-time. This thesis makes a distinction between rapid-onset and prolonged lead-time disasters and hypothesises that prolonged lead-time disasters are responded to in very differently ways than rapid-onset ones. Australian bushfires provide the context in which this research was conducted because bushfires are repeatedly warned about yet rarely (once every ten or twenty years) result in a major disaster.

Using social constructionist and social representation theoretical frameworks, and integrating psychosocial and sociological perspectives, this thesis examines the role that warning fatigue plays in the risk perceptions, warning responses and decision-making processes of people living in bushfire-prone areas of Australia. Utilisation of a mixed methods design, a substantive literature review and two rounds of semi-structured interviews resulted in a conceptualisation of a bushfire warning fatigue measure (BWFM). Application of the measure among at-risk Australian communities validated the measure. Through empirical statistical analysis, this standardised instrument was revised (BWFM-R) and used to measure the change in warning fatigue levels over a fire season (November 2011-April 2012). Analysis showed that warning fatigue appears to be multi-faceted comprising five aspects: Trust and credibility, over-warning, false alarms, scepticism and helplessness. It was also found that warning fatigue responses are contextual and interconnected with 'unofficial' warnings (such as media stories). The direction of the change and analysis of the qualitative component of the survey implied that unofficial bushfire rhetoric from the media during the winter months may produce a warning fatigue effect, so that when the official warnings were issued at the beginning of the bushfire season, the public were already 'tired' of the message.

Trust and credibility, over-warning, false alarms, scepticism and helplessness are not new factors in public warning response to disaster communication, but this research demonstrates that they can combine in a unique way to produce 'warning fatigue'. It proposes that if emergency and disaster agencies differentiate between rapid-onset and prolonged lead-time disasters, understand the complexities of warning fatigue and design their warnings accordingly, then disaster risk communication will become more effective, increasing public engagement and improving disaster response.

Acknowledgements

Table of Contents

Table of Tables

Table of Figures

Glossary of Terms

The terms used below provide the basis of understanding of these terms in this thesis. However, it is important to note that these definitions should not be regarded as deterministic or self-evident; rather this thesis is an exploration of peoples *understanding* of these terms. The approach of this thesis that underpins the understanding of these terms is that people socially-construct and interpret them as they experience them in their everyday lives.

Warning: information that warns people who are at risk from an impending disaster and enables those people to make decisions and take action.

Disaster: Whilst a disaster can equally be a social construction as well as a physical phenomenon (Quarentelli 1995), a disaster can be defined as a sudden accident or a natural catastrophe that causes great damage or loss of life.

Natural Hazards: Natural hazards are severe and extreme weather and climate events that occur naturally in all parts of the world, often as a result of severe weather events.

Natural Disasters: Natural hazards become natural disasters when people's lives and livelihoods are destroyed. Dennis Mileti argues that 'nature creates the hazards but man creates the disaster".[1]

Disaster Warning: a warning about a disaster which can (but not always) be issued in advance of a potential event. Warnings of this nature tend to be about large-scale potentially catastrophic events.

Emergency Warning: a warning about a potential disaster that is imminent and can be about events which are either small or larger in scale. These warnings tend to be very specific and localised.

Risk Communication: a social process 'by which people become informed about hazards, are influenced towards behavioural change and can participate in decision-making about risk issues in an informed manner'(Rohrmann 2008:1). It is characterised by risk information which is given prior to a possible event.

Crisis Communication: emergency information communicated immediately prior to or immediately after a major disaster event.

Bushfire: Bushfire, wildfire, wild-land fire, grass fire, forest fire or scrub fire are all terms used to describe any uncontrolled, non-structural fire burning in a grass, scrub, bush or forested area.

Rapid-onset disaster: a potential disaster event that is easily detected, has a high degree of certainty in terms of magnitude, severity of impact, time and location and usually happens as predicted within a short time period.

Prolonged lead-time disaster: a potential disaster event that has a high degree of uncertainty in terms of impact, magnitude, severity, location and is often warned about months or years before the possible event.

---

[1] "What keeps me up at night: lessons (Not) learned" 37th Natural Hazards Workshop. http://www.colorado.edu/hazards/workshop/2012/Sessions/ws201239.html

1. INTRODUCTION

"Coming events cast their shadows before them"
Lochiel's Warning, Thomas Campbell[2]

Warning Fatigue and the 'Cry Wolf' Syndrome

Cry-wolf' syndrome and 'warning fatigue effect' are generally recognised terms for cynicism or apathy that can result from being 'over-warned'; individuals who are exposed to recurring warning messages about an event which does not eventuate, become 'tired' of hearing warnings. They then turn off and may become desensitised to the threatened danger, thereby endangering themselves even more.

There are two popular interpretations of the 'Cry Wolf' fable,[3] and over time, with the telling and retelling, it is impossible to know whether it was based on an event or simply a story or as most fables are, a combination of the two. In the first interpretation of the original fable the boy saw the wolf creeping near to the sheep and cried out to the villagers to come and help, but the noise the villagers made scared the wolf away. Because the villagers didn't see the wolf they thought he didn't exist so after several incidents where the wolf appeared, the boy warned, the villagers came to help and the wolf ran away, the villagers did not respond to the boy's cries, allowing the wolf to eventually make off with the sheep. The boy did his job by warning the villagers but because the villagers failed to see the wolf (not once, but several times) they thought the warnings were bogus. Therefore the danger was real, the consequences equally real but the perception or evaluation of the threat was flawed. In the second interpretation, the boy was a mischievous trickster who enjoyed seeing the villagers rush out of their houses when he pretended that a wolf was endangering the sheep. The villagers eventually realised the boy was playing games and when a wolf finally did appear, they ignored the boy's genuine cries for help. Over the years the term 'cry wolf' has morphed into a myth about being warned about a danger that does not exist. Whereas the moral of the older 'cry wolf' fable was 'even if you do not listen to the boy, sooner or later he will be right', the 21st century's interpretation of the term 'cry wolf' is that the boy is a liar.

---

[2] 1802, Thomas Campbell, 18th century Scottish poet (1777-1844)
[3] 'The Boy Who Cried Wolf', one of more than 655 fables, supposedly written between 620 and 560 BC by a Greek slave and story-teller called Aesop

As the following literature chapters will show, 'Cry wolf syndrome' or 'cry wolf effect' is operationalised in the disaster and public safety literatures as being the same as warning fatigue; there is no distinction made between the two. This thesis is written with the assumption that 'cry wolf' is what the public perceive the authorities are *doing* (when threats that are repeatedly warned about don't eventuate) and that 'warning fatigue' is the resultant cumulative effect.

Warning Fatigue in Everyday Life

The use of the term warning fatigue in relation to warning scenarios is pervasive in everyday discourse. For example, a February 2013 agenda for the Food and Drug Administration (FDA) advisory committee stated: 'the Committee will discuss general factors in risk communication about FDA regulated products, including approaches to avoid message fatigue and related communication barriers such as prevention or warning fatigue or inaccurate risk perception'.[4] A study by the Social Issues Research Centre (SIRC) in Oxford UK titled 'Health scares can cause psychological side effects' suggested that health promotion campaigns which use shock tactics to discourage people from harmful behaviour could have the opposite effect.[5] The researchers identified three types of unwanted effects, the first of which was warning fatigue. They suggested that this effect resulted in people becoming desensitised to health messages and paying no attention whatsoever concluding: '*That is the danger of crying wolf. When there really is a wolf, you come up against warning fatigue: your audience has simply switched off.*'[6]

The existence of warning fatigue is considered conventional wisdom, that is, everyone knows about it (or at least what it is) and it has become a 'taken-for-granted' phenomenon. There is an assumption by end-users (emergency managers, governmental policy makers and civil defence authorities for example) that warning fatigue not only exists but is a problem. The acceptance of the effects of warning fatigue are widespread and are talked about by disaster and emergency managers, academics and the public alike. For example, in a paper presented at the AFAC[7] conference in Darwin in late 2010, principal research scientist for CSIRO[8] Dr Garry Cook

---

[4] http://www.fda.gov/AdvisoryCommittees/Calendar/ucm335076.htm
[5] http://news.bbc.co.uk/2/hi/health/352150.stm
[6] http://news.bbc.co.uk/2/hi/health/352150.stm
[7] The Australasian Fire and Emergency Service Authorities Council
[8] The Commonwealth Scientific and Industrial Research Organisation is Australia's national science agency and one of the largest and most diverse research agencies in the world.

concluded that in order to reduce residual risk from bushfires in the Australian context the 'cry wolf effect' needed to be managed (Cook, Bradstock and Williams 2010). At the same conference a year later and when explaining how bushfire fighters make decisions in worst-case scenarios, Johnson (2011) identified warning fatigue as the third of seven factors that act as barriers to effective management.[9]

Sandman (2008) identified the dilemma of emergency officials who find it hard to know just how aggressive to be when 'sounding the alarm' as they have a two-fold problem; avoiding the accusation of panicking the public but also running the risk of under-preparing them at the same time (1). Ensuring that people remain vigilant in a prolonged threat scenario is challenging, as Matthew Cochrane, communications and advocacy manager for the International Federation of Red Cross and Red Crescent Societies (IFRC) acknowledged: 'officials risk creating undue panic or becoming 'the boy who cried wolf' [and] it's a fine line between keeping people aware ..but not underwhelmed or overwhelmed'.[10] In June 2007, The Asian Disaster Preparedness Centre issued number 18 of their 'Safer Cities' case studies on mitigating disasters in Asia and the Pacific. This community initiative to provide early warnings was entitled 'The Boy Who Cried "Wolf" or Why a Community-based Alert System is a good idea'. The case study about community responses to tsunami warnings was framed using the cry wolf story and asked 'what is the village, who is the wolf, and who is the boy'? (Safer Cities 2007).

Examples of references to warning fatigue are often found in weather warnings contexts. Weather forecasters are particularly wary of the way they issue weather warnings, because even though technology has developed to the point where extreme weather events can be warned about days or weeks in advance, it is still far from an exact science. An article in the Newark *Star-Ledger* by Stirling (2011) quoted meteorologist Greg Heavener from the Mount Holly National Weather Service: 'You're dealing with dangerous situations and people's lives could be in danger. But if you over-warn, you can become like the boy who cried wolf, people stop paying attention'. Sharma and Patt (2012) point out that natural hazards are inherently uncertain and 'it is

---

[9] Seven factors that act as barriers to effective management : 1) Inexperience, 2) Tunnel Vision, 3) Underestimation of Risk, 4) Suboptimal attitudes, 5) Situation characteristics, 6) interpersonal issues, 7) standard procedures

[10] 'Global: The risk of warning fatigue in disaster preparedness" , http://www.irinnews.org/report/94109/global-the-risk-of-warning-fatigue-in-disaster-preparedness

impossible to make perfect predictions of hazards occurrence and its characteristics' (421). Many of the public understand this, yet when weather forecasters fail to warn of catastrophic events, they are criticised. The recent trial and conviction in an Italian court of six scientists who were accused of failing to give adequate warning of an earthquake in the city of L'Aquila in 2009, illustrate this (MailOnline 2013). The impact on public perception of tsunami warnings was uppermost in the mind of Jim Tetlow of the eastern Bay of Plenty CDEM[11] after a tsunami siren in the coastal town of Whakatane, New Zealand, sounded following a 4.2 magnitude earthquake. However this was a false alarm as there was no actual tsunami warning issued. Tetlow regretted the incident saying that he was 'wary of the Boy Who Cried Wolf factor that false alarms could bring' (Stuff 2013). Similarly, Joseph Miketta, the warning coordination meteorologist at the US Mount Holly National Weather forecast office was concerned about the high false alarm rate associated with tornado warnings and said: 'one of the problems with tornado warnings we see is warning fatigue [which] can have serious consequences' (Stirling 2011).

In March 1993 in the southern Appalachian region of the eastern United States, an extreme weather event occurred, later named the 'Superstorm of '93'.[12] Rhatigan, Barnes and Gruntfest (2004) surveyed emergency managers who dealt with this event and found that some thought that the public's confidence could be lessened by a false alarm, and that 'those issuing warnings may be more reluctant to issue warnings for the fear of issuing a false alarm' (Gruntfest and Carswell 2000; Weaver, Gruntfest and Levy 2000 cited in Barnes, Gruntfest and Hayden et al. 2007:1143). Perhaps the United States National Weather Service[13] was concerned about public warning fatigue when it issued a strongly worded warning to residents directly in the path of Hurricane Sandy.[14] There were five main statements in the warning, and the last one read:

> IF YOU THINK THE STORM IS OVER-HYPED AND EXAGGERATED, PLEASE ERR ON THE SIDE OF CAUTION.[15]

Prior to the same storm, a US news organisation – CNBC – ran a story about the impending disaster entitled *'Frankenstorm: Threat Launches Mass Evacuations'*. In the

---

[11] Civil Defence Emergency Management, New Zealand.
[12] Also known as the Great Blizzard of 1993, it impacted the East Coast of North America on March 12–13, 1993. It was unusually large in size and intensity and killed 310 people.
[13] Mount Holly, New Jersey
[14] Nicknamed "Super storm Sandy", the category 2 storm which killed 285 in seven countries, made landfall on the North-eastern United States on 29 October 2012 and was the largest Atlantic hurricane on record, spanning 1,800 kms with winds of up to 130kms per hour, producing a storm surge of up to 4 meters.
[15] Complete official warning is described in Appendices 7: Hurricane Sandy Public Information Statement.

article a comment by a resident of a town in the path of the hurricane shows why emergency authorities are wary of false alarms and warning fatigue:

> .But you know how many times they tell you, 'This is it, it's really coming and it's really the big one' and it turns out not to be? I'm afraid people will tune out because of all the false alarms before, and the time you need to take it seriously, you won't (US News: 'Frankenstorm Threat', 2012).

These examples are far from exhaustive, but serve to demonstrate that the use of the terms cry wolf or warning fatigue is a commonplace occurrence. Understanding how these terms have come to have meanings and impacts ascribed to them is fundamental to the exegesis of warning fatigue in this thesis, because as this chapter will show, it is a much contested term.

Warning Fatigue and False Alarms

The idea that false alarms could be used deliberately for a particular psychological effect has been documented as early as 331BC as a deliberate battle strategy: 'Repeated noisy marches and counter-marches of the cavalry of Alexander the Great kept Porus on tenterhooks, and then, through repetition, dulled his reaction to it' (Hart 1962 cited in Breznitz 1984:xiii). When a warning is given or an alarm sounded, the belief that the threat is real and the warning should be heeded is 'a function of the ratio of recent true alarms to recent false alarms' (ibid.: 12). Because of the assumption that over-warning is problematic and that false alarms reduce confidence in future warnings, in an attempt to mitigate the cry wolf effect emergency managers have been known to change the way they issue warnings. For example, in 2010 the U.S National Weather Service stated that it was actively seeking to reduce the problematic false alarm rate (FAR) related to weather warnings, because of anticipated community complacency (Barnes et al. 2007).

Emergency managers are aware that false alarms can undermine credibility, and want to reduce them. For example, Savage, Baker and Golden et al. (1984) report that having previously ordered evacuation orders that proved unnecessary, government officials during a subsequent hurricane[16] opted not to recommend evacuation because they were worried they would be accused of 'being wrong again' (cited in Mileti and Sorenson 1990:76). In tsunami warning scenarios, false alarms are problematic as they are often triggered automatically by emergency systems rather than manually by emergency authorities. Most often earthquakes do not generate tsunamis big enough

---

[16] Hurricane Alicia, struck Galveston and Houston, Texas in August 1983, causing US$2.6 billion dollars and killing 21 people.

to justify evacuation. A paper by Simmons and Sutter (2009) that explored the false alarm effect by plotting the relationship between tornado false alarms and death and injury rate from tornados for the same period,[17] found that there was a statistically significant false alarm effect in areas with a higher false alarm ratio (FAR). The study concluded that public perception of the FAR may be different to the actual effects; this observation illustrates that often public perception of risk is at odds with the official or experts evaluation of the same event. The public may not be able to distinguish between a false alarm and a near miss, or credit a near miss as a false alarm and vice-versa. This problem is not confined to the general public. In much of the literature reviewed for this chapter the language used in warning scenarios was often contradictory, vague and confusing; terminologies were used interchangeably with little distinction made between 'warnings' or 'predictions', 'false alarms' or 'near misses'.

'Disaster' is a highly contested term, and can be equally a social construct as well as an actual physical event. As Quarantelli (1975) points out, conceptualising 'disaster' is important, albeit difficult, because a broad consensus about what a disaster is needed if peoples working in different disciplines are to understand each other. At a minimum, it is important to have some agreement about 'characteristics of the phenomena, the conditions that lead to them and the consequences that result' (ibid:225). As stated in the glossary on page 10, a disaster is operationalised in this thesis as a natural catastrophe that causes great damage or loss of life.

The majority of contemporary disaster warnings are not typically followed by impact (Reser 1996). Therefore if 'high alarm' messages do not eventuate in an event of corresponding magnitude (despite the very real nature of the threat), it is possible that the public may become desensitised to subsequent warnings, be less concerned about the hazard and fail to take it as seriously as the emergency agencies recommend. Twerski, Donaher, and Piehler et al. (1976) suggest that over-warning or the frequency of warnings (in the environment) 'may contribute to a perception that certain types of warnings should be ignored' (cited in Stewart and Martin 1994:7). The very idea of a false alarm is problematic as it implies that any response to the warning was a waste of time, maybe a bit foolish, certainly unnecessary. After responding to a false alarm people can feel that they have lost face and were foolish for believing the prediction,

---

[17] In the United States from 1986 to 2004

and presume that preparatory and avoidant action were wasted (Breznitz 1984). Another study (Atwood and Major 1998) suggested that some people who had been involved in a false alarm event may feel that the event was 'a bad joke in which they been had played for a fool' (296). The problem is that people are 'exposed to repeated warning messages in the absence of an actual impact' (Reser 1996:204) and recent research into public reactions to the global avian flu pandemic supports this.[18] When the H5N1 influenza was first warned about in 2002, New Zealanders who had taken the threat seriously were subsequently ridiculed by others people in their social networks when the H5N1 threat turned out not to be as serious as first predicted (Mackie 2009). It is the repeated nature of false alarms that this thesis suggests is problematic; on the basis of cumulative experience of false alarms, subsequent warnings are 'reinterpreted at some point as benign' (Brezntiz 1984:15).

Barnes et al. (2007) conceptualised a 'general depiction of warnings for possible events' (1143) where instead of a 'yes/no' schema where events were classified as either an accurate warning or a false alarm, a spectrum of events could be mapped to reflect a range of warning scenarios.

Conceptual Model of Warning Accuracy

Unwarned Event		Perfect Warning		False Alarm
Warning was not issued but event occurred	Event occurred but was more severe than warning	Event followed as specified	Event occurred but was less severe than warning	Warning was issued but event did not occur
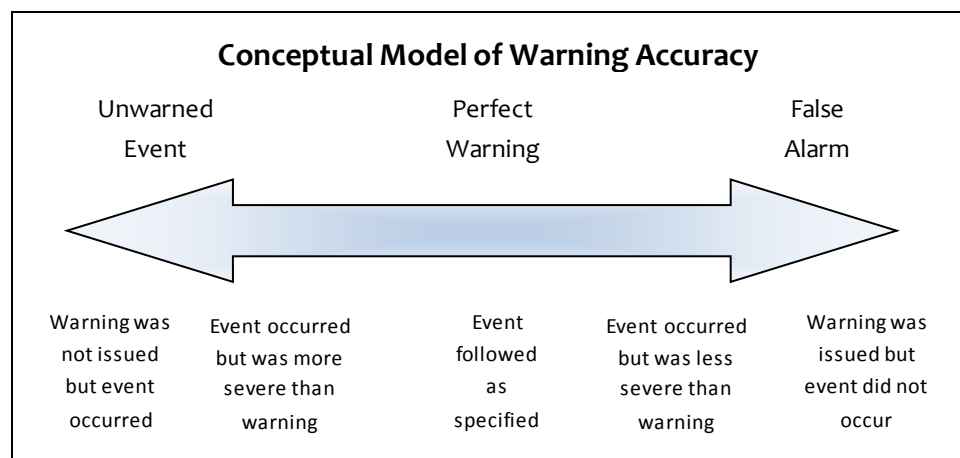
Figure 1: Conceptual Model of Warning Accuracy (Barnes et al. 2007:1144)

The model by Barnes et al. (2007) of warning accuracy reflects a range of official warnings, but makes no assumptions about how each warning scenario could impact upon public response. An adapted model is discussed in chapter 3.[19] There is an obvious negative effect on subsequent public response if false alarms occur, however, this can be mitigated if the reasons for the mistake are clearly communicated to the public (Mileti and Peek 2000:191). In this way false alarms may serve to improve public hazard

---

[18] Avian influenza, or H5N1, began in Asia in 2003 and by 2009 had killed 125 people worldwide.
[19] Page 39.

awareness and risk appraisal, and could be 'an opportunity to convey information' (Mileti and Sorenson 1990:33). Dow and Cutter (1998, 2000) offer that there is a difference between public response to a single false alarm compared with repeated false alarms and suggest that if the public understands why a false alarm has happened, their subsequent response (to another alarm) will not decrease. Sandman (2012) argues that the public are wise to lose faith in false alarms because he maintains that 'properly constructed warnings aren't falsified when the risk doesn't materialise ... any more than the failure of a house to catch fire negates the purchase of fire insurance' (6).

The Australian public is warned throughout the year about the dangers of bushfires and two discourses are common: if the winter has been wet it has produced abundant fuel for the summer bushfire season. However if the winter months have been dry, then the coming fire season is predicted to be dire. Immediately prior to the fire season, there are numerous official bushfire warnings, [20] and this cycle of bushfire rhetoric continues year after year. However, a bushfire event sufficiently destructive to be called a disaster rarely happens. For example, the 2009 Victorian Black Saturday bushfires (resulting in 173 deaths) occurred some 26 years after the previous comparable bushfire disaster event: the Ash Wednesday bushfires in which 47 Victorians perished.[21] Nonetheless, major bushfires occur often enough that most people know what a dangerous and unpredictable threat they can be. In Australia, fire danger warnings are issued by the Bureau of Meteorology when the fire forecast is deemed to be Extreme/Catastrophic. During the 2002-2003 fire season (November to April) there were 1,234 fire-weather warnings, of which just over half provided an advanced warning and 40 percent were false alarms (BoM 2003). There is little research about the impact of false alarms in the Australian bushfire context. More research is needed to understand whether false alarms are detrimental to public response to bushfire warnings; additionally, what measures could be adopted to lower the false alarm rate. This discussion is outside the scope of this thesis.

The 'Myth' of Warning Fatigue

Much of the existing disaster literature talks about the 'myth' of the cry wolf syndrome or effect, implying that it doesn't exist. However, much of the same literature raises questions about the public's response and puzzlement as to their non-response. Reser

---

[20] See discussion of warnings in the Australian context – chapter 5, page 119 - 124
[21] http://www.historychannel.com.au/articles/48/the-worst-bushfires-in-australian-history#.UyJF_dflZ5A

(1996) says there is little evidence to support warning fatigue but in the same paper he states 'repeated natural disaster warnings, as for example in the case of cyclones, can lead to inattention, complacency and desensitisation' (204). Sorenson (1993) calls 'cry wolf' a myth, yet when he explains what he means, he says that warnings are not *always* diminished by cry wolf syndrome implying therefore that sometimes they are. As Nigg (1995) points out, a myth does not necessarily mean that a social phenomenon should be regarded as fiction, but rather 'as a cultural explanation for events and phenomena that impact peoples lives' (374). Moreover, these myths are more likely to be associated with natural disasters[22] than man-made technological ones.[23] (Fischer and Bischoff 1987 cited in Nigg 1995). A 2002 workshop on effective hazards warnings[24] repeated the dictum that the cry wolf effect is a myth, yet it also qualified this statement by saying that [only] rare events produce this effect. Moreover, it is important to try and not interrupt peoples' lives with warnings [and] to limit the number of interruptions to those situations that are directly hazardous to them' ('Developing a Unified All-Hazards Public Warning System' 2002). Perhaps the prolonged disaster scenarios as outlined later in this chapter typify these 'rare events'.

Literature to date

Much of the literature that explores the cry wolf phenomenon was published over 30 years ago and only two empirical studies of warning fatigue have been done to date. In an early study Breznitz (1984) hypothesised that warning fatigue (or the False Alarm Effect – FAE) was a result of anticipatory stress from repeated threats of future harm that did not eventuate. His premise was that people cannot sustain vigilance about personal risk and through various coping mechanisms (of which warning fatigue is one) strive to palliate or mitigate the anticipated stress. Breznitz (1984) operationalised anticipatory stress as fear and hypothesised that any change in the amount of fear a person may experience as a result of a threat, could be a function of time. He also explored whether the way that a threat was communicated affected the fear response. He tested his theory of warning fatigue with participants in a laboratory setting, threatening them with a stimulus and measuring the strength of their fear reaction when the stimulus was not administered. The stimulus was the threat of an unavoidable intense electric shock,[25] the imminence of which was known to the participant and

---

[22] Extreme weather, earthquakes, bushfires
[23] Radioactive leaks, health scares, dam collapses, for example.
[24] 'Workshop on Effective Hazards Warnings' held in Emmetsburg Maryland, November 25, 2002
[25] This methodology would never have been approved by a 21st century ethics committee!

anticipated by watching a clock. The participant did not experience the shock prior to the experiment and knew when the shock was supposed to occur thus eliminating temporal uncertainty - where the participants do not know the exact time of danger. The fear or FAE indexes were heart rate (beats per minute) and skin conductivity. Some of his findings included:

- Threats increase a fear reaction and the cancellation of threats decreases it.
- The probability of a threat is positively related to the intensity of a fear reaction and a high probability threat leads to a stronger FAE.
- The greater the similarity between the new threat and the cancelled one, the greater the FAE.
- New information about why the threat was cancelled (not available during the issuing of the original threat) did not restore credibility.

The overall conclusion of the research was that a false alarm experience reduces the fear reaction of the receiver. Breznitz (1984) also hypothesised that personality characteristics and social norms influenced the extent to which individuals were susceptible to the FAE. His research was laboratory-based with a contrived threat stimulus and was not generalised to a real-world application of natural hazards. This was because Breznitz deemed warning fatigue 'too complicated a phenomenon to be studied in its natural environment' (23).

Turner (1983) explored six hypotheses[26] related to an extended period of waiting for a disaster, using as a case study a series of 'earthquake-near' predictions in 1976 of a 'great and destructive' earthquake in Los Angeles County. His second hypothesis was that a cry wolf effect could result from people concluding that 'the entire alarm was unjustified in the first place' and that the forecasters or scientists 'did not know what they were doing' (308). Turner found that people became less sceptical and disillusioned and so rejected his hypothesis. However, Turner's definition of 'cry wolf' is problematic because a fundamental premise of this thesis is that the cry wolf effect is the *end* result of a series of warnings not a faulty assumption at the *beginning* of the process. In dismissing warning fatigue as a possibility but then linking his conclusion with source credibility (scientists and forecasters) Turner ignored the vast body of risk communication literature that shows there is a strong correlation between trust and credibility of officials on one hand, and the public's uptake and belief of risk messages

---

[26] Turners hypothesised that when waiting for a disaster: 1) there is an initial sense of urgency; 2) warning fatigue may develop; 3) anxiety accumulates resulting in denial; 4) accumulated anxiety results in suspicion, scapegoating and resentment; 5) people seek clarification, hear repeated reminders and seek more information; and 6) led to rehearsals and selection of more effective responses.

on the other (for example Covello & Sandman 2001; Eagly et al. 1978; Flynn et al. 1992; Giddens and Pierson 2009; Gutteling and Weigman 1996; Hovland and Weiss 1952; Johnson and Sandman 1992; McGuire 1969; Pidgeon et al. 2003; Renn and Levine 1991; Sandman 1993, 2004, 2008). Turners study also interchanged the terms 'prediction' and 'warning'. Turner also linked his participants remembering earthquake 'announcements' with how likely they thought the earthquake may happen. This demonstrates only that a level of attention was paid to the announcements and more research into the specific components of the message would have added clarity to his findings. The sense of urgency about the earthquake threat and perception of its imminence did decline over time which Turner suggested should be interpreted as increasing realism. Turner also found that despite repeated 'reminders' the participants' uncertainty about the impending disaster increased, which other studies suggest would decrease credibility and increase warning fatigue. These observations imply a cumulative effect of warning fatigue which needs to be examined over a longer period than Turner used for his study.

Atwood and Major (1998) tested the cry wolf hypothesis based on an earthquake prediction by a New Mexico business consultant and self-taught climatologist, Iben Browning. His prediction had been widely reported in the media since late 1989, but it was not until October 1990 that the Ad Hoc Working Group from the National Earthquake Prediction Evaluation Council (NEPEC) announced that the 'prediction had no scientific value' (280). Atwood and Major (ibid.) observed that up to half of the public had recalled that a prediction had been made but the study did not explore the reasons for the recall. The results concluded that a false alarm effect was evident because after Browning's prediction was cancelled, people spent less time thinking about and preparing for the threat. They also assessed the earthquake as less of a threat than before the cancellation. Atwood and Major's study had some methodological limitations and was similar to Turners study in that the terminologies are used interchangeably: 'cry wolf' and 'false alarm effect' and 'warning fatigue' are described as the same phenomenon. Browning's predictions were made known through the media, but the effects on the public from the media reporting were not considered.[27]

---

[27] Media effects are discussed in Chapter 3.

Most of the literature to date has used weather warnings as their case studies. An example is a study by Dow and Cutter (1998) that explores the cry wolf effect in the context of people's responses to two hurricanes (Bertha and Fran), which made landfall in North Carolina in 1996. The underlying premise of the study was that 'repeated false alarms reduce the credibility of warning information' (2). It explored the cry wolf effect through examining the evacuation compliance of residents in the path of the predicted hurricanes. Dow hypothesised that information credibility was a factor in residents' evaluation of risk from the hurricanes and concluded that cry wolf was not a factor because there was no drop in information credibility after the first hurricane. However, there was no 'base-line' measurement established pre-hurricane which makes it difficult to conclusively surmise the drop (or otherwise) of the rate of information reliability. Dow and Cutter (ibid.) assumed a decrease in evacuations for the second hurricane would demonstrate a cry wolf effect; as this did not happen they concluded that the cry wolf effect was minimal, whilst noting that there seems to be a growing 'evacuation-resistant' population. Although in their study Dow and Cutter (1998) did not find evidence of the cry-wolf effect, they commented that the cry-wolf effect is often 'a widespread source of speculation and concern within the warning community' (1142). A strength of Dow and Cutters approach was that their study included cultural and social contexts, and included several different information sources.[28]

In a study that examined the inconsistent literature about the effect of experience upon warning response, Sharma and Patt (2012) suggest that the definition of experience may be problematic. They highlight that some literature defines experience as simply witnessing an event whereas other literature characterises experience as substantial loss. Many studies (but not all) negatively correlate experience (of either type) with disaster response. Sharma and Patt (ibid.) support the concept of a continuum to demonstrate a range of warning accuracy (Barnes et al. 2007) and their study concluded that 'the greater the experience of false alarms, the lesser the tendency to respond to warnings' (Sharma and Patt 2012:421). This finding has important implications for the exploration of false alarms as a factor in generating warning fatigue. In a different vein, but perhaps no less relevant, Roulston and Smith (2004) propose a cost-benefit (or cost-loss) matrix for the cry wolf fable scenario which factored in the rationality of the villagers in making the decision not to come to the aid of the shepherd boy. They

---

[28] Government officials at various levels, and information sources such as the Weather Channel (Dow 1998:2).

supposed that if the villagers had done a cost-benefit analysis, where the flock of sheep was one of the villages' most important assets, then they should have tolerated a quite high false alarm rate. Roulston and Smith (ibid.) calculated the false alarm rate was about 67 percent, which unfortunately for both the boy and the villagers, produced a low rate of compliance (answering the boys' cries for help). Through mathematical modelling Ralston and Smith (ibid.) show however that compliance is a combination of the frequency of the forecasted probabilities, cost-loss ratio and the intolerance of the users to false alarms. When seeking explanations for the phenomena of warning fatigue, these are ideas which merit consideration.

Sandman (2008) maintains that apathy is a more pressing problem than warning fatigue and that people 'intuitively understand that a false alarm is a much smaller problem than a disaster they weren't warned about'(3). Furthermore he argued that people stop taking warnings seriously if previous warnings do not eventuate and too many warnings about risk that do not materialize may result in people who shrug off future warnings (Sandman 2011). Sandman highlights the issue of contradictory warning language and ponders whether the warnings that are most susceptible to warning fatigue are not in fact warnings, but predictions. He suggests that warning fatigue, should it prove to be an issue in the bushfire context, may be a temporary effect and part of what he calls an adjustment reaction (ibid.: 2005a).[29] This is where, after a rare and catastrophic event, it is common for people to think there will be more similar events. However, when this doesn't happen the disaster is contextualised and preparations relaxed.

Warning fatigue could be beneficial because it may serve to correct an over-prepared organisational and personal disaster response that could 'waste resources year after year whilst waiting for a rare event to finally materialise' (Sandman 2012). Continuing this idea, Sandman (ibid.) did a 'cost-benefit' analysis, assuming that a bushfire similar to Black Saturday occurred once every twenty years (with comparable householder fatality rates), which equated to nine lives lost per year. He posed the question: 'how much distortion in people's lives is appropriate to save something less than ten lives per year'? This idea challenges the emphasis put on warning about bushfires by fire agencies and suggests a different way of thinking about bushfire risk communication.

---

[29] Peter Sandmans 'adjustment reaction' is discussed on page 45.

Over-reassurance by authorities is criticised by Sandman as 'warning fatigues' evil twin' (2008). He asserts that whilst exaggerated warnings about realistic potential hazards perform a service because they get people's attention and motivate precautions, 'by contrast, exaggerated reassurances about realistic potential hazards are mostly a disservice, lulling people into apathy about genuine problems' (Sandman 2013). Sandman maintains that warning fatigue operates much more in the sphere of risk probability than of risk consequence and that credibility is more likely to be damaged when warnings overstate how probable or imminent a potential catastrophe may be; it is far less damaged when warnings dramatize or even exaggerate how bad it might get if it happens (P. Sandman, personal communication *used with permission:* 20 September 2013). Implications of this approach are that warning fatigue is hypothesised to be less of an issue when warnings overstate the probability of the threat but have a greater effect when warnings overstate how bad things may get. This hypothesis is discussed in chapter 10. Sandman (2013) explains that 'I certainly don't think warning fatigue is a myth. But I do think its risks are themselves often overstated' (ibid.).

Discussion

It is the premise of this thesis that warning fatigue, as a warning response has been presumptively and wrongly assigned by disaster literature to the category of a myth.[30] Examination of the literature, and an analysis of commentaries, presentations, news stories and articles have shown that policy makers, emergency managers, academics and the public use the term cry wolf or warning fatigue in everyday life and, as conventional wisdom, believe that it is an influence on risk perception and warning response. The literature to date has examined the phenomenon both in a laboratory setting and in the field and has done so in the context of rapid onset disasters. However, the studies on false alarms suggest there is a direct relationship between warning time, preparedness and response. This allows for the possibility that warning fatigue may be a function of risk perception, frequency of warning messages, types of disaster and warning lead-time. This chapter has also highlighted the confusing and contradictory nature of the language that is often used in the disaster literature and by those issuing warning messages.

---

[30] Disaster myths are discussed in Chapter 3, page 50.

Australian bushfires are an infrequent disaster-level event, occurring once every 20-30 years in the magnitude that destroys vast swathes of land and causes many property losses and civilian deaths. However, it is also a threat which has an annual 'season' and is the reason for a myriad of official bushfire warnings. These are many and various, communicated primarily by fire agencies via a variety of methods.[31] Research on the Australian public's response to bushfire warnings has been limited, and has mostly focused on disaster behaviour, compliance with the 'Stay or Go' policy,[32] effectiveness of evacuation options and the benefits of preparedness on survivability. This thesis asserts that, in the context of a prolonged disaster threat which generates repeated warnings in the absence of an actual event, there is a need to understand how people assess their actual bushfire risk. Additionally, more research is needed to understand those things which influence attention to warnings and response. This chapter has considered the 'case for warning fatigue' and the following chapters explore the experiences, opinions and viewpoints of people living in bushfire-prone areas of Australia to see if warning fatigue is an influence upon risk perception and warning response. Rather than 'make an argument' for warning fatigue at the outset, this thesis makes no assumptions about the existence of the phenomenon.

The principle aim of the research reported in this thesis is to explore the phenomenon of warning fatigue and establish whether there was a way to operationalise it in such a way that it could be measured. Through the evaluation of relevant literature, use of pertinent theoretical epistemologies and analysis of in-depth interviews this thesis seeks to explore risk perception and warning response in the Australian bushfire context. The framework of this thesis is risk communication and risk perception and an argument will be made for examining these subjects drawing upon knowledges from both psychosocial and sociological disciplines. The media is implicit in communication and it is important to understand how the media can influence public perception of salient issues; indeed how some issues can be *made* salient by the media. Risk communication should not imply crisis communication although in many instances they are confounded.[33] In this thesis it is the communication that happens before an event (sometimes many years before) that is the framework within which warning fatigue is explored.

---

[31] Bushfire Risk communication is discussed in chapter 5, page 119.
[32] http://www.royalcommission.vic.gov.au/Documents/HR-Chapters/Chapter7_HR.pdf
[33] Crisis Communication is discussed in Chapter 5, page 109.

Thesis Overview

Chapter 2: The Australian bushfires in Context

This chapter situates the thesis in the Australian bushfire context. It details the unique vegetation of Australia and explains the role it has in Australia's 'bushfire story'. It examines the differing bushfire discourses and shows how the utilisation of 'collective remembering' and repeated memorial events can serve to keep the risk of bushfires salient for the public.

Chapter 3: Disasters, Media and Warnings

This chapter examines the role of the media in communicating risk and narrows the focus to the ways disasters are reported. Disaster myths are addressed with particular attention paid to Australian bushfire myths. Using relevant risk, media and disaster theories, the ways that the media report risk (and disasters in particular) and 'mediate' disaster risk for the public is discussed. A disaster typology is proposed that shows how the notions of certainty and uncertainty can influence how disaster risk is regarded.

Chapter 4: Subjectivity in the Social Domain

A psychosocial approach to understanding risk and the role that fear response plays in risk perception comprises much of this chapter. Arguments for the merit of including a cognitive approach in a sociological thesis are made. Approaches for understanding perception of risk include cognitive adaptations, coping strategies, biases and maladaptations. There is a focus on the cognitive affects that may contribute to warning fatigue.

Chapter 5: Risk

Risk perception and communication is examined from the perspective of 'the social' in this chapter. Pertinent risk communication theories as well as risk heuristics and biases are discussed. The latter part of this chapter details the official bushfire risk communication of the Country Fire Authority in Victoria, Australia.

Chapter 6: Methodology

This chapter outlines the epistemological frameworks and the theoretical and analytic methodologies used to examine the phenomenon of warning fatigue. In particular this chapter explains how the integrative and interdisciplinary philosophy, fundamental to this thesis, directed the methodological design. Practical considerations of participant

recruitment, interviewing and data issues as well as ethical and methodological limitations are elaborated upon.

Chapter 7: Study One

This first analysis chapter reports findings from semi-structured interviews with people living in bushfire-prone areas of Victoria and Tasmania who regularly attend community bushfire preparation meetings. The investigation of bushfire issues for this round of interviews was broad in approach, and covered a wide range of topics. Additionally it provided a framework to continue to conceptualise warning fatigue in the bushfire context.

Chapter 8: Study Two

The second analysis chapter extended the exploration of peoples' 'lived experiences' of bushfire risk. It reports findings from semi-structured interviews with people living in bushfire-prone areas of Victoria who, unlike the cohort in Chapter 7, were not involved in any community bushfire preparation activities. The interview protocol was more structured and focused on risk perception, warnings and warning responses.

Chapter 9: Study Three

The last analysis chapter reports results from a survey of a third sample of residents living in bushfire-prone areas of Victoria, Queensland and New South Wales. The survey was designed to test a purposively-designed self-report bushfire warning fatigue measure. The measure comprised items derived from both the disaster literature and the findings from the first two studies. Using both qualitative and quantitative methodologies, the measure was refined and used to determine levels of warning fatigue over a six month period.

Chapter 10 : Discussion and Implications

This last chapter presents the main findings of the thesis and how the research responds to gaps in knowledge previously identified in disaster literatures. It discusses the social construction of warning fatigue in the Australian bushfire context and describes the advantages of understanding warning fatigue in a broader disaster context.

2: AUSTRALIAN BUSHFIRES

Introduction

This chapter situates the thesis within the physical, cultural and social environments of Australian bushfires. Understanding the cultural and social meanings of bushfires is important because people rely on this knowledge when making decisions that can affect their survival during bushfires (Schauble 2008). The notion of bushfire risk is a social construction,[34] because as people gain knowledge about bushfires, meanings are created, organised and 'made concrete'. Cultural representations of fire include the place of fire in Australian culture, its landscape and its depiction as a disaster; they 'reflect the knowledges that Australians have developed about bushfires, their characteristics, behaviour and place in the landscape' (Schauble 2008:12). Bushfire is embedded in a larger nature discourse, which includes notions of 'the bush' and 'the bushranger'; these ideas are not 'neutral' and over the years have been imbued with meanings, symbolism and myth. Bushfires are talked about using competing narratives: they are natural or unnatural, good or bad, controllable or uncontrollable. Fires can be thought of as necessary for plant regeneration, a destroying force, the result of European ignorance or indigenous hunting practices.

Perceptions (and misperceptions) of bushfire are linked to narratives about the bush and narratives are produced by culture because they 'generate meanings' (Turner 1986:25). Moreover, as Schauble (2008) argues culture is just as 'equally influenced by the landscape and events within it' (13) because the land is not only constructed from meaning and language but also is transformed 'itself by words, phrases and ways of telling' (Bonyhady and Griffiths 2002 in Schauble 2007:18). This chapter discusses two of the worst bushfires in Australia's recent history – Ash Wednesday and Black Saturday – and show how different discourses can be drawn upon to understand the bushfire 'problem'. It also outlines the characteristics of Australia's landscape and bush that make it so susceptible to bushfire year after year. It situates the ideas about bushfire in Australia's recent history and explores the role of culture, context and collective remembering in the social construction of bushfire.

---

[34] Social constructionism is a foundational theory for this thesis and is discussed in Chapter 6, page 128.

The Landscape and the Eucalypt

We have had disastrous bushfires in the past, and we must expect them in the future with about the same frequency. Australia will burn time and time again (Packham 1992:12).

The geographic peculiarities of Australia contribute greatly to its bushfire vulnerability and every year eighty percent of Australia does not have any significant rainfall (Clode 2010). Australia is one of the most bushfire-prone countries in the world, with the worst bushfires most often occurring in the states of Victoria and South Australia. After heatwaves, tropical cyclones and floods, bushfires have been the fourth most hazardous Australian natural disaster in the last century (Coates 1999). This is because of several climactic and geographical factors; both states lie on the edge of the Great Victoria Desert.[35] The propensity for drought, seasonal growth associated with cyclic weather patterns (very wet months followed by drought) and the location of heavily populated areas make these states especially vulnerable to large-scale bushfires (Luke and McArthur 1978). The topography of the mountains, steep slopes, ridges and valleys channel the hot air that originates from the inland deserts which are amongst the hottest areas on earth. When very dry hot air is transported from central Australia over to the south east corner of the continent it does not pick up any additional moisture; intense heat builds and can be accompanied by very strong, gale force northwest winds (BoM 2013)

Bushfires and climate are intrinsically linked; for example prior to the Ash Wednesday bushfires of 1983 and as a result of the El Niño climatic cycle, over large areas of eastern Australia there had been the most severe drought since records began in the 1870's (Bureau of Meteorology 1982). Atmospheric conditions are one of several environmental factors for bushfires[36] and when the years are hotter and drier, fires start more easily and the fire season is often prolonged (Liu, Goodrick and Heilman 2013). Modelling of climate change due to the greenhouse effect suggest an increase in temperature worldwide which increases the likelihood of bushfires, even in regions not normally prone (IPCC, 2007). Climate change projections indicate that Victoria and NSW are likely to become hotter and drier in future while Tasmania is predicted to become

---

[35] The Great Victoria Desert stretches from Western Australia to South Australia; it is over 800 kilometres wide and covers an area of 424,000 square kilometres.
[36] The other factors include fuels, topography and management and the human factor of urbanisation.

warmer and wetter (Hennessy, Lucas and Nicholls et al. 2005:6). Therefore the inclusion of possible climate change impacts in future bushfires management practices is an important consideration.

The most common tree in the Australian landscape is the eucalypt. The Eucalyptus tree dominates the Australian landscape and has given Australia a special character; called 'The Universal Australian' it is 'less of a genus than an alliance with over 700 different species' (Pyne 1998). Commonly known as the 'gum tree' because many species bleed sap from any break in the bark, the Eucalypt is uniquely adapted for the Australian climate. Not only does it have a large root system capable of capturing and retaining water, but once water is absorbed the tree is able to store more nutrients than it immediately needs, using lignotubers or enlarged storage organs in its roots. It can produce seedlings, not only from these lignotubers, but from any broken branch, where it uses nutrients cached between the inner heartwood and the outer bark to facilitate rapid growth (Lyne 1996). The bark of a Eucalypt is thick, and as such is able to protect the epicormic buds beneath it during a fire, allowing the buds after a fire to almost immediately push through the burnt bark and begin sprouting. But whilst these many characteristics demonstrate its ability to survive bushfires, it is the sclerophyllous leaves that explain why the Eucalypt is no friend of the fire-fighter (Hillis 1967). As in other members of the myrtle family, Eucalyptus leaves are covered with oil glands, and produce the Eucalyptus oil which is uniquely scented. Australia's only medicinal export, it is often used in decongestants and has antiseptic and insect repellent properties. On very warm days or when exposed to the heat of a bushfire, the oil evaporates and rises above the tree, giving off a blue haze and creating a combustible gas. In the inferno which is a firestorm, trees have been known to literally explode, and the bushfire which begins on the ground is then transported to the tops of the trees, accelerated from canopy to canopy by the inflammable gases (Blakely 1965). In the 2009 Black Saturday bushfires for example, this process allowed the fire to travel at phenomenal speeds.

Bushfire
Bushfire, wildfire, wild-land fire, grass fire, forest fire or scrub fire are all terms used to describe any uncontrolled, non-structural fire burning in a grass, scrub, bush or forested area. In countries where fires are a regular occurrence, California (in the United States) and Greece for example, the different terms relate closely to the type of vegetation that is burned, and is often just referred to as 'wildfire'. 'Bushfire' is the commonly used,

'unique Australian blend of terms' (Schauble 2008:18) to describe any type of fire which burns vegetation. Even in the far north of Australia, the Northern Territory or 'Top End' (as it is colloquially known) where the geography is typically flat with vast areas of grassland, reporting tends to use the term bushfire rather than scrub or grassland fire. The bushfires that occur in Australia can be divided into two kinds and relate to the geography as much as the vegetation that inhabits it: (i) grassland fires that occur on the flat terrain and (ii) bushfires that burn through mountainous regions. All things being equal (ground moisture, humidity, wind speed, and temperature) a fire that begins and burns in the mountains and hills is a much more dangerous proposition. In the simplest of terms, when a fire burns up a slope, it burns faster and more intensely than when on the ground because when the heat is directed towards the ground, it ignites the fuel on it, accelerating and intensifying the fire; the steeper the slope, the greater the wind, the hotter the fire and the more rapidly the fire will burn (Campbell 2003., Hennessy et al. 2005).

Ash Wednesday

The Ash Wednesday bushfire - 16 February 1983 – was one of more than 180 fires burning throughout Victoria on that day. It was one of the worst fire weather days in south-east Australia since the disastrous Black Friday bushfires in 1939[37] and was the deadliest on record until the Black Saturday bushfires of February 2009. The summer of 1983 was one of the hottest and driest on record. After more than ten months of drought, a scorching heat wave primed South Australia and Victoria's west coast for fire (ABC 2012). During February 1983, and in the afternoon of Wednesday 16th February, a severe weather system pushed a super-heated airflow ahead of the fire-front which continued to strengthen. It produced gale force winds, high temperatures, low humidity and extensive areas of raised dust. The fire was preceded by a massive dust storm over 300 metres high and 500 kilometres long which cut visibility in Melbourne to 100 metres, creating near darkness for almost an hour (BoM 1983). A series of fires ignited across the country from the Adelaide Hills to east of Melbourne; evacuation became extremely dangerous with hundreds seeking shelter on the beaches. When the fire was over, some 2400 homes and 3700 buildings were destroyed with more than 520,000 hectares of land decimated. Livestock losses were very high, with over 340,000 sheep, 18,000 cattle and numerous native animals either dead or later destroyed

---

[37] The Black Friday fires of 13 January 1939, in Victoria, Australia, burned 20,000 km^2 of land, killed 71 people, destroyed several towns including over 1,300 homes, 69 sawmills; a total of 3,700 buildings.

(Emergency Management Australia 2006). In total 75 people lost their lives (28 in South Australia and 47 in Victoria) - including 13 fire-fighters. In Victoria, up to 8,000 people were evacuated and a state of disaster was declared for the first time in South Australia's history (Collins 2006).

Black Saturday

In terms of lives and livestock lost, the Black Saturday bushfire was the largest, deadliest, and most intense firestorm ever experienced in Australia's post-European history. The death toll was almost double that of Ash Wednesday. A week before the fires, an exceptional heat wave affected the whole of south-eastern Australia, with Melbourne sweltering through three days of record breaking temperatures above 43°C; the temperature peaked at 45.1°C on 30 January, the third hottest day in the city's history (BoM 2009). On Friday 6 February 2009 - the day before the fires started - the Premier of Victoria John Brumby issued a warning about the extreme weather conditions expected on 7 February:

> 'It's just as bad a day as you can imagine and on top of that the state is just tinder-dry. People need to exercise real common sense tomorrow' (Fairfax Media 2009).

On the Saturday, temperatures reached 46.4°C (the highest temperatures since records began in 1859), humidity levels dropped to as low as six percent and north-westerly winds were over 100 km/h. In the early evening there was a wind change which proved to be the defining moment in the fires' progress: it caused the long eastern flanks of the fires to become massive fire fronts that burned with incredible speed and ferocity towards towns that had earlier escaped the flames.

As many as 400 individual fires were recorded on 7 February and the major fires claimed 173 lives; 120 people were killed by a single fire in the Kinglake area alone. The worst bushfires in the nation's history injured 5,000 people, destroyed 2,029 homes, killed countless animals and burnt through over 4,500² hectares of land (Building Commission Victoria 2010). The fires affected 78 townships and displaced an estimated 7,562 people. The Insurance Council of Australia reported insurance claims of $1.2 billion and the fires were investigated by a Royal Commission which included a re-examination of existing recommendations and policies.[38]

---

[38] http://www.royalcommission.vic.gov.au/

Cultural Interpretations of the 'The Bush'

How Australians have responded to bushfire is an intensely practical matter but it is also a metaphor for how they relate to their environment, which is to say, a metaphor for who they are (Pyne 1995:43)

'The Bush' has an iconic status in Australian life and romanticising the bush was part of the way Australians constructed their identity. Many Australian myths and legends, intrinsic to understanding Australian culture, have emanated from the bush. For example, prior to World War I characteristics of bush life and the land - sleeping in the open air, learning to ride and shoot, fighting bushfires – were credited with preparing the Australian soldiers for battle (The Australian Government, 'The Australian Bush'). Flannery (1994) asserts that any ideas of Australian nationhood must come from 'an intimate understanding of Australian ecosystems' (24). The bush or land has been depicted in song, or art or literature as the only thing that Australians share in common; 'it is at once our inheritance, our sustenance, and the only force ubiquitous and powerful enough to craft a truly Australian people' (Flannery 2002). Representations of the bush provide strong cultural orientations, for example stories of the Outback, with its bushrangers and swagmen, are central to the Australian psyche. 'Waltzing Matilda', Australia's unofficial national anthem, encapsulates these themes.[39]

Australian identity created bushrangers as bush legends who were able to live within, control and overcome 'the bush'. The Australian cultural representation of the Bushmen as strong resilient men paints a picture of mate-ship, resilience and tremendous resourcefulness. The notion of 'mate-ship', comradeship and endurance has been pivotal in defining the Australian man. Pioneers had to rely upon each other because if they did not, they would surely perish; 'therefore mate-ship was esteemed above all other value [and is] considered a central tenet of Australian culture' (Flannery 1994:390). The quintessential Australian man is renewed in more recent bush legends such as 'Crocodile Dundee'[40] or 'Steve Irwin'[41] who, like the bush in which they lived, were savvy, tough and uncompromising. They were also imagined to be resourceful, tenacious and could be utterly relied upon in a crisis. This romanticised version endures despite its weak relationship to the truth of most Australians experiences, even by the

---

[39] Waltzing Matilda lyrics – Appendix 8.

[40] "Crocodile" Dundee is a 1986 Australian comedy film set in the Australian Outback about an eccentric crocodile hunter

[41] Stephen Robert "Steve" Irwin (22 February 1962 – 4 September 2006) was nicknamed "The Crocodile Hunter", was an Australian television personality, wildlife expert, and conservationist.

19th century a 'real bushman' was a thing of the past (Carroll 1992). However, these legends leave cultural legacies that influence present day perceptions of belonging and identity.

For the 18th century European navigators, arriving for the first time on the shores of a new continent, 'numerous smokes arising from native fires announced a country well inhabited'.[42] For the new settler's, fire was a signifier of occupancy but not of ownership; this came only after 'ploughing, tilling, grazing, sowing and harvesting' (Clode 2010:23). However, for indigenous Australians (the Aborigines) fire and smoke was tangible evidence of their relationship and stewardship of the land. As the following Aboriginal saying shows, this conservancy of the land is more than a belief; it is intrinsically linked to their spirituality:

> We don't own the land, the land owns us. The land is my mother, my mother is the land. Land is the starting point to where it all began. It's like picking up a piece of dirt and saying this is where I started and this is where I'll go. The land is our food, our culture, our spirit and identity.[43]

Different discourses about bushfire arise out of different conceptualisations of the land. Commentaries on the fire practices of the Aborigines show that there are a wide range of opinions on the impact that these practices have had on the Australian bush. Some literature espouses that Aboriginal burning over thousands of years enabled hunting, promoted an under-story of native grasses and kept the bush relatively free of scrub, creating the bush that is familiar today (Jones 1969). The discourses about the Aboriginal use of fire and their relationship with the land are conflicting and at times deviate into folklore. One discourse is that Aborigines managed the land, a perspective that aligns 'more comfortably with Western concepts of property ownership' (Clode 2010:26). Ethnographic evidence for Aboriginal burning practices can be found in many of the First Fleet journals:

> The weather being very dry, the natives were employed in burning grass on the north shore opposite Sydney, in order to catch rats and other animals…this is their constant practice in dry weather.[44]

The farming tool of the Aborigine was the 'fire-stick' and it was how they cultivated the land. Historical records show that three quarters of deliberately lit fires occurred in the 'four hottest months of the year [where the] conditions were typically hot and windy'

---

[42] Description of the Hastings river valley, north of Sydney by John Oxley (in) Ryan and Starr (1995)
[43] http://www.brigidine.qld.edu.au/library/pathfinders/re11_AboriginalSpirituality.htm
[44] Governor Arthur Philip, September, 1790

(Clode 2010:38). Whilst surveying the western coast of Australia in 1837, sailors on the HMS Beagle (whose second trip to South America had included Charles Darwin) noted that whilst flushing out game, Aborigines used large green boughs to beat out the flames of a fire which had taken off in the wrong direction.[45] The burning practices of 'the natives' were not always seen in such a positive light, especially when they were used against the colonising pioneers. Examples of the Aborigines using fire as a weapon are many. However, it must be noted that in their efforts to dominate the land and its inhabitants, the Europeans were not averse to also using this tactic (ibid.).

Another discourse is that the Aborigines, by their recklessly indiscriminate burning have irrevocably changed the Australian flora and fauna. However, in terms of impact on the landscape, the ramifications of European fire regimes have been equally significant; land clearing and decreased fire frequency due to suppression are two examples. Russell-Smith, Whitehead and Cook et al. (2003) state that 'the removal of Indigenous people from their country as a result of European settlement [and the] breakdown of traditional burning practices in northern Australia has led to a far higher incidence of large-scale, wildfires late in the season' (cited in Whelan, Roberts and England et al. 2006:3). Referring to the Ash Wednesday fires that roared through Victoria and South Australian in February 1984, Bill Neidjie, the most senior tribal elder of the Gagadju people[46] said what happened was 'a shame [and that] people would not have been killed if the country had been *kept clean'* (italics added; Lewis 1989:14). He explained that it was just as much a crime that the country had been allowed to get so dirty, something that would never had happened in areas for which his tribe had responsibility

European colonisation, with the deforestation of the gold rushes and grand-scale grazing, has been blamed for turning what would have been moderate bushfires, into the disasters that are now part of Australia's bushfire history. Tim Flannery in his book *The Future Eaters* underscores this idea: 'when control [of fire] was wrested from the Aborigines and placed in the hands of Europeans, disaster resulted' (1994:194). Lewis (1989) asserts that Aboriginal burning practices are 'clearly a form of resource and

---

[45] "Fire: The Australian Experience". Publication was originally produced by the Country Fire Authority, Victoria as "Fire in the Australian Environment".

[46] The Gagudju language is an indigenous language from northern Kakadu, after which the World Heritage-listed Kakadu National Park is named. The Gagadju speaking Aborigines were believed to be the region's original inhabitants, and evidence of Aboriginal residence in the Park dates back more than 50,000 years.

environmental management based on traditional ecological knowledge' and that they implicitly know that fire has a direct impact on 'the distribution and relative abundance of plant and animal resources' (946). However, this is a somewhat idealised view and the reality most likely lies somewhere in between the two perspectives. Perhaps the environmental impact of indigenous fire practices was more localised and less chaotic than first imagined, being just one factor of multiple processes including naturally occurring lightning fires and the extreme effects of climate. The competing narratives illustrate the diverse ways that bushfires and 'the bush' are regarded by the Australian people; there is no one way to understand this complex relationship.

Social Construction and Collective Remembering

'Major bushfires are embedded in the Australian collective memory' (Ellis, Kanowski and Whelan 2004 cited in Schauble 2006:105) and when the Australian public think about bushfires they draw upon their cultural resources to make sense of their perceptions. A powerful cultural resource is collective remembering. This is when 'what is recalled and commemorated extends beyond the sum of the participants individual perspectives' (Middleton and Edwards 1990:7). If a cultural object is linked to a salient event institutionalized on the cultural calendar then it will be available and more easily remembered over time (Schudson 1989:162); '9/11' is perhaps the most salient and recognisable disaster event of the 21st century in the western world (thus far) but each generation has events that have been given their own special meaning.[47] Individuals need to draw upon contexts in order to remember or recreate a past event, 'as it is in society that they acquire, recall, recognise and localize their memories' (Olick 2007:38). In this way therefore, history can be understood as not just a series of objective stages or events (one thing after another) but an active process of meaning-making through time; 'the ongoing work of reconstructive imagination' (Assman 1997:9). This meaning-making is exemplified in anniversaries of disasters, where the past event is reconstructed, re-imagined, re-emphasized and re-narrated by the media. The event is both publically remembered and privately experienced.

Collective remembering of disasters encompasses celebration (of personal survival and community resilience) and affirmation of triumph over adversity. There is the sharing of

---

[47] The day that the man walked on the moon, (July 1969), the day that John Kennedy was shot (November 1963), and the death of Princess Diana (August 1997) are but three events that for their generation, are often prefaced with "I remember exactly where I was when ..". Also, in non-western worlds, there are disasters which are equally memorable: the 2004 Indonesian Tsunami (killing approx. 259,000 people, or the 2010 Haiti earthquake, affecting over 3 million people and killing over 200,000

photographs and mementos, a mourning for lives and communities lost and an honouring of heroes and ordinary peoples alike. Disaster memorialisations often provide closure and resolution as people relive frightening events, in an environment where support is evident. When individuals have not directly experienced an event, then knowledge or connection with the event can be developed through accurate reconstructions of the past event; marking the anniversary of a disaster can provide a 'yardstick for gauging the magnitude and effect of current events' (Lang and Lang 1989:133). It is in these memorialisations that echoes of past disasters are heard and constructions of future ones are imagined.

An anniversary, as a collective remembrance, is a ritualised disaster symbol, a moment in time where the disaster is relived and retold. In 2008, a fire-fighter who attended the Ash Wednesday commemoration service at Prospect Hill, Adelaide commented that 'it doesn't seem like 25 years ago, the memories have just come flooding back'. At the same service, a permanent Ash Wednesday exhibition was opened at the museum to 'remember the day, not only for its devastating consequences, but also that it bought forth many heroes'.[48] When bushfires are of a magnitude that results in the loss of whole communities, these events become more than anniversaries or memories. They become an 'easily retrieved symbol' or signifier, with power to affect judgement of future events. The aphorisms 'it felt like that happened yesterday' or 'it was like time stood still' demonstrates this. This is not true for everyone as disasters are not perceived by everyone in the same way, so the importance of this event as a symbol can only be a generalisation at best.

Human Responses to Fire in the Australian Context

Community bushfire safety literature provides an important context for exploring warning fatigue in the Australian bushfire context. Much of the literature does so from the perspective of preparedness and community safety and has found that landowners relationship to the land and their attitudes towards bushfire and natural resource management can predict how the land--owners prepare for bushfire (Eriksen and Gill 2010). Everyday attitudes towards bushfire is interwoven with the 'social fabric' that surrounds peoples living in bushfire-prone areas - local environmental knowledge, social processes, ecological events – and 'in this sense bushfire is embodied in everyday

---

[48] Part of the opening speech at the Prospect Hill museum, by Federal MP and former foreign affairs minister Alexander Downer. http://www.adelaidenow.com.au/tragedy-stings-25-years-on/story-fna7dq6e-1111115568480

life….and becomes a significant factor in how landowners relate to and exist within bushfire-prone landscapes'. (ibid.:816). The relationship with, or perceived knowledge of the local environment may have contributed towards the high number of fatalities on Black Saturday 2009. Haynes et al (2010) found that late evacuation was the most common form of death where people were caught sheltering in their homes or succumbed to the fire whilst fleeing in their vehicles perhaps suggesting a familiarity with their surroundings accompanied with an assumption of control. Regardless, those who died underestimated their ability to survive a bushfire in surrounding they were familiar with. Related to preparedness and survivability is the interpretation and response to the recommended 'Prepare, stay and defend or leave early' policy of the Australian fire services. Rhodes (2005) found that, in a bushfire event, most people opted to 'wait and see' which could be assumed to be a confidence and familiarity in peoples local environment, and in their ability to conduct themselves within it, fire or no fire. Whilst Tibbits and Whittaker (2007) found considerable confusion over the meaning of the term 'leave early; people also relied heavily on unofficial warnings from family and friends as well as interpreting environmental cues such as seeing flames or smelling smoke (Whittaker et al. 2013). These literatures demonstrate that peoples relationship to and understanding of their environment are internalised to a large extent, and play a greater role than first thought in perception of bushfire risk and response to bushfire events. In her book *Ignition Stories: Indigenous Fire Ecology in the Indo-Australian Monsoon Zone,* Fowler (2013) encapsulates one of the main ideas of this chapter:

> *People's relationships to fire, and the relationships people have with one another—with things in their environments and with landscapes— …can involve very personal, very emotional, and very intimate kinds of things* (2).

Discussion

Bushfires are an 'integral part of the cycle of life and death in the Australian bush' (Clode 2010:22) and mankind has always lived with the spectre of uncontrolled fires. However, as the suburbs of Australian cities expand further and further into peri-rural and rural areas, the risk of bushfire impacting upon people intensifies in proportion to the development. 'Fires are an almost unremarkable part of the Australian landscape, and every day, somewhere in Australia, there is a fire. Our risk lies not so much in the nature of our landscape but in how we chose to live in it' (ibid.: 81). The reality that cannot be ignored is that without the people who have built permanent houses in the

bush, in most cases bushfires of catastrophic proportions would not have resulted in the disasters of recent years.

This chapter situates bushfire, not only as a physical entity in a landscape but also as a social and cultural construction of Australian identity. This understanding is central to any analysis of people's perceptions of bushfire risk and responses to bushfire warnings. The way that 'an ideal Australian man' has been depicted in Australian culture may have relevance for how the public respond to bushfire warnings – for example the recommendations to abandon property and homes on extreme fire danger days imply inhabitants' helplessness and lack of mastery over the environment; concepts that could be argued are in direct contrast to the 'real Aussie Bloke'. The narratives that people draw upon to make sense of bushfires influence how their preparations, their perceptions of their ability to cope in a potential bushfire, and their attitudes to their environment. If for example, people draw upon discourses that construct fire as a natural event, largely inhibited or encouraged by organic events such as rainfall or lightning (and once passed, bestow great benefit back to the environment), it could be imagined that they will think about and respond to a bushfire warning in a particular way. Others who draw upon alternative frames of understanding about fire, regarding it as fearsome and unnatural, always destructive and wholly uncontrollable could have an alternative reaction to bushfire warnings and a different perception of their risk.

The following chapter widens the discussion about bushfire disasters to an examination of the way the media report catastrophic disasters and the possible influences media has upon public understanding of such events. Myths about disasters exist for many reasons, and can be powerful determinants of public attitude and reactions to disaster warnings; well-known disaster myths as well as those in the Australian bushfire context will be explored. Lastly disaster warnings and warning heuristics will be detailed and a typology of disasters proposed.

3. DISASTERS; MEDIA, WARNINGS AND BUSHFIRES

Introduction

Personal knowledge about disasters comes from many places, and the public knowledge about disaster events comes primarily through the media including newspapers, television and social media. In order to theorise the communication of disaster risk, this chapter details the ways that the media can impact upon the public's thinking about disasters. Media encompasses many types of mass communication, and in the context of this thesis, refers to newspapers, television, digital media and official disaster and emergency communications. Media studies is a wide-ranging discipline, with applications in a myriad of related disciplines from psychology to politics. There is a large body of literature that addresses the theories and influence of the media but as no media texts comprise any analysis data in this thesis, there is no attempt to explore these in any depth. Disaster reporting by the media is examined in this chapter as well as the media propensity to privilege some aspects of a story over others which can reinforce stereotypes in a post-disaster scenario. The heuristics of warnings and the language often used in warning messages are considered along with a typology of disasters proposed; a differentiation is suggested between rapid-onset disasters and those which require a prolonged warning period. Relevant exemplars in the Australian context are used to discuss these topics. Just as there is a great variation in types of disasters and communication sources, the way that people attend to what they read and interpret what they hear is also diverse and by no means predictable. There can be no assumptions made about the uniformity of audience response; therefore theorising the factors that contribute to a mediated public evaluation of risk is an important part of understanding warning response and risk perception.

This chapter examines the way that the media interacts with its audience, and focuses on reporting conventions for rare and substantial events, which most disasters are. It discusses the ways in which the media contributes to the reproduction of common disaster myths and bushfire myths. An important part of this chapter is an exegesis of warnings in the disaster context, particularly the way that different types of warnings may influence attention to a threat for differing disasters. The mass communication theories and concepts that are most relevant to the interpretation of risk messages and warnings in the Australian context will be examined here.

Media

The media makes sense of and interprets the world for the mass public, 'emphasizing collective values that bind people closer together' (Curran 2002:77). A dominant idea in mass media studies is that mass media mirrors society, reflecting back to it ideas, norms and values, thus validating and maintaining what is already present. Traditionally, the media were thought to be powerful enough to be able to change people's views. However, opinions and perceptions are complex. Clearly the media has a powerful role in constructing people's knowledge beyond their personal experience, but people also construct their own relationship to that knowledge and use it as a personal resource. A more accepted view is that whilst the media may not have the power to tell people what to think, they are 'stunningly successful in telling them what to think about' (Cohen 1963:6).

The study of mass communication and media effects began as early as 1920 with the idea that people's opinions and attitudes could be influenced by what they read. Lippmann (1922) proposed that because the media is the means by which most people learn about the wider world it 'determines our cognitive maps of that world' (cited in McCombs and Reynolds 2002:3). An early focus was on the effectiveness of war propaganda as a tool for mass manipulation and social control, where the audience was considered to be passively receptive. Research then began to explore the possibilities of attitude change and 'limited effects', concluding that these were diminished by social connections and effective only if similar attitudes already existed. It was also shown that self-selection confounded accurate measurements of actual effects where people interpreted media content according to their own beliefs (Perse 2001). In the 1970s, mass communication research explored the cognitive and behavioural effects of mass media and since the mid-1980s, the focus has turned to understanding the influence and constraints of the social, political and cultural contexts.

The cumulative media effects model positions the public as reacting in predictable ways. When evaluating or deciding upon an issue, the public are thought to use information that they have recently read or seen, as it is easier to retrieve this data from their long-term memory (Iyengar 1991). In other words, what they have read or watched *most of*, and *most recently*, will be *most easily remembered*. Another name for this is the 'accessibility bias' which has been characterised 'as an almost mindless, mechanical response' (Takeshita 1993:276). When an issue endures in the media for some time, the

effect is that the issue becomes more salient, with the result that the public come to view as important the same issues which the media have highlighted. This is known as agenda-setting and is particularly important because of its assumed influence upon decision-making; many studies have explored this media effect in the context of political opinions. But it is equally relevant when people are making decisions about disasters. If the Australian media consistently emphasise one particular bushfire prevention activity over another (investing in sprinkler systems rather than clearing vegetation for example) agenda-setting effect could markedly change survival outcomes if clearing vegetation was a better bushfire mitigation tool. The theory has some constraints, and one of them is that for agenda-setting theory to be applied, the media content need to be consistent and the political system 'reasonably open' – that is to say democratic and free from censorship.[49] Lastly, it should be noted that agenda-setting effects are most influential for 'issues that lie outside the individual's personal experience because then the media becomes the public's only frame of reference' (Singer and Endreny 1993:4). Participants living in bushfire-prone areas of Australia often have personal experience of bushfires. However, for those who do not have personal experience, the agenda-setting effect of the media could influence how those people assess their bushfire risk.

The way risk communication is perceived via the media can be attributed in many cases to the devices the media use when reporting stories about risk. The framing of news stories is linked to ideas of news production, information control and notions of 'gate-keeping',[50] and it 'situates the analysis of news in the context of discursive formation of issues, policies, opinions and engagement' (Pan 2008:3). Framing is a schema of interpretation and when journalists change the wording or focus on some aspects of a bushfire and not others, they define and interpret the issue for the public, powerfully influencing decision outcomes for those who engage in an issue through the media (Goffman 1974). As an extension of agenda-setting (or a 'second-level' agenda-setting effect) framing is both an active process and an outcome; an organizing idea that through selection, exclusion, elaboration and emphasis, can 'turn an occurrence into a

---

[49] Critics of the media, for example Noam Chomsky, would argue that even in the most seemingly democratic countries, media censorship is pervasive and endemic.
[50] Occurring at all levels of media structure, 'gate-keeping' is the process through which ideas and information are filtered for publication. As a theory used in the disciplines of journalism and mass communication, it was first proposed by social psychologist Kurt Lewin in 1947.

newsworthy event, and a newsworthy event into a story' (Marks, Kalaitzandonakes and Wilkins et al. 2007:184).

One way to illustrate a consequence of media framing is the effect of 'attribute agenda-setting'. The fundamental assumption of this media effect is that people attribute responsibility differently depending on the way a story was framed: being more likely to hold individuals responsible if the story was framed in one way but more likely to hold government and society responsible if the story was framed in another. 'Risk and responsibility are intrinsically connected' (Beck 1999:6) and attributions of responsibility have elements of moral reasoning. Studies into framing effects of television news on political issues have shown that stories can be analysed in terms of episodic or thematic frames; an episodic news frame focuses on particular cases or specific events whereas a thematic news frame situates events and issues within a generalised context. Other studies (Dudo, Dahlstrom and Brossard 2007; Mackie 2009) describe episodic framing as typically containing sensational reporting (emotive language), non-contextual statements and little or no self-protection or self-efficacy information. Conversely, thematic reporting is factual, contextual and situational, and gives self-protection and/or self-efficacy information, often including scientific and medical facts. Iyengar found that when people read reports that were predominantly episodic, they were less likely to think that society was responsible for the event. Conversely, reports that were written with a thematic framing were less likely to attribute responsibility to individuals. Following this argument, this effect could be clearly demonstrated in media reporting about bushfires events: for example if bushfires are predominantly reported episodically (focussing on specific events), people would be more likely to blame individuals for their apathy or poor preparation. However, if bushfires were reported using a thematic frame, people would be more likely to attribute the causes and solutions to governmental policies (e.g. lack of regulation of land development, or resources for fuel reduction) and other factors beyond their control.

Media Scripts and News Values

The disaster scripts that 'tell a disaster story' are a combination of past disaster events, information from disaster and emergency authorities, previous media stories and socially constructed knowledges about known hazards. Scripts are stereotypical ways of constructing a disaster story, and comprise templates which organise ideas; defining how an event is talked about, influencing how people think about a new story and

predisposing them to 'come to conclusions with the minimum of analysis' (Nuestadt and May 1988:33). Templates in this context are not rigid journalistic practices, but organising strategies for reporting a disaster event. For example when the media use phases like 'another 9/11' or a 'potentially catastrophic bushfire', images are quickly formed and can short-cut the definition process. They work in much the same way as worldviews, mental models, cognitive schemas and heuristic biases [51] and 'not only make sense of current events, but are a point of comparison and proof of an on-going problem, highlighting patterns and minimizing dissenting or forgotten facts' (Kitzinger 2000:76). Whilst many scripts are culturally bound, some transcend cultural boundaries, so can be said to be multi-layered; different media audiences will understand them in different ways. It could be argued that through 'collective memories' or 'collective remembering' (Middleton and Edwards 1990) a bushfire script is constructed where past bushfire events are retold, reconstructed and remembered *beyond the sum of* the participants individual perspectives. It then becomes part of shared knowledges about bushfire and is more easily recalled over time. Therefore, arising from memorable events, scripts work as a 'social reference point' creating a narrative, script or 'rhetorical shorthand' (ibid.: 61) which are then used by journalists and audiences alike to make meaning of any new event.

As a device to depict an event Bennett and Lawrence (1995) present the idea of 'icons' or 'nuggets of condensed drama that can stand alone as an emblematic moment evoked with a simple phrase or visual reference' (20). This idea of the visual expands the template analogy where recognisable images can represent events, acting as a potent visual symbol. The 2011 CFA bushfire awareness campaign [52] made the most of this device, where a family is heard trying in vain to protect themselves from a bushfire. Whilst there is a minimalist narrative, it is the images of smoke and then ultimately of a house razed to the ground that is both instantly recognisable and powerfully descriptive. The adage 'a picture paints a thousand words' concisely explains the concept of a visual template here.

Newsworthiness or news values are the criteria by which journalists and editors decide what news events or how much prominence a news story should be given. Galtung and

---

[51] Worldviews, mental models, cognitive schemas, risk heuristic biases are discussed in Chapter 5.
[52] http://www.youtube.com/watch?v=kusjRALY8aM

Ruge (1965) were the first to identify twelve news values[53] and suggested that 'the more an event embodied these values, the more likely it was considered to be newsworthy' (Hughes and White 2005:9). Their theory suggests the media 'filter' potential news stories using these criteria and many are particularly relevant to bushfire stories and reporting. The news value of unambiguity for example makes use of familiar past events to make sense of the present one for the public, which simplifies the event even though the issues surrounding it may be complex. Comparing a new bushfire event with Black Saturday for example 'short cuts' much of the background explanations about intensity, magnitude and impact. More recently, the criterion of news values has been expanded to include emotion, negativity, conflict, 'visual-ness', and celebrity (Fiske 1987; McGregor 2002). The emotional association of the Black Saturday fires and the personalisation of the stories which include pictures of devastated communities is also a 'hook' by which the media engage the public. Hughes and White (2005) comment that it is only by understanding these journalistic practices that effective and practical ways of working with the media during extreme bushfire events can be achieved.

Media Reception

Media reception research focuses on the relationship between the individual and the media in order to understand effect, agency and causality. It has shown that audiences respond to mass communication based on factors such as the way an article is framed, or if they personalise what they read. Stuart Hall, a critical cultural theorist, proposed that people react to messages in one of three ways; 1) they respond and interpret the text as the creators of the text intended; 2) they 'negotiate' problems in the text in order to find their own interpretation or 3) they reject the intended meaning and choose to put the message into 'some alternative framework of reference' (Staiger 2005:80). A criticism of Hall's approach is that audiences are positioned as having multiple identities, and therefore cannot be regarded as a homogenous group. For the purposes of this thesis however, this idea is not problematic and as demonstrated in the previous chapter, the public is conceptualised as being made up of individuals who interpret risk within the Australian social, political and cultural contexts.

Reception theory focuses on the meanings within texts, how those meanings are constructed, the ways in which the meanings change over time and the effects of media

---

[53] Frequency; Negativity; Unexpectedness; Unambiguity; Personalization; Meaningfulness: Reference to elite nations; Reference to elite persons; Conflict; Consonance; Continuity; Composition; Competition.

texts on the audience. This theory is predicated on the idea that, although it is accepted that the media does not just inculcate the public, it does play a significant role 'in the shaping of public attitudes and beliefs about the social world' (Devereux 2007:217). The dominant, oppositional and negotiated readings of texts are at the heart of media reception theory, which focuses on the interpretation of media texts. This thesis is particularly interested in how people construct bushfire risk in the context of the media texts that have been available to Australian residents of bushfire vulnerable communities.[54] Media reception theory embraces the qualitative approach as a way to uncover the 'dynamic and often complicated nature of the relationship between media audiences and media texts' (ibid.: 237).

Issue-Attention and Adjustment-Reaction

Ideas about why people get 'tired' of issues, especially as they are reported and re-reported in the media are relevant to explore in the context of warning fatigue. Despite some issues having continued and real consequences, the public attention to issues do not seem to last very long. Downs (1972) claimed that the public demonstrate a 'systematic cycle of heightened public interest and then increasing boredom' (1). The premise of the issue attention cycle model is that there is a causal link between the content and frequency of issues reported in the media and the level of the public's attention to and concern about them. The issue attention cycle model is hypothesized by Downs as having five stages which begins with an event being highlighted in the media and culminates with it being replaced with another. Downs conceptualised his model in the context of public attention to ecological concerns, and others (Peters and Hogwood 1985; Hall 2002) have applied it to government security and tourism policies. It is a useful model to examine the influence of public attention to policy and practices, and can equally be applied to disasters and the Australian bushfires.

 In the first stage of the cycle a problem or crisis is bought to the attention of the media and is followed by 'alarmed discovery and euphoric enthusiasm' (Downs 1972:3). This is where the public, primed by similar past events (mass-fatality bushfires for example) re-interpret the issue in terms of larger problems – environmental concerns or governmental shortcomings. During the third stage, there is a gradual realisation that the cost of solving the problem could be very high indeed. Frequently, these problems

---

[54] Media texts include official CFA public education material such as newspaper and letter-box pamphlets and local and national newspaper stories about bushfires and bushfire prevention. These are detailed in Chapter 5, page 119.

associated with solving the issue seem overwhelming, and in the fourth stage, there is a gradual decline in public interest and discouragement and boredom can set in. Moreover, if a new issue has subsequently emerged, the public 'will' to continue to engage with the original problem wanes. The post-problem phase is the last stage, where the issue has been firmly replaced with a new one, although positive outcomes in the form of policies and campaigns may result. Sandman (2005) conceptualises the cycle as a long-term 'two-steps-forward-one-step-back' process, and if the issue were to emerge again, would 'receive a higher level of attention' (Downs 1972:4). The issue-attention model describes the trajectory of a story through public space, how it is framed and the ways news values and templates determine the way it can develop. However, this is not to assume that individual audiences (bushfire-prone residents for example), respond in equally predictable ways.

This theory of public reaction to risk events as mediated by the media, has some similarities to Peter Sandman's adjustment-reaction model which proposes that a past risk event serves as a rehearsal or 'prime' for a new event, evoking a reaction or cycle that can be predicted. According to Sandman (2005) responses to a threat are automatic and often seen by others as an over-reaction, but he asserts this as a normal and positive way for the public to learn about risks and risk response. He also points out that the primary reaction reduces the probability of a later over-reaction, serving as a 'dummy-run' resulting in people feeling and being better prepared. Both the issue-attention and adjustment-reaction models argue that the last stage results in a public with a heightened awareness of the risk event.

Issue-Attention Fatigue

When topics come to the attention of the public, whether by way of the media or bushfire public education campaigns for example, people pay attention to them for a certain length of time. This length of attention is determined by many factors, and literature suggests the importance of these topics to people can be heightened or diminished depending on competing concerns. Attention can be involuntary (which happens when something is exciting or novel) and voluntary (or directed) and requires effort on the part of the individual. It is the latter that is suggested to be susceptible to fatigue (Kaplan 1995). In terms of environmental concerns, of which bushfires are one of many, experience with a hazard such as bushfire could result in the public becoming 'tired' of the issue, paying less attention to it and becoming desensitised to warnings

about it. Studies have found that experience with a hazard resulted in people paying attention in the short term, but as time wore on, attention diminished (Weinstein, 1989; Burton, Kates and White 1993; Sims and Baumann 1983). It is these prolonged hazard events which are proposed in this thesis to influence risk perception and possibly increase the likelihood of a community becoming 'warning fatigued'.

Availability Heuristic

There is undoubtedly a 'collective response' to events in the social world –'crowd contagion' or 'moral panics' are collective behaviours which typify this phenomenon. However, given the complexities of public response, it is important to consider the individual response within 'the social', and psychologists have much to contribute to this understanding. [55] Often decisions in time of threat are made quickly, and it is those ideas that are most accessible and most salient that are considered the most important and acted upon first. Cognitive psychologists Kahneman and Tversky (1979) labelled this quick judgement the 'availability heuristic' and demonstrated that as well as being an unconscious process, it was an inaccurate perception bias. Other studies (Folkes 1988; Sjøberg and Engelberg 2010) have shown that people evaluate a threat to be more risky if it is brought to mind more easily than other risks; moreover, this judgement was not dependent on how often the event occurred. The predilections of news media to newsworthy and sensational stories mean that unusual events, disasters for example, are reported more often than common ones, leading people to magnify some risks out of all proportion to the actual risk. These risks become more salient, more memorable and therefore, are thought of as more of a threat. Priming[56] is a similar and related effect, which explains how an issue or event previously highlighted in the media can subsequently lead people to make quick and easy associations to related issues or events. For example, if fire safety campaigns have always included fire engines and fire personnel in their prevention literature and communications, people may come to expect that, in the event of a fire, fire services will be always available to them. [57] Priming can also reinforce pre-existing stereotypes (Pechmann 2001), defining what an

---

[55] A more detailed examination of the contributions that psychology brings to understanding individual risk perception is detailed in Chapter 4: 'Subjectivity in the Social Domain'.

[56] Originating in cognitive psychology, the theory of media priming is that one idea is related to other ideas by semantic pathways, a concept based on the associative network model of human memory.

[57] Recent bushfires in Victoria have shown that there is no guarantee of fire services for at-risk residents and the Victorian Fire services have begun to advise the public not to rely on being personally rescued by fire crews.

event or situation 'should look like' and producing a 'desirable' citizen; for example, families who pack up and evacuate every time there is a 'Code Red' day.[58]

Media Reporting of Disasters

The media and disaster warnings are intrinsically linked; few warnings are communicated without the media, and most disaster and emergency organisations have a working relationship with the media. For example the Country Fire Authority (CFA), which is a volunteer and community-based fire and emergency service organisation in Victoria, Australia, has multiple media 'presences'. As well as the more traditional - newspaper/press releases and website[59] - they have a Facebook page[60] and Twitter account[61] (with the hashtag #bushfires). They also have mobile phone[62] and smart phone applications,[63] (for up-to-the-minute fire and incident information) and a YouTube[64] link for information and safety videos. The following sections situates warnings, warning terminologies and typologies within the context of disasters, discusses the ramifications of false alarms upon warning response and challenges some assumptions about the ways in which disasters are conceptualised.[65]

For most people, perceptions of risk and information about disasters are mediated by one of three sources: personal experience, direct contact with other people and indirect contact, by way of the mass media (Singer and Endreny 1993:2). Dynes (1970) goes further and says that the media play a leading role, not only in 'describing and interpreting the disaster event [but also] in maintaining public morale' (12). By their very nature, disasters are newsworthy stories providing the media with a guaranteed audience who are often fascinated and horrified in equal measure. About two percent of news stories deal with large scale accidents or disasters (Larson 1980 cited in Drabek 1986) and contrary to media reporting of war, crime or politics, media coverage of natural disasters is largely accepted to be an accurate reflection of what really happened (Cockburn 2011). However, analysis of media reporting of disasters has

---

[58] 'Code Red' (Victoria and New South Wales) or 'Catastrophic' (Tasmania) is a Fire Danger Rating that recommends immediate evacuation because of conditions deemed to be potentially devastating. http://www.cfa.vic.gov.au/mobile/fdr/actions/codered.htm
[59] www.cfa.vic.gov.au
[60] http://www.facebook.com/cfavic
[61] https://twitter.com/cfa_updates
[62] http://www.cfa.vic.gov.au/mobile/index.htm
[63] http://www.cfa.vic.gov.au/plan-prepare/fireready-app/
[64] http://www.youtube.com/cfatv
[65] The psychological and social responses to warnings are explored in Chapters 4 and 5

shown that, regardless of the country, scale or type of disaster, the media by using well-worn scripts and news values, follow predictable norms and conventions (Turner, Nigg and Paz 1986., Fischer 2008).

When reporting disasters, the devices of symbols and imagery are important. Hoffman (2002) asserts that these devices influence behaviour and provide a 'compass of orientation on how to cope with and survive.. [a disaster]... giving it context, content, emotion and meaning' (114). By only using official sources and governmental perspectives (who can have a vested interest in the way disasters are reported), the media present a one-sided account, and in this process the voices of disasters victims can be marginalised. Differing interpretations of the event have an impact on post-disaster recovery as blame and compensation are 'attributed differently depending on whose voices are heard' (Button 2002:144). The depiction of a shocked immobilized and uncomprehending victim constitutes one of the most graphic and potent disaster images, leading to the misconception that disaster recovery must be initiated by outsiders and that 'the locals' are inadequate to deal with the crisis. In fact, by the time emergency organisations arrive at a disaster scene, the locals have most often begun to recover bodies, rescue the injured, assess damage and attend to the most vulnerable. Often the dazed and paralysed victims are simply exhausted survivors who, by the time the media arrive, are taking a well-deserved break (Fischer 2008). Additionally, local communities can become disenfranchised and resentment can result when outside agencies subsequently get 'all the credit' for disaster recovery; this can lead to disaster relief funds being channelled to these agencies instead of to the communities who need it most. These stereotypical media depictions of disasters can have negative consequences, not the least of which is public perception of hype and sensationalism. When the media is a major conduit through which critical risk communication is disseminated, it is important that, for the most part the media are regarded as credible.

Alarm and Reassurance

A pattern of media reporting prior to a disaster – the warning phase – has been identified by Turner, Nigg and Paz (1986). In the context of predicted earthquakes in California, they argue that the media uses an alarm-and-reassurance schema where the media report some worst-case scenarios, often over-stating the threat and 'blurring the distinction between possible and probable events' (418). At the same time, media reports often advise calm yet offer no information about protective actions that could

be taken; the implication being that something awful will happen eventually, but there is no pressing need to do anything about it. Turner, Nigg and Paz (1986) argue that this sets up an expectation from the public that they will be adequately warned should the disaster be imminent. Moreover, they observe that, in a prolonged lead-time disaster scenario it is simply not possible to 'sustain disruption of normal routines for extended periods of time' (377). Following the alarming story and possibly worried about panicking the public, the media often publish 'reassuring or nullifying reports' (ibid.: 418) where contradictory opinions are offered. There is no clear distinction between possibilities and probabilities and the public are given no help to clarify the contradictions. The reassurances include stories about building or environmental codes, the vigilance of scientists and the preparedness of government agencies. Turner et al. (1986) suggest that alarm and reassurance patterns of reporting confuse people, 'fostering an unjustified sense of certainty and imminence [about the threat], reinforcing fatalistic attitudes and encouraging complacency' (41). These observations about media reporting of disasters are important because, by bringing the media into the warning response frame, it makes possible a way to understand response and risk perception in the Australian bushfire context.

Disaster Myths

Disaster symbolism and imagery provide a way to think about and ways to cope with unexpected and cataclysmic events. Disaster myths are a cultural rationalisation for events and phenomena that impact people's lives and are a product of individuals' need to understand their world. Myths are shaped by the particular social and cultural context in which the individuals live and are 'systems of belief [which are] reshaped and internalised, constructing a world-view and influencing subsequent interpretation of natural phenomena' (Dake 1992). Often uncontested, and similar in many ways to 'well-worn' media scripts, these stories are society's way of explaining and working through events that have impacted upon it. Moreover, myths are more likely to be associated with natural disasters - extreme weather, earthquakes, and bushfires - than man-made technological ones: radioactive leaks or health scares (Fischer and Bischoff 1987 cited in Nigg 1995).

Disaster discourse (and media disaster discourse in particular) often includes the following two erroneous ideas: the first is that disasters are indiscriminate 'equal opportunity events' (Schoch-Spana 2005:2), and secondly that people are affected

uniformly regardless of gender, social class, or ethnicity. In numerous disasters, this has shown not to be the case as it is the elderly, those living in poverty in unsafe, shoddily-built housing and those who have few physical or social resources that are most affected. Statistics comparing first and third world damage and recovery rates after major earthquakes starkly demonstrate this phenomenon where corrupt governments and an inability to access insurance add to recovery challenges (Wisher 2004). Included in this discourse is the idea that disasters, such as bushfires, earthquakes, floods and hurricanes are natural 'acts of God', before which people are powerless. There is much that can be done to prepare for a disaster, especially when modern technologies enable scientists to learn in advance about the nature and behaviour of potential disasters. Warning systems are being constantly updated and weather forecasting has become increasingly accurate; millions of dollars are spent every year on disaster preparation and prediction in countries vulnerable to floods, earthquakes, tsunamis and bushfires.

Disaster myths are pervasive and are perpetrated by popular culture (for example doomsday apocalyptic movies). Despite a wealth of research (Drabek 1986; Dynes 1970; Mileti 1999; Quarantelli 1990; Scanlon and Alldred 1982) showing that after a disaster the public and victims often adapt and respond well, myths about public responses to disasters are widely accepted by emergency officials and the media alike. Results from a survey of Sydney residents conducted by Blong (1984) for example, mirrored those found in a similar Delaware survey which found that not only was media the predominant source of disaster information, but that 'a significant proportion of the population ... believe myths concerning human response to natural disasters' (260). These myths can be seen as media disaster schemas or templates, within which each disaster is placed; in this way the media frame and 're-frame' disasters for the public. The news media regard extreme events first and foremost as a generic disaster story rather than part of complex scientific, political and social processes. Media content tends to overemphasize the chaotic, irrational, and deviant aspects of the event and journalists are primed to look for heroes and villains, rescues and fatalities, sensational imagery and blame. Scalon and Alldred (1982) call it 'the same old story' (363).

A common 'taken for granted' disaster myth is that after a disaster social disorganisation will ensue and in their efforts to escape people will panic, 'running in any direction without thought' (Fischer 2008:50). Panic is rare; in fact the problem is not

that people panic, it is getting them to move (Wenger, Sykes, Sebok et al. 1975). The media find it particularly difficult to relinquish the idea of mass panic, so that in some instances, the absence of this myth is reported as 'there was no panic in this instance' (Turner et. al. 1979:132). In the Hobart, Tasmania fires of 1967 there was 'little evidence of panic' (Wettenhall 1975:320) nor verified instances of looting. Looting (and the fear of looting) is a prevailing myth and once again, when looting does not result, the media often comment how fortunate it was that this did not happen. Looting typically occurs during riots and emergencies such as power blackouts leading the public to generalise this exemplar to other emergencies (Fischer 2008). The belief that looting has occurred and the reality are somewhat different as a survey by Chamberlain, Doube, Milne et al. (1981) showed after the 1974 Cyclone Tracey, in Darwin Northern Territory. Seventy eight percent of the people surveyed believed that looting had taken place despite most of the reports coming from people who had evacuated after the cyclone and not returned. The 'crime wave' that is predicted to result from such social disintegration also does not happen, and most often reported crime actually declines in the aftermath of a disaster. Similarly, retailers who supposedly capitalise on disasters by price gouging are also a myth. By emphasising civil unrest and lawlessness, the media creates a military invention (martial law) discourse and 'reinforces a social control ideology' (Teirney, Bevc and Kuligowski 2006:57). Incorrect assumptions about the potential for civil unrest can have serious and negative consequences for emergency response. They can lead to inefficient allocation of much needed resources and lead officials 'to keep risk-related information from the public' and avoid issuing timely warnings (Fischer 2008:52).

A prevailing disaster myth is that of evacuation behaviour and need for temporary accommodation. Without consulting local communities about their actual requirements, government agencies often make assumptions about community needs, hastily providing designated public shelters; often at great expense. In the Brisbane, Queensland flood of 1974 Short (1979) claimed that less than seven percent of occupants who evacuated used the emergency accommodation provided for them by emergency agencies. As previously noted, when assessing risk people often do not act in predictable ways and evacuation decision-making is no different; those expected to evacuate often do not, and those who should not evacuate often do (Dash and Gladwin 2007). In the immediate aftermath of the 2010 Christchurch earthquake, where an estimated 2000 people were made homeless, a decision was made by the local city

council to make 350 motor homes available for temporary accommodation. This was at an estimated cost of many thousands of dollars per day. In the three months that followed, just one family made use of this facility as people stayed where they were, were accommodated by friends and relatives or simply left the area.[66]

In a content analysis of 40 years of disaster reporting in *Time Magazine*, Fischer and Bischoff (1987) found that whilst 'we no longer read of looters allegedly cutting off the fingers of the deceased to steal rings' (Quarantelli quoted in Fischer 2008:79), the portrayal of disaster myths had increased. Fischer (2008) found that the most telling statistics were for natural disasters where 77 percent of all disaster stories contained disaster myths. Additionally, in the post-disaster context, 88 percent of the reports contained at least one myth, with some containing up to twelve. Scalon and Alldred (1982) suggest that one of the reasons for this type of reporting is that few newspapers and television organisations can afford to have specialist reporters who are expert in weather and geological knowledge, with a good grasp of technical and scientific facts. They are 'generalists' who, within the constraints of news values and production deadlines, rely on others for their information. There are other challenges journalists face when reporting on an event of great magnitude. The death and misery of hundreds is much more difficult to report in a meaningful way than a more personal human interest story. Cockburn (2011) argues that when a journalist reports on disasters they must 'pretend to an emotional response on behalf of their audience which often comes across as contrived and formulaic' (4).

Despite the observed tendency for media to revert to predictable ways of reporting, researchers (Singer and Green 1972; Scanlon and Alldred 1982) conclude that the media are an asset in a disaster and a key source of information. They can be a valuable support, and can speed up disaster response by highlighting acute problems, pointing to areas not yet reached and warning of further issues. During major bushfire events, Schauble (2009) sees the media 'as a resource to be exploited by the fires service, [as they are] a critical conduit for information to the general public' (367). The media can also enable people to contact loved ones and provide reassurance; this is especially true of social media which has been shown to be extremely effective in communicating crisis information, centralising and focusing recovery efforts (Sutton, Palen and Shklovski

---

[66] "Campervans flop with quake homeseekers" - http://www.stuff.co.nz/national/christchurch-earthquake/4942205/Campervans-flop-with-quake-homeseekers

2008; Palen 2008; Gao, Barbier, Goolsvy et al. 2011). After the immediate disaster has passed, the media often play a role in social justice, highlighting community needs previously ignored and giving voice to 'ordinary people'. For example, frustrated by the progress by official agencies to give immediate help to people severely affected by the Christchurch earthquake in February 2010, a Canterbury university student[67] used the social networking website 'Facebook' to quickly mobilise over 13,000 students. Called the 'Student Volunteer Army', the students manned call centres, cleared away liquefaction, and distributed food, water, pamphlets and chemical toilets. Contrary to the myths, typical post-disaster behaviour is proactive, prosocial and altruistic. Survivors share resources and help one another, clean-up activities begin at once, police uphold public safety, looting and price gouging rarely happens and martial law is almost never declared. Damage, injury and death estimates, whilst initially exaggerated, are normally revised downwards (Fischer 2008:222).

As the literature shows, there are well-established ways of reporting disasters and yet, those scripts, schemas and myths are often not an accurate portrayal of the actual ways that people react to a disaster event. These repeated scripts are among people's resources to make sense of living in the bush, and are likely to have a complex relationship with other forms of knowledge people have. How these all come together in the judgements people make about risk, in situations where the risk is a long drawn out one and the scripts and myths build up over time, is the subject of this thesis. As the empirical chapters will go on to show, media messages form a backdrop to specific, context-dependent and individualised responses to those risks.

The Australian Bushfire Context

> 'I've often felt ... that reporters don't dig beyond the common clichés associated with forest fires – scorched earth, epic events, devastation and destruction, etc. – and the result is a one-sided, one-dimensional view of fire'
> (Smith 1992: 6)

The discourse around bushfire is saturated with superlatives. For example, words such as 'exceptional', 'unprecedented' and 'extraordinary' (Campbell 2003:246) are commonplace in bushfire media reporting. After the Black Saturday bushfires the word

---

[67] Sam Johnson is a law and politics student from Canterbury University who was honoured for his work during the two Christchurch earthquakes (2010 and 2011) by Secretary of State Hillary Clinton. He also received numerous accolades from the New Zealand government, won a leadership award from the Sir Peter Blake Trust and as a Global Changemaker attended the British Council Asian Youth Summit in Delhi, India

'catastrophic' was added to this list. This hyperbole contributes to the myth of helplessness,[68] where the fire is depicted as so severe, (a fire-storm or fire-ball) as to be unsurvivable. An analysis of newspaper reporting of the 1983 Ash Wednesday fires in South-eastern Australia concluded that media reports 'focused on descriptions of the victims as helpless during and after the event' (McKay 1983:89). Furthermore, there was very little self-efficacy information which would have helped people to 'help themselves'. Certainly not confined to the Australian landscape, but pervasive nonetheless, is the myth of the discarded bottle as an accidental cause of bushfire. Schauble (2008) once again calls this a fallacy and using statistics from a 2006 National Litter Index,[69] shows that despite glass rubbish accounting for many thousands of cubic metres of discarded roadside rubbish, for the preceding 6 year period, only 6 fires could possibly be attributed to discarded glass (22).[70] The myth or perception that a bushfire is able to be out-run (either on foot or by car) is a pervasive yet dangerous one, as the 2009 Victorian Black Saturday bushfires showed: some people perished as they evacuated late and underestimated the speed and ferocity of the fire and their ability to escape it. Others died whilst sheltering in their homes (Handmer et al.2010., Blanchi et al. 2014) but the majority of those who evacuated late (including those who drove through the bushfires), survived (Whittaker et al. 2013). It is difficult to conclude the specific role on the media in the perpetration of these myths; certainly they are circulated 'in the social', in everyday life. Suffice to say that, as media are credited with reflecting society's norms and values back to society, myth-making and myth-telling are all part of that process.

Bushfire myths are thought to contribute to much erroneous thinking about what to do in the face of a potential bushfire; so much so that the New South Wales Rural Fire Service included a page on bushfire myths in their 'Prepare.Act.Survive' brochure – a household information and preparation resource made available to every household in New South Wales.[71] Some common myths are that during a bushfire (a) sitting in a bathtub full of water is a safe place to be; (b) standing on the roof and hosing it down will avoid the house being burned; (c) the fire brigades will be available to residents; (d)

---

[68] Helplessness, as a cognitive influence of coping in times of stress is addressed in Chapter 4, page 87. Also as a sub-scale variable in a warning fatigue measure - Chapter 9.

[69] http://www.kab.org.au/litter-research/what-we-do/national-litter-index/

[70] On average, FIRS (Fire Incident Reporting System) records 400-500 wildfire calls annually (Schauble 2008:23).

[71] Page 19 of: http://www.rfs.nsw.gov.au/file_system/attachments/Attachment_BushFireSurvivalPlan.pdf

a house can explode if it catches fire and (e) a good local knowledge of roads will enable an escape. Erroneous thinking about bushfire behaviour has led to people believing that roads, or rivers or even brick walls will stop a major fire. Whilst occasionally this has been the case[72] more often than not roads and rivers are little protection from a major bushfire. Many people are influenced by visual cues and think that as long as they stay ahead of the wall of flames, they will be safe; however, embers driven by the wind can ignite a fire kilometres ahead of the fire front. Other more general myths about Australian bushfire include the idea that bushfires are a 'natural phenomenon', and as such, should not be thought of as a hazard. As Mike Klimek, a fire-fighter with the US Forest Service explains, bushfires are only a concern because of the wild-land-urban interface (WUI), and 'the increasing intrusion of people and buildings into fire-prone landscapes' (Tullis 2013:26). A persistent bushfire myth associated with the benign way that 'nature' is regarded is that the bush needs the fire to regenerate. Research has shown that plants regenerate vigorously after a fire simply because fires remove competing plants, open up the canopy to greater sunlight and enrich the soil with ash from the previous generation of plants (ibid.).

Research has shown (Wenger et al. 1975; Blong 1985) that the media is the predominant way the public get their information about disasters. Studies also show that media reporting of bushfire can add to people's sense of helplessness, increase dependence on fire agencies and encourage scapegoating (McKay 1996). Other literature criticise the media for engendering panic and increasing stress which, in turn, can discourage fire authorities from communicating with the media (Henderson and McKinney 2003). For example, during the 2003 Canberra fires, a coronial inquest found that 'fire fighting authorities were wary of providing the media with information that might cause widespread alarm' (ABC News 2004). Media reporting of bushfires has been likened by Marshall (1994) as similar to war propaganda where 'the irrational advance of the flames was placed in opposition to the rational organisation of troops and civilians' (538). He claims that when reporting about bushfires, television reinforces the link between the mythic character of masculinity – 'the digger myth of manhood' – and the resolution of bushfire crises (ibid.: 542). Similarly, Cohen, Hughes, White et al. (2006) argue that 'bushfire mythology may be built into poplar images of fire fighting itself'

---

[72] A January 2013 fire in Yass, ACT was stopped from impacting on the township of Yass when it reached the Yass River.

(49). Media depictions of bushfire myths can influence people's beliefs about their own agency in a bushfire:

> Once you've got people understanding bushfires to be a fire storm why would you believe you could defend yourself? Why would you believe you could protect your house? If you think houses explode, why would you bother starting to prepare yourself? You'll take your risk on the road (Carson 2004:34).

Instead of the overuse of emotive language which often hypes the threat, Campbell (2003) suggests that media reporting of bushfires should be more about 'knowledge and fire management' than 'warfare, destruction and terror' (244). The media tend to frame bushfires as a 'disaster' only when it 'escapes' from the rural into urban and peri-urban areas (Cohen et al. 2006a) which Campbell (2003) contends adds to public ignorance and a lack of respect for fire.

The media are important to consider in the context of public understanding of disasters because they interpret disaster events for the public by privileging some information over others, allowing experts to communicate with the public, and providing a way for the public to access knowledge usually only available in specific contexts. In many ways the media draw attention to disasters long before the public would normally become aware of them. Not only can they frame how the public come to think about disasters but they become a major source of 'unofficial' risk communication, making it difficult for the public to differentiate between 'everyday news', and what the disaster authorities need the public to pay attention to.

Warnings

> *If people at risk are to take action then warning messages must mean something to them* (Handmer, O'Neill and Kallalea 2010).

Disaster warnings are devised by emergency authorities to help the public prepare for a potential event, and the primary objective is public safety. A warning can be described as information that warns people who are at risk from an impending disaster and enables those people to make decisions and take action. Mileti and Sorenson (1990) state that public response to warnings is part of an larger warning system where the public respond to warnings from a management subsystem 'on the basis of their own interpretations of those warnings' (38). The effectiveness of the warnings varies and the reasons for this have resulted in decades of research and the development of many theories, models and hypotheses. Notable are the contributions psychology has made

to understanding risk perception from a cognitive and behavioural perspective, and the studies done by media researchers on the ability of mass communication to influence public opinion. Arguments for improving the efficacy of warnings include increasing the accuracy of predictions, making scientific information more accessible, augmenting the 'scientific literacy' of the public, reaching more of the target audience and better defining the message ('Developing a Unified All-Hazards Public Warning System' 2002). A distinction needs to be made in the first instance between those warnings which are made immediately before a threatened disaster, and those which are issued weeks, most often months before a potential disaster. The former falls within the genre of crisis communication[73] which is distinct from risk communication.

The phrase 'timely and effective' to describe the optimal types of warnings can be found in much of emergency management literature. However, what these 'best-practice' warnings look like in terms of the *timely* part of the equation is seldom, if ever quantified. Nonetheless, it is widely agreed that effective risk communication, of which warnings constitute a large part, include components of self-efficacy, timeliness, credibility and scientific information. Mileti and Sorenson (1990) also emphasise that good warnings need to be consistent, accurate, informative and confident. Disaster warnings need to include these elements, as well as those of predictability and controllability, magnitude, imminence, scope and duration. Ideally, warnings are able to give enough forewarning for people to heed the warnings and also give an indication of the ramifications if the warnings are ignored. In describing a warning system as one which 'provides the opportunity for coping', Breznitz (1984:5) could also be describing characteristics of an optimal warning. Important and relevant for this thesis, is the dimension of frequency. According to Mileti and Sorenson (1990) a warning consists of the message and source of the warning, the 'channels through which it is communicated and the frequency with which it is repeated' (45). They also insist that people do not mind receiving too many warnings; a point of view that this thesis contests as over-warning is hypothesised to be problematic in prolonged lead-time threats. However, they do acknowledge this dilemma and offer that 'in protracted emergencies ... there is a point of limited returns after which constant delivery of [the same] information may be counterproductive' (68).

---

[73] Definition of crisis communication can be found on page 109.

Disaster literature (Janis 1962; Turner 1983; Drabek 1996) has shown that there is a relationship between warning time, preparedness and response. Janis (1962) demonstrated this premise when he described public response to warnings about the great Kansas City flood and subsequent fire of 1951, where homes of 20,000 residents were damaged or destroyed. According to researchers from the University of Oklahoma Research Institute, a major factor in the non-compliance of people directed to evacuate was a series of preliminary communications issued during the time preceding the actual crisis. 'The very fact that it was possible to issue warnings long before the danger was immediate made possible a gradual, easy adaption to the approaching danger, but, at the same time, rendered the warnings less effective' (ibid.: 79).

Towards the end of World War II residents of London demonstrated a similar indifference to air raid warnings and, after a long period of air raids (which at first elicited a high level of response) they 'gradually became more and more emotionally adapted to the recurrent threat' (Janis 1962:109-116). This reaction (or non-reaction) is less to do with actual risk assessment and more to do with the way people who live with relatively high risk over a prolonged period of time adapt in order to go about their everyday life.[74] A health related case-study was published by Leventhal et al.(1960) who documented public reaction to the 1957 Asian influenza outbreak in two U.S. cities. Even though the prevalence of infection was high with more than forty percent of families having at least one person in the family sick with the virus, these cases had accumulated slowly over a period of 2 months. This meant that only a small number of people were sick at any one time, leading to the perception that the epidemic was not a real problem; this also limited the number of people who decided to protect themselves by being vaccinated. Bettman, Payne and Staelin (1986) claim long-term (prolonged lead-time) hazards are difficult for the public to quantify meaningfully (cited in Stewart and Martin 1994:1).

As this thesis argues, warning response depends on many different things including context and culture, experience and knowledge, interpretation and belief. Integral to warnings being responded to as emergency agencies intend, is that people understand the warning, believe what it is saying, personalize the risk and respond appropriately

---

[74] Cognitive and behavioural adaptations (Normalisation, desensitisation, adaptation, reactance, personality traits, attribution, dissonance and accessibility bias, helplessness, anticipatory stress.) that explain how people live with long term risk will be addressed in Chapter 4

(Mileti and Sorenson 1990). However, some people are 'better equipped to process and respond' and experience, responsibility (for others), understanding risk and social networks all contribute to a better response to warnings (92). An official warning implies:

> 'Based on what we **think**, which is based on what we **know**, a bushfire could happen therefore you need to prepare or evacuate'.

However, the public interpretation and response is more complex (and could be):

> 'Based on what I **think**, which is based on what I **know** from the media and other sources, which is based on whom I **trust** (family/neighbours/friends), which is based on how **feasible** it is for me to do what you recommend, which is based on what **happened last time** you warned me, I will or will not heed your warning'.

Drabek (1999) observes that the default response to a threat is denial. However much of the disaster literature suggests that the first response to a warning is belief; it is only upon examining the evidence around them (environmental risk assessment) that this initial reaction is modified. Moreover, experience has shown in the Australian context that 'often only a small percentage of those at risk will receive or recall receiving official warnings' (Handmer 2000-2:6) and many are warned through informal channels (Pareker and handmer 1977). These commentaries demonstrate how confused and contradictory the literature is, and how a better understanding of warning responses is needed.

Following a warning, people most often revert to their own evaluation of their environment; in the scenario of a bushfire warning, checking the temperature, wind direction or horizon and looking for clues that either will confirm or invalidate the warning. Social networks come into play, where neighbours, or those acquaintances nearby ('over the ridge', or 'in the next valley') are called upon to provide more information that is not immediately available. To the observer, it may seem somewhat chaotic, but this 'social disorganisation', according to Turner (1983) is common, and not necessarily unintentional or irrational as it often involves trying to get to a safer location, find and reunite families and gather up frightened pets. Nigg (1995) explains that after a warning has been issued, life continues to be regarded as normal or not life-threatening, that is, *until* social and sensory cues demonstrate anything to the contrary. Interpretation of warning messages always occurs within people's 'frames of normal expectations' and in order for people to take action, this 'normalcy bias' needs to be

overcome (374).[75] Of course, some people seem to do nothing, but research has shown that even when people go about their daily routines, they have paid attention to the warning; they've just reacted to it in different ways.

Warning Heuristics

Overwhelmingly, disaster literature describes warnings in terms of the systems used to communicate the warnings: for example sirens, SMS (phone texts) messaging, television safety campaigns, household letterbox drops and public education programmes. There is much less written in the disaster literature about the heuristics of disaster warnings, that is, the meanings that the warnings have for those to whom they are directed. Warnings mean different things to different people, and as such are always open to interpretation. Whilst acknowledging that, in times of crisis, people receive warnings through a myriad of processes, studies have shown that up to fifty percent can be from informal sources (Mileti and Sorenson 1990). It is important to clarify that the warnings in this chapter are operationalised as those official warnings that are issued by emergency and disaster agencies *prior* to the potential threat.

Uncertainty and certainty play a large part in disaster warnings, with emergency agencies erring on the side of caution; for legal reasons as much as for public safety. For example, in 1965 there was a tsunami threat in Crescent City California and public evacuation was the most desirable public safety option. However, Anderson (1970) reports that local officials were worried that if no tsunami eventuated, their call for evacuation would result in public condemnation. Mileti and Sorenson (1990) call this 'the warn-or-not-to-warn' dilemma and comment that the final decision often comes down to whose vested interests the warning best serves (119). A warning not only alerts the public but also functions to legally protect the agency that disseminated it. Warnings therefore, can be imbued with notions of motivation and credibility which can in turn, moderate public response. A 2006 report by the National Academies into hazards and disaster research in the social sciences, titled 'Facing Hazards and Disasters: Understanding Human Dimensions' states that there has been 'little systematic comparative work on the special characteristics of natural, technological and wilful disasters' (National Research Council 2006). The report highlights the need to understand the relationship between warning time, preparedness and response.

---

[75] Normalcy bias is discussed on page 85.

A disaster warning comprises a combination of four main components: the reality of the threat, the likelihood of it happening, the timeliness (when it is going to arrive) and the warning time (before impact). Other warning parameters are the extent to which a threat has been experienced previously and the level of clarity or ambiguity of the warning message (Breznitz 1984:5). A disaster comprises predictability, severity (magnitude), direction and impact, therefore a disaster warning can be imagined as a combination of all of the components mentioned above. Other components that are part of the warning process are the source(s) of information, the warning channels, the public and their response. Importantly, these warning components can be both objective and subjective. Current beliefs about the threat and previous experience with similar threats (for both experts and 'lay publics') can also influence how the warnings are received. With so many variables that contribute to a warning, it is understandable why agencies have found it hard to definitively predict or understand public response. Moreover, Svenson (1985) argues that the public have 'difficulty integrating multiple indices of risk to arrive at a summary judgement of overall risk' (cited in Stewart and Martin, 1994:1). The predictability or likelihood of a disaster happening is equally important and the likelihood of occurrence is time-bound and linked to the timeliness component; people want to know *when* the disaster is predicted to arrive, as much as *whether* it will or not. This makes warning about disasters that are known about well in advance but have yet to materialise, doubly problematic.

Conceptualising Disasters and Disaster Warnings

The threats that have a high predictability and certain timeliness have been characterised by Janis (1962) as precipient threats. Possibly a more useful way to think about these threats are as rapid-onset or shorter lead-time threats. Janis (ibid.) suggests that people are more vigilant about these types of threats and pay more attention to the warnings because they generate more reflective fear.[76] With rapid onset disasters, the perceived likelihood of the threat is high and so is the perceived level of danger; this results in higher vigilance and heeding of warnings. However, if a prolonged threat has been 'anticipated by numerous antecedent warnings' (Janis 1962:81) then by the time a final and more urgent warning is given, the potential hazard is perceived to be less of a threat.

---

[76] Fear which reflects the realities of the external danger situation.

Another way to understand human response to a prolonged lead-time threat is to think of the time before the threat as an incubation period during which people become more fearful and stressed (Breznitz 1984). Janis (1962) suggests that when there has been a 'sequence of warnings' there may be a finite amount of attention that people can pay to warnings before becoming fatigued and 'emotionally adapted' to the threat. A corollary to this hypothesis is that if, in the sequence of warnings there is some new information given, people's attention to the threat will be stimulated. However, Janis is not explicit about the *type* of new information. Conversely, if no new information is received, or the new information indicates the threat is less dangerous than previously described, then it could be hypothesised that the watchfulness of people decreases. Drabek's (1996) research following Hurricanes Bob, Andrew and Iniki[77] showed that, amongst other factors, two event characteristics constrained the responses of tourists and residents alike: the availability of escape routes and warning lead-time. These findings give weight to the argument that the length of time before a disaster a warning is issued has a 'considerable influence' in how messages are received and whether protective action is taken (521).

Threats which require a prolonged warning period are often those, as shown in Table 1,[78] where the reality is ambiguous, likelihood is low, the timeliness is uncertain and the warning time before predicted impact is prolonged. Mileti and Sorenson (1990) state that warnings need to have a 'when' component; in prolonged disaster scenarios this is very hard to provide. Pandemics, bushfires, earthquakes and volcanic eruptions can be characterised as prolonged lead-time disasters and all have a 'contextual potential', that is, in the context of season, or location or as a result of a past event, there is a likelihood of a disaster happening, but *as yet, thus far*, nothing has. Breznitz (1984) states that a threat 'arises from present cues about future harms' (3) which is problematic for disasters in the prolonged lead-time context. Unlike weather warnings which are often accompanied by environmental cues such as strong winds, drop in temperature or excessive rain, the environmental cues for most prolonged lead-time threats are not visible to the lay public, who have to rely solely on the experts for threat information and risk assessment.

---

[77] 1991, 1992 and 1992 respectively
[78] Page 66.

Mileti and Sorenson (1990) describe a typology of hazard types in a report on communicating emergency warnings prepared for the Federal Emergency Management Agency. However, bushfires, as a hazard or threat were absent from the typology. Nonetheless, it provides a framework to begin to think about how warnings might be impacted in different ways by the types of hazards or disasters. Their typology described warnings issued by emergency authorities rather than the perception of the warnings by the public, but it is logical to assume that the way a warning is devised can impact upon understanding and perception of risk. Their typology focused on three main hazard characteristics: predictability, impact and detection. It concluded that those hazards that were easy to detect, where the impact was foreseen and had a long prediction time were the easiest to warn the public about. These hazards were specified as riverine floods, a slowly erupting volcano, (those in Iceland or Hawaii for example) and an earthquake. However, the latter hazard (earthquake) poses classification problems, as Mileti and Sorenson point out: 'earthquakes can span two categories as time passes and its physical characteristics change' (ibid.: 106). Similarly, Burton et al. (1993) define 'speed of onset' as the length of time between the first appearance of an event and its peak (34); in this way earthquakes are defined as 'rapid-onset'. Bushfires pose the same problem and are equally difficult to define; in one sense they can be predicted over a long period, as wet winters produce fuel and dry summers make the vegetation conducive to fire. Bushfires always have the potential to be once-in-a-thirty-year events, yet equally may be (and most often are) mild to moderate events. However, once bushfires occur, the warnings are issued in a much shorter time frame; the fact remains that the impact is unknown until the fire starts. One of the issues with any sort of typology is that in most cases one variable is dependent on another one which is in turn dependent on a further variable. For example, impact is dependent on prediction time which is dependent on detection.

Warning fatigue literatures support the notion that false alarms impact warning response. The conceptual model of Public Perception of Warning Accuracy and Source Credibility discussed in Chapter 1 (Barnes et al.2007) showed a range of warnings on a continuum where a False Alarm resulted from a warning which was issued but the event did not occur. It could equally be imagined that there is a correlated public response for each warning scenario. The adapted conceptual model of warning accuracy and warning source credibility (Figure 2) assumes that, between an unwarned event and a

false alarm, there is a continuum of public perception about warning accuracy and warning source credibility. As in the Barnes et al. model (ibid.), the adapted model includes warning scenarios of under-warning (event occurred but was more severe than warning) and over-warning (event occurred but was less severe than warning). The public perception of a false alarm in the adapted model states that 'Warning was not accurate and warning source was not credible' – this response has much in common with the ways that warning fatigue has been conceptualised by emergency managers, meteorological officials, academics and the public.

Adapted Conceptual Model of Public Perception of Warning Accuracy and Source Credibility

Unwarned Event		Perfect Warning		False Alarm
No warning and no warning source	Warning was not accurate and warning source more or less credible	Warning was accurate and warning source is credible	Warning was not accurate and warning source more or less credible	**Warning was not accurate and warning source not credible**

Figure 2: Adapted Conceptual Model of Public Perception of Warning Accuracy and Source Credibility

This thesis argues that hazards are not straightforward to typify and that when the public hears a warning, or become aware of a threat, indices of (a) reality (of the threat), (b) likelihood (of it happening), (c) timeliness (of predicted impact), (d) impact location and (e) warning time needed (before impact) could be a more useful differentiation of hazards. The example of a hurricane in the following table, illustrates the ways a hazard can be described and shows that once a hurricane is detected by the weather bureau on the weather radar its 'reality' is unambiguous as it is able to be seen. It is highly likely it will eventuate into a hurricane event, and depending on the size of what is seen on screen, the magnitude and impact can be predicted. Because of the sophisticated nature of weather tracking technology, the time and location of landfall can also be accurately predicted. A hurricane can be categorised as a rapid onset hazard, because the time from detection to time of landfall is usually around a week or so. It could be argued that lead-time for a hurricane could be much longer as a hurricane

season can be predicted annually; just as there are tornado and bushfire seasons. However, in the typology below in Table 1, warning time indicates the time from when a threat is warned about, until it eventuates (or not); this is an important distinction. Pandemics, volcanic eruptions, risks from bushfires and earthquakes are sometimes warned about many months before an event occurs, and in many cases the predicted event never eventuates.

HAZARD	Detection	Predictability /Likelihood	Timeliness	Location	Warning Time (Lead-time)
Hurricane	Unambiguous	High	Certain	Certain	Shorter
Tornado	Unambiguous	High	Certain	Certain	Shorter
Blizzard	Unambiguous	High	Certain	Certain	Shorter
Flood	Ambiguous	Moderate	Certain	Certain	Shorter
Tsunami	Ambiguous	Low	Uncertain	Certain	Shorter
Pandemic	Ambiguous	Low	Uncertain	Uncertain	Prolonged
Volcanic Eruption	Ambiguous	Moderate/Low	Uncertain	Uncertain	Prolonged
Bushfire	Ambiguous	Uncertain	Uncertain	Uncertain	Prolonged
Earthquake	Ambiguous	Low	Uncertain	Uncertain	Prolonged

Table 1: Typology of Disasters

Bushfires were operationalised using this typology as ambiguous, as the reality of a bushfire can be imagined (because of seasonal and meteorological conditions) yet does not exist until one actually begins. Warnings about bushfires (either official or unofficial) are in the public sphere almost year round. The likelihood of a bushfire is uncertain, yet a warning can be issued because of a combination of ground moisture, temperature, wind speed, fuel load and topography. The timeliness aspect of a bushfire is also uncertain, as once a fire has started, where it may 'arrive' is dependent on the environmental factors mentioned above. Warning lead-time for bushfires can be prolonged (for bushfire seasons) as well as shorter, as fires actually start. In both bushfire scenarios the detection is straightforward, but only once ignited. So warning the public about bushfires, an inherently uncertain threat, is problematic. Mileti and Sorenson (1990) concur with this observation and comment that there are some warning scenarios which 'extend beyond the period of time that people would normally remain vigilant, concerned or even interested' (ibid.: 112). These scenarios are 'massive and rare events' and effective ways to deal with these events are difficult and 'pose unique problems for emergency officials' (ibid.: 113). It is one of the fundamental aims of this thesis to understand warning response in this context.

When exploring evacuation issues during the Ash Wednesday fires of 1983, Miller, Carter and Stephens (1984) identified timely, adequate and accurate warnings as one of the main problems. The challenges that lead-time presents when warning about bushfires was underscored in an address to the Institution of Fire Engineers, by John Nicholson, (AFSM):[79]

> Mass evacuation in the event of wildfire is a difficult option, as warnings of impending danger become increasingly difficult to issue the shorter the lead-time available between the knowledge that a danger threatens and when it is anticipated that it will occur. The difficulty is accentuated when the exact time and location of impact are uncertain (Nicholson 1994:5).

Findings from a study by John Handmer (1992) about the 1988 Rockhampton (Queensland) floods, identified a major challenge of prolonged lead-time warnings: that of competing 'unofficial' warnings. He argued that warning response is influenced by lead-time because, as official warnings are issued well ahead of the predicted event, the public have time to confirm or disconfirm the warnings by reading media reports and by talking to others. Media commentaries on the coming event also serve as unofficial predictions and the hazard discourse is confounded by multiple viewpoints which 'modify the context of the message' (9). This undermines the 'one source' official message, especially if these unofficial sources conflict with official advice. During the 1967 Tasmanian fires, known as 'Black Tuesday' Wettenhall (1975) found that people under-responded to pre-disaster danger signals because they claimed they had 'heard it all before' (71, 104). Handmer's (1992) study suggests that, response to warning messages in prolonged lead-time scenarios may depend not so much on *what* people hear but from *whom* or *where* they hear it.

In the wake of the Black Saturday bushfires householder behaviour and decision-making under threat in the Australian bushfires context was examined (Whittaker et al. 2009. McLennan, Elliott, Omodei et al. 2011, McLennan, Omodei, Elliott et al. 2013), and included evidence presented to the Victorian Royal Commission. Failures in warning systems and a lack of timely and accurate information regarding the location speed and direction of the bushfires was suggested to have jeopardised resident's safety (2009 *Victorian Bushfires Royal Commission Final Report*, 2009). McLennan, Elliott, Omodei et al. (2012) notes that prior to the bushfires participants reported few official warnings

---

[79] AFSM - Australian Fire Service Medal

about the imminent bushfire. Their study called for a better understanding of 'factors that drive decisions and subsequent behaviours of householders exposed to a wildfire threat' (916). However, not included in the post-Black Saturday literature was how the perception of official warnings influenced risk perception and whether warning lead-time had an impact upon decision-making. This knowledge gap is addressed in this thesis.

Discussion

Disaster warnings are interpreted by the media, defined and imbued with meanings. The public then re-interprets these messages and warnings in the context of their everyday lives, using social, cultural and environmental cues to confirm the warnings, evaluate their risk and respond as they see fit. Whilst media theorists no longer subscribe to the maxim that the media can tell people what and how to think, the conventions of reporting, templates and news values all combine to be a powerful influence upon people's understandings and perspectives. Nowhere is this more telling than when disasters happen; because of deadlines and news values (amongst other constraints) tried and true ways of telling a disaster story are employed. These ways stereotype both response and responders, often creating a problem where previously there was none. Myths are perpetrated in this way and these were detailed in this chapter. Absent from the list of myths was that of 'cry wolf' or 'warning fatigue' as this thesis challenges the accepted view that repeated warnings do not result in warning fatigue. This chapter also extends the definition of disasters by proposing a typology that included warning lead-time as a differentiating factor. It also suggested that disasters with a prolonged warning lead-time present unique warning challenges for emergency authorities and influence how the public respond to them.

The following chapter explores perception and appraisal of risk from the psychosocial perspective. It draws predominantly upon the discipline of psychology to understand stress and anxiety responses and explores the strategies individuals employ to cope with and mitigate the feelings arising from hearing a disaster warning. Whilst using psychological theories and models may seem incongruous to understanding 'the social', this thesis argues that to ignore the individual as part of the social is only to tell 'half the story', and that by bringing more than one perspective to an exploration of risk perception and warning response, a complete picture can be drawn.

4. SUBJECTIVITY IN THE SOCIAL DOMAIN

Introduction

The person, it is argued, is much more than a gateway or site through which affecting forces jostle, to be then transmitted on to other human receivers. Instead, a rather massive and distinctive re-working of the social is thought to occur as it passes thought human subjectivity (Wetherell 2012:128)

Studies into the interaction between the individual and community, or the self and the social, have often been reduced to an 'either/or'; a binary where the self has been seen as either preceding the social or resulting from it. Bodies and brains are embedded within social contexts; when sociologists talk about the social expression of a psychological concept for example, there is an implicit assumption that brain processes directly translate into social processes. However, I would suggest that this privileges the social contexts of these processes at the expense of acknowledging and understanding the psychological affects[80] that directly contribute to these social expressions. A psychosocial approach views the human subject as a social entity, with subjectivity in the social domain. Subjectivity is operationalised as the desires, feelings, perspectives, even personalities of 'the subject', who, for purposes of this thesis, are people who live in bushfire-prone areas of Australia. This complex dynamic between thoughts, feelings and actions can be understood as 'a crucial bridge between the individual and the social, and are a quintessentially psychosocial phenomena' they are situated in the body yet manifested in the social (Day Sclater, Yates, Price et al. 2009:1). The challenge that this chapter pursues is to 'move between existing disciplines of pure and applied domains' to 'rethinking the space between the psychic and the social' (Stenner 2007:1,3).

Risk perception, or risk judgment (Dunwoody and Neuwirth 1991) is multidimensional, encompassing cognitive, societal and cultural influences and few have 'distinguished between social and personal risk judgments' (Coleman 1993:613). A central theoretical aim of this thesis is to keep a holistic perspective on risk, acknowledging that risk perception can be social and cognitive and to explore the intersection of both. In the context of disaster warning and threat appraisal this chapter also explores the intra-personal component of risk evaluation and the cognitive affects that influence the decision-making process. This is not to imply that there is a right or wrong way to

---

[80] Affect –verb: to act upon or influence. noun: (psychology) an expressed or observed emotional response. The 'affect heuristic' is discussed on page 103.

respond to risk but to emphasise that individuals are not just information processors, they are also meaning-makers who evaluate and interpret risk within social, political and cultural contexts. Just to what extent these social contexts influence or mediate the perception of risk will be addressed in the following chapter.

One of the objectives of this thesis is to understand what impels the inhabitants of fire-prone areas of Australia to pay attention to bushfire warnings. Furthermore, as they pay attention (or not) and interpret them in their own context, to determine what shapes their assessment of bushfire warning credibility. As the environment and its dangers meet the individual *and are mediated* by emergency and disaster authorities, it is how risk is personalised and then made real (or subjectified) that this chapter explores.

The decision on which literature, theories and models to include was made as a result of several years of reading and research in the risk evaluation field, and led to narrowing the focus of this thesis to warning fatigue. This thesis takes an integrated and interdisciplinary approach to understanding warning fatigue and draws upon literature from several disciplines including psychology, sociology, geography, mass communication, and disaster and emergency management. However, in this chapter there is an emphasis on the psychological explanations for topics which are relevant to this thesis – anxiety, coping, risk appraisal, control, self-efficacy and biases; for the purposes of exploring these topics this chapter privileges the psychological over the social. It builds upon, in part, Irving Janis' ideas about the psychological effects of warnings which are encapsulated in Baker and Chapman's (1962) book *Man and Society in Disaster.* All the topics covered in this chapter involve the appraisal process of a threat and the psychological affects which influence how appraisals are made, rather than the behaviour which follows a threat appraisal. For example theories such as Azjen's (2002) Theory of Planned Behaviour concentrate more on beliefs about behaviour with the aim of being able to predict behaviour in certain contexts. Summarised in this chapter is the psychological literature on emotions such as helplessness, fear, and anxiety, as these have been shown to play a part in how the public perceive personal risk and decide to respond to warnings. The cognitive adaptations and maladaptations as well as appraisal, stress and coping theories are outlined; these include personality traits of optimism, unrealistic optimism, theories of attribution, normalcy and habituation, and the emotional 'reactions' of fatalism and

helplessness. Hobfoll's (1989) Conservation of resources theory is useful to examine how, in times of stress, people evaluate their ability to cope by assessing whether they have the required resources to deal with the threat.

The exploration of risk perception and cognition has a rich research history in psychology, and sociologists can use this knowledge to explore the interplay between subjectivity and its expression in the social domain. Until relatively recently, much of the psychological literature that has examined threat responses has done so in laboratory-based situations using a contrived stimulus and, compared to society at large, a relatively small number of individuals. For example, Breznitz (1984), in his exegesis on the cry wolf syndrome, details the electric shocks he threatened to give his participants and evaluated his hypotheses by their psycho-physiological (heart rate and skin conductance) indices. The quantitative methodologies that psychology typically embrace propose and then seek to prove or disprove hypotheses. However, without a qualitative component it is difficult to empirically validate *why* participants respond in such a way - only that they did. The psychosocial approach offers a way to observe the connection between thought and action, intention and behaviour, stimulus and response, emotions and affect.

Appraisal, Coping and stress theories

Within contemporary theories of stress, the ways that people both appraise threats and mitigate anticipated impacts is seen as integral to understanding how best to cope with life's challenges. Fleishman (1984) defines these strategies as 'overt and covert behaviours that are taken to reduce or eliminate psychological distress or stressful conditions' (229); research has traditionally explored responses that both confront and avoid. Typologies examined in this literature include the processes of change or control, modification or regulation and cognitive and behavioural strategies which focus on either the problem or the emotional response. Coping strategies can be initiated at any stage of a stressful scenario: before, during or following an event. This discussion of stress and coping will do so in the context of pre-disaster scenarios, (warnings and preparedness) rather than how people emotionally mitigate the effects of a disaster after it has occurred. Therefore, the appraisal and coping strategies people employ prior to a disaster or in response to a potential threat are especially pertinent.

Appraisal and response is a dynamic contextual and reciprocal process between a person and their environment; the response of a person cannot be understood in isolation of an equal understanding of the natural setting in which it occurred (Schwarzer, 1998). Lazarus (1991) acknowledges the environment also when he conceptualises stress reactions as comprising causal antecedents made up of personal beliefs on one hand and environmental constraints on the other. A sense of environmental mastery as well as self-esteem were found by Pearlin and Schooler (1978) to reduce emotional distress in situations which occurred over a relatively long period of time. Based on this idea of self and environment, Brandtstädter (1992) devised a model of goal-oriented coping in which he theorised that people are either 'assimilative' (they try to modify their environment) or 'accommodative', in that they try to modify themselves. He further explained that assimilative coping styles are used to pursue goals, whereas an accommodative style tends towards adaptation to the unexpected.

Most people do not exist in isolation, and peoples' social networks and relationships are often drawn upon in time of distress and crisis; these social resources have been hypothesised as mediating life stressors where low levels of social resources can cause psychological anxiety (Lin, Simeone, Ensel et al. 1979, Andrews, Tennant, Hewson et al. 1978). Additionally the quality of support can be a predictor of coping outcomes (Henderson 1977). Perceived support, also known as 'functional support' (Wills and Filer 2001) help people believe they can rely on friends and family to talk with, and that their social networks will be emotionally and practically supportive.

Emotion and Affect

Stress

> Although risk perception was originally viewed as a form of deliberative, analytic information processing, over time we have come to recognise just how highly dependent it is upon intuitive and experiential thinking, guided by emotional and affective practice (Slovic 2000:xxxi)

Aversive experiences such as anxiety, worry, dread and fear can all be understood as 'normal' adaptive response to threats. However, these responses can influence how people respond to warnings, interpret potential threats and respond to risk. Stress, often experienced as fear or anxiety, is a subjective psychological and physiological response which places demands upon the individual. A stress response is initiated by the body's nervous system and can result in physiological changes; for example in acute

stress situations, a stressor may produce increased stress hormones such as cortisol and adrenalin, enabling the evolutionary adaptive flight or fight responses. Neurotransmitters, such as serotonin, are released to mitigate effects of acute stress (Glanz and Schwartz 2008). Early psychological research developed to explore concepts of stress most often did so within the framework of abnormal psychology. However, more recently, research into stress has focused on chronic or long-term stress, and its effects on the body; for example the immune system, metabolism and memory.

A stressor can be any real or perceived physical, social, or psychological event and is often perceived by an individual as somewhere between a threat and a challenge (McLennan personal communication 25 November 2013). These events can result in anxiety and fear which are stress reactions and there are many factors which influence this subjective experience of stress. This chapter operationalises the 'stressor' as a disaster warning and 'stress' as the individual's response to a disaster warning. Using a threatened disaster as an example of a stressor, these factors could include the characteristics of the disaster – controllability, predictability and frequency – and an individual's previous experience with a similar disaster, coping consequences and outcomes. Lazarus (1991) states that 'the anticipation of a severe threat with its inherent uncertainty is often more stressful than the event itself' (204).) He proposed that stress was a transactional phenomenon, largely dependent on the subjective meaning the stimulus had for the perceiver (Antonovsky, 1979). For purposes of exploring stress responses in the disaster context, this chapter draws upon Lazarus' Transactional Model of Stress (Lazarus 1966). This model describes that in times of threat, people quickly situate the threat within their experience, imagine what the impact might be and evaluate their ability to deal with it. He suggests a primary and secondary appraisal schema where the first appraisal evaluates the personal risk and the second considers the available coping options. The secondary appraisal apportions responsibility or blame, evaluates their ability to cope with the threat and, if the event plays out in accordance with their goals, the probable outcome. Lazarus' theory has subsequently been revised and more recent research suggests the secondary appraisal of 'coping options' may in fact be utilised first. Krohne (2002) offers a more appropriate nomenclature of 'demand and resource' appraisals as he maintains both appraisals 'depend on each other and often appear at the same time' (2).

The ways that people respond to challenges from their environment can be seen 'as a function of their personality, constitution, perceptions, *and the context* in which the threat occurs' (italics added, Hobfoll 1989:513). Earthquake victims who experience on-going earthquakes, each of which may herald another large quake or a lesser aftershock, experience stress because they are situated between the physical event and the subjective experience of the event; they are active in this process and are constructing risk as they do so. Healthy citizens of a community which has recently experienced a flu-virus outbreak and who are monitoring their own health on a daily basis are another example. The idea of acute stress as opposed to chronic stress can be demonstrated as the difference between the stress experienced in an imminent pre-disaster phase ('there is a hurricane bearing down on your town') and the prolonged experience of living with awareness of a potential risk ('we know we live on a major, active fault-line').

People who live in bushfire-prone areas experience a fire season annually, where for the six or so months over the summer, the risk from bushfires is made known through public safety campaigns and targeted television and radio bushfire information. Apprehension about potential bushfires is activated with each very hot day, which is classified by fire authorities and well-known to communities as a 'total fire ban' day.[81] Observations of the vegetation and ground drying out, increasing fuel load and particular meteorological conditions (strong winds, high temperatures, low moisture) can raise the awareness of bushfire risk. This awareness has the potential to increase anxieties about the potential for a fire. These observations are not made just once, but are part of on-going risk assessment. However the ability of people to maintain vigilance about a threat over a long period of time is limited.[82] Vigilance depends on a variety of factors: the magnitude of the threat, the salience of the threat in relation to everyday life concerns and the perceived ability of the disaster and emergency agencies to keep the threat contained. Therefore, in a longer temporal context (prolonged lead-time), factors such as vigilance become more of an influence on decision-making and need to be considered along with the psychological affects.

---

[81] See page 121.
[82] see – 'finite pool of worry', page 86.

Anticipatory Anxiety

Anticipatory anxiety is a specific type of fear that initiates coping mechanisms. During the fire season and in addition to everyday cues, the public are exposed many warnings, the number and frequency of which can have a sensitising effect, making some threats more salient. From the road-side signs indicating the level of fire danger for that day, to frequent television bushfire prevention broadcasts, the public are primed to expect that a fire is likely should factors beyond their control conspire to produce a bushfire. In the absence of an actual fire event and regardless of whether the bushfire eventuates, the anxiety precipitated by the warning for some will be real.

Research (Monat, Averill and Lazarus 1972) suggests that temporal uncertainty (not knowing when a threatening event will happen) is managed better when the lead-time is prolonged as this gives people more time to activate or change their coping strategies. The usefulness of event lead-time or prior warning for coping strategies needs to be qualified however, as event uncertainty is compounded when the probability of the event is also unknown. Unlike severe weather events which are able to be predicted more easily as weather modelling and satellite technology develop, prolonged lead-time disasters present the public with well-known disaster outcomes but with little or no certainty as to when the event will occur. Probabilistic data for volcanic eruptions, pandemics, earthquakes and bushfires are the domain of industry experts, and the public are entirely dependent on their expertise and ability to convey timely and important information. In the case of bushfires, it is possible to evaluate the weather - the ground moisture, the wind strength and direction, temperature and moisture - so it is reasonable to assume that personal evaluation of environmental cues may reassure and moderate anticipatory anxiety to some degree. However, as Slovic, Fischoff and Lichentstein (1980) point out, 'even when statistical data are plentiful, the hard facts can only go so far...[and]... at some point human judgement is needed to interpret the findings and determine their relevance' (189).

Anticipatory Coping

Peacock and Wong (1996) posit that when people are exposed to conditions where an uncertain outcome induces stress, they employ a variety of coping strategies, activating one of eight coping schemas.[83] Based on accumulated knowledge of the situation at

---

[83] 1) Situational schema; 2) social support schema; 3) preventive schema; 4) passive-emotional schema; 5) active-emotional schema; 6) self-restructuring schema; 7) existential schema and 8) spiritual schema.

hand (an imminent bushfire for example) and much like mental models,[84] people use different coping schemas according to the perceived threat. Additionally, how well people cope when faced with a threat depends on how much control they think they can have over the situation. The schema most applicable to highly threatening situations is the 'passive-emotional' schema which involves a disengaging 'in order to control strong emotional reactions' (Peacock and Wong 1996:206). However, similar to Lazarus and Folkman's (1984) concept of emotion-focused coping, a passive-emotional approach is not thought to change a situation; rather it serves to make a person feel better whilst experiencing it. Anticipatory coping is posited by Beehr and McGrath (1996) as one of five coping behaviours[85] whose purpose is to manage the impending risk. For example women about to lose their hair from the side effects of chemotherapy often choose to shave it off before treatment as it provides a sense of control over an unpredictable process (Frith et al. 2007).

Coping with anxiety caused by events in the past, called reactive coping, is fundamentally different from anticipatory coping because the crucial threat has yet to materialise. The usefulness of anticipatory anxiety is that it motivates people to imagine the possible impact of the event and engage in preparation activities. Schwarzer and Knoll (2003) assert that anticipatory coping is a 'management of known risks [and a] short-term engagement with high-certainty events' where people invest their resources, enlist help or seek reassurance (5).

Preventative and Proactive Coping

Preventative coping are strategies people put into place long before an event occurs and includes gathering resources in order to 'reduce the severity of the consequence of stress' (Greenglass 2002:6). Preventative coping is most often event-specific and people usually know about the threat for which they are preparing. For example as the bushfire approaches, residents who live in bushfire-prone areas will often go through a well-rehearsed list of tasks (clearing gutters, checking water supplies) even though there is no certainty that their actions will result in protection. As Schwarzer and Knoll (2003) point out, preventative coping is not initiated because people are about to experience an acute threat, rather it is borne from a generalised concern about 'the dangers of life' (6). Uncertain events which have yet to materialise and of which people have had no

---

[84] Mental models are expanded upon in chapter 5, page 101.
[85] 1) Measuring the threat; 2) physiological; 3) psychological; 4) task performance and 5) interpersonal behaviour.

personal experience are harder to prepare for; these are also the disasters that emergency authorities know are the hardest to warn about. It is important to note that for preventative coping, the anticipated problems are viewed as controllable, and the mechanisms put in place to manage the event deemed sufficient.

Preventative and proactive coping are future-orientated, conceptualising a risk or threat and imagining ways to combat any negative impacts. Schwarzer (1999) defines reactive coping as more of a risk management strategy, whereas proactive coping is 'coping to prevent adversity and promote personal growth' (Schwarzer and Luszczynska 2008:22). Therefore, rather than being something that a person does in a specific instance for a specific event, proactive coping is operationalised as a 'life skill'. It is something to be incorporated into a person's general attitude where resources are acquired, managed and goals achieved. In contrast to preventative coping where worry levels are high, proactive coping results in lower levels of anxiety (Scharwzer 2000) and makes people feel better whilst imagining the threat.

Self-Efficacy

Perceived personal competence or optimistic self-belief was first addressed by Bandura (1977) whose concept of 'self-efficacy' (a personal belief in one's ability to succeed in specific situations) laid the foundation for his social cognitive theory.[86] As an internal coping resource, Bandura claimed that self-efficacy can be a predictor for 'whether coping behaviour will be initiated and sustained as well as how much coping effort will be expended' (Holahan and Moos 1987:953). The stronger an individual's sense of efficacy, the greater the effort, perseverance, and resilience they exhibit in the face of an adverse situation. Self-efficacy is positively correlated to self-control; the more that a person believes he or she can alter the outcome of a situation, the more positively a threat will be viewed and the more convinced they are that they will be able to overcome it. The terms self-efficacy, self-esteem or self-concept are often used interchangeably. Self-esteem can be defined as a personal judgement of worthiness, involves an attitude of approval or disapproval and 'indicates the extent to which the individual believes himself to be capable, significant, successful, and worthy' (Coopersmith 1967:4,5). Efficacy beliefs have also been shown to influence the amount of stress and anxiety individuals experience when facing a potential threat (Pajares and

---

[86] Originating from Social Learning Theory (Miller and Dollard 1941), Social Cognitive Theory asserts that it is only by observing others and copying their behaviour, that people acquire knowledge. That knowledge is then modified as a result of reward or punishment.

Shunk 2001; Pajares & Miller 1994). Furthermore, Lazarus (1991) conceptualises self-efficacy as comprising of 'hardiness, sense of coherence, optimism, consecutive thinking, learned resourcefulness and self-control' (442).

Personal self-efficacy is the belief that an individual can achieve what they set out to achieve and outcome efficacy is the belief that there will be a favourable outcome if this action is completed. Outcomes which are seen as successful enhance personal self-efficacy and those which are interpreted as failures, lower it. Self-efficacy mediates between a person's thoughts and emotions and their actions. Research (Bandura 1986;. Corbin 1972; Felz and Landers 1983; Kazdin 1978) has shown that individuals with high perceived self-efficacy more easily imagine scenarios in which they are successful, which in turn (when they are successful), further strengthen efficacy beliefs. Moreover, even when things do not go as well as planned, those high in self-efficacy recover more quickly, and 'maintain their commitment to their goals' (Schwarzer 1998:4). Hearing about and responding to disaster warnings is essentially a problem-solving dilemma and it is possible that those who can more easily imagine themselves being successful in a disaster may have better outcomes than those who cannot. These outcomes can range from more thorough preparation to better family and property protection measures. Furthermore they not only involve physical processes but also can include role-playing and rehearsal (Hepworth, Rooney and Dewberry-Rooney 2010). The majority of disaster literature which links self-efficacy to preparedness and effective decision-making under stress does so in the context of post-disaster scenarios. Self-efficacy is integral to understanding how individuals appraise potential threats.

In terms of decision-making under threat, encouraging proactive coping behaviour is a challenge for disaster and emergency management agencies, not the least because disasters are extremely negative, requiring reactive processes to alleviate distress. However, one of the tenets of proactive coping is that is changes how people think about adversity; instead of potential problems, the obstacles are reconceptualised as challenges and threats become opportunities. Positive coping strategies include imagining the threat and then acquiring personal resources to meet those challenges. The rationale is that the better the resources, the more empowered individuals will feel about facing adversity (Greenglass 2002). Correspondingly, it is hypothesised that the fewer resources a person thinks they have, and with no way to redress that problem,

the more stressed they are likely to become. These ideas were encapsulated in Steven Hobfolls (1989) 'Conservation of Resources' theory where both internal (self-beliefs) and external (physical and social) resources are hypothesised to contribute to proactive coping. This theory is valuable to explore in the psychosocial context of this chapter as it suggests that resources can be both psychological and social. Moreover that people who perceive themselves to having adequate amounts of both types of resources appear better placed to respond to threats should they occur.

Conservation of Resources Theory

Surviving a disaster has been shown to increase self-control and self-esteem which in turn, increases optimism (Taylor and Armor 1996). Within the discipline of positive psychology, these positive traits can be understood as 'positive psychological capital' (Luthans and Youssef 2004), a concept which describes the emotional resources that enable people to manage anticipated stress. Not unlike social capital, where social resources such as family and friendship networks increase social cohesion and personal investment (Dickenson 2013), so too emotional resources have been hypothesized to protect against the psychological and emotional impacts of threats. As a way of explaining why people become stressed at the prospect of losing their resources, Hobfoll (1989) proposed a 'conservation of resources' theory in which people strive to retain, protect and build resources in order to prepare for and mitigate anticipated stressful life events. These resources can be physical objects, social relationships, knowledges, personal characteristics or even conditions such as a stable marriage or a good reputation. Limitations of this theory are that it is often difficult for people to quantify or even recognise their own resources, and therefore find it challenging to add to these resources if they are perceived as lacking. Hobfoll's definition of resources is broad, and the weak association between resources and wellbeing problematic; 'whereas some people might be able to make a lot out of very little, others might be less skilled in using their resources efficiently' (Freund and Riediger 2001:373). The theory is a generalised framework at best where the resources which would be most relevant to any given domain are not specified. However, Hobfoll's theory goes some way to explaining why people become stressed when their perceived resources are threatened, or when a situation is approaching where their ability to cope and the resources they have available to them are outweighed by the magnitude of the threat.

Cognitive Adaptations and Self-serving Biases

The challenge of a psychosocial approach is to integrate the often contradictory traditions of psychology and sociology without privileging one over the other; this thesis maintains that both disciplines can contribute to understanding how and why people respond in the ways they do. Despite the criticism that psychology tends towards a pathologising of behaviour (Haslam 2005), the focus in the following section on 'the self' is to understand how a cognitive response can be a part of a socially-contextual process.

Optimism Bias

Weinstein (1989) describes optimism bias as the belief individuals have that if misfortune occurs, it will always be to other people, not to themselves; 'people tend to think that they are invulnerable' (806). A New Zealand study by Spittal, McClure, Siegert et al. (2005) showed that compared to friends and others who lived in the same city, participants thought should an earthquake occur, they were better prepared and less likely to be hurt. Survivors of the 2009 Black Saturday bushfires in Victoria reported both internally and externally-based optimism beliefs; most felt their fire plans and their fire knowledge were sufficient. They also believed their houses were more resilient to fire (than they turned out to be) and that emergency authorities would be able to warn and protect them (McLennan, Elliott and Omodei 2012). These optimistic beliefs were shown to be flawed, and for those who died, are believed to have contributed to their deaths (Handmer et al. 2010). The bias of optimism is important to consider in the decision-making and response process regardless of whether an optimistic 'default' is a way of making stressful situations seem more palatable. 'If people do not perceive themselves as vulnerable to a disease or condition [or threat] they are less likely to adopt recommended behaviours' (Avis, Smith and MacKinlay 1989:1608).

Because of its impact on control appraisals, optimism increases problem solving efforts (Scheier and Carver 1985); quite simply, optimistic people feel as if they have more control over personal situations. For example, if a person expects a positive outcome, they are more likely to see the threat as manageable, and envision ways to manage the problem. Belief in good luck (externally-based optimism) and perceived self-efficacy, that is, internally-based optimism, has also been thought to increase the expectation of a positive outcome. Schwarzer (1994) claims some people have a well-being 'default' and are constantly looking for a positive outcome. Moreover, in times of stress and

threat, optimistic people actively seek ways to overcome any perceived negative outcome. Studies have shown that optimism increases positive outcomes in many different contexts, (Marshall and Lang 1990; Reker and Wong 1984; Sheier and Carver 1985). However, there are fewer studies that have examined the influence of optimism on decision-making *before* an event.

University students, who had experienced a magnitude 6.7 earthquake in Northridge California (a suburb of Los Angeles) in 1994, were asked a series of questions designed to test their optimism bias. Conducted over a period of 5 months after the quake, the study found that 'those who had personal experience with injury or monetary loss as a result of the earthquake showed less optimism about injury in future earthquakes than those with no personal experience of injury or loss' (Helweg-Larsen 199p:119). Contrary to previous research suggesting that, over time, experience of disaster increases optimism bias, Helweg-Larsen found that even five months after the earthquake, optimism beliefs had not returned. This finding raises questions about whether there are other mechanisms that replace illusory beliefs in events where experience with a natural disaster has resulted in injury or loss. It also suggests that personal experience may moderate the effects of optimism bias. In addition to the personality trait of optimism (which can act as a psychological buffer in stressful situations), individuals who have been observed to have an 'easy-going' disposition anecdotally appear more psychologically healthy under stress. This has led researchers to propose that an easy-going coping style could serve as a personal resource (ibid), and studies have shown that people with this trait (and the related trait of self-confidence) tend to use active coping strategies and rely less on avoidance coping strategies. Other research however has suggested that despite the real nature of the threat, confident, calm easy-going people may have a reduced perception of risk and therefore do not feel they need to avoid it (Holahan and Moos 1987:947,953).

Cultural Influences of Optimism Bias

Optimism bias is thought to be culturally influenced. A study by Fontaine and Smith (1995) into attitudes to cancer compared American and British responses finding significant differences; American participants had much lower levels of optimism. Fontaine and Smith hypothesised that this was due to greater personal responsibility for health taken by Americans. Equally, it could be due to the confidence each culture places in their respective country's health system. Whilst not ruling out the limitations

of using multi-language versions of the same inventory, Schwarzer, BaBler and Kwiatek et al. (1997) compared self-efficacy between three cultures - Chinese, German and Costa Rican - and found there were differences between the collectivistic and individualistic cultures. Chinese students showed much lower self-efficacy than those students from Costa Rica. Heine and Lehman (1995) used the constructs of independence and interdependence to compare levels of unrealistic optimism between Canadian and Japanese participants, and over two studies found that 'Canadians showed significantly more unrealistic optimism than Japanese, and Canadians' optimism bias was more strongly related to perceived threat' (595). The authors suggested that the reason for these findings was that constructs of self and in particular self-serving biases such as optimism are, for collectivist or interdependent cultures, valued differently. As this thesis argues, the 'self' is socially constructed, and therefore it follows that, across different cultures the self will be expressed differently. In western individualistic cultures, the self is encouraged to be independent, and people 'strive to assert their individuality and uniqueness and stress their separateness from the social world' yet in collectivist cultures 'it is only within the contextual fabric of individuals' social relationships, roles, and duties that the self has meaning' (Markus and Kitayama 1991:596).

Unrealistic Optimism

Unrealistic optimism, optimistic bias or unique invulnerability are all terms to describe a hopeful outlook on life and are known as the 'better-than-average effect' (Alicke, Klotz, Breitenbecher, et al. 1995). These ways of looking at life seem like a great life strategy yet in some instances (decision-making under threat for example) it can be detrimental. Optimism, when rooted in knowledge and experience can be a realistic evaluation of the circumstances, whereas unrealistic optimism is more of a self-serving bias. 'The illusion of invulnerability is both robust and pervasive' and understanding why people resort to such strategies is far from straight-forward (Taylor and Gollwitzer 1995:214). However, some explanations for unrealistic optimism have merit: people are motivated to bolster their self-esteem because in stressful times they need to make decisions they feel good about. Good decision-making (or feeling good about an average decision) is reassuring, which can reduce fear thus making the individual feel as if the situation is under control.

Unrealistic optimism is also thought to be higher when predicted threats have not been previously experienced (Weinstein 1989a). However, the reverse has also been found to be true. When a community has survived a flood for example residents are more optimistic about their ability to survive a subsequent flood, even though the odds of another flood being as bad or worse have not changed (Sattler et al. 2000). This is an example of gamblers fallacy[87] where people ignore the truism that random events - 'one-in-10' or 'one-in-100' year floods - are equally probable, even when the 'one-in-100' year flood has just happened. When the prior experience of disaster has been a positive one, then the expectations that a subsequent disaster will have a similar outcome is common (ibid.). This is not to say that experience is detrimental to risk perception and preparedness, but it can result in a flawed and biased risk perception. [88] The usefulness of examining unrealistic optimism in the bushfire warning fatigue context is that when people have experienced a bushfire and survived it, it may be that for some people, a sense of invulnerability is generated. This is not to say that the survival may have been the result of good preparation and decision-making, but to highlight that no-one can truly predict how bad a bushfire may become; therefore unrealistic optimism could be an impediment to future risk evaluation.

Of particular interest to this thesis' exploration of warning fatigue is the point at which, after a disaster, unrealistic optimism affects risk perception. Berger and Palmer (1992) found in a study they conducted following the 7.1 magnitude Loma Prieta earthquake in 1989, that immediately after the earthquake, unrealistic optimism was not apparent for their participants. However, just three months later, because of the absence of the immediate threat and the associated feelings of vulnerability, their results showed their participants to be unrealistically optimistic about their perceived risk from all hazards (not just earthquakes). Berger and Palmer (ibid.) called this the 'out of sight, out of mind' effect (43) and even though unrealistic optimism can be seen as a positive trait in that it can help reduce anxiety, it can also contribute to people failing to prepare for future threats. [89]

---

[87] Gamblers Fallacy – The erroneous belief that if an event (slot machine pay-out for example) hasn't happened for a while, there is a higher likelihood of it happening as time goes on.
[88] Experience, as an influence on risk perception, is discussed in Chapter 5, 106.
[89] This finding of delayed optimism bias needs to be qualified however; Berger and Palmer asked a general question about the risk of being hurt in a natural disaster, not earthquakes specifically. Their study was also a 'between-participants' design, which asked different students over time.

Another bias which contributes to people being inadequately prepared for a disaster is the single-action bias. Often discussed in the context of climate change, this bias demonstrates simplified decision-making where just one action (buying energy saving light bulbs for example) reduces feelings of vulnerability and worry. People often take no further action even though their first action may not have been the most effective option and provides little in the way of protection or risk reduction (Weber 1997). A study of how Argentinean farmers adapted to climate variability found that, despite having several drought prevention options available to them, the farmers invariably chose to engage in just one activity, despite the known impact of drought on their livelihoods. Farmers who were able to store grain on their farms for example, were less likely to use irrigation or buy crop insurance although these measures would have provided an even greater protection against the impact of drought (Hansen, Marx and Weber 2004).

Taylor's (1983) theory of cognitive adaption explains how and why, in the face of threatening information people distort their perceptions and change their beliefs. This theory explains why different people can hear or see the same thing, but interpret it differently. For example hearing a warning about a bushfire but ignoring it because they think where they live is cooler or wetter (than the area being warned about), or rejecting a warning because it was given by an agency that the person feels has no credibility. For either scenario where the message is dismissed, it is necessary for people to create positive illusions about what they think the risk reality is. Taylor, Kemeny, Reed et al. (2000) argue that this allows people to understand the event and 'gain a sense of mastery' (875), and as the previous section explained, increase self-efficacy and feelings of control and agency. Those who do this most successfully in the face of a threat cope better than those who less successfully create positive illusions. Additionally, as the threat situation changes - information is updated, the threat passes - these illusions are often revised (Attwood 1994) and serve, similarly to optimistic bias, to bolster perceived self-efficacy and self-esteem. In this way, illusions fulfil a positive function and contribute to mental health in that they enable survivors of traumatic events to 'bounce back', demonstrating the defence and resilience-building mechanisms of the psyche. In contrast to delusions[90] which are typically associated with mental illness and unaffected by new information, positive illusions are often modified in response to context and the social environment (Taylor 1983). One of the findings of

---

[90] Hallucinations and/or grandiose misperceptions of physical reality.

research into self-evaluation maintenance was that people 'reduced the importance attached to the threatened dimension' (Tesser 1988 cited in Taylor and Armor 1996:878). This is despite having past experience of similar threats, the information being factual and the warnings being timely. This phenomenon of reduced vigilance is often seen in bushfire vulnerable communities when a fire season is particularly wet; there is a perceived lessening of bushfire danger even though the rain markedly boosts the fuel load and increases the likelihood of more destructive fires in the following fire season.

Normalcy Bias

Very similar to optimism bias, but different in that it relates to the unrealistic risk evaluation of the threat (rather than a 'self-other' comparison), is 'normalcy' or 'normalisation bias'. This bias has been shown to cause people to underestimate both the probability of a negative event occurring and its consequences (Valentine and Smith 2002). Normalisation bias can affect not only decision-making at the time of an event, but preparation ahead of a disaster. It usually occurs because people have never experienced the predicted threat, or known one to happen in their area. Referred to by some as the 'head in the sand effect', when a disaster is predicted to be of an overwhelming magnitude, people often simply cannot comprehend the scale of the threat and its impact. In a report to the Victorian Bushfires Royal Commission, Handmer et al. (2010) described the Black Saturday bushfires as 'unprecedented' and 'unimaginable' and commented that in the many cases where people had died, considering the ferocity and unpredictability of the fire, their survivability and the defence of their properties should never have been an option.

The degree to which people directly experience a disaster has been shown to influence normalisation bias. Studies conducted into risk perception and warning response after the 1989 Loma Prieta earthquake by Mileti and O'Brien (1992) concluded that, when asked about their perception of harm in any future event, those who experienced the earthquake without suffering any major effects displayed significant normalisation bias. Mileti and O'Brien suggested that in a pre-disaster scenario, normalisation bias may explain why 'persons without any disaster experience are more reluctant to personalize risk and respond to pre-impact warnings' and that this bias could constrain 'perceived risk and protective response even in the face of warning information'(ibid.: 54,55). Possibly another way of interpreting normalisation bias is when things return to

'normal' after an event, the saliency of a future disaster is lessened. This was certainly was the case for residents in Istanbal after a large earthquake in 1999; Tekeli-Yesil (2007) found that, in comparison with the many other challenges of living in a post-disaster reality (restoring basic needs like shelter and food for example) the motivation to prepare for another disaster was simply not there. The reduction over time of media commentary about the disaster was also credited with reducing concern about a future threat. This observed 'lack of motivation' has similarities to the idea that people struggle to maintain a fear of one problem when a new one appears and may be why disaster and emergency agencies have difficulty keeping a threat salient over time. This phenomenon has been labelled the 'finite pool of worry' (Weber 2006) and has some echoes in the cognitive load theory (Sweller 1988). This theory suggests that people can only pay attention to a certain amount of information before it gets replaced with more recent or more interesting information.

Cognitive Dissonance

Closely related and relevant to people's personal perception of risk is one of the most influential and extensively studied theories in social psychology; that of cognitive dissonance. The theory explains what happens when people are confronted with experiences or information that is inconsistent with their core beliefs or morals. People in these circumstances are faced with two choices: change the situation or change their beliefs (Brehm and Cohen 1962). Another approach is to reject the information (and keep their beliefs), and search for alternative confirmatory information from others who believe the same things (Aronsen 1969). This theory derives from the observation that people have a bias towards keeping their beliefs consistent with their actions. When a situation occurs where their beliefs are at odds with their actions or intended actions, people become 'cognitively uncomfortable'; so much so that there is a strong drive to reduce the discomfort. The example that is often used to explain this phenomenon is the conflict smokers have between their habit and the medical facts about the harm that smoking causes.

Festinger (1957) was the first person to coin the phrase 'cognitive dissonance' and suggested that there were three ways to reduce these dissonant feelings, a process he called 'dissonance reduction'. The first way was to change one of the dissonant factors (smoking less), the second added a consonant factor ('I smoke low tar') and the third lowered the importance of one of the consonant factors ('statistics show that driving in

a car is more dangerous'). People who live with a long term risk from a disaster, for example those who live in flood prone areas such as New Orleans, USA, or on the side of a dormant volcano as on Mt Etna in Italy, need to justify their safety and downplay the risks in order to go about their daily lives. Residents in bushfire-prone areas of Australia face identical issues of cognitive dissonance: despite generations of people experiencing devastating bushfires in similar environments, people choose to live close to, or amongst forests of eucalyptus. Ways of justifying these choices can be explained by dissonance reduction: residents fortify their houses with fire-retardant materials, clear fuel and vegetation from around their houses to the 'recommended' 30 metres, or report feeling confident about their local authority's ability to warn and protect them. This enables people to feel better about the risk and to believe that, because of the actions they have taken, the bushfires risk is reduced. To use Festinger's theory of dissonance reduction in the bushfire context, the residents at risk from bushfires can: 1) change one of the dissonant factors (move to a safer area); 2) add a consonant factor (install sprinklers on the roof of their house) or 3) lower the importance of one of the consonant factors (plant all English natives rather than Australian eucalypts). [91] Regardless of what action is taken, the outcome is the same: a belief that the bushfires risk is not as great as the authorities say it is. The importance of understanding the relevance of cognitive dissonance as a decision-making factor is that it can act as a bias towards certain decisions even though an alternative decision may deliver a much better result.

Attribution Biases

Just as optimism bias is a self-serving 'esteem booster', so too, attribution bias contributes to a feeling of well-being. It is a 'comparison to others', where others are judged less favourably in certain situations. For example living in bushfire-prone areas often report that think they are generally more prepared for a bushfire than their neighbours, and that, in an actual event, they will have a better outcome. [92] This could be an internal attribution (they see themselves as more careful, or better prepared) or an external attribution, where their house or property is deemed to be more resistant to fire than their neighbours. Some causal attributions can be seen as similar to cognitive dissonance; for example if an individual alters their belief about an obviously

---

[91] There is anecdotal evidence to suggest English native trees – oak, willow, elm and birches for example – are far more fire resistant than the Australian eucalypt. A Tasmanian interview participant purposely planted rhododendrons as she had heard they 'steamed' during a fire.
[92] See participants' reflections of their personal risk from bushfire in chapters 7 and 8.

negative situation, then by attributing their situation to controllable factors they can mitigate anticipated stress. This can be done in a variety of ways: for example attributing an improvement in life experience to misfortune: 'I never would have begun my new business if I hadn't lost everything in that fire'. Alternatively people can compare a current situation to a hypothetical worse situation: 'our house was badly damaged in the earthquake, but not as badly as those whose land was also affected'. Kunda (1990) calls this 'motivated reasoning' and argued that whilst a large body of psychological research has shown that individuals use cognitive processes and representations to arrive at their desired conclusions, motivation is important 'in determining which of these will be used on a given occasion' (480).

Building upon previous research about self-serving conclusions, (Kruglanski and Ajzen 1983, Chaiken, Liberman and Eagly 1989; Pyszczynski and Greenberg 1987), Kunda (1990) clarifies that she is not referring to the motivation to make accurate judgements. Rather, she is interested in the motivated reasoning where people 'arrive at conclusions that they *want* to arrive at' (italics added:480). She observes that people use different beliefs and rules depending on the motivation for a desired outcome and that these beliefs can also change if the outcome changes. In the context of decision-making where the outcome of a decision can be the difference between surviving or succumbing, Kunda observes that 'motivated illusions' stems from motivated reasoning and often excludes more rational and objective reasoning.

Third Person Bias

Third person bias has traditionally been examined in the context of media and mass communication. However, because of its influence on risk perception and the inherent cognitive affects, third person bias merits consideration here. From a psychological viewpoint, third person bias is thought to be an attribution error or inferential bias. This is because when evaluating the impact of media messages on others, people underestimate the effects of situational or external factors (Gunther 1991). Interestingly, early psychological research into social cognition showed that generally people think they have more positive traits than negative ones and that compared to others they also have more positive attributes (Salwen and Dupagne 2003). Third person bias is important to consider in the context of decision-making as it may be an influence on preparation and why people attend to warning messages. When a bushfire is warned about and threat information broadcast, those who are subject to third

person bias may reject the message more often and take less precautions than those who are not.

Cognitive Maladaptations

Denial, Avoidance, Helplessness and Fatalism

Maladaptive strategies are coping strategies that allows individuals to moderate or mitigate anxiety. However, whilst these can reduce anxiety in the short-term, they are flawed approaches because the problem that caused the anxiety in the first place still remains. In the face of a potential threat, people orientate either towards or away from it; a coping strategy referred to in some psychological literature as the approach-avoidance distinction. [93] Rothe and Cohen (1986) state that 'people are either approachers or avoiders' (815) and these strategies of approach or avoidance are not mutually exclusive, even though people generally seem to have a preference for one or the other. As previously mentioned, an avoidance coping style is useful for reducing stress, which if high enough can become debilitating, rendering the individual unable to respond at all. When the threat first presents, emotional resources are scarce and avoidance can enable an individual to prioritise and focus. It also gives the individual an opportunity to become accustomed to the threat and gather resources. As a coping strategy denial or avoidance can only be used for a relatively short time as it cannot be sustained and eventually the reality of the situation will intrude (ibid.: 820).

Whilst avoidant coping may make an individual feel better in the short term, when the reality of a threat or disaster is denied, opportunities to quickly remedy a dangerous situation may be lost. This, according to Horowitz (1976, 1979), is the first consequence of denial whilst the second is an intrusion into the psyche (nightmares, negative feelings). Both of these consequences lessen over time as the process of dealing with the threat is worked through. The avoidance coping style has been shown to be more effective in situations where the threat is deemed uncontrollable, whereas when individuals felt the situation afforded them some sort of control, an approach coping style worked better (Roth and Cohen 1986). Interestingly, when avoidance strategies are used and the threat does not materialise as predicted (in other words a false alarm), the avoidant behaviour is reinforced.

---

[93] Other trait-orientated approaches used to moderate stress that are analogous to the avoidant-approach are attention-rejection (Mullen and Suls 1982), monitoring-blunting (Miller 1987) and repression-sensitisation (Byrne 1964); each of these conceptualise stress responses at one end of a coping dimension.

As previously explained, when faced with a threat the perception of personal control makes a big difference to how the threat is evaluated. A threat could be perceived to be uncontrollable because of past experience of a similar threat or because the new threat is very different to the last one. Responses to evaluations of an uncontrollable situation have often included helplessness ('there is nothing I can do') and fatalism ('no matter what I do, it won't make any difference'). There are a number of studies done in the experimental psychology domain which have investigated responses over time to an uncontrollable threat. These have concluded that 'learned helplessness' is the result of people essentially giving up because they have learnt that their actions cannot alter the outcome. However, in the context of a disaster, that is, experiencing a disaster and learning the limitations of personal control within the event, it is difficult to imagine a scenario where an individual does not learn from his or her experience. Moreoever when a similar disaster threatens, remains in a vulnerable position. In fact, Eiser, Bostrom, Burton et al. (2012) comment that when people have been frightened or injured in past events, they work very hard to avoid similar scenarios. Therefore, it is a *feeling* of helplessness that this discussion of negative coping strategies refers to, rather than learned helplessness, which is usually characterised by demoralisation, increasing passivity, a decline in motivation, and depression. When individuals attempt to exert mastery and control in situations where no control is possible, not only do they give up, but the resultant 'motivational, cognitive and emotional deficits [may] interfere with learning in a new environment' (Seligman 1975; Abramson, Seligman and Teasdale 1978 cited in Taylor 1983:1169). In the context of communities who have repeatedly survived a disastrous event, emergency authorities need to acknowledge these maladaptations if they want to effectively communicate future threats.

Fatalism is an external attribution, where the factors outside of an individual's control, sometimes referred to as 'fate', are perceived to be so overwhelming that no personal agency can be entertained. Mileti and Sorenson (1990) state that 'having fatalistic cognitions' are a 'constraint to processing warning information and to response' (92). Wheaton (1983) views fatalism as an organising schema that comprises related concepts such as locus of control,[94] feelings of powerlessness, helplessness and personal mastery. He also suggests that an increase in personal resources will lessen the effect of fatalism and environmental stressors. Several studies (Gullatte, Magee,

---

[94] http://www.mccc.edu/~jenningh/Courses/documents/Rotter-locusofcontrolhandout.pdf

Brawley et al. 2010; Flores, Aguirre, Viladrich et al. 2009; Parsons, Cruise and Davenport 2006) have examined fatalistic beliefs and health outcomes in the context of religiosity and culture. Whilst religiosity and strong spiritual beliefs were found in people with a stronger fatalistic outlook, neither concept predicted a non-adaptive response to health threats. However, in the context of environmental threats, especially those which have the potential to be on a large scale, religious and cultural influences have the potential to amplify fatalistic beliefs.

Habituation

> *We are highly adaptive creatures. The predictable becomes, by definition, background, leaving the attention uncluttered, the better to deal with the random or unexpected (McEwan 1997:141).*

Warning fatigue, the observed complacency to warnings from official sources, is a puzzling phenomenon that this thesis argues is not a bounded concept, but rather is composed of several factors.[95] The role that habitation plays in the ways people interpret risk is an interesting one to contemplate. Traditionally, most of the habituation literature details laboratory-based stimulus/response experiments, and does so from a biological and physiological perspective. However, this thesis would suggest there is an argument to be made for 'event habituation' where, after exposure to repeated events (and in a similar way to the biological paradigm) there is a decrease in responsiveness; people pay less attention to warnings than they did before. When an event is threatened but neither eventuates nor (if it does) causes harm, the event and its outcome become less of a threatening prospect. Disaster literature (Turner 1983. Drabek 1986) has shown that there is not only a relationship between preparedness, response and warning time but that the number of prior warnings makes a difference as well. Janis (1962) observed that these conditions make possible 'a gradual, easy adaptation to the approaching danger.. [where] ..the potential hazard is perceived to be less of a threat [and] render the warnings less effective' (79-81). If the desired stimulus response to warnings is paying attention, then it could be argued that warning fatigue is a cognitive mal-adaptation or 'habituation' to warnings. This habituation is increasingly likely when there have been multiple false alarms and is true particularly when the reasons for the false alarms have not been made clear to the public. Possible ways to alleviate this affect, or 'dis-habituate' could be to change the characteristics of the warnings through language, frequency or the delivery method.

---

[95] See Warning Fatigue measure Chapter 9, page 185.

Wilson and Gilbert's (2008) model of affective adaptation represented by the acronym AREA – attend, react, explain and adapt – illustrates clearly the social habituation process. Once people who are exposed to an extraordinary threat come to understand the threat (because of past experience, or additional information), it is transformed from the extraordinary to the ordinary, is paid less attention, and so elicits less emotional response. Habituation therefore is a result of the same cognitive drive to reduce stress; when individuals quickly make sense of a threat, thereby rendering it 'normal', it ultimately lessens their emotional reaction to it. In other words, 'people know what the event is, why it occurred and how it fits into their self-concepts; as a consequence they have adapted to it' (373). Furthermore, the very nature of 'explaining away' an initially frightening event renders the threat less scary and more predictable. The 'reference point principle' (Brickman and Campbell 1971; Helson 1964; Parducci 1995) and 'norm theory' (Kahnemann and Miller 1986) also go some way to explaining event habituation, especially in reference to disasters. The premise of these approaches is that it is the differences or changes in a situation that grab our attention. It is only when a threatened event is different in some way, that people will pay attention to it. Moreover, if there has been an extraordinary event in the past, all subsequent events may be compared to it, even though lesser events have the potential to be just as dangerous. A logical extension of this idea is that repeated events, especially when they don't produce the threatened results, exacerbate the effects of event habituation. Warning Fatigue therefore, could be imagined to be a classic example of event habituation; prolonged lead-time disasters are warned about many times over periods of months, and most often years. The hazards are often the same which negates the 'new information' effect, and because these types of hazards are familiar ones (they have been warned about before), they are 'known-about', and rendered somewhat normal and less concerning.

Reactance

Psychological reactance has some resonance with the previously explored appraisal theories that position perceived personal control as key. When people feel obliged or pressured to adopt a certain point of view, or act in a certain way, a belief that certain freedoms are being denied can engender strong emotional reactions. There is no doubt that warnings, by their very nature, intrude into people's everyday lives. However, they 'should not interfere with civil liberties; on the other hand they cannot help but do so to some degree' (Mileti and Sorenson 1990:118). As an anger response, reactance is

typified by people deliberately taking an opposing view or attitude and can also strengthen their resolve not to be persuaded further. An interesting aspect of reactance is that the persuasive messages 'reacted against' are most often those which are intended to improve the health, well-being or safety of the intended audience; for example health messages encouraging cessation of smoking, or warnings about the dangers of bushfires. Whilst this maladaptive strategy could just as easily be discussed in the context of media and the influence of media framing, it is how this cognitive response affects the perception of a threat that is of interest here.

First conceptualised by Jack Brehm in 1966, the theory of psychological reactance argues that people want the freedom to feel, think and act as they (not others) choose and when these freedoms are threatened, some people experience psychological reactance (Donnell, Thomas, Buboltz Jnr. et al. 2001). Operationalised as a motivational personality trait, past research (Brehm and Brehm 1981; Dowd and Wallbrown 1993) suggest that reactance has elements of locus of control, depression and self-esteem. Considering that reactance has been conceptualised as a constraint of freedom, self-efficacy has been found to be a relevant affect (Brockner and Elkind 1985). In other words, people who feel more self-efficacious are less likely to display reactance. Moreover, as the previous discussion revealed, religiosity may not only be related to helplessness but, as suggested by Hong and Feadda (1996) also have an inverse relationship with reactance.[96]

Reactance has been found to be higher in unhappy, lonely people (Joubert 1990) which suggests that although this emotional reaction is a strategy people use to deal with a threat, it is a maladaptation that does not appear to improve the outcome. Reactance is somewhat similar to cognitive dissonance in that in order to make themselves feel better about the threat, people rationalise why they do not need to pay attention to the warnings, and they become contemptuous of official advice. One of the main features of reactance is that after people have emotionally reacted to a perceived loss of freedom, they are then motivated to restore that freedom. This restoration can be achieved through several means: doing something that demonstrates an alternative freedom (Wickland 1974), downplaying the danger of the threat or even acting illegally.

---

[96] The Questionnaire for the Measurement of Psychological Reactance (QMPR) was originally developed by Merz (1983) and subsequently critiqued and refined by Donnell et al. (2001), Hong and Ostini (1989) and Tucker and Byers (1987).

The concept of reactance therefore, demonstrates that people are neither rational nor predictable and that disaster and emergency authorities need to understand this when devising warning messages and 'public education' campaigns. It is important to note that there has been little recent research into this theory.

The Australian Bushfire Context

There are limited studies that explore the effects of stress and anxiety on decision-making in the Australian bushfire context. There have been many studies which have examined effects of stress on cognition and performance in a range of settings but fewer where, away from a laboratory setting and in a naturalistic setting, peoples' warning responses to a stressor such as a disaster, have been studied. By assessing research literature that examined the effects of stress on human performance and by analysing interviews conducted after the 2009 Black Saturday bushfires, McLennan et al. (2011) inferred how people facing an imminent bushfire may be cognitively affected. They suggested that the approaching bushfire caused individuals extreme stress; they found it difficult to remember previous bushfire plans, and misinterpreted 'the significance of emerging threats' (311). Additionally, survivors reported not being able to understand new information, and they had difficulty selecting the best options for survival. Some interviewees reported that their decision-making was poor and in more than one instance, they were clumsy and unable to do basic tasks. McLennan et al. (2011) observed that higher levels of alertness and preparation and an ability to 'down-regulate fear and control attention focus was closely linked to surviving in a potentially lethal environment' (3). It is important to note that this research was in the context of imminent, certain and extreme conditions, not a prolonged bushfire scenario where bushfires are seasonally warned about.

Discussion

This chapter has explored some psychological affects and theories that can go some way to explaining why people act the ways they do in the face of potential disaster. Importantly it does so from the perspective of pre-disaster risk perception. This approach emphasises a fundamental tenet of this thesis, which is to 'pay attention to what people are trying to do instead of only observing how they actually respond to natural events' (Krohne 2002:9). Risk perception is a 'catch-all' term for how people assess personal and community risk and there are many ways to understanding it. The processes involved in risk perception discussed in this chapter are multi-faceted, and

cannot be addressed nor understood without acknowledging the interplay between the psychological and the social. It is important to note that decision-making and risk evaluations are complex, combining many cognitive responses in numerous ways depending on the context and risk. There cannot be one way of understanding these complex interactions, nor is there one element that is more important to this understanding than any other. Out of this literature some things are well-established: self-efficacy and optimism bias for example. However, other coping strategies such as the maladaptation of reactance have been explored much less. In disaster scenarios, especially prolonged lead-time scenarios, it is the interactions of these coping strategies and affects that have yet to be explored; it is the intention of this thesis to do so.

The following chapter "Risk Perception and Communication" discusses risk from the social and cultural perspective, and examines the role of the media in framing risk perceptions. The emphasis of this chapter is on the psychological processes associated with response to warnings about risk, and the aim of the following chapter is to situate the psychological literature models and theories within the social context in which these responses occur. A focus of this chapter will be disaster warnings; existing approaches to warning the public, disaster warning in the context of the Australian bushfires and the phenomenon of warning fatigue.

5. RISK PERCEPTION AND COMMUNICATION

Introduction

The examination of the disaster literature thus far, the exploration of cognitive affects and coping strategies in pre-disaster contexts, and the analysis of the media reporting of disasters has identified that risk is a common denominator. More specifically, the concept of risk is fundamental to understanding how people perceive risk, evaluate it in times of disaster and use that evaluation when responding to warnings. In the context of exploring warning fatigue, risk becomes an organising framework within which knowledge can be built about the ways that people living in bushfire-prone areas construct risk as they go about their daily lives. The epistemological underpinnings of this thesis are that the individual and society are inextricably linked and that there is more than one way to understand how people perceive risk. The perception of risk is both a psychological and social process, and a subjective social construct reflecting symbols, values, history and ideology; it is an amalgamation of knowledges constituted in a social and cultural environment. Early sociologists and philosophers[97] made a distinction between the individual and social realities outside the individual. However, this thesis argues that 'reality for the individual is, to a high degree, determined by what is socially accepted as reality' (Lewin 1948:57). More importantly, the individual and society are neither 'one and the same thing, nor is one reducible to the other' (Jovchelocitvh 1996:122). The theoretical approaches such as social constructionism, social representation and interpretive phenomenological analysis (as outlined in the methodology chapter)[98] are useful to explain the reciprocal interactions between the individual and society. In many ways they are congruent, certainly complementary, which is both useful and confusing at the same time and perhaps a result of the 'unhelpful separation of the disciplines of psychology and sociology' (Burr 2003:2).

Risk perception comprises multiple factors and is not a homogenous or bounded process (Moscovici 1998). This chapter focuses on the interpersonal, inter-subjective, shared 'meaning-making' of risk, and aims to understand the relationship and the interplay between the individual and society. Furthermore, it builds upon the conceptualisation of bushfire risk in Australia as outlined in Chapter 2. Following an operationalisation of risk, this chapter will focus on the perception and communication

---

[97] For example: Scottish philosopher David Hume (1711-1776) and French sociologists Auguste Comte (1798-1857) and David Émile Durkheim (1858-1917)
[98] Chapter 6

of risk, heuristics of risk and bias and some theories and models that 'unpack' public response to risk communication. The last part of this chapter details the current risk communication used by bushfire authorities in Victoria, Australia. .

Risk

> *Risk is not synonymous with catastrophe. Risk is the anticipation of the catastrophe. Risks concerns the possibility of future occurrences and developments; they make present a state of the world that does not (yet) exist* (Beck 2009:9)

Although risk can be reduced to an equation, Risk = ∫(probability X severity), there is no such thing as 'real risk' or 'objective risk'; something just waiting to be measured that is value-neutral and independent of cognition and culture. Regardless of who is making the risk evaluation (expert or lay person) the risk is always 'subjective and assumption-laden' (Slovic and Weber 2002:4). Risk is appraised differently by experts and non-experts as 'experts tend to base their perception of risk on statistics [and] risk perception for lay people is much more complex' (Bushnell and Cottrell 2007:5). Meacham (2004) insists that in order to better understand risk, research needs to move away from the 'statistical risk approach for addressing public risk issues' (207). Risk information can be scientific and fact laden, nonetheless the public interpret, transform and construct risk from these facts. The risk evaluation that results is influenced by a myriad of factors: experience, context, beliefs, resources, threat typologies and the emotional and cognitive affects detailed in the previous chapter.

Defining risk has occupied researchers since the early 20th century, who have approached this task by categorising risk by its characteristics, hazard types, impacts and stakeholders. Attempts to position the notion of risk within different disciplines, such as cultural studies, sociology, earth sciences,[99] psychology, even economics, have led to distinct 'understandings' of risk. This has resulted in many theories, models and approaches which are detailed by Renn (1992) in *Concepts of Risk: a classification,* where he states that although they are diverse they have one element in common; they each distinguish between the reality of risk and its possibility. Across disciplines and perspectives, there is a consensus that the 'essence of risk consists of the probability of an adverse event and the magnitude of its consequences' (Rayner 1992:93). A strength

---

[99] Geology, Geography, Hydrology and Climate-change scientists.

of the cultural theory of risk[100] as advanced by Mary Douglas[101] and Aaron Wildavsky, is that individual responses to threats can be predicted by social and cultural exemplars.[102]

German sociologist Ulrich Beck asserts that people have always lived with and understood certain risks but as a result of modernisation and globalisation, modern risks 'affect all peoples alike, whether rich or poor, regardless of national or geographic borders' (cited in Lupton and Tulloch 2003:2). He coined the term 'Risk Society'[103] and argued that earlier risks were much more visible because they 'assaulted the nose or eyes and were thus perceptible to the senses' (Beck 1992:21). Knowledge about modern everyday risks has become the domain of experts, especially scientists, however Beck asserts that modernity[104] has transformed the role of science and less and less this 'expert authority is taken as a given' (2009:6). Beck suggests that knowledge about risk is culturally and socially pervasive and in fact it was 'cultural perception and definition that constitutes risk' (Adam, Beck and van Loon 2000:213). This interpretation Beck argued, made risks 'open to social definition and construction' (ibid.: 23) and positioned those within society able to influence such construction (the mass media or politicians) as key. Whilst interactions between people shape perceptions of risk, there is a vast body of communication literature that shows the quasi-social relationship the media has with the public. The media has a powerful role in constructing people's knowledge beyond their personal experience, reflecting back to the public ideas, norms and values, thus validating and maintaining what are already there. The literature and these ideas were discussed in chapter 3.

A 'risk society' is not only one which has created new global risks never known before (climate change for example) but one which assumes that it will be able to anticipate, mitigate and control these risks. In fact it is the very anticipation of risk that obliges

---

[100] The Cultural Theory of Risk is a conceptual framework that challenges the notion that people see risk only in terms of objective definitions (like magnitude and probability). It offers that the risks most important to people are those which help to reinforce the cohesiveness of their social systems.

[101] Dame Mary Douglas (1921 – 2007) was a British social anthropologist. Her interest and expertise lay in the study of human culture and symbolism and (along with Aaron Wildavsky) she created the Cultural Theory of Risk building on the ideas of Émiele Durkheim and structural analysis.

[102] Social networks are constructed recognitions of how people ('nodes') are joined to one another ('ties'). Once all the nodes and ties are known, pictures of the network can be drawn to discern every person's position within it" (Dickenson, 2013)

[103] 'Risk Society', as a way of describing how modern societies respond to risk, was first coined by sociologists Anthony Giddens and Ulrick Beck, and interpreted in Beck's book *Risk Society, Towards a New Modernity*.

[104] Modernity can be described as a reflexive modern society which differentiates itself from other societies by focussing, not on what has gone before, but on the future; a society where knowledge and agency resides more with individuals than with institutions.

society to do something about them. Intrinsic to a risk society is the 'security business' (insurance, surveillance, protective policies) that, despite restricted personal freedoms and resultant fears, is nonetheless embraced by society. Beck goes as far as to suggest that security has become a consumer product, able to be lucratively traded and sold. In attempting to define risk, Krimsky (1992) asks "Is the risk of something an objective measure of that thing, or is it a subjective value that varies according to context?" (19). This question encapsulates two ends of the risk debate continuum where risk has traditionally been regarded as either an objective property (or measure of probability) or a cultural and social construction (Renn 1992). Another risk binary is the 'external' (to human control) and 'manufactured' (man-made) risks as first defined by European sociologist Anthony Giddens.

Risk and risk perception in the context of disasters is the focus of this thesis. Blaike, Cannon, Davis et al. (1994) define risk from a disaster as a function of vulnerabilities and hazard: Risk = $\int(V+H)$. Vulnerabilities are conceptualised as ideological and originating from (a) 'limited access to power, structures, (b) social deficits in markets, skills and training and (c) unsafe conditions (Aguirre and Best. 2005:2). When these vulnerabilities interact with hazards, (earthquakes, floods, volcanic eruptions, bushfires, earthquakes for example), disasters are created. As risk and emergency management has developed into the 21st century, the approach to managing disaster risk has become focused on disaster resilience, where risks, both environmental and technological are regarded as preventable. The very idea of a natural disaster (and the risks associated with it) has begun to be challenged, and the 'taken-for-granted' definitions contested. Increasingly, contemporary risk studies regard disasters as the result of poorly managed risks and a combination of resilience, preparation, and vulnerability. Aguirre and Best (ibid.) also argue that the nature of hazards have changed and the new hazards[105] tend to be 'infrequent, have long durations and widespread effects, often have slow speeds of onset and diffused spatial dispersions, and are irregular in their occurrence' (3). These new hazards have parallels to prolonged lead-time disasters that, as suggested by this thesis, may exacerbate warning fatigue.

---

[105] Aguirre and Best. (2005) argue that 'new hazards' are caused by human error and intentional foul play. Examples include: SARS pandemic, 9/11 and the collapse of the New York Trade Centre towers, cyber terrorism (computer viruses) and Japans earthquake/tsunami/nuclear accident.

This thesis is predicated upon the assumption that bushfires are a risk. Moreover that for the Australian ecosystem and those living in or near it, bushfire risk is 'a given'. However, what is not so certain is how *much* of a risk people think bushfires are, and how that risk is interpreted by those who have a stake (and an opinion) on risk in the bushfire sphere: scientists, fire prevention agencies, media and the public. Those who are accepted as experts in the field of fire behaviour and mitigation have different risk knowledges than public for whom bushfire is just one more risk they have to incorporate into their daily lives. The question of how people live in 'risk societies' is addressed in this section and is exemplified by Krimsky (1992) who asked: 'why is it that lay people often fail to follow the advice of experts in responding to the risk of modern life?' (5).

Risk perception

Gilbert F White[106] a American geographer famous for his work on natural hazards and known as the 'father of floodplain management' concluded that for some reasons such as familiarity about the risk or the amount of personal control (over the risk), members of the public perceive some risks differently from others (Lofstedt 2003). Sometimes called 'decision-making under risk', or 'human response to natural hazards', the study of risk perception has examined the judgements people make when asked to evaluate and describe hazardous technologies or activities (Slovic 2000). Risk perceptions direct decision-making and influence behaviour prior to, during and following a disaster. These perceptions can be thought of as risk attitudes, which are how people feel about a particular risk (Rhormann 2008). Attitudes include aspects of 'experience–seeking, self-enhancement, pleasure from being at risk, social pressure, financial gain, lack of time or means and underestimation of a hazard' (5). If the risk has the potential for personal harm or to friends and family, then the risks are cared more about, paid more attention and responded to differently. Whilst that statement may seem self-evident, it is important to note that attitudes to risk depend on who may be the potential victim. Furthermore when households comprise families (including children), risk is perceived differently than by those people who live in single person or childless households (Riad and Norris 1998).

---

106 Professor Emeritus Gilbert F White (1911-2006) was the founder and Director of the University of Colorado's Natural Hazards Research and Applications Information Centre. He was most notable for work to identify and classify adjustment mechanisms for flooding in the United States.

Worldviews and Mental Models

Risk perception is an active process of meaning-making where individuals construct their own mental models that enable them to make sense of what they see happening around them; in other words, the 'real' world can be a different place for each person. Fischhoff (2002) suggests that a person's mental model can help shape behaviour and develop problem-solving skills, as well as anticipate outcomes of known events. Dake (1991) offers the idea of 'orientating dispositions' to describe how a person comes to view the world; these dispositions are essentially deeply held attitudes about such things as politics, and social and cultural functions. These worldviews guide peoples responses (Buss, Craik and Dake 1986) and function in the same way as mental models in that they enable people to efficiently navigate in a sometimes unfamiliar and threatening world (Slovic 2000). Depending on a person's world view and when confronted by a threat, risk will be evaluated as either positively or negatively. As discussed in chapter 2, if someone's worldview is that bushfire is a natural phenomenon and plays an integral role in Australia's ecological system, then they may perceive the risk from bushfire in a more positive way than those who regard bushfire as aberrant and an intrusion upon their chosen lifestyle. Additionally, receptiveness to warnings about fire, and response to advice about how to manage the bushfire risk may also be influenced.

When making judgements about potential risk, worldviews are not the only heuristics that influence perception; risk and benefit are two others. Research[107] has shown that there is an inverse relationship between risk and benefit: the greater the perceived benefit the lower the perceived risk. Moreover, if an activity is liked, people tend to 'judge its risks as low and benefits as high; this appraisal is reversed when the activity is disliked' (Slovic 20009:416).[108] Risk perception in the Australian bushfire context has been shown to depend on multiple factors such as frequency (McCaffrey 2004), experience (Handmer and Penning-Roswell 1990; Blanchard & Ryan, 2003), perception of property in relation to environment (Montz 1993; Gilbert 2004), social capital and

---

107 Fischhoff, Slovic, Lichtenstein & Read et al.1978. Slovic, Kraus et al.1991. McDaniels, Axelrod, Cavanagh & Slovic 1997.

108 In most academic studies about risk, it is assumed to be a negative construct, and there is little said about voluntarily assumed risk, that is, risk accommodated for pleasure. Any extreme sport (for example: rock climbing, snowboarding, base-jumping, hang-gliding, mountain biking and sky diving) demonstrate that it is the danger and riskiness associated with the activity that enhances its attraction; people have made a decision about how much risk 'they are willing to bear and that risk becomes a fixed parameter' so they incorporate the risk into the whole activity (Heimer, 1988:509).

community connectedness (Gough 2000; Flint and Luloff, 2005), and personal and official preparedness (Beringer, 2000; Odgers & Rhodes, 2002; Anderson-Berry, 2003). Lupton and Tulloch (2002) found that bushfire risk was regarded by people as no more of a concern (to themselves or others) than day to day risks including other environmental risks. They commented that this appraisal of risk was contextual and if the research had been done immediately after a major bushfire perhaps the response would have been different.

Experience of past bushfires has been found to raise awareness of future bushfire risks. However, Gardner, Cortner, Widaman et al. (1987) found an opposite effect in a study that compared two communities – one fire affected and the other non fire affected – in southern California's San Bernardino County. Contrary to predictions that the fire affected community would have higher risk perception than the non affected community, Gardner et al. (ibid.) found that the risk expectations were reversed: those residents who had no experience of fire in their area thought they had a higher probability of a future fire, than those who had recently experienced fire in their community. The authors suggest that this may be a function of flawed probabilistic thinking, or that the residents may have thought the recent fire had 'reduced the vulnerability of the landscape to another fire' (cited in Bushnell and Cottrell 2007:10). Past bushfire experience and a close association with the local fire brigade were positively correlated with high risk perception amongst the residents in a rural bushfire-prone community in North-Central Victoria, Australia (McGee and Russell 2003). Additionally the authors observed that there was strong community cohesion and self-reported social capital.

Risk perception (rather than preparedness) contributed towards many people dying in the 1983 Ash Wednesday bushfires. Krusel and Petris (1992) identified that late evacuations of people who thought they were not at risk until the wind changed, resulted in a large number of deaths. A study of a fire-affected peri-urban community in New South Wales in 1985 explored the role of time upon bushfire risk perception. Cunningham and Kelly (2001) found that when they surveyed the residents six years later, every household assessed their risk from bushfire to be high. However, in 2001, just over half of those surveyed thought they were at risk from bushfire; importantly, just under a third of residents surveyed had experienced the 1985 fire. This

demonstrated that, over time, there was both a decrease in collective community knowledge and a reduction in risk perception.

Risk perception can also depend on how responsibility for the risk is viewed; perceived responsibility can determine which risks are addressed and by whom (Winter and Fried 2000). Bushnell and Cottrell (2007) maintain that bushfire risk (and the consequences) is shared between residents and public land managers, portraying the risk as both private and public. If individuals perceive the risk to be public (the responsibility of governmental land management for example), then the impetus for individuals to mitigate the risk could be reduced (16). Controllability or mastery over a bushfire situation has an influence upon risk perception (Kumagi, Carrol, Cohn et al. 2004) For example, if bushfire is considered to be a likely event but considered survivable because people think they are able to successfully fight it, then people evaluate their risk from bushfire to be low, even though they are most probably 'most at risk' (Bushnell and Cottrell 2007:14).

Perhaps people living in bushfire vulnerable areas of Australia make risk and benefits judgements when deciding to live in the bush. The benefits of living in a quieter, less urban environment, coupled with a larger section and a more community-like environment may mean that they downplay the risk from bushfires because they see the benefits of living in the bush to be many. It is pertinent to consider that perhaps the fire and emergency authorities believe that bushfire risks should be diminished as much as possible, whereas people who have chosen to live in the bush accept a certain level of risk. Communicating risk in this context needs to acknowledge these challenges.

Affect Heuristics

Just as disaster and emergency agencies and people living in bushfires-prone areas of Australia have differing views of 'acceptable' risk, similarly, an assumption cannot be made that there is a 'right' or wrong' way to perceive risk. Experts in a field have a greater awareness and knowledge about a particular risk, and because these knowledges are largely based on scientific facts, could be regarded as 'objective'. This risk perception is in contrast a more subjective risk assessment where people who have experienced a threat and gained a personal knowledge about it believe they know about the risk as a result (Alba and Hutchinson 2000; Lindell and Perry 2000). As people negotiate the world around them, they build up images and feelings about activities and

objects, and it is these prior judgements that influence risk perceptions when new situations are faced. Finucane, Alhakami, Slovic et al. (2000) suggests people employ a dual-process way of thinking about risk whereby they evaluate risk analytically and emotionally, that is, by how they feel about it. This is not to imply an 'either/or' binary: Damasio (1994) showed that, 'in all normal thinking, emotional processes interact with reason-based analysis' (cited in Slovic 2000:xxxii). Moreover, these ways of making decisions have been labelled deliberative or intuitive, with an implication that people do the latter automatically and subconsciously; a mental short-cut called the 'affect heuristic'. Affect is operationalised here as an automatic, subtle form of emotion, of which people are often not aware. It can be feelings about an external stimulus that can be either positive ('I like that') or negative ('I dislike that') and can also be viewed pejoratively as 'good' or 'bad' (ibid.). Because of the often subtle nature of the feelings, people's judgements can be seen 'irrational', that is, based more on subjective reasoning that objective facts. Slovic and Peters (2006) call this 'the faint whisper of emotion' (322) and research has shown it has a powerful influence on decision-making under uncertainty. One emotion in particular, dread, has been shown to accurately predict the extent to which a hazard is perceived as risky. Those hazards deemed not under a person's control, or a high potential for disaster (for example nuclear power), were 'dreaded' more than other risks because the deaths from these more dreaded hazards were also viewed as 'worse' than deaths from other hazards (Slovic, Fischhoff, Lichtenstein et al. 1982).

The amount of time people have to make a decision influences the affect heuristic. Specifically, if people have more time to make a decision they are more logical in their approach, whereas when a decision is time is restricted, people rely much more on affect and make judgements that are more emotion-based. Information has also been shown to change the way risks are perceived; whether there is some or no information and whether risk is described in positive or negative terms. Predictably, more information meant that people used the affect heuristic more (as their cognitive load was greater) and information which implied a higher benefit resulted in the situation being judged as less risky (Slovic, Finucane, Peters et al. 2007). However, these findings need qualifying; Wilson and Arvai (2006) found that when participants were asked to make risk evaluations about two different problems (crime and deer over-populations),

despite factual information about both issues, the participants largely disregarded the information and made their evaluations based on affect.

Framing, that is, how different options are presented, also demonstrate the affect heuristic. When scenarios use percentages and numbers, and the outcomes are described in negative terms ('33 people out of hundred may die') or positive terms ('66 people might be saved'), people most often choose the second option, even though the percentage of possible deaths is the same. Based in prospect theory,[109] Kahneman and Tversky (1979) termed this a 'value function', where a loss is viewed as more devastating than the equivalent gain. People feel much better about choosing a positive scenario over a negative one regardless of the outcome. The influence of the media upon framing risk was discussed in chapter 3.

Availability Bias

Similar to affect, the ease of recall serves as a mental shortcut to decision-making. This availability heuristic is a combination of drama, salience, frequency, recentness and personal relevance and, in many cases is a very effective strategy for assessing risk. These judgements are often biased because people think when something is easier to remember it means that the risks or consequences are greater. Additionally, events that are easy to recall are deemed to happen more often than those that do not spring to mind so easily. The media is a powerful contributor to the availability bias; by presenting newsworthy but unusual and rare images and events, and by ignoring more common (but non-sensational) issues, the public's perception of risk is often distorted. Interestingly (and relevant to the phenomenon of warning fatigue) are studies by Fischhoff, Slovic and Lichtenstien (1978) that suggest that availability bias may lull people into complacency, because the 'commonplace' is easier to ignore. Moreover, because visibility implies probability, when something is not visible it falls prey to an 'out-of-sight' and 'out-of-mind' affect.

As discussed in the previous chapter, people's opinion of their ability to control a potentially hazardous situation influences decision-making. It can also impact upon risk evaluation where, in a previous disaster event, the predicted risk turned out to be

---

[109] Prospect theory is a behavioural economic theory developed by Amos Tversky and Daniel Kahnemenn. The theory describes decisions between alternatives that involve risk, where the probabilities of outcomes are known and posits that people make judgments based on the potential value of gains and losses, despite a known outcome.

manageable and despite warnings to the contrary, people were able to defend themselves against the threat. Surviving an event can engender a false sense of invulnerability and demonstrates the erroneous risk evaluation process of the 'hindsight effect'. Simply put, if a decision (not to evacuate for example) is followed by a good outcome, it increases the confidence that the decision not to evacuate was a good one and, despite a future threat being very different in impact potential, makes it more likely that the same decision will be made again. 'Not only does this mean that such actions are reinforced (and hence repeated) it means that people may ignore real signs of danger' (Eiser et al. 2012:7). Hindsight effect is a 'bias of hindsight' and is also known as the 'knew-it-all-along' effect; it is related to memory recall and how recall influences subsequent judgments (Fischhoff 2003). This is a bias of which people are unaware and has consequences for the evaluation of (past) decisions and the ability to learn from experience. Hindsight bias reconstructs the past in a way that makes people feel better about the actions they took (or did not take); often because they think they 'knew all along' how the scenario would play out (Fischhoff and Beyth 1975). This is especially true in disaster events where positive outcomes resulted from 'good luck rather than good management' and yet are seen to be the product of good decision-making. People subject to hindsight bias become overconfident and ignore equally probable possibilities. Another term for this could be 'survivors effect', where people presume they have withstood and prevailed against incredible odds because of their actions, rather than acknowledging the part that luck played in the outcome.

Experience

People's perception of risk is based on their direct experience with the risk and their subjective knowledge of the risk (Martin, Martin and Kent 2009). Furthermore, 'a subsequent episode, even if objectively independent of a previous event, is automatically altered by past experience' (Brezntiz 1984:16). The literature about the influence of experience on response behaviour and decision-making is contradictory. Past hazard experience can have an effect on the public's responses to disaster warnings (Sharma and Patt 2012), and people with prior experience of natural disasters 'are likely to experience heightened stress and anxiety when a subsequent hazard is warned about, because they will remember and re-experience the past events' (Moore and Moore (1996 cited in Reser 1996:207). Moreover, studies have found (Weinstein 1989) that people are more motivated to engage in risk reduction behaviours because of past experience with a hazard event, especially if the experience has been a negative

one (Sattler, Adams, Watts et al. 1995). Conversely, Mileti and O'Brien (1992) point out that those who have experienced a disaster are 'harder to convince to take protective actions' than those people in a pre-impact scenario. This could be because people who live in areas which experience repeated disaster events 'accept this hazard as part of life and do not readily adopt risk mitigation strategies' (Tierney 1994 cited in Martin et al. 2009:491). In relation to flood risk Drabek (2010) observes that experience has a 'curious effect on people's risk perceptions' (207) and if their immediate area has not flooded in their lifetime, then people take that as evidence that it will not flood in the future. For example Kates (1962) claimed that residents of floodplains seemed to be 'prisoners of their experience, and were unable to imagine floods that had never occurred or see the future as anything but a mirror of the recent past' (cited in Slovic et al. 1981:18).

The 'common sense' idea that once something unpleasant has been experienced, then people will avoid repeating that experience appears to be flawed, as research with floodplain dwellers has shown (Kates 1962, Burton and Kates, 1964). Despite detailed records detailing repeated floods in flood-prone areas such as Lehigh Valley in Pennsylvania, almost 40 percent of floodplain occupants did not expect to be flooded in the future (Slovic et al. 1974). This was because disasters are often seen as occurring at regular intervals ('once every 50 years' for example) rather than randomly which more accurately characterise natural disasters. One flawed assumption was that a flood was less likely to occur in the future if one had just happened ('the law of averages' approach) and another was that floods were such freak events they were unlikely to happen again (Slovic, Kunreuther, White et al. 1974: 190). Kates (1962) concluded that it was the frequency of floods rather than the magnitude of any one flood that determined whether experience was useful in raising risk awareness. It is possible therefore, that experiencing an event similar to that which is being warned about, alters risk perception and decision-making about a future risk. Having experienced a disaster, people are more likely to be aware of its consequences. However, as many disasters have shown, this does not guarantee that the public will pay more attention to subsequent disaster warnings. In fact in some cases, the public can become more complacent (because they have survived before and expect to do so again), pay less attention to warnings and prepare less. This is because, as McCaffrey (2004) observes,

when people underestimate a risk, they are less likely to act to reduce their exposure to it (cited in Martin et al. 2009).

McGee and Russell (2003) found that people living in an area of high bushfire risk in Victoria who had personally experienced bushfires, reported being more aware of the risks, more knowledgeable about what to do and more prepared. In some cases the experience of not having a recent bushfire made them more complacent as well: 'You get a bit slack … if you haven't had a fire for a good many years' (8). This finding was consistent with studies by Martin et al. (2009) who concluded that direct experience with bushfires did not significantly influence homeowner's decisions to mitigate risk (497). One of the key findings in a review into the fatalities of Black Saturday was that there was 'no evidence that prior experience of bushfires was an advantage' (7). This was because past fires of note were deemed to have been less severe and as in the 1983 Ash Wednesday bushfires for example, had happened many years before (Handmer et al. 2010).

Experience of bushfires has led to flawed assumptions which, over time, have become part of bushfire discourse. A common assumption for example is that it only takes 20 minutes or so for a fire front to pass and that houses are defendable, should a person make the choice to do so (Handmer and Tibbits 2005., Tibbits, Handmer, Haynes et al. 2008). This suggests that for experience to have any effect on decision-making and attention to warnings, past events need to be made more salient and need to have happened in the recent past. Therefore, disaster 'memorability' or salience is important to consider when exploring the influence of experience upon attention to warnings and decision-making. Some disasters are more memorable than others especially if they have been extreme, 'blots out recall of earlier events and acts as a fixed point against which to calibrate later points' (Slovic et al. 1974:194). After the 2009 Black Saturday bushfires another rating was added to the existing fire danger ratings: 'Catastrophic' in New South Wales and 'Code Red'[110] in all other states. Anecdotally, it seemed to some of the public that the fire emergency authorities then proceeded to 'overuse' the 'catastrophic' subsequent to Black Saturday.[111] That every bushfire after 2009 was implied to be 'a potential Black Saturday' demonstrates Kirby's point. This is an example of 'recency bias' where the not only the public but the emergency officials as well gave

---

[110] Fire Danger Ratings - Appendix 4.
[111] See participant's recollections of Black Saturday warnings in chapters 7-9.

more weight to recently experienced events; Black Saturday became the 'new normal' and every potential bushfire became a potential Black Saturday catastrophe.

Risk Communication

Crisis Communication

Crisis communication deals with things that <u>do</u> go wrong. Risk communication deals with things that <u>might</u> go wrong (Telg 2010:1)

Some emergency and disaster management literatures do not differentiate between risk communication and crisis communication, and the examination of warning fatigue is not made within this context. 'Crisis' communication is something that has just happened that is a real threat to people's lives, or will be in the near-future. Often these types of dangers come 'out-of-the-blue- and were totally unexpected. It is important to make a distinction here between risk communication and crisis communication as they have different goals and outcomes. Crisis communication is closely linked to the public relations profession and used to manage public concern and mitigate perceived risk from technological (or man-made) disasters (Coombs 2004). Crisis communication has been identified by political parties as crucial in their managing of unexpected events, from election gaffes to national disasters. Political parties typically employ public relation companies to anticipate issues and ensure that public fears are allayed and confidence is maintained (Benoit 1997). One of the tasks of public relations companies is pre-evaluating potential audiences so that when a disaster happens, they are able to predict, to some extent, how they may react; but as this thesis has previously explained, people are not 'blank slates' and have pre-existing worldviews about all sorts of things. For this reason, when preparing crisis communication, Sandman (2004) argues that agencies need to 'start where *they* - the public - start' (italics added:2). Business continuity is the goal of crisis communication which ensures organisations, especially critical infrastructure authorities, can maintain operational continuity such as security, connectivity (internet, telecommunications) and employee safety. By communicating key facts quickly, clearly and calmly, the public response to a crisis and public opinion in the aftermath can be altered dramatically. The avoidance of public outcry and reactive action is as much a goal of crisis communication as is the dissemination of accurate information immediately after a disaster.

'Crisis management' and 'risk management' are often used interchangeably with crisis communication. A key difference between risk and crisis communication is that, initially

at least, the source of factual information is almost exclusively the domain of the expert. This is because disasters that need crisis communication are often one-off, extremely large, mostly unexpected and sometimes mass fatality events. For the most part they are large-scale failures of technology; nuclear power-plant malfunctions, or dam collapses for example. Information has to be disseminated quickly and action taken equally fast, which often does not allow time for the public to make up their own minds. Crisis communication in catastrophic natural disasters requires similar communication because the affected fields such as infrastructure, telecommunication and medical, have particular expertise assigned to their areas. So the experts within these organisations become the immediate and definitive source of information. These scenarios are quite different to risk communication where the risk is usually 'known', and has been warned about for a long time before it happens (if at all). The experts have previously been able to inform the public allowing them much more time to refer to other sources of information; friends, family and other members of their community with whom they may discuss the risk. In terms of power relations, prolonged lead-time risk (as opposed to sudden unexpected events) enables the public to take control of the risk to a certain extent, and lessens their reliance on the experts for information.

Theories and Models

Development of risk communication theory was seen as a 'means to bridge the gulf between expert views and public perception of risk' (Golding 1992:43). Much more than just the broadcasting of information, risk communication is 'the flow of information and risk evaluations back and forth between academic experts, regulatory practitioners, interest groups and the general public' (Leiss 1996:86). Rohrmann (2008) described risk communication as a social process 'by which people become informed about hazards, are influenced towards behavioural change and can participate in decision-making about risk issues in an informed manner'(p:1). He asserts that at the core of risk communication is an exchange of risk information between interested parties (individuals, groups, institutions) and that its goal should be to 'modify individuals risk perceptions and risk attitudes towards protective risk behaviour' (p:6).

In her risk theory of social drama, Swedish scholar Palmlund (1992) constructed risk communication as primarily a social interaction comprising actors who perform as agents upon their audience. As a reaction to what she saw as an over-emphasis on quantitative management tools to mitigate risk, Palmlund theorised that through social

interactions, 'risk actors'[112] are involved in a dramatic process, employing a genre and engaging in a dramatic plot (205). Palmlund asserts that her theory provides a critical perspective not only on the discourse and symbolic action of risk communication, but also on the field of risk analysis. US risk communication consultant Peter Sandman similarly positions the public as central to effective risk communication. His risk communication model comprises four stages; [113] firstly he claims that risk communication simply ignored the public, and 'they were content to be ignored' (Covello and Sandman 2001:169). However, this method ceased to work as the environmental activism of the late 1980s began, and during the second stage, companies and organizations realised that they needed to explain risk data better. Sandman (1993) argues that in the third stage risk was viewed differently from how it had been viewed before. It could now be thought of as a combination of two new ideas; hazard and outrage. According to Sandman (ibid.) 'Hazard' is the technical component of risk, the product of probability and magnitude, whilst 'Outrage' is the nontechnical component, an amalgam of voluntariness, control, responsiveness, trust and dread.

This new conceptualisation of risk allowed risk communicators to reframe the problem. Instead of just quoting numbers and statistics, organisations needed to acknowledge people's outrage or emotion, as being related to the hazard, and adjust the risk messages accordingly. Sandman's fourth stage is described in hopeful terms as a stage that is yet to be fully realised and 'involves a full partnership between organisations and the public, including negotiation and dialogue' (Covello and Sandman 2001 cited in Mackie 2009:27). What Sandman shows us is that, regardless of how social actors are theorised in the risk literature, it is the process through which the actors progress that is essential to understanding the social construction of risk.

Hazard and Outrage

Trust and credibility are central to any successful risk communication and notions of blame are also implicit. Sandman (2001) distinguishes between short-term and long term public judgements of trust and says that the former is influenced more by verbal

---

[112] Risk Bearers (Consumers and workers). Risk Bearers' Advocates (Consumer and health organisations, Labour unions). Risk Generators (Pharmaceutical industry, cattle industry, veterinarian, agricultural extension advisors). Risk Researchers (Scientists in private sector research, scientists funded from private-sector sources). Risk Arbiters (Law firms, mediators) and Risk Informers (Producers and journalists in news media, journals, books and films).
[113] (1) Pre-risk-communication stage (2) explaining risk (3) dialogue with the community,(4) treating the public as a full partner.

and nonverbal communications. In long term judgment scenarios however, actions and performances of the organisations are more important factors on public judgements of trust and credibility. Moreover, in low trust/high concern situations, empathy and caring often carry more weight than numbers and technical facts (Covello and Sandman 2001:3). It is this conviction that trust and credibility is at the heart of effective risk communication that led Sandman to advance his idea that 'risk equals hazard plus outrage'. Incidentally, Sandman makes no distinction between risk and risk perception, arguing that to do so would be to suggest that 'risk assessment experts have some way of getting their risk data directly, while the poor public is stuck perceiving the risk and therefore gets it all muddled with outrage' (Sandman 2004a:35).

Sandman argues that for emergency authorities, outrage is as much of a hazard as the hazard itself. Experts define hazard (risk) as a function of magnitude and probability, Risk = $\int (M+P)$, however the public view risk as all the things they worry about that the experts ignore, which Sandman has coined 'outrage'. According to his model, problems with risk communication arise when the 'experts focus on the hazard and ignore the outrage, [but] the public focus on outrage and ignore the hazard' (Sandman 1993:8). Moreover, risk perceptions become biased when outrage is part of the risk equation; risk is overestimated when people are outraged, even when the hazard is low. Furthermore, risk is underestimated when people are not outraged, even when the hazard is high. One of Sandman's twelve components of outrage[114] particularly relevant to this thesis is 'controllability'. As discussed in Chapter 3, this component strongly impacts the way people react to stressful situations, respond to warnings, assess risk and evaluate their ability to cope with it. Public outrage is something that is often dismissed by authorities as no more than nuisance value, and more importantly, by accusing the public of being irrational it allows the experts to 'define the debate' (Sandman 1993:8). However, Sandman argues that public outrage is valuable because it undermines the experts positioning themselves as the ultimate decision-makers and allows the concerns of the public to be heard. It is important to point out that Sandman does not present outrage as heightening the perception of risk, rather it distorts it, becoming a function of emotion which is then regarded by 'experts' as irrational and puzzling. Sandman's model is useful for this thesis because it encompasses both

---

[114] "Is it: 1) voluntary or coerced; 2) natural or industrial; 3) familiar or exotic; 4) memorable or not memorable; 5) chronic or catastrophic; 6) knowable or not knowable; 7) air or unfair; 8) morally relevant or not morally relevant; 9) dreaded or not dreaded; 10) controlled by me or others, 11) can I trust you or not [and] 12) Is the process responsive or unresponsive (Sandman 1993).

cognitive and affective responses to risk; it acknowledges the emotional response of the public, suggests possible reasons for the response, and proposes ways to address it.

Sandman's model of risk as a function of hazard and outrage, (Risk = $\int(H + O)$), was developed in the mid 1980's and it has not been widely used in risk literature until relatively recently. It is a theory (albeit empirically untested) that applies equally to both technological and 'natural' disasters. It addresses the conundrum that when emergency authorities devise risk communications that are intended to warn and help the public, the warnings are often received by the public with suspicion and resistance. Its appeal to the academic community has, to date, been limited, possibly because it has an 'applied', real world application and is advanced by somebody working outside of traditional academia.[115] Sandman acknowledges that as his model is more prescriptive than descriptive, and less likely to have been tested empirically.[116]

There are two peer-reviewed papers that use Sandman's work. Lachlan and Spence (2007) extended Sandman's conceptualisation of public response to risk communication by hypothesising that the concepts of hazard and outrage were tangible; they were measurable and relevant components of the public's perception of risk/crisis events (ibid.: 120). Using the four scenarios possible in the Sandman model they devised a 2 X 2 matrix: high hazard/high outrage, high hazard/low outrage, low hazard/high outrage, and low hazard/low outrage. The high hazard/low outrage scenario is defined as having the potential to cause the greatest harm even though people do not appear to worry about it very much. This scenario may have some resonance with warning fatigue where, despite experts continually warning about a threat they are convinced is dangerous, the public are sometimes puzzlingly apathetic and do not respond in ways that are expected or recommended. Reynolds and Seeger (2005) used Sandman's model of risk as a function of hazard and developed a framework to effectively communicate public health risks. Their model of communication was called crisis and emergency risk communication (CERC) and

---

[115] Dr Peter Sandman was 'an academic' for 32 years. He received his Ph.D. in Communication from Stanford University in 1971, and was a professor at Rutgers University from 1977 to 1995. He founded the Environmental Communication Research Program (ECRP) at Rutgers in 1986, and was its Director until 1992. During that time, ECRP published over 80 articles and books on various aspects of risk communication. In 1995 Dr. Sandman left the university and became a full-time consultant.

[116] Peter Sandman addressed this issue of why his work does not appear to be used in academic literature on his website recently: http://www.psandman.com/gst2012.htm#research

proposed an amalgamation of traditional health and risk communication with crisis and disaster communication.

Social Amplification of Risk Framework (SARF)

Perceptions of risk are a central element in the process of social amplification. The metaphor of amplification is derived from communications theory and describes the way that various social agents 'generate, receive, interpret and pass on risk signals' (Pidgeon, Kasperson and Slovic 2003:15). In 1988 researchers[117] from the Clark University and Decision Research created the Social Amplification of Risk Framework (SARF). This was in order to integrate the technical and social experience of risk, and explore why individuals pay attention to some risks (but ignore others). This framework conceptualised risk as not only a social construct but also an objective property (of a hazard or event); an approach which avoided 'the problems of total relativism on one hand and of technical determinism on the other' (Renn, Burns and Kasperson 1992:138).

SARF advances the premise that risk information passes through individual and social 'amplification stations' which transform the risk signals in various ways:[118] reinterpreting and elaborating, augmenting or attenuating and highlighting the salience of specific features of a message (Kasperson and Kasperson 1996 cited in Pidgeon et al. 2003). Moreover it is through this communication process that risk and risk events interact with psychological, social, institutional, and cultural processes in ways that amplify or attenuate risk. For this thesis, these amplification stations are imagined to be local and state fire and emergency authorities, individuals and their social networks, the Australian media, and local, state and national politicians. The influence and impact of the amplification stations is not assumed to be equal, in fact in the SARF theory, the media is given primacy. Media can only attenuate or amplify risk 'if they capture or resonate with an existing public mood' (Murdock, Horlick-Jones and Petts 2001:ix). When the lay public has little information or direct experience of an issue, the media plays a greater role in the process of interpretation and refinement. It is important to clarify that amplification and attenuation is seen as a two-way process, not just a one-way transfer of information. The difference between the voice of the expert and the voice of the 'lay public' is an important consideration of SARF. Risk amplification can

---

[117] Roger E. Kasperson, Ortwin Renn, Paul Slovic, Halina S. Brown, Jacque Emel, Robert Goble, Jeanne X. Kasperson, Samuel Ratick.

[118] Risk signals: messages about a hazard or hazard event that affect people's perceptions about the seriousness or manageability of the risk (Pidgeon et al. 2003:17).

occur when the risk event is judged by experts to be 'low-in-risk', but the public do not, affording the risk more attention than the objective threat deserves. Risk attenuation on the other hand, can result from the public deciding that, despite the expert's assessment of a risk as serious, they pay less attention to it than expert's think they should. Warning Fatigue could be imagined to embody this process.

Social Attenuation

> *Each society selects its worry beads, the particular risks that we choose to rub and polish assiduously while we relegate others to inattention* (Kates, 1985 cited in Kasperson 19888:102).

This idea of society highlighting or downplaying risks has echoes in Mary Douglas' Cultural Theory of Risk. The reasons that issues become attenuated are less clear than the reasons for amplification; there is a suggestion that attenuation may result from risks that 'occur in distant times, distant places, or to distant, powerless or marginalised social groups' (Kasperson and Kasperson 1996:103). Attenuation could be relevant in the Australian bushfire risk context. Anecdotally, fire and emergency authorities in Australia have commented the risk that bushfires poses is not paid enough attention, that the level of bushfire risk is often downplayed by some members of the public. Attenuation has similarities to the psychological concepts of denial and cognitive dissonance which were previously addressed in chapter 4. Whilst these concepts can apply to individual attenuation, the remainder of the discussion focuses on the social aspect.

In a study that examined newspaper coverage and social group activity in Lincoln County Nevada, Kasperson (1992) describes some key amplification or attenuation processes: filtering signals, processing of risk information, social values, interaction and engaging. Risk information is transformed through these processes, and, using the 'Chinese Whispers' analogy, seldom results in an accurate reflection of the original communication. In another study into community response to health risks arising from excessive and prolonged noise, Pidgeon et al. (2003) suggest that attenuation had resulted from people normalising the risk to such an extent that they were not able to imagine it could have serious consequences (399). Despite being given information about the health risks, this view was reinforced because people believed they had not, to date, suffered any serious damage.

Freudenberg (1992) examined the role that organisations play in the attenuation of risk and concluded that both management and employees contribute to hindering information flows, albeit unintentionally. He points out that communication is always an imperfect process, and 'the greater the number of links in a communication chain, the greater the likelihood that important information will fail to get through' (14). These links can be both people (management) and processes (administration, protocols). Failings of these links are exacerbated in scenarios where the identified problems are critical and the choices available to address them equally unpalatable. Risk attenuation results from the management filtering the negative information in such a way that the oft-preferred 'concentrate on the positive' approach changes the real implications of the threat. In the context of fire and emergency authorities in Australia, it could be imagined that these types of organisations would be more vigilant about risk attenuation than most. However, as the 2009 Black Saturday bushfires showed, there were many failures of the very organisations that were committed to the issues of fire prevention, mitigation and control. In particular, the communication of the risk came in for criticism, not just by the Royal Commission (Teague et al. 2010) but also by residents and survivors.

The characteristic of the disaster itself is suggested by Turner (1978) to be another reason risk is attenuated. In the case of prolonged lead-time disasters and during what Turner calls the 'hazard incubation period', there may be an accumulation of troublesome events, of which the scientists may be aware but the public has little or no visibility. Whilst Turner hypothesised this idea in the context of man-made disasters (technological, structural, operational) the application to 'natural' disasters is valid. Shorter lead-time disasters[119] have high visibility and multiple cues. However, prolonged lead-time disasters have few, if any obvious cues, and this absence of cues reinforces the public perception that the scientists (or experts) are at best over-hyping the threat, and at worst simply wrong. The attenuation of these hidden hazards is attributed to complex global factors such as culture marginalisation, ideologies, and the disparity between the development of technologies and the ability of societies to keep up with it (Kasperson, Kasperson and Turner 1995).

---

[119] See typology of disasters, page 66.

Trust and Credibility

> *Trust is not a simple 'uni-dimensional' construct that can simply be lost or replaced.. [it is] a highly contextual multi-dimensional concept involving such things as knowledge/expertise, implied public duty .. independence of a risk regulator and the ability of resources to act upon intentions (Pidgeon et al.2003:6).*

There are several elements that contribute to effective risk communication, and one of the most important is social trust: in the experts, in the accuracy of the risk information and in the media. The media also need to trust that different stakeholders in the disaster scenario agree with each other, trust that the authorities will be accountable after the hazard has passed. Because of the pervasiveness of global media and the constant advancement of digital technologies, 'modern society is increasingly informed and active, *less trusting*, more demanding of influence and more socially and culturally diverse' (italics added; Cronin 2007 cited in Mackie 2009:33). Moreover it takes a long time to build trust but it can be lost in an instant and is almost impossible to regain (Covello and Sandman 2001). Far from being a one way process where the 'problem' is how to get the public to trust the experts, trust is multi-dimensional and necessary between scientists and journalists (and journalists and scientists). Sandman (1993) insists that experts needs to trust the public more and ask to be trusted less; in fact, he suggests that if the experts 'share information, share the control, and keep the outrage from getting in the way, people will make pretty good decisions about risk' (82).

Many agencies are reluctant to involve the public in important decisions about risk, as they consider them less able to understand the complexities of scientific knowledge. Whilst this may or may not be the case, until the public feels at least that that they are part of the conversation, it is very difficult for agencies to maintain public confidence. In order to be effective, trust has to be reciprocal and 'it never rests on blind faith' (Giddens and Pierson 1991:109). This notion of faith is exactly what Giddens (1991) described when he characterised trust as 'the vesting of confidence in persons or abstract systems, made on the basis of a "leap of faith" which brackets ignorance or lack of information' (244). A truism is that trust (or the lack of it) is inextricably linked with the public's previous dealings with experts and their practices; often governmental agencies act autonomously, not involving the public at all. When decisions about risk are not transparent, suspicion and mistrust results, especially when agencies are perceived to have a vested interest in which action is taken. For example, after the 2009

Black Saturday bushfires (and compared to previous years), it seemed to some members of the public[120] that Code Red warnings were 'overused' because authorities did not want to be held responsible should a bushfire occur and people were harmed. These warnings were seen by some members of the public as having a legal impetus rather than a community safety one.

Source credibility can dramatically influence how people respond to risk messages. 'Source trust' in this context comprises characteristics of faith (or good will), consistency, fairness, objectivity and competence (Gutteling and Weigman 1996:155). Warnings are judged as being more biased and less true if they come from sources judged to be less trustworthy (Hovland and Weiss 1952). In the same way risks are judged to be greater when they are associated with sources lacking in trust and credibility (Covello and Sandman 2001). Studies show how an agency behaves (or is reported to behave) 'is at least as critical for public perceptions of risk and agency performance as *what* it says' (italics in original; Johnson and Sandman 1992:3). Communicators often see the lack of trust and credibility as their central problem, especially where the agency is regarded as having a history of frequent distortion, exaggeration and secrecy. Activists can leverage this and regard the undermining of undeserved trust as a major achievement (Covello & Sandman 2001). If an authority is suspected of having a hidden agenda, in other words, of trying to deceive or manipulate the public, this can lead to the public reacting negatively to warning messages.

This negative response was detailed in the previous chapter as reactance[121] and is especially strong when the public are being pressured to give up something they value so that a problem may be fixed. People need to be motivated to pay attention to risk communication; often that is made easy by cues that herald an imminent disaster, for example dense smoke from a bushfire. But in less obvious scenarios, motivation to heed warnings can be hampered by perceptions of source duplicity, resulting in a deliberate rejection of the message, also known as the 'boomerang effect'. In democratic societies, where public debate is encouraged and the media is regarded as 'free', public and scientific debates about all manner of risks are easily accessible to the public; often the information is abundant and conflicting views encouraged. The 'reach' of social media into people's everyday lives means that very little in the public arena is

---

[120] See reflections about over-warning from case study participants in chapters 7,8 and 9.
[121] Page 92.

taken at face value; debates, whilst informing, can also confuse and change the salience of the risk. Climate change is an example of an on-going debate where, despite the experts who disagree in the premise of climate change being in the minority, those on both side of the argument are often afforded equal voice. When those who are supposed to be the experts are seen to publically disagree, it brings into question the credibility of both the message and the experts. This has been suggested as a core risk communication dilemma where 'science is not yet able to provide the clear and certain answers the public is waiting for' (Gutteling and Weigman 1996:153).

Australian Bushfire Risk Communication

Risk communication in the Australian bushfire context encompasses the official messages and warnings from fire authorities, media stories and commentaries as well as informal information that the public access through their social networks. The following is an overview of the Country Fire Authority and a summary of the official fire information that is communicated and available to the Australian public prior to and during the annual fire season.

The Country Fire Authority (CFA)

Each state and territory has their own fire authorities and fire advisory practices and procedures,[122] but as the three case studies used for analysis in this thesis were conducted primarily in the state of Victoria, it is the bushfire risk communications of the Country Fire Authority in Victoria that will be discussed. The Country Fire Authority is an amalgamation of three fire boards: The first two were a result of the Fire Brigade Act of 1980 and were the Metropolitan Fire Brigades Board (MFBB) and the Country Fire Brigades Board (CFBB) and the third, (the Bush Fire Brigades) was formed in 1926 following a devastating series of fires that killed 60 people and razed 1000 properties. Consisting entirely of volunteers, the Bush Fire Brigade had little official power and no governmental recognition or support. The outcome of a Royal Commission into the 1939 'Black Friday' bushfires that burned 2 million hectares, destroyed 3,700 properties and killed 71 people, recommended a single fire fighting organisation for country Victoria; subsequently the Country Fire Authority (CFA) became an official entity on 2 April 1945. A first-responder for any house or bush fire, the CFA has currently more than 1,200 CFA brigades servicing the operational areas throughout regional Victoria (except

---

[122] The fire services for other states in Australia are: New South Wales Rural Fire Service (NSW RFS), Queensland Fire and Rescue Service (QFRS), ACT Fire and Rescue Service, Northern Territory Police, Fire and Emergency Services (PFEF), Western Australia Fire Service (DFES) and South Australian Country Fire Service (CFS).

state forests and parks) and outer metropolitan Melbourne. It is one of the world's largest volunteer based emergency management organisations.[123]

The CFA works closely with Forestry industry brigades and provides assistance in other emergencies, for example flooding. As well as year-round risk reduction, fire suppression and incident management, they coordinate a variety of non-emergency activities including community awareness, education and safety programs, building code-related inspections, post incident analysis and land-use planning. Distributed via a variety of media the CFA have sophisticated and comprehensive fire information and warning systems. Additionally, the public education campaigns and community fireguard groups aim to communicate to as wide a population of people in Victoria as possible.

Fire Danger Ratings

Fire Danger Ratings[124] are a measure of fire danger as well as how a fire may start, and how hard it will be to put out. Fire Danger Ratings are forecast by the Bureau of Meteorology during the fire season. Based on weather and other environmental conditions (and forecast up to four days in advance) it is an assessment of the potential fire behaviour, the difficulty of suppressing a fire, and the potential impact on the community should a bushfire occur on a given day.

Fire Danger Index

The Fire Danger Rating is determined by the Fire Danger Index (FDI). The FDI is a combination of air temperature, relative humidity, wind speed and drought. Displayed on billboards throughout Victoria, the Fire Danger Index ranges from a value of 1 to 100. Definitions are assigned to each value range:

- LOW-MODERATE (1-11) means that fire will not burn, or will burn so slowly that it will be easily controlled; HIGH (12-24) denotes that a fire can be controlled but still present a threat.

- VERY HIGH (25-49) fires present a very real threat and may be difficult to control.

- SEVERE (50-74) fire rating predicts that fires will be moving fast and be difficult to control.

- EXTREME (75-99) fire rating are uncontrollable fires, with embers likely to cause problems, starting fires up to 6kms ahead of the main fire.

---

[123] http://www.cfa.vic.gov.au/about/history/index.htm
[124] Appendix 4.

- CATASTROPHIC (100+) rating, the fires will be aggressive, totally uncontrollable, with fires starting in excess of 20 kms in front of the main fire. Incidentally, this last rating was added to the categories after the 2009 Black Saturday bushfires as a result of the Royal Commission.

Additionally, each rating has actions and recommendations associated with it:

- LOW-MODERATE/HIGH/VERY HIGH: Check your bushfire survival plan, Monitor conditions as action may be needed. Prepare to leave if necessary.

- SEVERE: If you are not prepared to the highest level, leaving high risk bushfire areas early in the day is your safest option.

- EXTREME: Well prepared homes that are actively defended can provide safety – check your bushfire survival plan [but] if you are not prepared, leaving bushfire-prone areas early in the day is your safest option.

- CODE RED: Leaving high risk bushfire areas the night before or early in the day is your safest option – do not wait and see. Avoid forested areas, thick bush or long, dry grass.

Fire Warnings

There are three levels of warnings which are made available to the public via the CFA and Department of Environment and Primary Industries (DEPI) websites, the Victorian Bushfire Information Line (VBIL), Radio & Television,[125] Social media and mobile phone RSS feeds.

ADVICE: General information to keep you up-to-date with developments.

WATCH AND ACT: An emergency threatens you. Conditions are changing and you need to start taking action now to protect your health, life and your family.

EMERGENCY WARNING: You are in imminent danger and need to take action immediately. You will be impacted by the emergency.

In addition, a siren sound may be played over the radio or TV before an emergency warning is broadcast. This is known as SEWS (Standard Emergency Warning Signal).

Total Fire Ban Days

During days of increased fire danger and based on the advice of the Bureau of Meteorology, the CFA may declare a Total Fire Ban which sets legal restrictions on what activities can or cannot occur in a particular district for that day. During these days all fire permits are suspended and open fires of all kinds are prohibited. This also includes using any sort of tools or equipment that could potentially produce a spark: chainsaws, vegetation clearing tools for example. The Total Fire Ban days are declared the day before and penalties for ignoring a Total Fire Ban can include large fines and up to 25 years imprisonment (CFA 2013).

---

[125] ABC Local Radio, commercial and designated community radio stations and Sky News TV.

Code Red Days

Code Red days were another government initiative following recommendations from the 2009 Black Saturday Royal Commission. Code Red is the highest Fire Danger Rating; the declaration of a Code Red day happens during a fire season and signals the worst conditions for a bush or grass fire. Schools, parks and forests in high risk areas are closed and people who live in high fire risk areas are recommended to leave early.

Communication of Bushfire Risk

Summer fire campaigns typically incorporate media and social media, partnerships with state-wide organisations. Fact sheets, ad templates, radio scripts, and media releases are freely available. General and critical information (advice and warnings) are communicated through a variety of means: newspapers, television, community education, internet, mobile and electronic technologies and social media.

Information

The CFA has made available a community information guide[126] which has been developed for a number of communities state-wide deemed to be at risk of bushfire or grassfire. Whilst they are mostly generic, they contain information specific for that area or community with maps and targeted advice.[127] Prior to a fire season, it is typically delivered to all households in bushfire-prone areas of Victoria. The Fire Ready Kit[128] is a 12 page pamphlet that is designed to prepare households for a possible bushfire. It includes general bushfire information, statistics about bushfire risk and ways to prepare. It is comprehensive and covers year-round preparation, specific preparation for the fire season and details about what is involved in staying and defending a property.

Newspaper

The CFA regularly provide media releases containing stories of interest pertaining to relevant CFA activity. Along with media originated stories, the newspaper publishes the official communications from the CFA, and government and emergency agencies. The communication encompasses 'business as usual' information, as well as bushfire relevant weather updates, fire season public education campaigns and warnings. A version of the CFA FireReady information brochure[129] is published (in conjunction with

---

[126] http://www.cfa.vic.gov.au/plan-prepare/community-information-guides-faq/
[127] For example, a community information guide for Aireys Inlet:
http://cfaonline.cfa.vic.gov.au/mycfa/Show?pageId=publicDisplayDoc&fname=2012/CIG-W-BSW-Aireys-Inlet-2_00_48255.pdf
[128] http://www.cfa.vic.gov.au/fm_files/attachments/plan_and_prepare/frk/fire-ready-kit-complete.pdf
[129] http://www.cfa.vic.gov.au/fm_files/attachments/Publications/FireReady_Herald_Sun_Guide_091112.pdf

CFA) by a local newspaper and inserted into their daily distribution prior to the fire season.

Television

Just prior to the fire season the CFA releases a series of television advertisements to educate the public about relevant fire dangers. These take various forms and change according to the events of the previous fire seasons. For example, in 2011, the television ads were described as 'graphic' and survivors of the 2009 Black Saturday bushfires were warned about the nature of them, giving them an opportunity to avoid seeing them if desired. In 2012, there were four televisions ads produced,[130] which targeted people travelling in regional Victoria and stressed the importance of checking warnings before travelling. They also addressed the 'Stay and defend or leave early dilemma using the catch phrase "If you are in two minds – Leave Early".

Community Engagement

The CFA offers and runs a comprehensive community home-based fire safety programme called the Community Fireguard. Meetings usually last around two hours and are held in community members' homes. The programme covers planning for varying scenarios, how to make informed decisions, how to ensure a fire-safe home and property; importantly it enables and builds community cohesiveness. The format is group discussion and practical activities and covers around eight hours of material. As part of Community Fireguard the CFA also offers a practical "Stay and Defend" workshop. In addition to group meetings, community members have available to them personalised bushfire information advice and can 'book' an expert to come to their home to advise them on bushfire related matters. These range from ensuring the fire trucks can access their property to managing vegetation around their house.

Victorian Bushfire Information Line (VBIL)

The Victorian Bushfire Information Line (VBIL) is essentially a call centre set up to provide information to the public during and after major bushfire incidents. It also offers information to help householders, landowners and small businesses reduce bushfire risk. The public can ring a free 1800 number during business hours and talk to someone who will provide pre-scripted information; for example whether there is a prescribed burn planned or in progress in the caller's area. For non business hours inquiries, there is recorded up-to-date information.

---

[130] http://www.youtube.com/playlist?list=PL6EHXr54f5MruZOCNFpw4Q19xd03NjLRK

Mobile Telephone FireReady App, RSS Feeds.

The FireReady app[131] was launched in 2010 to 'deliver critical emergency information and community safety advice to smartphone and tablet devices'. To date it has been downloaded by more than 450,000 users and aims to provide timely and accurate incident and fire safety information to smart phones or other compatible tablet devices. The CFA provides RSS feeds for the public.[132] This is also an 'opt-in' service where the public need to subscribe to the CFA feeds. Once subscribed the CFA automatically sends warnings & advice, incident summaries, total fire bans & fire danger ratings and any relevant news.

Social Media: CFA website, Twitter, Facebook,

CFA has a comprehensive internet presence with an official CFA website,[133] Facebook page[134] and a Twitter account[135] (hashtag #bushfires). The website provides a myriad of bushfire information and if people choose to become a member they can log in to the CFA website and have access to public forums and blogs. These are discussions that are open to the public who are able to contribute to the discussions. The public has to 'opt in' to these social media sites to receive information, updates and warnings. Warnings are posted automatically to both Facebook and Twitter during bushfire events.

Discussion

> *The sociological imagination consists of the capacity to shift from one perspective to another, and in the process to build up an adequate view of a total society and its components* (C Wright Mills, 1959)

This chapter (and the one preceding) has demonstrated that there are many different ways to understand the same phenomena, and each discipline has an emphasis that others do not. Each perspective brings with it its own strengths and weaknesses, and also related thinking as demonstrated in the literature referenced. Risk perception in the previous chapter has been examined using a cognitive individual perspective, and this chapter widened this understanding to include the society and culture in which the individual resides. Each idea, theory, model and approach detailed in this chapter has relevance for understanding how people may (or may not) respond to disaster warnings and evaluate risk threats. The theoretical underpinning of this thesis is social

---

[131] http://www.cfa.vic.gov.au/plan-prepare/fireready-app/
[132] http://www.cfa.vic.gov.au/rss-feeds/
[133] http://www.cfa.vic.gov.au/
[134] http://www.facebook.com/cfavic
[135] http://www.cfa.vic.gov.au/warnings-restrictions/social-media-updates/

constructionism which advances the notion that knowledge is produced as people 'construct it between them' (Burr 2003:4). Moreover, in direct contrast with the essentialism of traditional psychology, knowledge construction and meaning-making is conceptualised as an active, dynamic and on-going process.

The ways that risk is assessed are complex and as chapters 2,3 and 4 show, depend on a great many elements which are constructed though social interpretations and mediated by scientists, journalists and disaster and emergency agencies. Slovic (1987) described risk as 'inherently subjective', and a conceptual tool that helps people decide what is dangerous and therefore needs to be paid attention to. How people view their worlds and how they construct ideas of risk and vulnerability contribute to an individual's 'mental model', that is, a persons' beliefs, values and use of their surrounding environments. Similarly, worldviews predict how people prioritise and interpret risk, including technological, economic, political and environmental risks. (Dake 1991; Dake & Wildavsky 1991). Bushfire risk literature that focuses on how risk is evaluated in relation to warnings comprises few studies and more in the Australian context is needed.

Models of communication have evolved since the beginning of media communication research in the 1920's and the ones relevant to this thesis have been described in this chapter. The contextual model resonates strongly with the social constructionist approach of this thesis and is a useful model with which to analyse the ways in which the Australian public respond to bushfire information and warnings. Heuristics of risk have been described in social terms in these chapters, and included biases of accessibility, availability and positive affect. Kahneman (2011) called the availability heuristic as perhaps the most dominant heuristic in the social context which, beginning with the media and ending with large-scale government action, can create a chain of events that amplifies over time. The social amplification of risk theory explained that communication is a two stage process where the first stage is risk perception and signal transformation and the second are its effects. A key assumption of SARF is that, unless risk events are socially discussed and debated, their impact remains 'localised and largely irrelevant'. When the idea of audience reception is viewed through the 'social construction of reality' lens, it is easy to understand how texts can shape public discourse.

Studies exploring the public perception of risk communication (Eagly, Wood and Chaiken 1978; Renn and Levine 1991; Flynn, Burns, Mertz et al. 1992) agree the assessment of risk is very much dependent on how much the source of the message is trusted. Trust and credibility is central to any effective risk communication and McGuire (1969) defined trustworthiness as a measure of the possible hidden agenda of the source, that is, the possible intention to the public (154). There is no doubt that the public and the experts view risk differently, and some people can react emotionally to risks in ways that the experts find puzzling. Sandman, (1993) confronts the criticism often levelled at the public from emergency agencies of 'irrationality' and suggests that it is unhelpful to think that emotional responses are irrational whilst thinking or measured responses are rational. Furthermore, agencies often link 'irrationality' to ignorance; Sandman (1993) asserts that just because the public may be ignorant of scientific facts, does not mean their reaction to a scenario (about which they have experience but no knowledge) is irrational.

This chapter made a distinction between risk communication and crisis communication and showed crisis communication is very specific, often concise, and people focused. As Covello (2002) points out, good communication concentrates on 'what the people most need to know and most want to know' (52). The following chapter outlines the theoretical epistemologies and methodologies employed to understand the topic of warning fatigue as well as addressing methodological issues.

6: METHODS, THEORIES AND EPISTEMOLOGICAL CONSIDERATIONS

Main Aims

As stated in the introduction, the principle aim of the research reported in this thesis was to explore the phenomenon of warning fatigue and establish whether there was a way to operationalise it in such a way that it could be measured. The research aimed to establish whether prolonged lead-time disasters influence risk perception, engender the phenomenon of warning fatigue and impact response. A further aim was to understand how people living with the risk of bushfires evaluated their personal risk and interpreted and understood bushfire risk communication. The previous chapters (4 and 5) explored these concepts and showed that, within the substantive subject of risk, there can be differing ways to respond to it. For example, an individual can assess risk personally as it relates to their own concerns; they can 'react' or 'cope' or strategise'. They can manage their responses and how they feel about them, they can reduce their reactions or altogether ignore their feelings. Within the social context in which they operate - their neighbourhood, their community, their family and social networks – they can assess how well their surrounding environment might survive the threat, how prepared their property or neighbours property might be and evaluate the readiness of their local brigade to respond to a bushfire. They may also gauge how helpful their family and friends might be in a crisis situation. Some literatures have examined these ways of assessing risk, but as yet, none has done so in the context of a prolonged lead-time threat. By using these knowledges about the many ways to perceive risk, the question that this methodology seeks to answer is,, 'how do people living with the on-going threat of annual bushfires, evaluate and respond to *their* risk?' Therefore, it is important that this methodology captures the multi-dimensional character of this unique situation: people continue to live in bushfire-prone areas and are annually confronted with the risk from bushfires even though a bushfire of disastrous proportions rarely occurs.

Consistent with the interdisciplinary focus of this thesis, the methodology will draw upon more than one approach: for the first two studies it will employ a qualitative methodology but for the third study, the design is both qualitative and quantitative. The advantages of a mixed methods approach is discussed on page 138 of this chapter. The design methodology aimed to ensure that both the individual responses to personal risk and the evaluations of risk in their wider social context were captured.

Through investigating the bushfire warnings that the people pay attention to, considering whether there are some warnings that are paid more (or less) attention and exploring the reasons for this, the research aimed to understand what it is like to *live* with bushfire risk, to understand the participants' points of view; to 'get under their skin' in a sense. In the context of Australian bushfires, the methodology therefore was designed to explore how the participants talked about those aspects of living with risk, how they constructed risk and warning issues and what considerations influenced those constructions.

Theoretical epistemologies

The epistemological underpinning of this thesis is that the individual and society are inextricably linked. A fundamental premise is to understand how the individual, as part of his or her social and cultural environment, perceives risk from potential disasters. Moreover this risk is mediated by emergency agencies and the media. Therefore, the epistemological orientation of this thesis is integrative and draws upon several psychological and sociological theories, models and approaches. These include Social Constructionism, Symbolic Interactionism, Social Representation Theory, Critical and Discursive Psychology and Interpretive Phenomenological Analysis. What is notable about these different theories are their complementarities; despite being grounded in different disciplines, the philosophies of each approach are very similar in that the individual is considered in the wider socio-cultural context.

Social Constructionism challenges the taken-for-granted assumptions about ways to understand the world. Rather than deriving knowledge from 'an objective, unbiased observation of the world' social constructionism advances the notion that knowledge is produced and incorporated into everyday life as people interact socially. Moreover, in direct contrast with the essentialism of traditional psychology, knowledge construction and meaning-making is conceptualised as an active, dynamic and on-going process. Social Constructionism examines the ways in which events, realities, meanings, experiences and knowledges are 'the effects of a range of discourses operating within society' (Braun and Clarke, 2006:81). Importantly, Social Constructionism is not deterministic and 'relocates problems away from the pathologised, essentialist sphere of traditional psychology' (Burr 2003:7). Language is central in the social constructionist process as it renders the content and structure of peoples thoughts 'visible' and in no small way demonstrates that 'what we say is what we think' (ibid.: 47). Moreover, it

emphasises that, it is the social realm (or linguistic space) where individuals interact with others that understanding is to be found.

The term Symbolic Interactionism was coined in the 1970's by social constructionist Herbert Blumer (1900 – 1987), who built upon the earlier works of American sociologists George Herbert Mead (1863–1931) and Charles Cooley (1864-1929). It builds upon the concept of social interaction and was seen to be a major alternative to functionalism [136] and social system theory[137] where society was imagined to be an exchange of gestures which involved the use of symbols. According to symbolic interactionism individuals and society are considered inseparable because they are both 'created' though social interaction and one cannot be understood without the other. Fundamental to this theory was the belief that humans act toward things on the basis of the meanings they ascribe to those things. The meaning of such things is derived from, or arises out of, the social interaction with others and the society. These meanings are used and modified through an interpretative process when dealing with everyday life. Symbolic Interaction challenged traditional psychology's assumptions of consciousness and mind, and argues that people are as affected by their interactions with society as they are by their cognitive physiology. Mead insisted that 'Individuals' do not exist independently of society but are, instead, 'made possible by social interaction between people' (Burr 2003:193). Importantly, these interactions are made possible (and made sense of) by the use of symbols; there is an assumption that successful interaction is only possible within a system of shared meanings and understandings. The premise of symbolic interactionism (and of this thesis) is that the individual and society exist only in relation to each other and therefore can only be fully understood in terms of their interaction.

Risk perception can be seen as a 'representation of risk' and comprises multiple factors that are 'beyond information processing' (Joffe 2003:60). It is not a homogenous or bounded process, because, when forming a representation 'there is always both conflict and cooperation' (Moscovici 1998:377). Originally coined in 1961 by Serge

---

[136] A now controversial sociological perspective, functionalism explained how different elements within society were seen to be interdependent, where social activities have consequences for other social activities, institutions or society as a whole. Social activities were posited to fulfil functions within society, contributing to its maintenance and stability and satisfying basic social needs.

[137] Talcott Parsons (1902-1979) defined a social system as one or more social actors engaged in interaction within a bounded environment which included groups, institutions and societies. The system therefore maintained some boundary or unity of the 'parts' which are linked together by way of information carrying symbols such as language, money or influence. Ideally there was a balance between inputs and outputs.

Moscovici,[138] social 're-presentation' is framed as a socio-cognitive practice that enables people to learn about their world by reinterpreting events to 'fit with what is already known' (Howorth 2006:68). Social representations not only embody individual and collective histories, social and cultural entities but they also enable people to make sense of new events, creating what Moscovici termed an 'environment'. Moscovici (1984) was particularly interested in the ideological 'battle of ideas', that is, how meanings are challenged and negotiated:

> *Social representations are systems of values, ideas and practices which enable communication to take place among the members of a community by providing them with a code for social exchange and a code for naming and classifying unambiguously the various aspects of their world and their individual and group history.* (Moscovici 1973: xiii).

Moscovici proposed two distinct processes by which representations of events are constructed: the first is 'anchoring' which transforms unfamiliar abstract concepts into familiar, concrete experiences. Anchoring ascribes meaning to an unfamiliar, strange and threatening object, rendering it less threatening and more familiar. In this way, it is a similar process to that of affective adaptation,[139] where (the model proposes) the mere action of understanding something makes it less scary and more predictable (Wilson and Gilbert 2008). The second process Moscovici called 'objectification' and is where new or strange ideas are 're-categorised' using familiar concepts that are already part of a society's collective frames of reference. Objectifying extends the idea of anchoring because objectification 'domesticates the unfamiliar', transforming the unfamiliar into something concrete and 'known', giving it a sense of understanding. Once an idea is reified, it feels more within the control of the individual; therefore objectification is a process not dissimilar to the cognitive adaptations discussed in chapter 4 that enable people to feel more in control (or less out of control) when managing anxiety provoked by unfamiliar threats. Whilst the past is drawn upon when attaching something already known to something new, objectification 'saturates' a new idea with the current or familiar, turning it from an abstract idea into something much more tangible. For example, when the media demonstrate the effect of climate change (an abstract idea) by repeatedly depicting exceptional floods, bushfires or storms, they objectify and transform climate change into a concrete phenomenon.

---

[138] Serge Moscovici, born in 1925, is a French social psychologist who is currently the director of the European Laboratory of Social Psychology.
[139] Affective adaptation is detailed on page 92.

Social Representation theory (SRT) 'allows for the simultaneous presence of divergent concepts, inconsistent ideas and paradoxical meanings' (Moscovici 1973 cited in Rose, Efraim, Gervais et al. 1995:4). Depending on the culture within which the representations are formed, collective representations will vary in the extent they are contested or challenged; for example hegemonic social representations 'rooted in systems of power' are ubiquitous and more resistant to change (ibid.: 23). Emile Durkheim (1858-1917)[140] viewed collective representations in the same way calling them 'social facts that are imposed upon society' (Howarth 2006:71). Critics of this theory (Potter 1996b; Moloney and Walker 2002) have questioned the extent of the relationship between social representations and action. However, Howorth (2006) insists that social representations are 'often only apparent in action [as they] influence social practices' (72). Other critics (McKinley and Potter 1987) have questioned the degree to which a key feature of SRT - shared knowledges - implies consensus. However, consensus is neither just agreement nor the 'shared-ness' of social opinions and values, rather it is a taken-for-grantedness about those things that people share - language, protocols, rituals; in short, all those things that make up social life (Rose et al. 1995:1).

Situated cognition contends that knowledge can only be gained through experience, situating this learning within cultural, social and physical contexts. Importantly, this learning is conceptualised not a result of knowledge retrieval, but as the individual interacts with his or her environment. Language is central to another psychological theory, that of discursive psychology which explores how people actively construct their own accounts of events, of which others may have a different view. Language, as people use it in everyday life, is seen to be a representation of what they think, believe, who they are and how they interpret the world around them. Like social constructionists, discursive psychologists view everyday life as constantly changing through interaction (which they call 'performance'); 'thus memory, emotion and other psychological phenomena become things we *do* rather than things we *have*' (italics added, Burr 2003:17). Situated Cognition describes a perspective of human cognition that claims that learning happens as human beings interact with the living world; it is a theory of thinking mainly 'as you go' and 'in the moment', and is a situated in physical

---

[140] Emile Durkheim was a French sociologist, social psychologist and philosopher. Respected as the father of sociology he is, along with Karl Marx and Max Weber, regarded as the principal architect of modern social science. Durkheimian terms such as "collective consciousness" have since entered the popular lexicon.

and social contexts (Greeno 1989). Situated cognition theory shifts the focus from the individual to the socio-cultural setting and the activities of the people within that setting. Knowledge is understood as 'accumulating through the lived practice of the people in a society' (Driscoll 2004:158); this theory is particularly pertinent for understanding participants 'lived experience' of bushfires. In short, these theories are most useful for 'making-sense' of the ways that risk is perceived by individuals who are also constituents of a social world. Predominantly however, it is their similarity to social constructionism that affords their inclusion in the theoretical epistemology of this thesis. In particular, it is how they complement social constructionism, symbolic interactionism, and the augmentation of these two theories: 'Social Representation Theory' (SRT).

The importance and relevance of these theories to conceptualising the research design cannot be overstated and at every stage of the research, these theories directed the methodological approach. In practical terms, this meant that when reading relevant literature assumptions that psychologists made about 'the social' were challenged. Similarly, the ways that those writing about the social talked about the individual were not taken for granted. In this way the concept of risk was not reified, but considered a concept within which the participants' perspectives were paramount. These different theories underpinned the theoretical epistemology of this thesis' research, enabling a consistent, coherent and integrated understanding of bushfire risk communication and perception.

Analytic epistemologies

In order to understand the participants' perception of their personal and community risk in the context of possible annual bushfires, more than one analytic approach is used. These include interpretive phenomenological analysis (IPA), discourse and narrative analysis and the concept of interpretive frames and repertoires. These methods are concerned with 'themes and patterns across an entire data set rather than within a data item' - one participants comment for example - and although they are similar each brings an analytic strength. Moreover they all share a fundamental feature: qualitative thematic analysis (Braun and Clarke 2006:81).

Qualitative thematic analysis is a method in its own right which allows for the interpreting of 'various aspects of the research topic' as well as a flexible way to

'identify, analyse and report patterns (themes) within data' (ibid.: 79). It is a process for encoding qualitative information and can be a complex model with themes, topics, indicators and qualifications. Themes are understood as interpretations of the phenomenon, and are recurring patterns of meaning (ideas, thoughts, and feelings) throughout the text. They identify both something that matters to the participants and also convey something of the meaning of that 'thing' for the participants. (Boyatsis 1998). In the context of this thesis the themes may be initially generated inductively from the transcribed interviews or generated deductively from the literature. Thematic analysis begins with an individual data set (the interview) but importantly extends understandings gained from these single interviews to the whole data set (all interviews). It is a useful method for this thesis as it can be used to 'reflect reality and [also] unpick and unravel the surface of reality' (Braun and Clarke 2006:81). Themes can be determined by prevalence, that is, how many times the idea came up in an interview, or by the number of participants who mentioned the idea. However no attempt is made to quantify these themes, rather they are represented in terms such as 'most of', 'the majority of' or 'many'. Thematic analysis is a 'data driven' analysis where no assumptions are made about the coding framework or analysis outcomes. It is used in the context of this thesis as a 'starting point' from which more detailed analysis, using different analytic methods, can be done.

Interpretive Phenomenological Analysis (IPA) is a two-stage interpretative process where the researcher is trying to 'make sense of the participants trying to make sense of their world' (Smith and Osborne 2003:53); it enables a more detailed and nuanced account of the personal experiences of a smaller sample. It is a useful approach to use for qualitative research as it suggests ways that people make sense of a given phenomenon which can include, but is not limited to, personally important experiences. IPA 'assumes that there is a connection between people's talk and their thinking and emotional state' (ibid.: 54). Therefore questions for the interview protocol were designed to explore the participants' ideas and opinions, as well as their reasoning and feelings. Consistent with the social interactionist ontology, IPA is a 'bottom up' approach which can be used to generate understanding, interpretation and meaning from the data rather than beginning with a preconceived hypothesis. IPA enables a broad framework that does not assume a point of view nor a hypothesis and was an especially useful epistemology for the first round of interviews. Semi-structured

interviewing (as is employed for both interview rounds) is the most compatible interview method for IPA as it is a flexible method which can be iterative and adaptable depending on the participant's responses and interests. Importantly, this approach allows for a participant-lead interview rather than one which is largely orchestrated by the interviewer. By ceding some control over the interview process, the interview can, at times, take longer than 'necessary', resulting in lengthy transcripts (and longer analysis); this could be seen as a limitation of this approach.

Discourse analysis (DA) has similarities with IPA, in that it is a qualitative approach that places an emphasis on the importance of language. It is congruent with social constructionism and symbolic interactionism, as both approaches are concerned with how individuals construct meanings from their social and personal worlds (Nunn 2009). Discourse analysis pays attention to social interaction, and is ideal for exploring forms of subjectivity: 'ways of understanding and experiencing the world, of accounting for it, and being positioned in it' (Edwards 2005:258). It is an analytical approach that is entirely congruent with social constructionism, as it focused, not on the individual and personal, but rather on the 'public realm which people have access to when they are dealing with other people' (Potter 2012:5). The 'public realm' in the context of the analytic chapters is the bushfire-prone environment in which the participants construct their everyday lives. Discourse analysis makes possible more nuanced analysis than IPA, and is especially useful for the second round of interviews and the reflections of participants from the warning fatigue survey. This thesis used DA 'as a source of evidence or insight about social life and social relations' (Cameron 2001:13) rather than a linguistic approach concerned with function and form of language. Importantly, DA allows for competing viewpoints, and does not assume or promote homogeneity of response.

A fundamental aim of the analysis was to understand the 'talk' of the participants as they discussed why they lived in a bushfire-prone area; how they made sense of their decisions and described their everyday lives in these contexts. 'Talking' in this context means 'the social activity of making meanings with language and other symbolic systems in some particular kind of situation or setting' (Lemke 1995:6). Meaning-making or sense-making is a process whereby people respond to events in the real world and actively construct them, 'often using pre-fabricated vocabularies or schemas' (Benford

1997; Gamson, Croteau and Hoynes 1988). 'People develop some sort of sense regarding what they are up against, what their own position is relative to what they sense, and what they need to do' (Weick 1999:42). It is only when people talk about their responses to events that an interpretation of their sense-making can be made. Wetherell (2008) calls this 'basic psycho-discursive practices where the inter-subjective nature of sense making is revealed' (Manuti, Traversa and Mininni 2012:1) The ways of talking about or 'narratives' that the participants used when talking about their everyday lives in bushfire-prone environments can be thought of as interpretive devices through which they represent themselves and their worlds to themselves and to others. Narratives are social products produced by people in the context of specific social, historical and cultural locations and narrative analysis focuses on 'the ways in which people make and use stories to interpret the world' (May 2002:6).

Interpretive repertoires are the textual and interpretative stories or building blocks used by people in their social interactions to develop accounts and versions of significant events. Moreover, it is through using these interpretive repertoires that they are able to perform identities and social life. Operating at a broadly semantic level, they are recognizable routines of connected arguments, explanations, evaluations and descriptions which often depend on familiar anecdotes, illustrations, tropes or clichés (Wetherell 2006). The terms, categories and idioms of an interpretative repertoire are closely conceptually organized and are typically assembled around a metaphor or vivid image. In most cases, interpretative repertoires are identified by analysing a set of open-ended interviews in which participants address a set of different themes. This concept formed the basis for designing the interview protocols for the first and second round of interviews; it also directed the coding and analysis.

As an analytic method for understanding text (which the transcripts of the interviews represent) content analysis (CA) was considered. Certainly, during the 'first pass' of the transcript data, words were the predominant unit in the coding process, but subsequently, they were used in a different way to the intentions of a true content analysis. Content analysis systematically codes words, phrases and text to produce reliable, valid variables; it aims to produce a consistent classification that is able to be done by different people but get the same result. Whilst CA does not preclude a qualitative analysis, it employs a mostly quantitative approach and was considered to

be a reductionist methodology inconsistent with the predominant qualitative methodology of this thesis. Finally, the advantages of using more than one analytic method for this thesis are that it reinforces the philosophy of this thesis which argues that there is more than one way of 'seeing the world'. By approaching the same issue from differing perspectives a more comprehensive and integrated understanding of people's perception of risk is achieved.

Design Overview

The research design consisted of three case studies: two rounds of interviews and a survey. The participants for the interviews (n = 36) were people living in bushfire vulnerable areas in Tasmania and Victoria. The survey participants (n = 33) also lived in bushfire vulnerable areas in Tasmania and Victoria, New South Wales and Queensland. The design was mixed methods and comprised semi-structured interviews (using an open-ended question technique) and a survey, which included responses to statement on a 7 point Likert scale as well as options for participants own reflections on their responses.[141] The particulars of the participants, recruitment methods, rationales for each particular study design, the methods and limitations are detailed at the beginning of each case study.[142]

Design

The research design of the research project involved mixed methods using both qualitative and quantitative data generation, collection and analysis methodologies. The advantages of this design are that the qualitative method can inform and shape the quantitative method and the findings can be triangulated, allowing for convergence or dissonance. By using different methods to assess the same issue, the investigation is more broad, allowing for nuances and unexpected findings often not obvious when only one method is used. For example, a quantitative method may establish *what* people are saying or thinking about, but will not be able to say *why* or *how*. Because social issues involve complex inter-relationships and diverse individuals, different features of the same phenomenon may be illuminated. As each method has limitations, mixed methods can help balance out the strengths and weaknesses: for example qualitative interviews can provide an in-depth understanding of people's experiences, but may lack the capacity to generalise. Mixed methods allow for a flexible complimentary approach, which is able to be expanded and developed as the project

---

[141] Interview questions are detailed in Appendix 3.6

[142] Study (I) – page 145., Study (II) – page 163., Study (III) page 185.

progresses. Lastly, by using a mixed methods design, it is envisioned that this research will have relevance to a wider range of audiences and heighten the acceptability of the findings (Emmerson and Goodrich 2008).

The literature review highlighted gaps in the literature, focused the direction of the study and coupled with the main research aims, afforded the formulation of questions for the first round of interviews. The analysis of the first interview data revealed dominant themes and patterns, and were used to devise a second set of questions which teased out some of these ideas in more depth. The intention of the second interviews was not only to involve a different cohort of participants but also to focus more closely on the main issues that had arisen out of the first round of interviews. Subsequently, and during a discussion with a colleague[143] about the initial findings of these interviews, a casual comment "I wonder whether warning fatigue changes over time" led to the idea for the third data set, which was primarily quantitative. This consisted of a measure of warning fatigue hypothesised from limitations in the risk perception literature, participants' ideas and opinions and themes and patterns observed in the interview data. This measure was tested using a predominantly quantitative survey administered over the 2011 fire season.[144] The survey included qualitative components which were comments and responses to statements that had also been informed by the previous interview findings and literature review. The mixed methodology for this thesis enabled an ontogeny of understanding about the thesis topic. In this context therefore, the addition of a quantitative component to a dominantly qualitative research strategy provided information about participants' perceptions and responses that could not have been gained by one method alone.

Survey

Most of the thesis has been written from a qualitative epistemological perspective, while taking advantage of benefits accruing from adopting a mixed methods approach: specifically, the device of triangulation. The third study employs both quantitative and qualitative data gathering methods. The rationale for including a self-report questionnaire survey in the final study of the thesis was to 'map out, or explain more fully, the richness and complexity of human behaviour by studying it from more than one standpoint' (Cohen and Manion 2000:54). The assumption which underpins this

---

[143] John Schauble, Manager of Policy and Planning, Fire Services Commissioner, Victoria.
[144] November 2011-April 2012.

methodology is that by using standardised questions it is possible to infer people's thoughts and opinions about a specific topic, which data can then be quantitatively analysed. The results can then be generalised tentatively to a larger population.

Quantifying qualitative responses is not a new idea in social science and is entirely consistent with the interdisciplinary and integrative epistemology of this thesis. Surveys were first used to measure poverty among the working class in England at the end of the 19th century (Park 2006) and more recently have been used to understand risk perception in the context of environmental hazards (Williams, Greenberg and Kahn al. 1999), environmental quality (Saarinen and Cooke 1971), flood risks (Brown and Damery 2002), and intentions and actions in the face of bushfire threat (McLennan et al, 2013). Surveys work best when the population surveyed is clearly defined (Emmerson 2010), and at this point in the thesis, the population needed for the third study had been made clear by the previous studies. Importantly, quantitative surveys complement qualitative work by providing a wider context for confirming the findings from qualitative analyses (Alreck and Settle 1995). In the third study, the survey examined risk perceptions of people in the context of the peri-urban bushfire-prone environment of Australia for the purposes of measuring bushfire warning fatigue over a typical fire season.

Depth of Transcription

When giving the transcriptions back to the participants to validate, some commented "that sounded just like me!" which is a confirmation that the way the data was transcribed was a true representation of both *how* and *the way* they talked about things. There are many ways to transcribe spoken data, from linguistic analysis of spoken syntax that documents in fine detail to micro-pauses. Other transcription conventions include intakes of breath, multiple uses of symbols to denote speaking order and interruptions or speed of speech. However, a functional approach is more interested in 'how language communicates when it is used purposefully in particular instances and contexts' (Cameron 2001:18). The aim of the transcription for this research was to understand the text rather than the finer points of spoken interaction, hence 'there was a clear trade-off between accuracy and detail on one hand and readability on the other' (ibid.: 39). Nonetheless, the interviews were transcribed verbatim, with the accuracy of what was said as close to the original recording as possible. There were small changes made for ease of reading such as transcribing 'and', instead of 'n', and making a judgement call as to whether to notate a full-stop or

comma. In some but not all instances, repeated words or 'filler' words such as 'um', 'er', 'ah', 'you know', 'sort of', and 'I mean' were not transcribed. A couple of the participants had strong foreign accents, and verbal mannerisms that meant they used filler words such as 'basically and 'actually' numerous times. Where the meaning of the sentence was not changed or compromised, these words were excluded from the final transcription.

The level of transcription was moderate (Bird 2005) and the discussion was written down verbatim. However, some transcription conventions such as transcribing the length of a pause with a number of seconds in brackets (2) or 'hh' for audible out-breath were not followed. The instances of laughter were noted. The transcribing of all interviews was done by the author and even though this took a great deal of time, it was an excellent way to become familiar with the data. Researchers (Bird 2005; Lapadat and Lindsay 1999) argue that transcription is 'a key phase of data analysis within interpretative qualitative methodology' and should be recognised as 'an interpretative act, where meanings are created, rather than simply a mechanical act of putting spoken sounds on paper' (cited in Braun and Clarke, 2006:87). Transcription is interpretative in the sense that, depending on the theoretical emphasis of the thesis, selection of what is recorded is made at the transcription stage, therefore it can be argued, is part of the analysis process. A limitation of this approach could be that by choosing a moderate level of transcription (where the text was more important than pauses and tone), the talk is constructed in a certain way and therefore a claim cannot be made that the transcription is an absolute reflection of the interviews. A further limitation could be that the ordering of the talk into sentences, using commas and full stops could be seen as subjective, because, as is normal for 'natural speech', ideas (as they were spoken) were often not fully formed, and words or whole phrases were repeated in order to express an idea. However, for the theoretical purpose of this thesis, the construction of the topics discussed (fire risk, personal safety for example) as representative of the meanings that the participant gave to the ideas, was what was most important to capture, rather than the *way* (inflections, emphases, hesitancies) the participants spoke.

The question of whether the method for collecting qualitative data is contrived and therefore does not constitute 'natural speech' is one which needs to be addressed. An

assumption could be made that one sort of talk is more 'natural' than the other. For example by privileging 'ordinary talk' - that is talk which is informal and would have occurred whether it was recorded or not - over talk that has been 'manufactured' for research purposes. Ethics demand that recording is with the participants consent and not covert, and some researchers (Green, Franquiz and Dixon 1997; Edwards 1993) recognise that natural talk also happens in structured situations such as medical consultations, counselling sessions and courtrooms (cited in Wetherell, Taylor and Yates 2001:27). Whilst acknowledging that all talk is shaped by the context in which it is produced, Cameron (2001) states that she does not think that 'anyone has shown convincingly that what the talking research subjects do in a laboratory is a different thing from "normal" talk' (20). For all three studies of this research there is no doubt that the participants knew the overall intended subject of the interviews before they were conducted. However, the questions posed to the participants were more of a conversational guide than a predetermined script, and deviations and elaborations were encouraged.[145] When designing the interview questions, considerable effort was made not to lead or prime the interviewees, and interviewer input was kept to an absolute minimum as it was the participants' voices, their ideas and their points of view that were most important. Some participants apologised for 'wandering off the topic' at which point they were assured that, in this context, "there was no such thing and to please continue". This last point addresses a critique that interviews are unnatural because the interviewer 'controls' the interview, imposing a structure that detracts from a natural conversation, and interpreting the participant responses in a certain way. However, the transcripts show that 'control' of the interviews was at the very least shared and possibly more firmly with the participants than with the interviewer.

Methodological Issues and Limitations

Participants

Studies (I) and (II) were exploratory in their aims and design where the goal was to get the views of people who lived in areas that were bushfire-prone. Mileti and Sorenson (1990) claimed that people who are part of a particular social network 'are more likely to hear a warning' (90), 'understand, believe and personalise warnings and to engage in response' (94). For the first study, members of Tasmanian and Victorian Community Fireguard Association (CFA) groups were contacted and asked to participate in the

---

[145] Interview Protocol – Appendix 1.5 and 2.5.

study. The particular communities were chosen primarily because of the authors' personal contacts with people in the fire and emergency agencies. In Tasmania people were approached during a community education morning, and in Victoria, email contact details for members of a local CFA were used to request participation. Because this was an exploratory study, the views of people who could be considered to be 'knowledgeable' about living with bushfire risk were sought first. It was assumed that people who were already involved in personal and community bushfire mitigation would be engaged in the issue and more easily bring to mind issues of living in bushfire-prone areas.

Study (II) was more focused and aimed to elaborate on the issues raised by participants from Study (I). In order to get wider and possibly contrasting viewpoints, people who did not involve themselves in community Fireguard activities but who still lived in areas prone to bushfires were sought. Study (II) participants were recruited by approaching people in a Mt Dandenong village as they went about their weekend business. Even though it was a seemingly small community the resulting participants were quite disparate and did not all live in the same area. This gave a contrast to the participants from Study (I) who were mostly long-time residents of small communities and knew most of the people in them.

Study (III) participants were recruited through social media, personal contacts and snowballing methods. Because it was not community or area focused, this enabled a more diverse sample of residents, with participants living in bushfire-prone areas over four Australian States. This was a new cohort of participants who responded to a post on the CFA website,[146] various emails and requests from friends and colleagues.[147] Limited time and financial resources meant that the number of participants in each of the three studies was less than 70. However, the qualitative component of Study (III) yielded sufficient data for a robust analysis.

Methods

Semi-Structured Interviews

Semi-structured interviews were chosen as the method for Study (I) and Study (II) as it was a qualitative research method conducive to the social constructionist epistemology

---

[146] Appendix 3.4.
[147] Recruitment email – Appendix 3.5.

of this thesis. The discussion format that semi-structured interviews encourages allowed the participants to express their views 'in their own terms', and digressing and elaboration was commonplace. In this way topics and issues which were not anticipated by the interviewer but important to capture, could be part of the interview. Semi-structured interviews are best used when interviewing participants once (Bernard 1988) and provide reliable, comparable qualitative data (Cohen and Crabtree 2008). As the literature review preceded this data collection, semi-structured methodology allowed for preparation ahead of time where questions and observations were able to be drafted; they were in the form of open-ended questions. It provided a template for discussing the topic without restricting the exploration of other viewpoints.

Interviewing participants requires a certain level of expertise and is time consuming. These limitations were mitigated because of considerable experience in conducting semi-structured interviews on the part of the interviewer. The time component was not an issue: the participants were told that an interview may last up to 40 minutes and all were happy to take part. They were conducted at a time that best suited the participants.

Survey

The survey methodology for Study (III) was chosen because of the mainly quantitative requirement but also because a qualitative aspect could be included. Research has also shown (Schuman and Presser 1981) that, because of the relative anonymity that electronic surveys offer, participants are often more honest in their responses than with paper surveys or interviews. Other research has also shown that when participants use their own private networks their response rate is higher than paper surveys or interviews (Boyer, Olson and Jackson 2001). The survey was designed to be done online, and was able to be conducted remotely, repeatedly and reliably. Survey Monkey™ was the online tool chosen and enabled transfer of data between platforms.[148] It was a relatively time and cost-efficient method of collecting data and because the survey was repeated several times, ensured a consistency across time points. The survey allowed for specific statements to be responded to and was designed to eliminate ambiguity. Because the survey was conducted over a period of six months; it was easy to liaise with the participants quickly if needed; this included follow-up emails. When participants are asked to respond in a definite way to statements, there is always a possibility that they may have misunderstood the reason for the questions. For this reason, an option for

---

[148] SurveyMonkey is a web survey development cloud based (Software as a Service - SaaS) company.

the participants to elaborate on why they answered the way they did, was made available. This enabled analytic interpretations to be made with a greater degree of certainty.

Limitations

The method for recruiting of participants (snowballing and through personal and professional contacts) meant that the sample for all case studies was not representative as it might have been if census data was used for example. This method of recruitment would have required a much larger time frame which was outside the scope of the thesis. Nonetheless, as detailed in the case study chapters, there was a satisfactory range of age, gender, and household demographics (single, partnered, with or without dependants). The sampling for the studies were purposive and the most important criteria for the three studies were that the participants had lived in bushfire-prone areas of Australia for more than three years and that they were, or were not, involved in formal bushfire mitigation and community education activities. It was clear from the results of the analysis of the first study data, that there were no obvious or distinct differences between the Tasmanian and Victorian participants' responses. Therefore, for this reason, and also for practical and economic reasons, the cohort for the second study was wholly people living in the Dandenong mountain region of Victoria.

Self-selection bias is a common limitation in any study and is difficult to avoid altogether, even in a perfectly designed study. For the first study, participants were approached to be interviewed and the criterion was that they were regularly involved in their local community fireguard groups (TFS or CFA).[149] As this was the main selection criteria, the participants selected themselves into or out of the study based on the research mandate, rather than any subjective, personal bias. For the second study, once again, the criteria for inclusion or exclusion was set by the study's author and was straightforward: if the potential participant was regularly participating in any formal community fireguard activity, they were excluded (by the recruiter) from the study. Nearly all of those approached to participate who met the study's criteria (non-involvement) agreed to take part. Those who did not agree to take part (n=2) were not available to be interviewed at the time required for family or work reasons.

---

[149] TFS – Tasmanian Fire Service., CFA – Country Fireguard Authority, Victoria.

The participants for all three studies were predominantly Australian-European and more than half owned their own home. Therefore the findings of this research may not generalise well to other cultures. Additionally, because study (III) required participation via an online survey, it can be imagined that those who were less internet capable would not have chosen to take part, meaning this particular demographic could have been more limited than others. The sample size for each study was at the lower end. However, it was still well within conventional standards for empirical analysis.

Ethics

A minimum risk ethics application was sought and granted by the University of Canterbury Human Ethics Committee for both the first and second round of interviews.[150] Seven months later an amendment to include the warning fatigue survey (Study III) was sought and granted.[151] The participants for both rounds of interviews were recruited in several ways: by word of mouth, through social networks and by personal invitation. Permission to attend the CFA open days was granted by the local CFA personnel. At no stage and in no way was anyone put under pressure to participate. Furthermore, as the information sheet explained, the participants were free to withdraw at any stage during the process, or at any time subsequent to agreeing to take part.[152] The information sheet was accompanied by an informed consent form which expressly sought the participant's permission to have their interview recorded.[153] The informed consent form invited the participants to take part in the research, explained the objectives of the study and outlined the process of the interview and when they could expect it to take place. Information affirming that their confidentiality and anonymity would be respected and details about the security of the data was also provided. Contact details for both the researcher and primary supervisor were supplied.

---

[150] Appendix 1.1 and 2.1
[151] Appendix 3.1
[152] Appendix 1.3, 2.3 and 3.3
[153] Appendix 1.2, 2.2 and 3.2

7. STUDY I: KNOWLEDGES, PERCEPTIONS AND CONCERNS

Introduction and Aims

The primary aim of this chapter is to understand how people who live with bushfire risk in semi-rural areas of Australia perceive bushfire risk and interpret bushfire risk warnings. Additionally, to understand those factors which hinder or enhance the uptake of warning messages. As discussed in Chapter 3, risk from disasters which do not occur frequently or predictably are very different scenarios from those disasters (mostly weather-related) which are relatively frequent, highly predictable and with multiple visual cues. These have been characterised in this thesis as short-term or rapid-onset disasters. Within the rapid-onset context previous researchers have largely dismissed the notion that that warning fatigue influences risk perception and householder decision-making. However, it is the premise of this thesis that when prolonged lead-time disasters threaten and the likelihood, severity and impact are unpredictable, there is a need to find out more about how people perceive risk and respond to warnings.

Bushfires are one of four major threats to Australian residents who live in rural and peri-rural environments.[154] Although bushfire threats remain constant (in that it is an annual threat), bushfires of the magnitude which result in destroyed homes and multiple fatalities occur about once every twenty years. For people who live day to day with this risk, it is regarded as an uncommon and infrequent occurrence. Pertinent for understanding risk perception in prolonged lead-time scenarios, is that people who live in these bushfire-prone areas of Australia are warned about the possibility of bushfires annually. Furthermore, when media reporting and prediction of bushfires is taken into account, it could be assumed that the Australian public is made aware of bushfire risk throughout the year. The aim of this first round of interviews was to hear from members of the public who live in bushfire-prone areas of Australia about their perception of bushfire risk. The interviews were intended to gain some insight into the relevant issues of living with a well-known risk. The literature discussed thus far in this thesis encapsulated several topics: risk perception, communication and understanding of disaster warnings, and the important cognitive and social influences on both. It was intended that the findings from these first interviews would augment the understanding already gained from the literature, and highlight directions for further research.

---

[154] The others are floods, cyclones and severe storms (Ellis et al. 2004).

Participants

Both Tasmania and Victoria have experienced severe bushfires: notably Tasmania in 1967[155] and Victoria in 1939[156] and 2009;[157] participants were from both these areas. The characteristics of this first group of interviewees (n=16) were that they all lived in a bushfire vulnerable area, were all actively involved in bushfire mitigation activities and identified as belonging, at some time over the past two years, to the Community FireGuard group in their area.[158]

There were two groups of participants; the first (n=7) lived in Middleton, a small community 40 minutes south of Hobart, Tasmania and they were recruited during a TFS information day; they were all retirees, four male, three female. The second group (n=9) were from various communities in the Dandenong ranges, which lie 35 kms north-east of Melbourne, Victoria. The Victorian participants were five male, four female, mostly in their mid-thirties with families of young children; however, there was one retired couple.

Method

The participants were all recruited using community and network contacts, either face-to-face or by email. The interviews took place between September and October of 2010, (Spring in the Southern Hemisphere) and before the start of the official fire season in late November. All participants were able to be contacted via email, and were sent (or had been given on the CFA or TFS information day) an information sheet[159] and a consent form;[160] the latter which was signed and returned to the interviewer. The interviews were held by phone at various times of the day and began with a question re-confirming the participant's willingness to have the interview recorded. The purpose of the interviews was to capture relevant bushfire issues, from people who, by virtue of the fact that they all belonged to their local community FireGuard group, were assumed to be engaged and thinking about issues of bushfire, bushfire mitigation and preparedness.

---

[155] 'Black Tuesday' - 62 people died and 1,293 homes destroyed.
[156] 'Black Friday' - 71 people died and 3,700 homes destroyed.
[157] 'Black Saturday' - 173 people died and 2,029 homes destroyed.
[158] Community Fireguard is a community education program promoted and supported by the Victorian Country Fireguard Authority (CFA) and the Tasmanian Fireguard Service (TFS), designed to reduce the loss of lives and homes in bushfires. It emphasises that bushfires are survivable if communities take responsibility for their fire safety and prepare themselves for the event.
[159] Appendix 1.3.
[160] Appendix 1.2.

The interviews were semi-structured, and the telephone interview schedule [161] comprised 25 questions which were a guide, and were only asked if the discussion progressed in such a way that it was appropriate to do so; the interviews were similar to a facilitated conversation. This was deliberate, as the interview aimed to understand any issues that arose for each participant when thinking about their risk from bushfire; if a subject arose that was not detailed on the interview protocol, it was facilitated and included. It is important to note that the questions were open-ended and did not promote a point of view or opinion. Participants were asked about their assessment of personal and community risk from bushfires, evaluation of warnings and sources of fire information both generally, immediately prior and during a bushfire event. The average time for the interviews was 42 minutes with a range of 24 minutes to 1 hour 7 minutes.

Coding

The level of transcription was moderate and is detailed in the methodology chapter. [162] The interview transcripts were coded first to get a sense of whole issues important to the participants, so 'large ideas' were coded for (risk and behaviour for example). Within these ideas, there were more nuanced threads which were grouped together to enable a more coherent understanding. Once the more detailed categorisation of issues was completed, a synopsis of the ideas and viewpoints expressed by the participants was undertaken. These broader narratives constitute the main sections in this chapter and directed the way the participants' narratives were presented. The excerpts (denoted by italics within single speech marks) are a representation of themes, patterns and sub-themes but are not exhaustive; they are the most pertinent examples and illustrate the mostly commonly used narratives. The participants are denoted by letters which have been assigned to ensure anonymity: for example (AV). [163]

Analysis

The purpose of the analysis was to capture the 'big picture' around issues of risk perception and communication. The analysis of these ideas is primarily thematic. However, discourse analysis was also used. Discourse analysis in this context relates to using discourse 'as a source of evidence or insight about social life and social relations' (Cameron 2009:13) rather than a linguistic approach concerned with function and form. Ideas, opinions and viewpoints were taken note of and recurring patterns, themes or

---

[161] Appendix 1.5

[162] Page 136.

[163] Similar letters do not indicate members of the same household.

threads in the narrative recorded. The analysis is situated within symbolic interactionist and social constructionist epistemologies which were detailed in the Methodology chapter. The analysis was qualitative and no attempt was made to quantify responses.

From this analysis of the 16 interviews, 27 narratives about bushfire risk were identified, which comprised five major themes: (i) assessment of risk; (ii) behaviour; (iii) information sources; (iv) warnings and (v) warning fatigue. Within each of these five themes there were several threads; for example under 'behaviour', was talk of what participants did during a pre-bushfire event, on a total fire-ban day, what participants did to prepare and what they planned to do when a bushfire warning was issued. There was no attempt to differentiate between either the Tasmanian or Victorian responses and unless specifically noted, the analysis is a generalisation across all 16 participants.

Findings

(i) Risk

Participants were asked about their assessment of personal and community risk from bushfires and their responses indicated that their assessment of risk depended upon several factors: their knowledge of their immediate environment, their experience of previous bushfire events and their knowledges of fire behaviour.

Most of the participants had thought about the bushfire risk before they chose to move into their particular area - *'yes it is in the back of your minds, but it's not a key indicator to sort of go 'oh god, I'm not going to come here'* [AF] - but several had not: *'and we never gave it a thought when we came up here, no'* [AV]. However, as result of the 2009 Black Saturday fires, *'look, I didn't give 2 hoots about the risk until Black Saturday'* [AF], many realised that they now lived in a high risk area; *'the last fire was in 1962, which means we're overdue, but it burnt before then in the 30s, and before then last century so, it's almost inevitable that we'll have a fire up here'* [C]. Acknowledging that their area was bushfire-prone was not the same thing as evaluating their personal risk as high, and many participants strongly doubted that there would be another bushfire that would necessitate them leaving their homes. One of the reasons for this was their appraisal of where they lived in comparison to the conditions and location of the most recent bushfire - the Victorian Black Saturday bushfires of 2009. Many participants said that the conditions of Black Saturday were unique, and, rather than the result of a relatively short period of dry weather conditions, had been *'building up for 10 or 15 years'* [AV]. Black Saturday was described as exceptional in terms of the extreme heat, and the

participants described the day as 'hideous' and 'extraordinary', 'a one-in-80-year event' and something that they 'just knew' was going to be different from any other day they had ever known.

All of the participants had experienced a previous bushfire event and their direct experience of bushfires and their knowledge of past bushfires heightened their awareness of the danger. The Victoria cohort talked about the Black Saturday bushfires as a 'near-miss', and it became an impetus for discussion and preparation: '*everybody after Black Saturday sat up and went 'whoa' we really ought to get our act together, it frightened everyone out of their wits'. 'So there was this huge meeting that everyone came, and then we set up the fire tree, and we became aware of what we should and shouldn't do. So it really started from the Black Saturday bushfires*' [J2]. Hindsight showed them that 'it was more by good luck than good management' that they escaped the same fate as their near-by neighbouring communities of Kinglake and Marysville '*and it was only afterwards, we realised how close it came to the Dandenongs burning as well*' [C]. For some it was an opportunity to re-evaluate what was important to them: '*cause after Black Saturday I walked around the house and said 'OK, what can I bear to lose', and really there really wasn't much*' [K1].

Knowledge of how their house and surrounding environment survived past fires played a big part how the participants viewed their risk from a future event; '*We have many European trees, and we have a stone house which is really thick – built in the 1930's and it...it's been here since the 1930's and the garage is hugely cool and the walls are really thick*' [A]. The participants were knowledgeable about weather patterns, vegetation, growth, regeneration and had a good understanding of how fire may behave in their area. The amount of rain, humidity – '*it's a wetter forest than other parts of the mountain*' [C] - proximity to the sea and geographical location featured in many discussions. 'Up here we get a lot of' or 'in these parts the wind always comes from' and 'fires don't burn in that direction' were common preludes to describing why they weren't going to be at risk from a bushfire: '*So the fire wouldn't approach from this side, it would approach from the north, and we would see it coming from a long long away 'cause we've got big open undulating hills and farmland out to our east and forest to our west*' [J2]. Although it did not preclude the participants listening to warnings, overwhelmingly they used their own knowledge and experience as their 'first port of call'. The 'disconnect' between the status of their immediate surroundings and what the

authorities said the conditions were, meant that they prioritised personal knowledge over official warnings: 'L*ook, the warnings are not particularly useful I have to say, just because the micro-climate up here is so different'* [C].

All the participants were active members of local CFA or TFS Fireguard groups and as such had attended regular meetings, knew a lot about ways to protect themselves and had invested in technologies to protect themselves. This preparation and perception of preparedness (and for many participants it was extensive) seemed to influence their assessment of risk: '*so we've put in a 27 thousand litre tank – we're like a fire station. We've got pumps, we've got water coming up to the house, we've got taps from the tank in case the water system goes, we've got our kits, which are all stocked with what we're supposed to have – you know, water, torches radios, clothing, food etc etc etc'* [A]. Some participants owned larger properties that incorporated natural or man-made dams: '*… we've got an electric pump on our dam and most of our reticulation is underground. As one of the first things we'll lose in a major bushfire is power we've put a 2 kilowatt generator which will run that dam pump'* [A]. Some participants 'helped' their neighbours prepare also: '*But behind the house here were blackberries everywhere and I just got in there and cleaned them all up, threw a bit of petrol in there in winter and got rid of them all'* [J3]. Controlling their immediate environment in these ways seemed to give the participants a sense that their risk had been reduced. These preparations and observations show that these participants had perhaps 'habituated' the threat of bushfire; by making 'sense of a threat' they turned it into a more normal occurrence, one that they could control and not be afraid of.

(ii) Behaviour

The interview discussions showed that several different behaviours were relevant to the participant's decision to continue to live in a bushfire-prone environment: what they did (or saw others doing) during their most recent bushfire event, their general preparation, what their overall bushfire plan was and what they did when Catastrophic or 'Code Red' days were predicted.

Research has shown that in the event of a disaster there is a difference between what people say they will do, and what they actually do. The participants understood this also: '*..and a lot of people are saying 'yes they're going to leave, they won't be here', there's quite a bit of difference between saying 'yes I will be leaving' and actually doing so'*

[R]. On Black Saturday, despite most of the participants having good preparedness information, acknowledging how ominous and 'different' the day seemed *and* being interested and engaged in the issues of bushfires, none of them evaluated the risk from the bushfires to be great enough to leave their properties: *'We did everything wrong on Black Saturday'. 'If I made a mistake on Black Saturday, (it was) we decided to stay. You could see it on the scanner that everything was getting out of control and 2 o'clock I realised that I could have made a mistake, because we would've been on our own'* [R]. In the same way, others acknowledged that they had completely underestimated the danger they were in: *'On the actual Black Saturday day, we had a look around, "gosh, its' going to be a bit hot, we'll be alright, it's going to be another normal day". Well it wasn't a normal day, we were up here at 2 o'clock in the afternoon and it just seemed like an alien world out there, "Cripes, we don't want to be here"..* [C]

Description of preparation behaviours were both 'general' (what participants did all year round), and specific (the week prior to a predicted event). Many participants had designed their houses with bushfires in mind: *'And when we built the house we looked for a product that would be as fail-safe as possible and it's a mesh...and it goes over the gutter so that nothing can, the wind or anything, can get in'* [K2]. Others had substantially added fire mitigation equipment to their properties: *'But now we put a big tank in, we've got a fire hose, we've bought clothing and equipment like masks and boots and gloves and hats for everybody in the house, overalls and gloves and they're all in a box ready to go..'* [K2]. Other preparation was more low key but seen as important nonetheless: *'When it comes to summer I mow the grass pretty short because I figure you can't stop a fire coming through the place but what you want is for it to pass through as quickly as possible'* [A]. Planting plants such as rhododendrons, well known for their fire retardant characteristics, was common as was a realisation that living in the bush comes with a certain level of anxiety: *'because under stress situations your perceptions will change...rational thinking will not be there and you're working from instincts – basically what you haven't practiced you won't be able to do'* [R]. A mother of a child who attended a community primary school appreciated that the school acknowledged how their pupils may be feeling as the fire season approached: *'the local Catholic church this year they put out a flyer to say they were going to have a prayer for the hills, a prayer for the fire season (and) a prayer for everyone who lives in a fire area...'* [K1].

Until very recently, the main bushfire preparation advice from the CFA or TFS on a 'Catastrophic' day was to 'Stay and Defend, or Leave Early'. It still remains their recommendation, but since Black Saturday the CFA and TFS have emphasised the 'Leave Early' part of the message as 'the best and safest option when a bushfire threatens is to leave 'early'.[164] However, for the participants the definition of 'early' was open to interpretation and led to a wide variety of planned behaviour: *'I think it means on the day..when you wake up; not hanging around til lunchtime, yeah, you gotta get up and go in the morning'* [K1]. *'Well leaving early means that you have to leave way in advance..that's 12 hours, the night before'* [R]. Some participants were reluctant to follow official advice: *'because we kind of take the view that, you know, we can't leave the mountain every day it's over 30 degrees'* [AF]. Several participants talked about the inconvenience of leaving, especially when they had done so for previously warned Code Red/Catastrophic days: *'so there were multiple times where the families were relocating, to Lillydale under the oval ..they went into this refugee camp and they were hanging out there in tents and they were saying this is the third time we've been doing that and we're really getting tired'* [R].

Plans ranged from definitely leaving every time a Code Red/Catastrophic day was warned, to staying and defending their homes no matter what: *'well, my husband won't ever leave this place so we'll stay and fight..Took too much getting to not do it, so we will definitely do that, yes'* [B2]. For some couples, their plans differed, *'we haven't made a clear decision'* [A], which could suggest that, in the event of a bushfire event, neither plan would be implemented. Some participants commented that because their plan was to leave, they didn't really have one: *'I don't need to worry about a fire plan because my plan is to go, I'm just going to go'* [K1]. Other participants had different plans for different conditions: *'what our fire plan is, on a normal fire danger day we're relatively comfy to sit out here with our fancy fire sprinklers and things..but on a catastrophic day, we'd absolutely head off to Mum and Dad's'* [C]. For others, there was an acknowledgement that their 'plan A' might not work: *'well, we've decided to stay.. so we will probably, but if worse comes to the worst, we'll head for the dam or channel'. We have a backup plan that says if we can't get off the mountain we'll stay in our house and prepare it to the best of our ability – we've got a list of things to do to do that'*]K2].

---

[164] CFA guidelines – http://www.cfa.vic.gov.au/plan-prepare/stay-and-actively-defend/defending-your-property-planning-template.pdf

(iii) Information Sources

The participants understood that official bushfire warnings and information originated from three sources: the government (including the Royal Commission), national and local fire organisations and the media. There was a general acceptance that communicating warnings effectively was a challenging task, and many appreciated the process of the Royal Commission – *'it's given us the opportunity to empower ourselves and get as much information and knowledge as we could for the fire'* [AF]. Several valued the knowledge they gained from the published findings: *'and the fact too that even though some of them were very well prepared it didn't matter, so that was a shock. I thought we'd survive anything and I thought I was all prepared... you know'* [B]. It was the policies and actions recommended by the government via the local councils that many participants were unhappy about. Particularly the 'Leave Early' actions to be undertaken on a Code Red/Catastrophic day: *'we've got the warning, but what you're telling us we're supposed to do we're not able to do'* [D]. *'I think the problem is .. where is everyone supposed to go? If we have another hot summer where we have a week of 40 plus, you know, are we all supposed to relocate?'* [A].

Many of the participants had lived in their respective areas for a long time, knew it well and were openly sceptical about the practicalities of the recommendations: *'the morons are saying we should now go and stand in the oval where radiant heat and all the rest of it, embers and so forth would be far less safe'* [C]. Additionally, many commented how dangerous it would be to follow official advice: *'I don't know how they base their plans but the idea of everybody on the road at once, with a road with a lot of dangerous material along the edge of it – to me it's a disaster waiting to happen'* [D]. The logistics for some of packing up a family that often included young children, extended family and pets, combined with the cost of staying away from their home, seemed overwhelming: *'And it could be quite hard to find a place to stay with dog, cats, chicken, goats and the family, so evacuating is a very impractical option - I can't see myself with the family sitting in a shopping centre'* [AF].

All of the participants lived in semi-rural environments: the Mt Dandenong cohort stated that they had chosen to live in that location because of its abundance of trees and larger block sizes, and the Middleton cohort typically lived on life-style blocks of several hectares. Council policies pertaining to fire prevention on their land were

discussed at length and some participants felt many of the policies had damaged the bush environment: *'There's been a whole lot of successive reactive policy decisions that are detrimental to where we live - 'chop down trees within a radius of your home' which now makes them look like suburbia.. It just doesn't make any sense, it's reactive..'* [AF]. Participants were also suspicious that council policies were being driven by the 'green agenda' 'There's *obviously a lot of conservationists in the council. Because they value conservation more than their lives I suppose'* [AV].

Print media came in for criticism for the way it represented bushfire issues and reported bushfire stories, mainly because of the language it commonly used. Participants described the reporting in terms of 'hype', 'frenzy' and 'hysteria' and some believed that the '*media reports on bushfires is always in a disaster mode anyway'* [AV]. There was a general consensus that *'the media (as with most major events) try to sensationalise it, it's how they sell papers, so there's the old adage "you don't believe anything that you read and anything that you hear and only half of what you see"* [A]. Television coverage was on a par with views about newspapers with the radio regarded as having more credibility, especially the official emergency broadcaster (ABC).[165] In crisis scenarios it was felt that the information supplied by the radio stations was not current or updated quickly enough to be useful: *'Many people in our fireguard group have, I believe, police scanners or emergency service scanners because we have been told that the media's at least 20 minutes behind'* [J1]. Some of the criticism of the media was because of the way bushfire-prone areas had been recently portrayed by the media: *'It's been quite frustrating, because all of a sudden we're living in a place deemed to be the second most, worst place in the whole of the world, well I mean you look at California, you look at Greece, and you think,' how can we be the second most dangerous place to those?* [AV].

(iv) Warnings

A third of the questions put to the participants related to warnings, and their responses included how they were warned (and how they would like to be warned) and the technologies associated with those warnings. They also talked about different types of warnings and debated their effectiveness and the reasons for that.

Once again, the environment gave the participants many cues as to how much danger they were in from a potential bushfire: *'The whole day, the minute you got up... the day*

---

[165] ABC: the Australian Broadcasting Corporation.

was hot, like today but if you could imagine 50 times drier in the atmosphere and a roaring, roaring crazy loud wind, hideous day – you knew immediately you got up… there was just this foreboding – awful' [J2]. Other aspects of the environment were noticed also: 'well, *Kookaburras in the afternoon usually means rain in a day or two, and then you look at the moon and if it's got a ring around it, it's rain in 4 days.. And they say that the animals will know before we do and on a really bad bushfire day you'll wake up in the morning and there'll be no sound, everything's quiet and waiting'* [J2]. As well as taking notice of their surroundings, the participants were well aware of (and much reassured by) living in a community where *'we now know our neighbours.. and we all look out for each other'* [AF], *'I guess the bush telegraph's pretty good down here'* [A]. Friends and family were often cited as the first place participants went for information about bushfires as well as the CFA or TFS 'fire tree' phone group. Warnings that were communicated via people and authorities that the participants knew were viewed as being more accurate; having more credibility and were privileged over more generic advice: *'localisation would make the real difference. I would've thought some sort of general system of warnings as they have now combined with a local spin on those, where the local brigade commanders can say: "for our area there's no risk of grass fires today… or alternatively overall for the state it's pretty quiet, but for us it's more significant"* [C].

There were many official ways of being warned and the participants were well informed about all of them; which is maybe not unexpected given that they were active members of their local CFA or TFS. Participants distinguished between the different media sources, and had a good awareness of the latest technologies: *'I'm expecting text messages, and I also get emails from the CFA as well'* [K2]. The CFA website was used by many on days when there was a fire alert, as a way of keeping up with developments: *'we rely a lot on the CFA website for our information, so um, during the fire season, if there's fires around us and stuff we'll usually check out the CFA'* [C]. However, during periods when timely information was critical, the CFA was not generally well regarded: *'..the CFA website was useless, in that it just wasn't updated in real-time, which, you know, it's about 5 times removed from what's actually happening'* [AF]. The weather bureau was seen as a very credible source of information – *'honestly the weather bureau's going to give us better information than the CFA'* [C] – mainly because it was updated frequently. Television and radio for this reason, and because of its association with

official information sources, was seen as less reliable: '*the ABC has a partnership with the emergency services, and was not going to broadcast anything that wasn't clarified or verified with the CFA*' [J2].

Roadside billboards were another way that the participants were warned about bushfire dangers, and a few participants thought they were useful: '*I've learnt to look out for the CFA signs that are up, you know they'll start coming up soon and I'm starting now to wonder 'oh, when are they going to open fire season*' [K1]. However, a common criticism was that they weren't kept up to date which meant they lost their effectiveness: '*so it stays on the large register, and that doesn't get changed so people say 'oh its always out of date'. And as soon as you have that, it becomes useless, because it takes only a couple of events and people say' well it can't be right today*' [R]. The billboards were regarded by participants as more relevant for visitors than for locals: '*I think they're more for the tourists, perhaps a little bit more than the residents. There used to be one where I went to school on the way, but I wouldn't ever use that board for my own information*' [J1]. The road-side billboards served as a reminder, a 'heads-up', rather than a definitive harbinger of immediate danger. Like the warnings from CFA, the fact that they were not kept current with the latest fire condition, for some participants, negated any usefulness: '*they've got a low to moderate today, well it's higher than low to moderate' and then they leave it about 2 weeks - it hasn't even changed and we've had really hot days - so what's going on?*' [J2].

CFA and TFS have three levels of bushfire warnings: advice, watch and act, emergency, additionally, the main CFA or TFS 'alert' refers to the phone warning system and also to the siren. The participants understanding of warnings, alerts and the fire danger ratings varied widely. They were asked if they knew the difference between an 'alert' and a 'warning' and few did: '*My perception is that people don't know what to do with it, it's like - yes we are alert but what does it mean?*' [R]. The discussion about warnings that elicited many comments was the addition (since the Black Saturday bushfires) of a 'Catastrophic' or 'Code Red' fire danger category[166] with many people questioning the need for a further category.[167] '*I also think it's hard for the average person to make a distinction between so many categories..*' [J1]. Additionally, there was confusion as to

---

[166] 'Code Red' is officially used in Victoria and 'Catastrophic' is officially used in Tasmania. However, 'Catastrophic' is most widely understood by both cohorts to be the highest fire danger rating.
[167] The existing fire danger categories were: low, high, very high, severe and extreme.

what the categories really meant: *'we were trying to work out whether extreme and catastrophic denoted a total fire ban, but I don't think they do? Yeah, code red is catastrophic isn't it?'* [J2]. *'What weather conditions denote an extreme fire danger...let me think, can you have extreme weather conditions without a total fire ban?'* [J3]. Catastrophic was described as '*a helluva word*' and a much too emotive word to use as a warning: *'code red will get people alert and doing things whereas catastrophic could actually make people go into panic mode, which I think will be far worse'* [AV].

Many participants felt that Black Saturday was an unprecedented event, moreover, even though the issuing of a 'Catastrophic' warning is done when the FFDI[168] deems it necessary, the use of Catastrophic implied that every predicted bushfire event would be the same as Black Saturday – '*catastrophic is to me really what happened, and personally I don't think we're going to have another one of those for quite a few years*' [A]. Others commented that the interpretation of the word 'Catastrophic' was problematic '*because what's catastrophic for me isn't necessarily for you, or vice-versa*' [AF]. These comments notwithstanding, some participants said a 'Catastrophic' warning would encourage them to take action which implies it was meaningful to them: '*I probably wait until they said it was going to be a code red so if I thought it was going to be a day of extreme danger I would certainly consider leaving*' [J2].

Many of the participants said that they thought a community siren would be a preferable way to be warned about an impending bushfire. The siren that sounds to call fire volunteers to an emergency served as an 'alert' for most; for one participant this meant she put her scanner on and listened to the CFA radio frequency and for another it was a signal to watch for the fire trucks on the road. '*For ourselves, we think it's a jolly good idea. If there's a clear fire danger in the Dandenongs, you sound the alarm, it makes common sense...*' [C]. One of the arguments against using sirens was that there was no distinction between a siren that called volunteers out for anything emergency-related, and one that was specifically warning about fires '*so it would take a bit of education to make people understand that*' [AF], '*perhaps a 'whoop, whoop whoop would be better*'.. [AV]. However, people who talked about sirens in this way still thought they could be

---

[168] The McArthur Forest Fire Danger Index (FFDI) which measures the degree of danger of fire in Australian forests. It is a combination of dryness (based on rainfall and evaporation), meteorological variables for wind speed, temperature and humidity.

useful: '*it does give you a bit of clue as to whether you need to worry or not*' [J1] and '*if it saved even one life*' [A] then it would be valuable.

Finally, as disaster research has shown, people respond best to warnings if they contain self-efficacy advice, and suggestions from the participants as to what they would prefer in a warning, confirmed this: '*a little check list would be better for people – get your plan ready, turn your gas off, grab the dogs, call the..*' [J1]. '*I don't want to get text messages on the hour but I don't mind that the signs saying 'start cleaning up now, start cleaning gutters, start getting ready' and I like...it's comforting to see people out in their gardens doing a bit as well*' [K1]. Participants were clear that they wanted timely, specific and practical information: '*But for me it's as much about getting as much information as you possibly can about the fire risk and about where geographically, fires come from, what winds, what weather conditions..*' [J2], '*it was quite useful knowing how fast it does actually go up steep hills and that sort of thing*' [J1].

(v) Warning Fatigue

> '*Every year it's the worst fire season ever; if its dry, it's because everything's dry and it's going to burn. If it's wet, it's because it's good growing weather, with lots of fuel being manufactured*' [C].

Black Saturday resulted in changes to policy and reviews of processes by the CFA, TFS and other emergency authorities; the bushfire fire-rating system was changed to include a new category of danger 'Code Red/Catastrophic'. This is determined by a complex formula that calculates the moisture, humidity, temperature, and wind direction on any given day where there may be a threat from bushfire. Subsequently Catastrophic/Code Red days were forecast, and when fires did not eventuate as predicted, for some participants the believability of the warnings began to be undermined. One participant described such a day: "*and [they] said that this is going to be as bad if not worse than Black Saturday, and it was obvious to even the most amateur observer – they looked at the weather forecast – and the forecast was for a day that was at least 15 degrees cooler*' [C].

The consequences of the over-warnings and false alarms were talked about by most of the participants who used terms such as 'hysteria', 'cry-wolf', 'false alarm', '*yeah whatever*' and '*why the hell would we do that again?*' [D]. Many participants had heeded the first one or two warnings and for some this was at great inconvenience: '*But from*

my point of view there's no point evacuating the family and losing a day of work etcetera, unless there's a real risk' [A]. *'Yeah, on the Tuesday I was a little bit narky, because we went through so much effort, and about 11 or 12 o'clock midday it started raining…and I thought 'oh gee, all this work' .. but as it was it was a bit of a fizzer'* [R]. The sensationalist nature of some media warnings combined with a perception that warning in such extreme terms engenders panic, led to several participants expressing disdain: *'We literally had neighbours tearing off the mountain with kids, dogs and you name it, only to cause grid-lock. If a fire had occurred, they would've all perished.. it's just a convoy of the Beverley Hillbillies with Granny on top'* [AF].

There were three main reasons that the participants felt they were being over-warned: firstly the type of language used in the warnings: *'It got to the point we were sick of people on the radio saying 'it's going to be worse than Ash Wednesday, 'cause you just kept thinking 'oh, don't be a drama Queen' – you know, it's just too much drama'* [J2]. *'They signal a Code Red and everyone goes [intake of breath] "ooh, panic, leave" and then nothing happens and the next…couple of days later "Code Red" and off you go again and I'm just worried that it gets diluted, you know, the urgency of it'* [K1]. The second way the participants felt over-warned was the amount of warnings they received: *I think you can certainly overdo the warnings, if you yell 'wolf' every week they're not going to believe you after the 4th week and the wolf arrives (or it doesn't arrive) [laughs]'* [C]. The third main reason was the number of times the warnings turned out to be false: *'no, it's too disruptive … you're talking about 10 or 15 times, it's more than public holidays in a year…You could potentially be talking 100 or 150 days over 10 years where, everybody says 'nothing ever happens'* [R].

The phenomena of 'switching off' or 'tuning the warnings out' described by participants are supported by research that has shown that people cannot sustain a heightened level of anxiety and continue with their daily routines; they have to normalise the risk to some degree. *'We just don't plug into it, and I think that's true for a lot of folks that I talk to up here, they go 'oh god, we're so sick of hearing about it, all the rubbish', because a lot of it's never based in fact, a lot of it's hearsay, or, you know, hysteria'* [AF]. The scepticism of the warnings translated for some participants into questioning the fire authorities' motivations: *'After the 3rd or 4th false alarm, it's like [laughs] 'hang on': this is coming from someone with legal liability check boxes, not someone trying to help'* [C].

Discussion

All the participants were active members of their local CFA or TFS, and were all involved in their community to varying degrees. They were very knowledgeable about fire risk and behaviour and had invested considerably in their properties and communities. However, despite fire authorities and the state premier warning extensively during the weeks prior to Black Saturday, none of the participants made the decision to leave their homes. The reasons for this were complex, and the risk assessments combined rationales of local knowledge, past experience, preparation and family and evacuation practicalities. Added to this was scepticism towards official warnings and the way the media had reported similar bushfires in the past. It is possible that the comprehensive fire prevention technologies that the participants had incorporated into their properties helped to reassure them that they were protected from the threat of bushfire better than most.

At least half of the participants had a fire-plan that had them leaving early (as the CFA and TFS information recommends); there was a wide interpretation of this recommendation. The event of Black Saturday caused some participants to re-evaluate their decision to stay and for others, was a 'wake-up' call that clarified their decision-making. Knowledge of how fire behaved in their particular area was broad and the participants talked at length about why they would be safe in the event of a bushfire. As the discussions showed, it was only when their personal evaluation of their surroundings aligned with what they were hearing on the radio or television, did they pay attention to the warnings. Warnings issued from central as opposed to local authorities were considered to have less credibility; compounding this were the observed lags in communication time and the discrepancies in information between the official fire authority (CFA, TFS) and the official emergency broadcaster (ABC). This led to a decline in credibility for the communication process and a belief by some participants that lives would have been saved if the CFA, TFS and ABC had better systems. The addition of the fire danger rating 'Catastrophic' was seen by the participants in equal measure as a good thing and unnecessary, with many feeling that it just added to the hype and panic of an already volatile situation. The understanding of the warning categories and rating varied between the participants, but were moderately understood. However, the methods of communicating them were less appreciated: road-side billboards for example were seen as irrelevant, unreliable and

mostly for the benefit of tourists. The ways of warning, or the ways people could get information once warned were several, with many relying on the internet and real-time sites such as the Bureau of Meteorology and the official CFA webpage. In times of high bushfire risk, the participants' friends and neighbours were the first 'port of call' for fire information.

The largest discussion thread was that of warning fatigue, and given that this was deliberately not mentioned nor used as a prompt by the interviewer, this was a major finding of this analysis. Participants called this phenomenon 'cry wolf' and were aware of its anecdotal effects on others. They suggested people became complacent and apathetic about bushfire risk when the predicted events did not happen. The increase in catastrophic days as a result of a systemised formula for calculating extreme fire danger days, led to more of these days being warned about; moreover, most of these days were not as dire as predicted. The participants attributed the media with promoting panic and fear which they argued led to warning fatigue. As the primary purpose of this research is to understand what hinders or enhances the uptake of warning messages, the strength of the participants' opinions and feelings about warning fatigue is important. Questions which arise out of this analysis are: 1) to what extent does warning fatigue affect attention to warnings; 2) is it an effect which can be measured and 3) if so, what things contribute to it?

When the preceding literature chapters are reflected upon in the light of this study's findings, some ways of theorising and conceptualising risk appear to have more value than others. For example, the participants talked at length about how they *felt* about being threatened with bushfire year after year and what they did about the perceived risk to make themselves feel better about it. Therefore, the emotional reactions to threat and the coping strategies outlined in chapter four will be useful to explore in more detail. Similarly, opinions about the trust and credibility of warnings and officials combined with their previous bushfire experience determined how the participants assessed their risk and how they responded to it. The cognitive maladaptations of denial and avoidance do not seem to have been evident in the participants responses, and as all the participants in this study had direct experience with bushfires (and as a whole were conservative in their assessments of risk), unrealistic optimism would not be a useful concept to explore in the next study. The analysis of this study shows that,

in the context of living in a bushfire-prone area, risk decisions for the participants were not simply about whether or not they thought they were at risk from a bushfire. Rather, their responses to warnings and the decisions about what to do were complex.

The following chapter builds upon the findings of Study (I) by interviewing people who live in bushfire-prone environments but who are not actively involved in community bushfire mitigation. It narrows the focus of this research by exploring some of the more relevant theorisations of risk from Chapters 3, 4 and 5 and continues with the exploration of what role warning fatigue may play in warning response and an everyday understanding of bushfire risk. In particular, the next chapter will focus on the part that repeated warnings play in this response.

8. STUDY II: RESPONSES, RATIONALES AND REASSURANCES

Introduction and Aims

A second interview study was conducted in order to extend the understanding of how people living in bushfire-prone areas of Australia interpreted their bushfire risk. More specifically, the focus was on how people who were not affiliated with a formal bushfire mitigation program[169] made decisions in anticipation of future bushfire threats. The first interview study (1) involved participants who attended community meetings by their local CFA and TFS and as such, could be assumed to be more knowledgeable about issues of bushfire safety. They were also possibly more engaged in the processes of protecting themselves and their families, therefore it was thus important to have the views of people who were not formally associated with CFA or TFS. The aim of the second study was three-fold: (i) to interview people who were not actively involved in any community fire mitigation activities; (ii) to explore in more detail those themes which had arisen from the analysis of the first interviews; and (iii) to understand further what topics, themes or aspects may constitute the phenomenon of warning fatigue. This chapter does several things: firstly it describes how the participants talked about issues of living with bushfire risk. Secondly, through exploring psychosocial aspects as detailed Chapter 4, it confirms that many of the participants used typical coping strategies to manage stress resulting from anticipating a bushfire threat. And thirdly, it explored whether, similar to the first group of participants, warning fatigue or cry wolf was talked about in the context of warnings and risk assessment.

One of the most notable findings from the first interview study was that warning fatigue was considered by most participants to be an important issue when commenting on why people did not pay attention to bushfire warnings. Important questions arising out of the first analysis were:

1. To what extent does warning fatigue affect attention to warnings?
2. Is it an effect which can be measured? And if so
3. What factors contribute to it?

Thus, an important aspect of the second interview study was to examine in more detail the phenomenon of warning fatigue and to explore those aspects which participants

---

[169] CFA – the Victorian Country Fire Authority and the TFS – the Tasmanian Fire Service.

reported to be an influence on their risk perception. Question (2) is addressed in the following chapter;[170] Questions (1) and (3) are addressed in this chapter.

Participants

The inclusion criteria for participants (n=20) were (a) living in a bushfire-prone location and (b) not actively participating in community bushfire mitigation activities. The participants comprised 11 men and 9 women aged between 23 and 57 years of age. Nineteen were partnered and 14 had at least one dependent child living with them. All the participants but one lived in and around the villages of Ferny Creek, Upway, Olinda, Sassafrass and Kalorama on Mount Dandenong, in the Dandenong Ranges, 35 kms north-east of central Melbourne, Victoria. All but two of them had lived there during the 2009 Black Saturday bushfires. The remaining participant lived 160kms south-west of Melbourne on the Great Ocean Road.[171] In May 2011 (six months after the first interviews), the participants were recruited for the second study and in June 2011 the interviews were conducted.

Recruitment of the participants took place over two weekends in May, in the small village of Mt Dandenong. Members of the public were approached as they made their ways to local shops and, after agreeing to hear a brief description of the research project, were asked two questions: 1) Did they live in a bushfire vulnerable area and 2) were they involved in any community bushfire mitigation/preventative activities. If they answered 'Yes' to Q1 and 'No' to Q2, they were asked if they would be prepared to have a telephone interview taking about 20 minutes, at a time of their choosing before the end of May 2011. If they agreed, they were told some information about the study, asked to sign a consent form,[172] given a more detailed information sheet[173] and a small gift[174] to take away. People who were approached but refused to participate gave time constraints or not being available at the time of the interview as the most common reasons for not agreeing to take part.

---

[170] Chapter 9.
[171] This participant was included in the study because they were recruited in exactly the same way and the same location as the others participants - they met the criteria of living in a bushfire-prone area and not being involved in any community bushfire mitigation activities. Moreover, their comments (when compared with the others) were not distinct in any way. Finally, no attempt was made in this analysis to make any observations about the particular area the participants lived in, other than it was bushfire-prone.
[172] Appendix 2.2
[173] Appendix 2.3
[174] The gifts comprised souvenir-type items from New Zealand.

Interview Format

The interview guide differed somewhat from that used in the first study in that the questions were more focused around warnings, perception of risk and perception of the effectiveness of warnings. There was a more concerted effort to cover all the topics on the interview schedule in depth; this did not appear to constrain the informal feeling of the discussions and the interviews progressed very naturally. Once again, as in the first interviews, discussion of warning fatigue as a topic, phrase or idea was not initiated by the interviewer. The interview protocol comprised nineteen questions which were focused on the topics of warnings and risk perception.[175] Of particular interest was how the February 2009 event of Black Saturday had influenced participants' perception of bushfire risk. Over half of the questions were specifically about warnings, as opposed to general bushfire information (in contrast to the interviews of Study (I)). The average time for the interviews was 30 minutes with a range of 18 to 42 minutes.

Coding

The level of transcription was similar to that of study (1) and was at a 'moderate' level (Bird, 2005), but the coding differed in some respects. Initially transcripts were coded to get a sense of whole issues important to the participants, so global themes (Braun and Clarke 2006) were coded for (assessment of risk, opinions of authorities for example). The coding then built upon these global themes, but focused on how the participants were 'making sense' of these ideas, (Gamson et al. 1992; Benford 1997; Weick 1999; Smith and Osborne 2007; Manuti et al. 2012), which necessitated a more detailed coding schema. As noted above, interviews were more structured than for study (1), and the discussions more nuanced. Rather than whole sentences or ideas being captured for analysis, words within the sentences were coded. For example, words which the participants used to describe their experience of Black Saturday gave not only an 'objective' description of what the event was like but also a 'subjective' sense of what the event meant to the participants. However, it is also relevant to acknowledge that through the act of transcribing and analysis, the author is interpreting, contextualising and attributing meaning to their voices, ultimately writing the research up and presenting it as an original product.

---

[175] Interview protocol - Appendix 2.5.

Analysis

Similar to the first interview study, the analysis was thematic, and looked for patterns within the data (Braun and Clarke 2006). However, it was also iterative and adaptable, where codes were able to be built upon, as the transcripts were examined for meaning. When the transcripts had been coded inter-relations between the codes and categories were taken note of, and a 'new picture' of what the participants were saying was constructed. Therefore, from small codes and then larger categories, patterns and themes were established which created an overall picture or 'sense making' of the participants' ideas, opinions, feelings, perceptions and experiences. What became evident during this more detailed analysis was that most participants had strong feelings about why they (or others) made the decisions they had about living with bushfire risk. These feelings demonstrated a strong association with many of the coping strategies outlined in chapter 4 and are discussed in section 2 – 'Rationalisations'. The excerpts[176] used in this chapter are not an exhaustive listing of every relevant response, rather they are an illustrative representation of comments overall, and were chosen because they encapsulate well the sentiments of most.

Findings

> *Life is in many ways a series of conversations [but] studying people's talk is not an end in itself, but a means for studying other aspects of their lives*
> *(Cameron 2001:145)*

From this analysis, three ways of talking about bushfire were evident: (i) participants responded to the questions and highlighted important issues for them; (ii) they rationalised their discussions and decisions and (iii) they reassured themselves about their decisions in multiple ways. The three ways of talking have been characterised as (1) responses, (2) rationales and (3) reassurances. Within these main categories, there were several narratives: (i) media; (ii) authorities; (iii) warnings; (iv) appraisal schemas; (v) coping strategies; (vi) biases; (vii) stress responses; (viii) environment; (ix) social capital; (x) previous experience; (xi) personal risk assessment; (xii) plan; and (xiii) technology. The final substantive narrative was (4) warning fatigue.

---

[176] The source used for the excerpts is denoted by a letter, or by a letter and a number: for example [A2]. This represents the code assigned to the transcripts.

(1) Responses

There were some similarities of response between the participants in study (II) and study (I) which could be expected as some of the questions were similar. Most notably these were the large number of responses around (i) media, (ii) the role of authorities and (iii) bushfire warnings. This section addresses these three issues and shows that, although there were some positive evaluations of the ways that media and fire authorities communicated the realities of bushfire risk, these comments were in the minority.

(i) Media

The media were generally not viewed favourably, nonetheless, occasionally they were seen as 'getting it right': *'I don't think they really over sensationalise it, I think it's quite informative reporting ...quite factual and they don't really over-blow the reporting in any particular way'* [M1] . Others were just grateful to be told about an impending risk: *'I'd welcome any news like that. Just tell me if you've got suspicion on a day that's going to strong winds and there might be fire around...I might avoid that camping trip you know'* [T1]. *'It's better to be warned about and nothing happens than to be warned about or not warned about'* [V]. Media was loosely defined by the participants and meant for most, both the newspapers and the television: *'I get the impression they're just sitting there waiting.. like ambulance chasers of the legal professions...I wouldn't put one bit of faith in the..'* [N]. *'Everyone's' putting their spin on it, um, and again, also, sometimes it becomes so harrowing you tune out...because people can't cope with all these stories of misery'* [T2]. The media came in for a substantial amount of criticism. This was partly because of the post Black Saturday coverage: *'the media continued that on for months, and months, where every time you turned on the TV they'd be talking about any puff of smoke they saw, and it was gratuitous...they wrung it for all it was worth'* [RC]. *'But Black Saturday caught the media's attention and they trotted it out for months...yeah it was like watching the Twin Towers thing'* [A1].

The local media was perceived as more accurately portraying the real situation, and had been used by most of the participants prior to or during a bushfire event: *'I listen to the local radio if there's a fire, they're very good at reporting...I also check the CFA website, and watch their reports of where fires are and what they're doing - I have that on all day and keep checking yeah, and if anything looks like it's moving or it's started here, then we'll just go'* [A1]. The newspapers in particular came in for a lot of criticism as *'the over*

reporting of it gives you a sense that things are far worse than the actuality is' [D1]. The general view of print media was that *'the media is there to sell stuff and..try and get viewers by sensationalising things..(it's neither) helpful or factual'* [D2]. Some participants thought the media were predictable in the way they reported bushfire events. As discussed in Chapter Three there often seemed to be a formulaic way to depict bushfire disasters, and as this participant observed, it always ended the same way: *'You know, the newspaper is always insisting on juicy stories where the most dramatic always wins'* [V]. What this means is that if the warnings came via the media, often the credibility of warnings and the urgency of the recommended actions were paid less attention because of the participants' reluctance to believe the source of the message. Participants expressed their frustration at the way the media reported bushfire issues: *'it's a bit hyped up and then it turns out to be overload'* [T3]. *'The media beat it up, it went on for months and nothing happened, as usual'* [A1].

(ii) Authorities

There was a general acknowledgment that the authorities have a difficult job to make the warnings relevant and timely, and the experience of Black Saturday loomed large in their evaluations: *'Well, I think about the kind of build up to that Black Saturday and we were constantly warned that it was going to be a bad day so we were warned well in advance. The Victoria government was very proactive about warning us about it'* [M2]. *'You're never going to get it right, in that, if you don't warn and it flares up, you're going to be accused of not warning people'* [C]. The official response on Black Saturday was deemed inadequate and considerably lacking in many areas; for this reason and to examine all aspects of the government's bushfire strategy a review was conducted; it was called the Victorian Bushfires Royal Commission.[177] Some saw the Commission as effective because *'the way they gave space to people affected, families, and people were able to have their stories and involve people … was a credit to them'* [I]. However the participant's view of the official response was mostly poor: *'John Brumby was buying a water pump to protect his property on the day at least one government minister should've been helping to run something, rather than all the ministers turning to ground and putting the sprinklers on their own roofs'* [R1]. *'And the leader of that (Christine Nixon) off having dinner with her friends and other people were scratching their heads saying 'what's going on'* [RC]. A common view was that official involvement in addressing bushfire issues is *'just politics'* [L] and that the government *'holds everything up, they don't make anything*

---

[177] http://www.royalcommission.vic.gov.au/

any better, they just slow everything down, you know, they're just not efficient, they just don't function very well, all they seem to do is waste the money' [T3].

A particularly strong sentiment was that the fire officials (and bushfire warnings) did not take into account the local conditions; *'I don't think they approach what it's actually like to live a life up here realistically...it's like they don't look out the window'* [A1] which eroded community confidence in the warnings. The tension illustrated by these comments perhaps shows where the 'knowledge' about bushfire is perceived to lie; the fire and emergency officials have information about the bushfire risks and communicate that risk in prescribed ways. However, often this does not take into account that there are individual and social knowledges used to evaluate risks that are equally valid.

One of the problems that arose was the perceived confused oversight of the bushfire risk. As a result the local authorities were overwhelmingly regarded as the best ones to listen to: *'for me the local CFA is most knowledgeable, right?...much more meaningful (way to be warned) than someone sitting in a remote centre control room somewhere'* [I]. The reasons for this trust were very clear: *'your local council, your local papers, your local everything, because they know, they know the local area, they know what's happening'* [RC]. This trust translated to participants saying they would not only pay more attention to what was being said to them about the bushfire risk from their local media: *'um, I don't feel like I get any warnings for my area. I think Melbourne in general gets the kind of weather and high fire danger warning on the weather reports, but the only people who talk directly to us are our local radio station and so that's who I listen to'* [A1].

(iii) Warnings

Bushfire warnings are communicated in several ways and the participants were aware of many of them. However, for differing reasons the warnings were regarded as having limited value: *'any warnings that come through text or sms-ing .. that's way too late'* [A1]. Some of the participants were not sure of the technology behind the messaging: *'my fear there was have they sent this message because of my house address or have they picked up I'm within the area, so it was a bit disconcerting'* [C]. Likewise: *'yeah, I think the billboards are pretty confusing, well because all they've done is recalibrated those boards so in terms of how your eye works, you're still looking at the needle at a similar stage, they've just put in an extra category'* [A2]. Similarly, sirens, although preferred by most participants, seemed to add to the confusion: *'The other thing is, you hear the little CFA*

alarms going off during the summer on days that there are fires, I don't know what they are, if they're a call for arms to go to the local station, it might only be for a car crash or something' [D1]. The solution offered by several participants was '*pure, simple, if there was a secondary tone of some description that would indicate to residents that OK, the first sirens were for the firey's, but then one distinctively different that would mean activate your procedure plans...a tone that would be so distinctive it couldn't be confused with the call out siren'* [N]. Participants in bushfire-prone areas in Australia are exposed to many different types of warnings (as discussed in Chapter 5) and perhaps the comments expressed indicate that a simplified warning system may help the public understand them better and pay attention to them in a timely way.

One aspect of the warning system that came in for particular attention was the revised fire danger rating category 'Code Red' ('Catastrophic'). [178] After the 2009 Black Saturday bushfires, this extra category was added not only to the CFA road-side billboards (Code Red) but also as a description of the worst category of fire danger. As a result of recommendations from the Royal Commission the following was announced by the Victorian Premier:[179]

> There is a new fire danger rating for an index of above 100 that will be known as Catastrophic (Code Red). Under these types of weather conditions fires will be unpredictable, uncontrollable and fast moving. The fires on February 7 are an example of the types of fires that may be experienced under a 'Catastrophic' rating. Advice to communities under these conditions will be that leaving is the safest option for survival.

The efficacy of this modification to a warning system that already included Very High, Severe and Extreme was debated by the participants, with some (but not many) agreeing with the change: '*well it certainly piques our attention and 'extreme' or 'severe' maybe doesn't have that same 'ring'* [T2], '*and to me that means Black Saturday conditions'* [S1]. It was certainly meaningful enough that some used it as their decision point: '*probably we wouldn't leave until catastrophic..the night before if a catastrophic..if it was severe or extreme, we might leave on the day'* [T1]. The addition of an extra category was seen as a legal imperative rather than safety advice: '*that terminology was just driven by the fact that that last event scared people so much they had to do something'* [S2] and '*catastrophic' should be something they use once every 50 years,' but it's not, they're going to trot it out because it's going to be their way of saving their bacon*

---

[178] The fire danger rating of 'Code Red' is used in Victoria. All other states use the rating 'Catastrophic'.

[179] 'New warning system explained'. Posted by Bushfire Preparedness Program Thursday, 10 September 2009. https://www.cfaconnect.net.au/news/new-warning-system-explained.html

basically' [D2]. Many other participants had strong feelings about the term and several thought that '*it caused people to panic'* [D2]. '*One of things up here that people need to be really careful about is raising the anxiety to an unproductive level, and to me 'catastrophic' does that, like it makes you feel that.. completely disabled'* [A2]. This last comment is a clear example of the anticipatory anxiety discussed in Chapter Four. Research suggested that the uncertainty generated by a prolonged lead-time event such as a bushfire increases this type of anxiety.

As in the first interviews, the participants were asked about their preferred warning system and most agreed that the messaging and SMS message system worked reasonably well. In addition to a different sounding siren and, '*in conjunction with last resort shelters (but they won't spend money on that)'* [A1], '*it would have to be plain language, that helps people understand, as opposed to just evoking potentially panic scenarios'* [A2]. It was clear that the participants had thought a lot about what warnings would be useful, prior to the discussion: '*I think that a warning system is only meaningful when if it is given a context.. embedded into a larger understanding of how fire works [and] how it can destroy incredibly quickly. And obviously it's the heat and the smoke which is as destructive as anything else'* [M2]. Like the participants in Study (I), the participants in the second study relied on hearing the sirens from the CFA stations and from the fire trucks to warn them of an impending bushfire. And both groups mentioned that they would like these 'everyday' emergency sirens to be differentiated from the sirens used in bushfire scenarios. '*Yeah that to me would seem like a logical thing to do because if you hear the call out signal, if there was a different signal that followed at least then you'd know if it was a going fire or not'* [A2].

(2) Rationales

South-eastern and south-western Australia is one of the most bushfire-prone countries in the world, an, apart from Queensland and the subtropical north, most of the country is at risk annually from potentially devastating bushfires. The Australian bush consists of predominantly eucalyptus trees whose leaves, in certain weather conditions, evaporate combustible oils; when ignited by natural or deliberate means, they burn ferociously. These facts about the Australian bush are well known by most Australians, which raises an important question: Why do people continue to continue to live 'in the bush'? The most common answer is that it is a lifestyle choice; a more 'natural' way to live, a place where people feel more at home and removed from the fast-paced urban and peri-

urban existence: 'We do want to be in a bushed area, we don't want to be in a cleared away, we love the bush and that's part of the reason we want to be here' [T2]. The participants in the second study seemed to be well aware of the risks of living 'in the bush', [180] yet they consciously chose to locate their homes in a bushfire-prone environment. The question then becomes: how do people living with heightened, consistent, and on-going risk, interpret this risk? The analysis of the participants' discussions suggests that they do so by activating various coping and appraisal schemas and rationales. These rationalisations will be discussed using the literature that explains psychological reactions to stress and threat, as outlined in chapter 4.

(iv) Appraisal Schemas

Research (Lazarus 1966, Khone 2002) suggests that, when faced with an actual threat, people enact two appraisal schemas (although there is debate as to which may come first): one appraisal evaluates the personal risk - 'If there's dew on the ground, there's moisture in the air, if there's moisture in the air you're not going to have a belter of a fire' [D2], and the other considers the available coping options – 'we've put a sprinkler system along the front of the deck and we've got the water tanks behind us, the header tanks for the whole area so we'll always have pressure' [D2]. The latter appraisal schema also apportions responsibility or blame: 'my brother rang me and said 'the mountain's on fire, don't let anyone go home … which is what he heard on the radio. The media blew it out of proportion because what they predicted didn't happen, you know, it wasn't Armageddon, it wasn't…' [RC]. The evaluation of the ability to cope with the threat (and its probable outcome) is also part of this appraisal: 'well I would take chainsaw with me cause trees fall and people get stuck on roads. I would head towards Monbulk, which is probably only 5 minutes from here. And there's no fire risk in Monbulk cause as you know, up there they grow tulips and daffodils and it's just cleared…they've a footy ground, the bowling green, it would be a pretty safe place' [R].

(v) Coping Strategies

The imagining of a possible scenario and planning ways to combat it is described as preventative and proactive coping strategies (Schwarzer (1999a). Proactive coping results in lower levels of anxiety – 'I was looking around and I couldn't see anything, in terms of smoke or anything so..I wasn't overly worried' [C] and makes people feel better

---

[180] The participants were asked to quantify their perception of living in their area: sixty percent (n=12) regarded their risk as moderate to non-existent. The question asked about their general perception of risk, rather than their risk perception at the time of their interview.

whilst imagining the threat: '*I don't worry about it, or let it concern me, it's just factor in the fact that it is there and some steps or some sort of planning as we mentioned before is necessary..*' [D1]. Acquiring and managing resources is a strategy that Steven Hobfoll (1989) argues people use to control or mitigate threats and can be both internal and external. The internal resources are self-beliefs: '*cause I think I'm prepared, because I keep myself alert to the fact of looming conditions .. you know the ground's dry, you know we're in the deep end of summer, you know we haven't seen rain for a month, it's been over 35 degrees, big hot summer and all its waiting for is that big wind really*' [T1]. The external resources can be physical and social: '*I'd say we're quite prepared, yeah so I mean we've got a proper pump for the water and hoses and stuff around the house that we can easily lay out and stuff to put in the drain pipes and things like that*' [A2]. Social resources are an example of social capital which is discussed in the next section.[181] Knowing that family, neighbours and others knew about them and would look out for them in a bushfire threat scenario was a safety resource: '*You might get a few text messages from people that you know. Even my sister who lives in the city might ring up and ask if I'm OK and yeah... people kind of just keep in touch to ask where you are and what you're doing. Like a friend, she picked up another friends' kids from home that were stuck at home alone .. We all just kind of keep in touch*' [T3].

For some participants, having a mastery over their situation appeared especially important. There was a lot of discussion about the things that they did to prepare and also the things which they had been advised to do, but realised were simply impractical. Many of these discussions elicited strong and derisive comments, some of which could be interpreted as reactance, which is primarily an anger response to being pressured to adopt a certain point of view: '*The CFA people tell me to go home and rake up my leaves, now I rake up my leaves, the next day they're all back again because I live in the forest! [laughs]. I can't battle the entire forest of leaves and earn a living and bring my children up and be driving everywhere all the time*' [A1]. Recommended advice from fire authorities came in for criticism, and even more so when the participants had tried to follow it: '*well my plan was to make my way to the, you know, the safe zone but I lost faith in that this year (because) my nearest safe zone was a construction site. When I made that point to the CFA they said 'oh, it's a council thing', when I made the point to the council they said yeah, but they'd move the machines only if it's a holiday*' [laughs] [C]. The outcome of

---

[181] Page 178

reactance is that advice is not listened to and decision-making excludes those actions officials recommend: '*they could spend 60 seconds per street driving down saying 'get out, get out, fire coming, evacuate evacuate, emergency' whatever, rather than radio saying 'oooh, 'catastrophic' , the world's going to burn you're all dead, best move'. When I hear that I think 'go to hell, I don't' believe you, who are you?*' [RC]

Many of the coping and appraisal strategies discussed thus far served to make the participants feel less stressed about the possibility of a bushfire threat which is a natural cognitive drive. The participants showed that by making sense of the threat of bushfires in a myriad of ways, they rendered it 'normal'. The idea behind this strategy is that the threat is transformed from the extraordinary to the ordinary, is paid less attention, and therefore elicits less emotional response: '*but I don't let that become a overriding emotional thought in any way, I don't worry about it, or let it concern me*' [D1] '*you can't just worry all the time*' [R1]. The possible threat of bushfire is 'adapted to' through these processes, and is hypothesised in this thesis to contribute to warning fatigue.

(vi) Biases

Evident in many of the participants risk evaluations was the bias of optimism, or the belief that if misfortune occurs, it will always be to other people. It was either inferred: '*I think those are the people who are in the most danger because they actually don't know what they are doing*' [L] or overt: '*my life is about assessing risk, and managing risk, so I'm probably more attuned to what's going on, than maybe a lot of people*' [C]. Optimism increases problem-solving efforts: '*I think we're 100 percent prepared, I've been round and spoken to all my neighbours, we've swapped phone numbers, and so on*' [D2] and enables people to feel more in control: '*then every day when you look at the weather forecast and figure out what the weather forecast is going to be and whether it's going to affect you or not*' [L]. Participants talked about their experience in terms of luck or destiny: '*we were lucky there was only one death, we're in the same position as areas where more lives were lost there were better support*' [I], '*we're actually very protected, as I said, I think it's a very... we're a bit lucky, we're in a tourist area*' [R]. These comments are examples of externally-based optimism and locus of control (Rotter 1954) where the participants felt as though that there was nothing they could do to influence the outcome of the event one way or the other: '*We were lucky, or he was lucky at that time because there was a wind change and the fire was coming directly towards Wye River but the wind changed and it went back the other way*' [S1].

In the same way that optimism bias boosts self-esteem, so too, attribution bias contributes to a feeling of well-being. It is a comparison to others, where others are judged less favourably in a myriad of different situations; for example residents living in bushfire-prone areas often report that think they are generally more prepared for a bushfire than their neighbours, and that, in an actual event, will have a better outcome: '*I'd probably say, in some aspects of it quite low, but at the same time I think we're more prepared to leave a lot quicker than other people would be so*' [D1] This could be an internal attribution (they see themselves as more careful, or better prepared) or an external attribution where their house or property is deemed to be more resistant to fire than their neighbours: '*We live in a property that has been inhabited for over 100 years, never had a bushfire there ever, and that's part of the reason why we feel a lot more secure than other areas*' [R2]. This comment, and the one following could also be an example of realistic optimism where the participants evaluation of the bushfire risk is grounded in knowledge and experience: '*Cause I've lived here for 50 years, I've seen god knows how many bushfires, I've travelled round the state with the CFA fighting bushfires, so I've got a fair enough experience to know what days are not the days to be around. I also know the experience of Ash Wednesday*' [D2].

A number of participants explained their perception of risk by reducing the importance attached to the threat – a self-serving bias called positive illusions (Taylor 1989): '*People have been living in high fire dangers forever, we know we live in them and you know, we're not dying in droves, it was just that one fire, I mean like it was huge fire*' [A1]. Employing these biases to make themselves feel better about their bushfire risk also allows the participants to understand the event and increase feelings of self-efficacy and agency (ibid.). Some of the participants compared their likely risk of a devastating bushfire with past events, demonstrating the erroneous belief that if something similar has happened recently then the likelihood of it happening in the near future was low: '*I think that fire was one in a lifetime event, because it was all the conditions that were manifestly wonderful for a fire to happen, um... I don't think that condition will happen again probably in my lifetime*' [S2]. '*I think the odds are relatively low*' [D1], '*I mean, you probably won't see another day like that for another 20 to 30 years I doubt, it's pretty uncommon, that kind of day...a bit extreme*' [T3].

One way to explain how the participants rationalised living in bushfire-prone areas is that for some, living in the bush creates a cognitive dissonance: the reality of bushfire risk (as told to them by bushfire authorities and as recently experienced through the 2009 Black Saturday fires) is at odds with their beliefs (they will be safe) about their 'real risk'. According to research (Festinger 1957), there is only one way to resolve this, and for those participants, it would be to either move out of the bushfire-prone area, or to change how they think about living there. A common way that people change the way they think about their situation is to compare it favourably to others; some of the participants clearly did this: '*I mean, you live in the inner suburbs you can get stabbed by a junkie and get HIV, you can get knocked over the head if you walk through the city and live in the city with the dickheads drunk at the nightclub. There's risks and benefits to everything. You live by the sea and love sailing a boat - you can die in a storm*' [L]. This type of justifying rationalisation has also been called 'motivated reasoning' (Kunda 1990), and during this type of talk, participants also referenced other large disaster scenarios: '*and the tsunamis are worse for deaths aren't they, just shocking for deaths those ones*' [A1], '*I'd sooner do fires, than earthquakes darling, you can never deal with those*'[R2].

(vii) Stress Responses

A fundamental premise of this chapter is that, in the face of an actual threat, people may become stressed and anxious, and cope with these reactions in differing ways. Certainly, many of the participants reported being anxious - '*it's probably more the nights that were more distressing. Thinking... because you don't have the visibility, um, so that sense of 'god, what if you wake up and you see fire' or something like that*' [A2]. They were also aware of the anxiety that the threat of a bushfire evokes: '*I've got some friends involved in that and they go along to these meetings all the time and I've got to say that the level of anxiety it raises amongst them and the steps they're all taking to do it, I sort of think removing myself from the area will be just as effective*' [D1].

Having recently experienced Black Saturday as a 'near miss', many participants talked about the bushfires in emotional terms: '*I mean we weren't anywhere near as afraid before the whole Black Saturday thing; yeah, the Black Saturday thing really really scared us*' [A1], '*I think that probably really that period was significant stress for me and my husband*' [M2]. Several of the participants reported feeling one stress response in particular: that of helplessness. This was most noticeable when they were talking about

the Black Saturday fires: '*it (Black Saturday) was a rare case of being so extreme, so violent so that even if you were prepared you had no chance if you were right in its path ..how can you fight a fire like that?*' [RC]. These feelings were also evident when they talked about how they felt when viewing media footage or reading survival stories: '*and it's only through the repetition of images and seeing the extraordinary footage of fire just rushing up hills that we suddenly realised what an absolutely extraordinary force you're dealing with*' [M2]. '*Oh, you feel helpless, and I guess that's my point about some of the articles after the bushfires, there was a real feeling of helplessness and not enough about what you could do and what you should do next time*' [T2]. A threat such as a catastrophic bushfire is seen as outside of people's control; as well as feelings of helplessness, analysis of participants interviews showed they also viewed their 'agency' in a bushfire threat in fatalistic ways: '*you do what you can but maybe there are limits to what you can do depending on the particular situation*' [M2]. Fatalism is an external attribution, where the ability to change and effect a potential outcome is seen as virtually impossible; there is an inevitable sense of powerlessness: '*if there was actually a fire of 'catastrophic' proportions coming, your little safe house is going to do nothing, this thing is a living monster that just tears through the trees above and beyond anything anybody else can do*' [RC].

Similar to the participants in the first study, these participants did not deny that bushfires happened regularly or that they were a worthwhile risk to pay attention to; neither did they actively avoid thinking about the threat. Thus, it is reasonable to assume that the maladaptive strategies of denial and avoidance are not influences upon risk perception and decision-making in time of bushfire threat.

(3) Reassurances

In addition to rationalising their decision to live in bushfire-prone areas of Victoria, Australia, the participants were much reassured by different aspects of their life 'in the bush'. These reassurances comprised of six main categories: viii) the environment, ix) their social capital, x) previous experience with bushfires, xi) their own risk assessment, xii) knowing they had a plan and xiii) the advantages of technology.

(viii) Environment

A participant's environment includes not only the environment that surrounds them (countryside and vegetation for example) but also their immediate surroundings and physical circumstances. Several of the participants talked at length about the location

of their properties in relation to local fire authorities and major neighbourhood facilities: '*and on the north-west side we've got the hospital, so the authorities fly a chopper any time there's anything close cause they don't want to have to evacuate the hospital, so they protect this hill like it's Tobruk basically*' [D2]. Similarly, the region in which the participants lived was deemed to be safe by virtue of its distinguishing characteristics: '*this is a high tourist area, they are not going to let anything happen to Mt Dandenong, it's worth too much money to them*' [RC]. Many of the participants referenced their geographical location and, using their knowledge of prevailing winds assessed their risk from a bushfire as low: '*As I say, if we had a westerly wind, it would never get to us anyway, it would destroy the township of Upway first and that's not going to happen because there's nothing there really to burn. Plus a southerly wind is not going to happen on one of those really really hot stinking days 'cause that's what will drop the temperature down*' [D2]. Participants' knowledge of fuel loads, nearby open spaces and topographical advantages all combined to make the participants feel much happier about where they lived.

(ix) Social Capital

The communities in which the participants lived played a big part in reassuring them about how they would cope in a bushfire, and more importantly, that they would know about a bushfire in advance. Almost all of the participants talked about their extended social network in terms of being given sufficient warning to be able to react safely: '*because our community is such a small community word spreads very quickly*' [S1]. '*You'd just know, it's such a small area, community, you would know that you would have to get off the mountain, you wouldn't need the radio to tell you that*' [RC]. Those considered to be in the participant's social network did not need to be close family or friends: '*Yeah, or even, this is like a small town and even...somebody standing down in the pizza shop, or outside the pub saying "what do you want to do, do you want to leave"*' [L]. '*People just ring and say there's a little fire down the road so everyone knows...it's like an unofficial bush telegraph*' [A1]. Participants were very confident about how their community 'worked' in times of threat '*anyone who was missing they'd make sure the others would know about it*' [A2] not only because they knew their neighbours and others in the community but because '*our community is such a small community [and] word spreads very quickly*' [S1].

(x) Previous Experience

Participants drew much reassurance from knowing that their house had withstood previous fires: '*The house I'm living in for example has been here for 100 years and hasn't burnt down in that particular time and there's 80 year old trees around as well so statistically the odds of a bushfire coming through and actually wiping us out and been caught unawares are relatively low* ' [D1]. Participants experience and the knowledge that came with experience not only reassured but seemed to make the participants feel as if any threat was manageable: '*I've lived here 50 odd years. Dad was captain of the fire brigade…so I've grown up with bushfires, like country folks grow up with brown snakes basically*' [D2]. This participant also had direct experience of fighting bushfire in the past: '*I actually took the first truck into Ash Wednesday, I was the officer in charge of the first truck*' [D2]. Other participants talked about past fires as being part of their 'reference' points for understanding the bushfire threat: '*I have the benefit of growing up here…we've also lived through the Ash Wednesday fires in the 1980's..fire risk and the prospect of fire coming through has been part of my childhood and really my own sense of self*' [M2]. Yet other participants had learned about bushfire through their parents' experiences: '*My mother lived through the famous 1939 bushfires..she remembers fighting to save her house because the fire was at the front door and things like that*' [R2]. As all of the participants lived in bushfire risky areas, they all had knowledge of the ramifications of doing so – '*we live in the hills, we know what the weather is [and] what is going to be like tomorrow*' – [R2], '*a total fire ban is don't have your Barbie outside where it's going to cause problems, and as a kid you grew up with total fire bans..it was just part of summer*' [A2].

(xi) Personal Risk Assessment

Participants' perceived ability to assess risk was high, and many of them felt confident to make decisions rather than rely on official information: '*so that's why I think accessing your own information and making your own judgements …probably puts you in a better position than blanket statements made from afar*' [D1]. These assessments were based on many things, not the least of which was the fact of where they were living: '*I think when we bought into the area we accepted we were buying into a bushfire area, so we came into it with our eyes open in that respect*' [A2]. Some participants were more specific about this assessment: '*I assumed that the openness around the house would protect us, a mud brick house, there were very few trees coming up by the house*' [S2]. Whilst that type of assessment was reassuring, other comments illustrated how the

participants made their assessments: *'We have the forest right on our doorstep, both sides, we're surrounded'* [A1] and *'I live in an old weatherboard house with a number of trees on the property quite close to the house, so if a fire were to come through, there's probably little I could do to protect the place'* [D1]. Once again, participant's knowledge of where they lived and in particular, typical weather patterns for their area helped them assess their particular risk: *'Well, it depends on what the climate is on a daily basis, if we had of had some hot days we would've done a lot more thinking about it, but right now, recently, it's not a big concern at all'* [I]. *'But over there it's just dry, seriously seriously dry and I always reckon personally, you don't have to be a rocket scientist to work out that on a bad day they could cop it there'* [R1].

(xii) Plan

All participants had a plan, whether it was to stay and defend or to leave well in advance of any high fire-risk day. Those who planned to leave were unequivocal about their plan and they had a lot of confidence in it: *'if there was decent fire coming and we were threatened with that, I would've been long gone – and I have got a plan which direction I would head in, that's all worked out and I know what I would do, when I left'* [R1]. *'I mean for me it's quite a simple scenario, when there's a bushfire you have to get out as early as possible'* [M2]. Others had practised their plan which reassured them that they were prepared: *'I mean we've done things like [laughs] had our own little fire drills and things like that, so that we know the sequence of what we need to do if the worst did happen'* [A2]. Several participants planned to stay and for those, the preparation was often detailed: *'Our attitude was 'we will stay in our house', that's ok – we had the buckets around the place with the mops in them, to mop up the cinders, we had our bath full of water, we had the heavy blankets ready right in the centre of the house to dive under..we had never planned on leaving our home'* [R2]. Several participants had multiple plans - *'We've got 3 avenues of departure from here, so we've weighed up that ability to have multiple escape routes, and just go in the opposite direction'* [M1] – and especially if things did not go the way they had planned: *'The worst case scenario if we did get stuck here and there wasn't that avenue off, we'd try and head to the Ferny Creek horticultural society, go there go there as fast as possible'* [D1].

(xiii) Technology

Knowing that they would have the advantages of living close to large fire-fighting organisations reduced the participants' concerns about their risk: *'And as I say, within three, four kilometres of us, we have no less than four fire fighting units. So I think we're*

fairly well covered' [R2]. *'..but we are very well serviced with a number of brigades very close. We also have the helicopter which is just at the top of our hill...here would be a lot of action straight away'* [R2]. Furthermore, the progress in communication technologies of these agencies reassured the participants a great deal: *'I mean, it's not that hard to...get on the internet'* [L], *'And I mean they've got the technology, it's not like ten years ago when you didn't even text message. I hear sirens going off, I'll get on my iPhone on the CFA page and.. now the CFA put stuff regularly on the website, so you've got more of an idea'* [L] . Reassurances comprised many of the ways that participants made sense of why they were able to live where they did and why they did not need to worry. Whilst the veracity of their claims of safety was not verified, and in some cases their assumptions may be true, it was clear that the participants felt able to justify why they lived where they did and that those justifications reduced their concerns.

(4) Warning Fatigue

In chapter 4, it was suggested that warning fatigue could be conceptualised as a cognitive maladaptation or 'habituation' to warnings. As an issue that was raised by the participants, the idea of warning fatigue or 'cry wolf' was a dominant narrative in the interviews: out of 36 themes that were coded for, only the media was coded for more.

Participants used many ways to talk about being 'fatigued': *'if you had several (warnings) in a row quite quickly, you might get a bit more **blasé** about it'* [A2]; *'We become **wearisome** of the message, and then fail to react when a real warning came through'* [C]. *'I've driven past (the billboards) that many times I forget what they say to be honest, you become a bit **complacent'*** [N]. The participants were vocal about warnings which were seen as over-playing the seriousness of the threat rather than the likelihood of it: *'Every year since Ash Wednesday in the 80's, you get told 'it's going to be a bad bushfire season, this year, it's going to be a bad bushfire' so I never took any notice'* [L]. The following comment supports Sandman's (2013) hypothesis that warnings which overstate the probability of a threat can raise the level of warning fatigue: *'I don't want to be in the situation that 30 days out of 90 I'm getting these ridiculous warnings that are over the top, forcing me out when I don't really need to be out, and disrupting my life and the finally getting another warning and thinking 'god, not another one' and totally ignoring it, and the that being the bad day'* [D1].

These types of comments were also linked to the use of 'Code Red' or 'Catastrophic' which was also seen as an over-statement of the likely impact and an actual prediction of a fire. However, they were just as much an evidence of third person bias where other people were thought to behave in one way, whilst the participants themselves would have acted differently: *'We get 5 or 6 of these Code Red days in a row, **people** are going to say 'oh well, nothing happened in the last fires, I'm not going to do anything about it'. So you've got to be really really careful about what days you call Code Red'* [D2]. Similarly, the following participant does not say that they themselves don't take any notice of warnings: *I think a lot of **people** wouldn't really listen to them, it's like 'oh that's what you said last time'* [RC]. This comment highlights how risk is socially constructed and how the community in which people live influences everyday concerns.

Because 'Catastrophic' came into the bushfire warning lexicon after Black Saturday, it became synonymous with that terrible, 'once-in-thirty-years' event: *'I would associate 'Catastrophic' with the Black Saturday fires'* [M1], *'to me that means Black Saturday'* [S1] - *'Catastrophic' is a mixture of absolutely everything, I drop a match and the world going to burn'* [RC]. When 'Catastrophic' was used as a warning, some participants reported that they 'reacted' against it: *' ..and if that was to be put into the catastrophic category I'd go 'oh yeah, ok, [laughs] another year another warning'* [N]. Over-warning in the absence of any obvious threat was mentioned by several participants: *'I do feel like they make an enormous fuss about things that have been going on forever and nothing ever comes out of it'* [A1]. *'If I were getting those 5 or 6 times a season where there was nothing that seemed to be a big threat, I think I would start to ignore them after a while'* [D1].

Some participants felt alarm was created by warnings about extreme bushfire risk, and, as discussed in chapter 4, they reacted against the feeling that engendered: *'… now it's panic stations before anything really happens* [R1]. *'But there's an enormous bunch of terror on the tele, and it's not like any of its new. Oh, you know what, it's like terror-fatigue, we don't take any notice of what they say anymore. I don't take any notice of them [A1].* Similarly: *'Panicking them, or getting them to the point of stop listening because they're so sick of the message, and they think they've got it'* [T2]. A few participants seemed to get annoyed at the recommendations to leave: *'The fires didn't come within a kilometre of us [but] we had our whole area evacuated .. when they started the fires were all going away from us but it was 'everyone evacuate, get out! Get out!"* [RC]

The issues talked about when referencing warning fatigue were varied and the narratives of warning fatigue were interlaced with references to message sources and implications of trust and credibility. *'One of the issues was the cry-wolf thing, people are not going to take the message seriously when they look out the window and it's chucking it down with rain – we've got the floods on, or was it 'oh well, we've spent our budget and we've no more to tell them, so we won't tell them'[C].* It was clear from the comments that they did listen to the warning messages and bushfire information and evaluated it carefully, but if it didn't equate with their own knowledge of their particular location, some became derisive about the message source: *'the whole mountain didn't burn down so now everyone's thinking the next time they say we're not going to really listen, so God forbid if something really tumultuous happens'* [RC]. Moreover, if the warnings had been issued too soon, or were seen as exaggerating the magnitude of the threat, participants reacted in a similar way: *'There was a couple of high-level warnings to the point where I was getting messages on my phone and things like that to say, 'we're back here and nothing happened' and people are sort of saying 'we don't want to be 'crying wolf'..so I thought, 'yeah, maybe the warnings aren't as they should be'* [C].

Finally, the participants talked directly about warning fatigue, and most of them called it 'crying 'wolf': *'(there's) this constant 'oh we're expecting a ripper of a summer, the fires are going to be horrendous, blah blah blah, get yourself in order' because people don't take any notice of it because it just goes on and on and on and it becomes like 'the boy who cried wolf'* [D2].

Discussion

This chapter summarised the 'sense-making' and 'meaning making' of people living in a bushfire risky environment. It sought to understand how people explained why they continued to live in the bush (despite its inherent bushfire risk) and whether they perceived their bushfire risk from bushfires in different ways to the participants in Study (I). This chapter also explored the reasons for the participants' decisions in the context of the psychosocial response to a threat. The analysis confirmed previous observations about possible aspects or facets that could contribute to warning fatigue. It also disconfirmed an assumption made after the analysis of the first study, that people who were not actively involved in community bushfire mitigation issues could be thought of as 'non-engaged'. The participants in Study (II) were deeply interested in the issue of bushfire risk, and seriously engaged with the challenges and contradictions of

managing their risk. They had thought about their bushfire plans; many had actively prepared, and most had changed their view of their risk as a result of experiencing the Black Saturday bushfires. They were very cognisant of their surroundings and how their environment might respond to a bushfire. Furthermore, all of these elements afforded them confidence in the face of a bushfire threat.

The strategies that the participants employed to cope with and appraise bushfire risk were apparent through their explanations and interpretations of their everyday lives. In the first instance, the participants responded in similar ways to the first cohort in identifying the media and official fire authorities as influences upon their risk perception. In more instances than not, the media and official were seen as hindering effective bushfire communication. Closer analysis showed that their responses comprised detailed reasons and justifications for their perceptions of safety amongst what they knew to be a bushfire risky environment. Additionally, they bolstered their confidence in their decision to live in the bush by reassuring themselves that their community, the authorities and their past experience with and knowledge of bushfires would keep them safe should a bushfire threaten.

When interviewees talked about warning fatigue the dominant narratives were: 1) how sceptical many of them had become about bushfire warnings; 2) the anxiety that had resulted from the many uncertainties a bushfire warning presented; 3) the helplessness that some felt when thinking about what they would do if a bushfire threatened them and 4) the apathy that a series of uneventful bushfire seasons (and public education bushfire prevention campaigns) had engendered. Their comments suggested that warning fatigue is complex, multi-layered and multi-faceted: for example the warning fatigue narratives included themes of anxiety, overtly reacting against warnings, trust and mistrust of both the warnings and warning source. Some participants explicitly talked about being 'tired' and choosing not to listen to bushfires warnings as attentively as they had in the past. What is interesting for this study, is that the issues involved in warning fatigue were teased out in depth, and, adding to the findings from study (I) and the literature review, have allowed for 'an imagining' of what warning fatigue may be like. This conceptualisation is expanded upon in the next chapter in the form of a measure of bushfire warning fatigue.

9. Study III: DISSECTING WARNING FATIGIUE: an Experimental Self-Report Measure

Introduction

Warning Fatigue, as previously discussed in Chapter 1, is a phenomenon that is hypothesised to influence the way people respond to disaster warnings. Disaster literature has already established many impediments to effective public disaster response; trust and credibility of disaster authorities, past disaster experience, the prevalence of false alarms (about a similar threat), the public's preference for local risk information, the lack of self-efficacious information and an optimistic view of the world (Mileti 1999; Paton 2006; Fischer 2008). The preceding analysis chapters showed that interviewees from the bushfire vulnerable areas of Tasmania and Victoria were well aware of the notion of warning fatigue and furthermore, many spoke at length about how they felt it affected their perception of risk and response to bushfire warnings. Their narratives about warning fatigue included many of the concepts hypothesised in this thesis to be related or constituting a 'cry wolf effect'.

This chapter reports on an exploratory study intended to extend the findings described previously. This third study re-examines the concept of warning fatigue and describes (a) development of an experimental self-report measure of Bushfire Warning Fatigue; and (b) an investigation as to whether self-reported levels of bushfire warning fatigue are related to bushfire warnings over the course of a bushfire season. The aim of this study was threefold: (i) to re-examine both the relevant literature and the interview transcripts from the previous two studies to investigate the multi-faceted nature of warning fatigue; (ii) to develop a self-report measure of bushfire warning fatigue; and (iii) to use this self-report measure to track self-reported levels of bushfire warning fatigue in a sample of residents over the course of a fire season to see if their levels change.

Method

The Composition of Bushfire Warning Fatigue

Previous Literature

Previous research and literature on warning responses suggest that there are different aspects, or facets, or components of the warning fatigue phenomenon. It seems clear that this is so. For example Dow and Cutter (1998) showed that the evacuation response for tornadoes changed depending on the residents experience with past tornadoes and the perceived level of information credibility. Repeated natural disaster warnings were claimed by Reser (1996) as leading to 'inattention, complacency and desensitisation' (204) and over-warning or the frequency of warnings was also assumed by Tverski et al. (1976) to 'contribute to a perception that certain types of warnings should be ignored' (cited in Stewart and Martin 1994:7). Repeated warnings are also proposed as contributing to the relationship between preparedness, response and warning time (Turner 1983. Drabek 1986) as they make possible 'a gradual, easy adaptation to the approaching danger where the potential hazard is perceived to be less of a threat and render the warnings less effective' (Janis 1962: 79- 81). False alarms were suggested by Rhatigan, Barnes and Gruntfest (2004) to contribute to a lessening of public confidence in subsequent warnings. Desensitisation or normalisation bias was alluded to by Handmer et al. (2010) when (in a report to the Victorian Bushfires Royal Commission) the Black Saturday bushfires were described as 'unprecedented' and 'unimaginable'. The report observed that, considering the ferocity and unpredictability of the fire, the people who had perished should never have considered defending their homes.

Trust and credibility has been shown to affect public confidence in and response to warnings: if warnings come from sources considered less trustworthy, they are appraised as less accurate (Hovland and Weiss 1952). Similarly, the integrity of an information source is 'critical for public perceptions of risk' (Johnson and Sandman 1992:3). As one of the many fear responses detailed in chapter 4, worry is suggested to be a predictor of coping; often leading people to feel vulnerable, and inhibiting decision –making (Weber 2006). Apathy has been shown to affect decision-making but in a different way. Some people can dismiss disaster warnings because, over time, they have become complacent about the risk (Sandman 2008). The disaster literature examined in chapters 1-5 has established these influences upon warning response and

decision-making and has informed the selection of components for the bushfire warning fatigue measure. The most pertinent literature is detailed in table 2 below.

Suggested Component	Sources of Suggested Component
Helplessness	Abramson, Seligman and Teasdale 1978; Flores et al. 2009; Gullatte et al. 2010; Mileti and Sorenson 1990; Parsons et al. 2006; Seligman 1975; Wheaton 1983; Wilkins et al. 2012;
Desensitisation/Normalisation	Handmer et al. 2010; Mileti and O'Brien 1992; Reser 1996; Tekeli-Yesil 2007 Tverski et al. 1976
Trust/Credibility	Covello & Sandman 2001; Eagly et al. 1978; Flynn et al. 1992; Giddens and Pierson 2009; Gutteling and Weigman 1996; Hovland and Weiss 1952; Johnson and Sandman 1992; McGuire 1969; Pidgeon et al. 2003; Renn and Levine 1991; Sandman 1993, 2004, 2008
Over-Warning	Barnes et al. 2007; Dow and Cutter 1998, 2000; Drabek 1999; Janis 1962; Mileti and Peek 2000; Mileti and Sorenson 1990; Sandman 2012; Stewart and Martin 1994; Turner 1983; Tverski et al. 1976
Risk Perception	Anderson-Berry 2003; Beck 2009; Blaike et al. Breznitz 1964; Burton et al. 1993; Bushnell and Cottrell 2007; Finucane et al. 2000; Folkes 1988; Gardner et al. 1987; Handmer and Penning-Roswell 1990; Joffe 2003; Kahneman and Tversky 1979; Dunwoody and Neuwirth 1991; Krusel and Petris 1992; Lofstedt 2003; Lupton and Tulloch 2002; McCaffrey 2004; Mileti and O'Brien 1992; Montz 1993; Moscovici 1998; Renn 1992; 1994; Riad and Norris 1978; Sjøberg and Engelberg 2010; Tversky and Slovic 2000a; Weinstein 1989
Localisation/ Relevance	Bushnell and Cottrell 2007; Eagly et al. 1978; Flint and Luloff 2005; Flynn et al. 1992; Gough 2000; Hovland and Weiss 1952; McGee and Russell 2003; Mileti and Sorenson 1990; Olick 2007; Renn and Levine 1991; Short 1979
Apathy	McCaffrey 2004; McGee and Russell 2003; Martin et al. 2009; Fischoff, Slovic and Lichtenstien 1978; Sandman 2008, 2103
Scepticism	Downs 1972; Fischoff, Slovic and Lichtenstien 1978; Sandman 2008; Punongbayan and Newhall 1999; Wilson and Gilbert 2008
False Alarm	Atwood and Major 1998; Barnes et al. 2007; Breznitz 1984; Dow and Cutter 1998, 2000; Gruntfest and Carswell 2000; Mileti and Soresnon 1990; Reser 1996; Sharma and Patt 2012; Rhatigan, Barnes and Gruntfest 2004; Roulston and Smith 2004; Savage et al. 1984; Sandman 2008; Simmons and Sutter 2009; Stirling 2011; Weaver et al. 2000;
Worry	Averill and Lazarus 1968; Breznitz 1984; Glanz and Schwartz 2008; Kates, 1985; Lazarus 1991; McLennan et al. 2011, 2011a; Monet et al. 1972; Sandman 1993; Scharwzer 2000; Weber 1997; Weber 2006

Table 2: Literature that informed selection of bushfire warning fatigue components.

Interview Transcripts from Study I and Study II

The transcripts (n=36) of those interviewed in Studies 1 and 2 were re-examined in the light of suggestions gleaned from previous literature about the likely components of bushfire warning fatigue. The different ways participants described their individual bushfire warning fatigue experiences were tabulated and experiences which resembled each other were grouped. It was ascertained that ten different possible aspects, or facets, or components of bushfire warning fatigue could be identified (Table 3). These corresponded to those noted in previous literature that discussed the warning fatigue phenomenon: Helplessness, Desensitisation/Normalisation, Trust/Credibility, Over-Warning, Risk Perception, Localisation/Relevance, Apathy, Scepticism, False Alarm and Worry.

Bushfire Warning Fatigue Component	Illustrative descriptive extracts from Study 1 and Study 2 interview transcripts
Helplessness	*Oh, you feel helpless, and I guess that's my point about some of the articles after the bushfires, there was a real feeling of helplessness and not enough about what you could do and what you should do next time [2T]*
Desensitisation/Normalisation	*On the actual Black Saturday day, we had a look around, gosh, it's going to be a bit hot, we'll be alright, it's going to be another normal day (1C)*
Trust/Credibility	*Official advice does carry more weight than my own assessment - I expect that professional meteorologists and people in the emergency services have more information and expertise than I do [H1]*
Over-Warning	*They signal a Code Red and everyone goes [intake of breath] "ooh, panic, leave" and then nothing happens and the next... couple of days later "Code Red" and off you go again and I'm just worried that it gets diluted, you know, the urgency of it [1K]*
Risk Perception	*If there's dew on the ground, there's moisture in the air, if there's moisture in the air you're not going to have a belter of a fire (2D)*
Localisation/ Relevance	*Your local council, your local papers, your local everything, because they know, they know the local area, they know what's happening [1RC].*
Apathy	*I've driven past (the billboards) that many times I forget what they say to be honest, you become a bit complacent [1N].*
Scepticism	*We just don't plug into it, and I think that's true for a lot of folks that I talk to up here, they go 'oh god, we're so sick of hearing about it, all the rubbish', because a lot of it's never based in fact, a lot of it's hearsay, or, you know, hysteria [2AF].*
False Alarm	*After the 3rd or 4th false alarm, it's like [laughs] 'hang on': this is coming from someone with legal liability check boxes, not someone trying to help [2C].*
Worry	*And yes if you don't worry about bushfires whilst living in the bushfire-prone area you are delusional and I'm sorry, an idiot. (2D)*

Table 3: Illustrative Bushfire Warning Fatigue Components from Study 1 and Study 2.

Hypotheses

On the bases of findings from study (I) and study (II) coupled with a review of the literature, it is hypothesised that:

> **Hypothesis 1:** Bushfire Warning Fatigue is a multi-faceted phenomenon.
> **Hypothesis 2**: Bushfire Warning Fatigue can be captured by a multi-component, self-report measure.
> **Hypothesis 3:** Bushfire Warning Fatigue may change over time.

Development of a Bushfire Warning Fatigue Self-Report Measure (BWFM)

The previous literature on the warning fatigue phenomenon suggested ten possible components. This was supported by descriptive material extracted from the transcripts of interviews conducted for Study (I) and Study (II). This suggested the starting point to developing a self-report measure of bushfire warning fatigue, was to construct ten subscales (Sudman and Norman 1982). For each subscale, four statements were formulated to express peoples' reported experience in relation to each hypothesised bushfire warning fatigue component. The statements were designed to be responded to on seven-point Likert scales where '1' corresponded to 'Strongly Disagree; '2' corresponded to Disagree Somewhat; '3' corresponded to Disagree; '4' corresponded to Neither Disagree nor Agree; '5' corresponded to Agree; '6' corresponded to Agree Somewhat; and '7' corresponded to 'Strongly Agree' (Harre 1974; Kelly 1955; Howard 1984). The initial bushfire warning fatigue measure thus comprised forty statements. Sixteen of the items were reverse-scored in order to counter 'acquiescence response set' (Winkler, Kanouse and Ware 1982).[182]

A third sample of residents living in bushfire vulnerable areas of Victoria (n=30), New South Wales (n=2) and Queensland (n=1) were recruited primarily through snowballing methods. A request for participation was advertised on the Victorian CFA website;[183] in addition requests were made through personal contacts within the Office of Land and Fire from the Department of Sustainability and Environment (Victoria).[184] Contact with all the respondents by these various recruitment means was entirely via email, and once the study criteria was established, the respondents were asked to complete the

---

[182] Acquiescence response set (ARS) is the tendency to agree with questionnaire statements regardless of content.
[183] Appendix 3.4
[184] Appendix 3.5

bushfire warning fatigue survey measure on six occasions, one month apart over the course of the 2011/2012 bushfire season (November 2011 – April 2012).

Participants

The participants (n= 33) comprised a purposive sample of 15 men and 18 women aged between 23 and 62 years of age living in rural or peri-rural communities; they were asked to completed the survey on six occasions, once a month for six months. Most owned their own home, almost three quarters identified as married or partnered, and just over half had dependents living at home. Fifty two percent had lived in their present home for more than ten years and two-thirds had had personal experience of bushfires as well as being affected by them. Just under half (45%) reported that bushfires occurred regularly in their area and many of them (82%) had a bushfire plan which, for half of the participants, had changed since the 2009 Black Saturday bushfires. Those who were recruited following an initial expression of interest were:

1. Aged between 20 and 65 years.
2. Lived in a peri-rural or rural area.
3. Had lived there for 3 years or more.
4. Knowledgeable in their use of the internet.
5. Had no or limited involvement in the local Fireguard programs, activities or local community bushfire mitigation activates.

The age group was chosen because the elderly are generally regarded as a distinct and more vulnerable group (than non-retired peoples) and understand and respond to risk quite differently (Bolin and Klenow 1982-83). Participants had lived in their area for some time and had some experience with the issues of bushfires. For most this meant they had experienced at least three fire seasons in their present location. The requirement for limited involvement in the local Fireguard groups was because previous interviews had been with those involved in CFA or TFS Fireguard groups, and these people had shown a certain level of engagement with and knowledge of bushfire issues. Additionally, bushfire prevention with these 'involved-type' groups has been well-documented. The participants recruited for study (III) were very similar demographically to those of Study (I) and Study (II), so because of this Study III can be assumed to be a logical continuation of the previous studies.

Limiting involvement in the study to those who had a good working knowledge of the internet privileged a group of people who probably have good access to information, bushfire and otherwise. It is possible that there are other groups of people living in bushfire-prone areas that do not avail themselves of online information and therefore,

could have responded differently to the survey; a different study would need to be done to understand these peoples' experiences of bushfire warning risk.

Procedure

In addition to the quantitative 40-item Bushfire Warning Fatigue Measure (BWFM), the survey [185] included a qualitative component which were questions about the participant's experience with and knowledge of bushfires. These optional questions were included in the survey only for Time 1. Also asked at Time 1 was whether the respondents had a bushfire plan and whether this plan was different to any bushfire plan they had prior to the Black Saturday bushfires. The intent of the exploratory survey was not made obvious to the respondents. The survey was labelled 'Decision-making and Warnings' and as the Participation Information Sheet[186] explained this was in the context of the Australian bushfires.

The phrase 'warning fatigue' was not used in any literature the participants received; there are two main reasons for this. Firstly, the purpose of the study was to understand the different components that had been hypothesised to construct bushfire warning fatigue, rather than a (whole) predetermined construct. Asking people what the term 'cry wolf' or 'warning fatigue' meant to them would not achieve this purpose. And secondly, avoiding the first use or reference to warning fatigue avoided the classic psychological effect of priming (Jacoby 1983). In the survey context, this would mean that when exposed to a stimulus, in this case the word or idea of warning fatigue, the participants would be more likely to talk about warning fatigue and report that warning fatigue had an influence on their warning response (Ratcliffe and McKoon 1988). This priming effect would essentially render the findings from the study invalid.

Pilot

A pilot was run to establish the viability of the survey, for example how long it took to do and to make sure the questions were understandable and did not confuse the respondents. The online survey was sent out to thirteen people to complete and comment on. The participants were recruited from the second cohort, and were people who had previously offered to partake in any other research I was doing.

---

[185] Appendix 3.6
[186] Appendix 3.3

They were asked to not only do the survey, but also to take note of:

1) How long it took
2) Were there any questions that were unclear, hard to answer or generally problematic
3) How did the survey 'feel' overall, noting issues of font, colour, layout and ease of use

Thirteen people completed the online survey and six responded in depth. None of them reported any issues with the survey; they reported that it took them between 10 and 29 minutes to complete, the questions were easy to answer and layout was 'user-friendly'. One mentioned that the orange background may be problematic for someone who was colour-blind, and another commented that the questions felt 'a little repetitive towards the end'. In terms of ensuring that the participants commented when given an option to do so, there was an issue with how SurveyMonkey™ allocated 'priorities': a participant was able to ignore the request to comment if they chose. To mitigate this in the survey proper I added an introductory statement immediately after the 'consent page':

> *"Thank you for agreeing to take part in this survey - it should take you about 20 minutes. Each question requires an answer, additionally, where a "please explain" box is provided, please DO NOT skip this bit: your reasons for giving your answers are as important as the answers themselves. Most often, a couple of sentences will suffice".*

This amendment proved successful: one respondent who was late to do the pilot (which had the amended statement in the introduction) subsequently commented on each occasion when prompted. Once the pilot was completed and the feedback incorporated into the survey, participants were recruited for participation in the survey proper, to be carried out over the upcoming bushfire season (November 2011-April 2012). Participants were invited to contact the author via an email account, and were sent an information sheet[187] about the study. Consent was obtained by the participants responding in a certain way on the very first page of the survey.[188] The survey was uploaded to an online survey program SurveyMonkey,™ and sent to the participants to complete in the second week of December 2011. The survey was completed at their convenience and all participants completed the survey within 10 days. This was done every second week of the month until May 2012. A reminder email was sent to any participants who hadn't returned the survey within a week of receiving it. Upon completion of each month of surveys, they were downloaded from SurveyMonkey™

---

[187] Appendix 3.3
[188] Appendix 3.2

and printed. For analysis, the results were subsequently downloaded into the statistical analysis program 'SPSS'. [189]

Results

The first hypothesis – Bushfire Warning Fatigue is a multi-faceted phenomenon - was confirmed on the basis of a literature review and content analysis of interview transcripts from studies (I) and (II): it seemed that the bushfire warning fatigue experience could be described as comprising ten characteristics or facets: Helplessness, Desensitisation/Normalisation, Trust/Credibility, Over-Warning, Risk Perception, Localisation/Relevance, Apathy, Scepticism, False Alarm and Worry. [190]

To test the second hypothesis that bushfire warning fatigue can be captured by a multi-component, self-report measure, an internal consistency reliability analysis (Cronbach's a) was carried out on each of the ten subscales. Using a generally accepted convention for the homogeneity of short subscales (<six items) of a Cronbach's alpha of .6 (Aron and Aron 2002), six of the subscales had an acceptable level of reliability of Cronbach's alpha of .6 or above: Helplessness, Trust/Credibility, Over-Warning, False Alarms, Scepticism, and Worry. Table 4 shows the subscale Alpha levels. A Principle Components Analysis (PCA) was carried out on scores of the six surviving subscales: Trust/Credibility, Over-Warning, False Alarms, Scepticism and Helplessness. [191] It's important to note while it is usual for such data reduction procedures as PCA to be carried out using individual items, the small number of participants meant that this was not possible. This is because a PCA requires there to be more participants than items and the generally accepted convention is there should be at least five participants per item (Abdi and Williams 2010). For example, in this context (and for the number of items, n=40) there would have needed to be 200 participants. But by using the six reliable subscale scores, the number of participants (n=33) was sufficient. The purpose of the PCA was to see if the six BWFM subscales were sufficiently highly inter-correlated to conclude that they constituted a single cohesive bushfire warning fatigue construct. This could be concluded if the PCA showed the presence of a large first Principal Component (Reckase 1979). Table 5 details the loading of each subscale score on the First Principle Component (Bushfire Warning Fatigue).

---

[189] SPSS, an IBM-owned software package is among the most widely used programs for statistical analysis in social science.
[190] Item content of ten subscales – Appendix 5.
[191] The item content for the revised scale (BWFM-R) - Appendix 6.

Subscale (BWFM-R)	Alpha Levels
Helplessness	.640
Trust/Credibility	.791
Over-Warning	.765
Scepticism	.700
False Alarm	.790

Table 4: Subscale Alpha Levels (< .6)

Subscale (BWFM-R)	Loading
Trust/Credibility	.919
Over-Warning	.881
False Alarm	.858
Scepticism	.711
Helplessness	.695
Worry	.292

Table 5: Loading of each Subscale Score on the First Principal Component

Figure 3 shows the scree plot for the BWFM-R PCA. The eigenvalue of the first Principal Component was 3.430 and the second was .919.
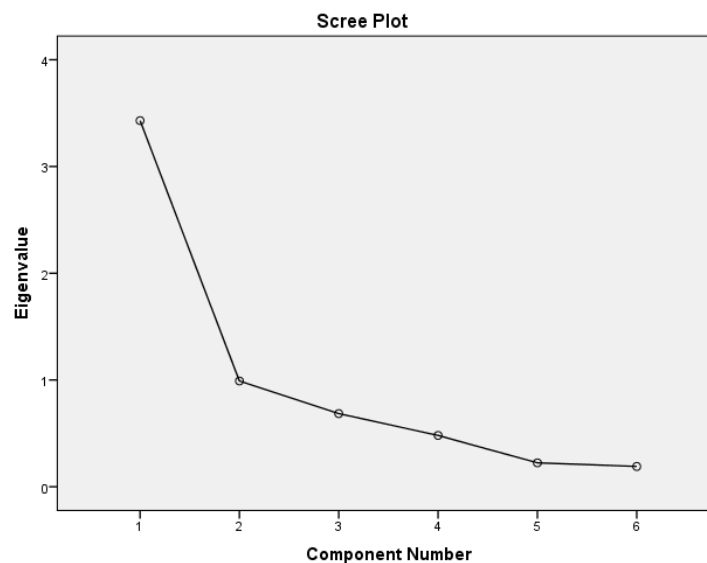
Figure 3: Principal Components Analysis Scree Plot for 6 Warning Fatigue Eigenvalues

Five of the six subscales loaded appreciably (>.6) on this first component using a generally accepted criterion of a loading of 0.4 or greater. The loadings (i.e. the correlations of each of the subscales with the first component) indicated that scores on the Trust, Over-Warning, False Alarm, Scepticism, and Helplessness subscales cohered to constitute a self-report bushfire warning fatigue measure. Worry scores did not load appreciably having a loading of just .29 and this suggests that in terms of self-report, it makes sense to talk about a global warning fatigue construct as having five components, or facets, or aspects: Trust/Credibility, Over-Warning, False Alarms, Scepticism and Helplessness. The inter-correlations, subscale score means and standard deviations at Time 1 of the five subscales of the revised bushfire warning fatigue scale (BWFM-R) are shown in Table 6.

	Trust/ Credibility	Over- Warning	False Alarms	Scepticism	Helpless-ness	Mean	Std.Dev
Trust/ Credibility[b]	[.79]					13	5.4
Over- Warning[c]	.76**	[.76]				6.1	3.1
False Alarms[d]	.74**	.76**	[.79]			13.7	5.7
Scepticism[e]	.66**	.55***	.45***	[.70]	.30	16.6	4.9
Helplessness[f]	.55***	.51***	.51**	.30	[.62]	16.3	5.0

[a]Note: Figures in square brackets are the sub-scales internal consistency coefficients (Cronbach's α)

[b,c,d,f] sub-scales have 4 items, responses 1-7

[c] sub-scale has 2 items, responses 1-7   ** p<.01   *** p<.001

Table 6: BWFM-R Subscale Inter-Correlations, Mean and Standard Deviation for 5 Bushfire Warning Fatigue Subscales at Time 1.

It was concluded that Hypothesis 2 was partly supported: a self-report measure of bushfire warning fatigue was able to be constructed. An examination of the psychometric properties of the original ten subscale measures (limited by the small sample size) indicated that only five of the originally proposed ten subscales could reasonably be regarded as comprising a self-report measure of bushfire warning fatigue: Trust/Credibility, Over-Warning, False Alarms, Scepticism and Helplessness.

To test the third hypothesis, the ten component self-report measure was completed by the 33 participants once a month for the six months that comprised the 2011 bushfire season, in Victoria, Australia (November 2011- April 2012). This was done using an online survey program which captured the data and allowed it to be downloaded into an Excel and SPSS programme to be analysed. The third hypothesis (that bushfire warning fatigue would change over time) was tested by calculating the total BWFM-R mean scores for each of the six time points, and plotting these (Figure 4). A t-test for paired samples was then conducted comparing the mean score at Time 1 with that of Time 6. Figure 4 suggests that bushfire warning fatigue did change over time. However, not in the direction hypothesised. The magnitude of the decrement in self-reported bushfire warning fatigue from Time 1 to Time 6 was small although statistically significant: effect size (Cohens δ) =.023, t(32) = 2.325, p = .027. The finding of a decrease in self-reported bushfire warning fatigue over time, even though small, was unexpected. Possible explanations are offered in the Discussion.
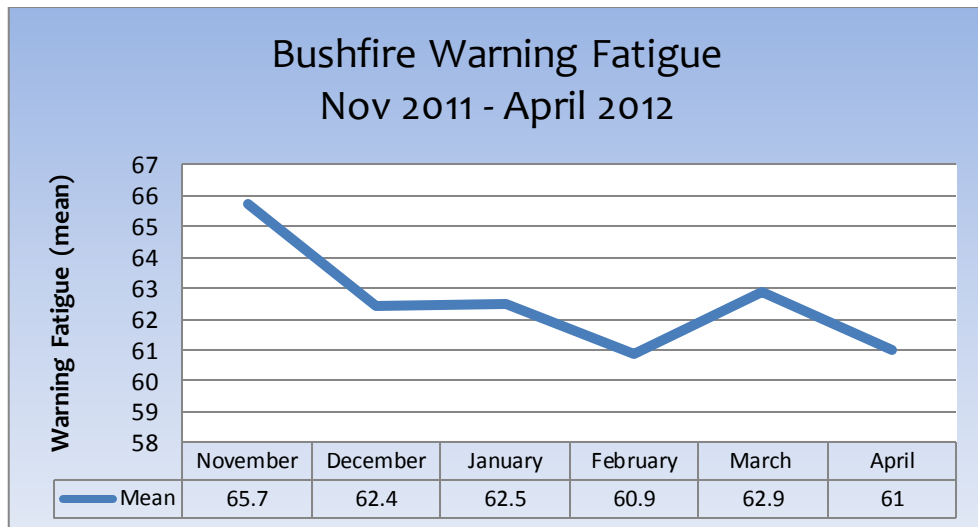
Figure 4: Mean Bushfire Warning Fatigue Scores November 2011 – April 2012

Month (2011 Fire Season)	Means	Std Dev
November	65.7	19.85
December	62.4	19.31
January	62.5	22.07
February	60.9	20.36
March	62.9	20.22
April	61.0	21.88

Table 7: Means and Standard Deviation Bushfire Warning Fatigue scores 2011 Fire Season

Discussion

In summary, the proposal that warning fatigue is a multi-faceted phenomenon was confirmed because a self-report measure could be constructed whose psychometric properties indicated that five out of an originally-proposed ten subscales had an acceptable internal consistency (Cronbach's alpha 0.6 of greater). Scores on the five subscales were summed and the total used to chart changes in self-report bushfire warning fatigue over a six month fire season. The results confirmed the second hypothesis that it is possible to measure bushfire warning fatigue by a self-report measure. The third hypothesis, that bushfire warning fatigue increases over time was not confirmed; bushfire warning fatigue changed significantly over time but not in the direction that was predicted. The hypothesis that bushfire warning fatigue would increase over the fire season was predicated on the assumption that warning fatigue was low at the beginning of the fire season and, in response to continuous warnings about bushfire events that, over time, did not eventuate, the level of bushfire warning fatigue would rise. There are several explanations that may account for this decrement.

There was no normative base-line for bushfire warning fatigue available before the study. It is possible for example, that bushfire warning fatigue is at its highest at the

beginning of the fire season because previous fire seasons have produced no significant bushfire events. Additionally, as a result of a previous winter season that had produced observable fuel growth, the rhetoric often employed by bushfire prevention campaigns is that the up-coming fire season will likely be one of the 'worst ever'. It is possible that as the fire season approaches, those who are more likely to be fatigued will have a one-off 'here we go again' response to public education bushfire campaigns and warnings to be 'bushfire ready'. As the fire season progresses, and no major bushfire event happens, it may be that the public's perception of risk from bushfire and their bushfire warning fatigue response decreases. The 2011 bushfire season was extraordinarily wet. The following information from the Bureau of Meteorology monthly weather reviews summarises some of the more significant weather events across the 2011 bushfire season: (http://www.bom.gov.au/climate/mwr/)[192]

November 2011: Hailstones the size of golf balls, heavy rainfall and flash flooding in the first week led to minor to moderate flood warnings for rivers in central and eastern Victoria.

December 2011: The third week in December was warm but very wet, culminating in a memorable Christmas day, especially for the Melbourne area. A number of super cells (very severe long lasting thunderstorm cells) produced large hailstones, heavy rainfall and flash flooding. Victoria State Emergency Services (SES), received over 3500 requests for assistance and the Insurance Council of Australia estimated the damage at over $100 million.

January 2012: There was an exceptionally cold outbreak early in January, setting a new Australian lowest January maximum temperature. At Mt Hotham, where the temperature barely crept above freezing and light snow fell in the alpine areas.

February 2012: Rainfall records, some which had stood for over 130 years, fell during February 2012. Several townships suffered flash flooding that affected main streets and inundated properties. A number of river systems were impacted by flash flooding and broke their banks.

March 2012: March 2012 was the wettest March since 1900, with more than twice the Victoria average rainfall.

April 2012: In the last week of April, many location in south-eastern Victoria recorded rainfall in excess of 100mm, with large hailstones and damaging wind gusts.

This weather overview clearly shows that for the respondents of the survey, bushfires were not the risk they usually were over the 2011 bushfire season. In fact, there was more concern about flooding and more warnings about severe weather and associated flooding, than there were about bushfires. The respondents would have also been aware of the severe flooding in Queensland during this time where, beginning in December 2010, a series of floods hit Brisbane and other areas. The floods forced the

---

[192] Note: In the southern hemisphere these months are Summer.

evacuation of thousands of people from towns and cities, killed 35 people, and three-quarters of the state of Queensland was declared a disaster zone. Damage is thought to have cost around $2.38 billion.

It could be assumed that during the 2011 bushfire season the salience of bushfire risk was very low for the respondents; they simply did not need to be concerned about bushfires because there were fewer warnings to 'react' to, and little bushfire risk to evaluate or respond to. Simply put, it is almost certain that most of the survey respondents had 'other things to worry about' during the 2011 bushfire season. It could be hypothesised that by the end of the bushfire season, bushfires were so little a concern for them that they had stopped paying attention (and responding to) any suggestion that bushfires may be a threat. Therefore any associated bushfire warning fatigue would likely also have decreased.

Findings from this third and final exploratory study show that bushfire warning fatigue, as a phenomenon, is a multi-faceted construct, probably made up of five subscales: Helplessness, Trust, Over-warning, Scepticism and False Alarm. The levels of bushfire warning fatigue are able to be measured over time, and bushfire warning fatigue changes over time. Moreover, the direction of change can be explained by the context in which the respondents operate. The context in which the survey was conducted can be understood in multiple ways, not the least by analysing the reports from the Bureau of Meteorology. However, it was by examining the participants' reflections on their feelings of risk, and how they reported they responded to the 2011 fire season that was most useful in understanding the reasons for the bushfire warning fatigue decrement. The unexpected finding that bushfire warning fatigue decreased over the fire season seems counter-intuitive, and highlights the reality that understanding phenomena that are inseparable from and dependent upon people's feelings and circumstances, is complex.

The Participants' Perspectives

Introduction

At Time 1 (November 2011), the participants were given the choice to comment on one of each of the subscales in order to expand on the answers they had given. This gave some insight into how they were thinking about the subscales. Importantly, as self-report warning fatigue decreased over the fire season, participants' comments that show how they were thinking about the fire season suggest why the change in bushfire warning fatigue was not in the direction predicted. The questions which the participants responded to are shown in Table 8.

Time (when question was asked)	Question
Time 1	In terms of bushfire warnings, is there anything you think needs to be addressed?
Time 2-6	Since the last survey, has anything changed for you that you'd like to comment on?
Time 6	As you reflect on this past fire season, is there anything further you would like to add?

Table 8: Optional Questions in the Bushfire Warning Fatigue Survey

This section discusses the interviewees' comments and is in three sections: the first details the ways that the participants talked about warning fatigue, the second illustrates how they talked about the five subscales and expands on issues around those subscales. The third section describes the context in which the interviewees were receiving and responding to bushfire warnings and their perception of the bushfire risk during this time. Moreover, their comments indicated the salience of bushfire for them during the 2011 bushfire season. The excerpts are representative rather than exhaustive and are used because they are the best examples of the subjects discussed.

Warning Fatigue

One of the main hypotheses of this chapter is that it is aggregation of several elements that 'construct' the experiential phenomenon of warning fatigue. This section shows that as well as specifically referring to 'warning fatigue' or 'cry wolf', the participants talked about these particular elements in detail; because of the importance of the responses in the context of warning fatigue, no attempt has been made to condense the participants' comments. When responding to statements about over-warning and false alarms, some participants referred to the fable about the boy who cried wolf, using, in several instances those exact words:

(Just like) the little boy who cried wolf [G2]

Whilst awareness is important, "boy who cried wolf" syndrome must also be considered [F:1]

It's the "boy who cried wolf" syndrome again [I]

Similarly, when commenting on the way the authorities issued warnings:

[they] need to be careful of crying "Wolf" [J1]

It's about faith in what you're being told, like the boy who cried wolf [M2]

Several participants thought that the style of public education campaigns and the frequency of the warnings contributed to the warning fatigue problem:

Govt has overreacted now and issue scare campaign 'warnings' that people will become immune to and not heed over time. [D2]

But I guess if I received warnings on a daily basis (or close to) I'd be less likely to pay attention [A1]

.. when there are warnings all the time you tend to switch off, one can't be healthy and live in fear [G4]

Lastly, several comments reflected a common theme narrative that the language used for warnings post-Black Saturday was unhelpful. Moreover, it contributed to a type of complacency and desensitisation often implied in disaster literature as encouraging warning fatigue and hindering disaster response:

It's important that the catastrophic warnings don't engender the same complacency by having too many of them (R1)

The warning scales are silly – Code Red comes out of Hollywood and means nothing and it is associated with silly reactions – automatically run without taking into account your own circumstances [E1]

Catastrophic warnings are already being overused. They should only be used when absolutely necessary - once every several years, otherwise there is the risk of complacency (as there was on Black Saturday) [R1]

These comments show that not only do the participants have a taken-for-granted knowledge about warning fatigue but they understand the meaning of warning fatigue as it relates to warning response. There was an assumption by some of the participants that the 'cry wolf effect' is a real influence on risk perception and their opinions implied that, if it were to be eliminated, people's attention to warnings and subsequent safety in times of a bushfire, would improve. The language used by emergency and disaster agencies was singled out for comment and highlights that, as well as the frequency and

timeliness of warnings, the content of the warning message has an influence of warning response. It also shows that people have paid attention to the warnings, but because people's interpretation of what they hear is complex and subjective, the messages can be understood in multiple ways.

Bushfire Warning Fatigue Subscales

In the first part of this chapter, the elements that comprised bushfire warning fatigue were pinpointed by statistical analysis of the participants' responses to the self-report bushfire warning fatigue measure. This section continues this analysis by looking at how the participants talked about each of these subscales: (i) Helplessness; (ii) Scepticism; (iii) Trust; (iv) Over-Warning and False alarms. It is in the context of 'building a picture' of warning fatigue (as a global construct) that these comments and opinions are highlighted.

(i) Helplessness

Risk communication literature (Davies, Covello and Allen 1986; Friedman, Gorney and Egolf 1987; Mackie 2012; Roche and Muskavitch 2003) has showed that self-efficacy is an important part of any disaster warning: people need to feel that there is something that they can do in the face of what often seems an insurmountable and overwhelming threat. Therefore it is not surprising that helplessness constituted one of the warning fatigue subscales. Participants talked at length about what they could do (or not do) in the face of a potential bushfire and, like the second cohort of interviewees, seemed to find much reassurance in those actions.

Detailing their bushfire plan was one of the main ways participants showed that they felt less helpless, although, as one participant commented '*Nothing could have ever prepared anyone for Black Saturday' (D2).*

> *I am prepared to an extent, I have valuables boxed, know several different routes to get to the freeway (A1)*

> *Our plan is simple as we have a large dam close to the house - the kids abandon the house and head straight for the dam (L4)*

> *I have insured my property for the correct amount and they can worry about it (J2)*

Concepts related to helplessness – control, fatalism and powerlessness – were evident in the responses. Acknowledgment of the unpredictable nature of bushfire was a common thread:

Black Saturday showed bushfires can move extremely fast (A1)

[it was] incredible and not predictable and not controllable (N1)

If a grass fire came from the north with a strong wind there would be little chance of saving the house (S3)

Participants' perception of their level of control (their self-efficaciousness) differed across responses:

I do feel that is possible to prepare our property to be defended (A3)

[after Black Saturday] it was just luck! (D1)

Whether bushfire preparation will be enough depends on factors out of our control – for example weather (J3)

This comment from a participant who had experienced Black Saturday described how helpless she felt, in stark terms:

There was no water, no electricity, no communications. [G4]

These comments reinforce and build upon what previous interviewees have expressed. The degree to which the participants felt helpless was very dependent on how self-efficacious the participants felt. This is in keeping with previous research discussed in chapter 4 that shows that self-efficacy is a predictor of coping behaviour, agency and resilience and positively correlated to self-control. Almost all of the participants seemed to have good knowledge of bushfire behaviour and the ramifications of a disastrous bushfire. Additionally, knowledge about weather conditions, especially those which precede a bad fire appeared high. For some this knowledge afforded them a degree of reassurance but for others, the knowledge highlighted just how vulnerable they could quickly become.

(ii) Scepticism

Scepticism involves a negative judgement about the accuracy of information and the motivations or 'agendas' of the source of that information. For the participants, the way they evaluated the accuracy of the warnings implied on the part of some participants a degree of scepticism. Several did not expect the warnings to be accurate:

they are warnings - they alert us to the future which no one can predict absolutely – it's a mistake to want them to be accurate (S3)

I'm not sure how warnings can be defined this way - how can a warning be quantified as accurate or inaccurate? [J2]

However, others were sure that the veracity, certainty and timeliness of warnings were lacking:

> *If the warnings on Black Saturday had been accurate there would have been many less lives lost [G5]*

> *they are often out of date by the time they are relayed [J1]*

> *Warnings are rarely accurate, lots of overkill, warnings when it's not urgent or important [N1]*

A number of participants were equally sceptical about the emergency authorities and their motivation for issuing warnings:

> *There is usually a high degree of butt-covering incorporated into the warning [G1]*

> *Again most have been an overprotection of the department managing them (nanny state stuff) [J2]*
> *Much of the problem is that the Vic government is unwilling to give real advice on anything lest it is sued for inadequate advice that is relied upon [L3]*

However, one participant issued her own warning:

> *You would be a fool to question their accuracy - it is better to be warned and nothing come of it, than the other way round [L2]*

The comments in this section not only show that the accuracy of the warnings and the motivations of agencies are scrutinised for resonance with the participants own situation, but also that advice, however well intended, is seldom taken on face value. Warnings are not issued in a vacuum but in a past and present context where authorities have a reputation 'of sorts'; warnings are then evaluated in relation to what the public know and believe about the authorities. Their warnings are also compared the public's knowledge about their own environment and what they see as they go outside to assess the conditions. Often all the factors (visual cues, local knowledge, source credibility for example) need to combine to convince the public to take protective action.

(iii) Trust

Trust and credibility of both the warnings and those issuing them is an important determinant in public response to disaster warnings. The participants had strong opinions about whom they trusted, and which information they relied on when made aware of a potential bushfire. Some were unequivocal that the official advice was the best:

> *Official advice does carry more weight than my own assessment - I expect that professional meteorologists and people in the emergency services have more information and expertise than I do [H1]*

I am not an expert, I rely on official advice [L2]

Official advice is given by experts with access to more broad resources than I have [M2]

The majority of the comments suggested that a combination of trust in official advice and trust in their own assessment was the best way to evaluate their potential risk:

Of course I believe my own eyes and ears but i don't discount the official news either. I use a combination of the two plus local networks and knowledge - everything I can in fact - to keep myself informed [S3]

Official advice combined with personal assessment is the best option as far as I'm concerned [R1]

I combine information from official channels with my own assessment [J3]

Some of the comments demonstrate a well-known reality that, when people go looking for more information to verify a warning, they turn to their social networks: family, friends and neighbours:

I go to some length to keep myself informed both through official and unofficial channels (friends throughout the area) [E1]

I relied heavily on ABC radio and friends for my information [F1]

On Black Saturday we survived because a neighbour called us and told us he believed the wind was going to change and the fire would head straight for our property. None of the "official" advice gave us this information [G5]

Equally 'trusted' was people's own knowledge of their environment:

I think I am in a better position to make relevant judgements regarding the local conditions but temper that by saying I am also guided by what they say might be coming. [I1]

So I use my knowledge of local weather [M1]

Also, on the morning of Black Saturday we had no birds in the garden- that was spooky and it felt eerie as we usually have lots of birds [F1]

Lastly, many of the participants preferred to trust their local sources of information – radio, CFA or their own community:

I do tend to rely on people that are on the ground 7 days a week to provide advice on the condition, dryness and flammability of the understory ground level file load [D2]

Local radio tries to let you know what is happening where you are. Also I listen to the local brigade [N1]

The local network is a better guide as to what is happening [G5]

Trust and credibility is an important category in this study: in the first section of this chapter correlation and factor analysis revealed that it had the highest internal consistency score (Cronbach's α .79) and the highest eigenvalue in the PCA (.919). There are many 'types' of trust that the participants talked about and all play a role in how people perceive risk and respond to warnings. For the most part, participants trusted the official news they heard, and they sought out known and 'trusted' sites (ABC news, local weather channel) for more information. It was only when the fire event became urgent, and participants wanted the information to be 'up to the minute', that fire information sources (CFA website, national news channels) became less credible. People trust themselves more often than they trust others when evaluating risky situations, especially when they are familiar with their environments and have had experience of similar events. They also 'trust their gut' as detailed in Chapter 7, (first analysis chapter); people's intuition often comes to the fore in such situations, which may not be a 'logical' response but one that is used nonetheless. Words such as 'a foreboding' and 'we just knew' shows that, in unsettlingly uncertain scenarios, some people relied on their 'sixth sense' as much as their other senses. It's difficult for disaster and emergency agencies to account for intuition in their warnings, but it should be acknowledged. People trust their own assessment of the environment they live in, because they consider they are more familiar with it than any emergency authority. So when people hear warnings, they invariably go outside, looking for cues (flames, smoke) that confirm what they have heard. And they will often trust more what they see and sense than official information. In these often critical scenarios, the local authorities have the most influence in persuading people of the severity of a situation.. Trust is a broad category and importantly, it is not 'a given'; when considering 'trust' as a component of warning fatigue it is important to acknowledge that many types of trust are talked about by the participants.

(iv) Over-Warning and False Alarms

The responses to the over-warning and false-alarms subscale statements were strongly at either end of the 'agree/disagree' scale. In fact some participants were scathing of those they thought were taking the warnings lightly:

> ..and yes if you don't worry about bushfires whilst living in the bushfire-prone area you are delusional and I'm sorry, an idiot. (D3)

> You would have to have your head in the sand to not have known of the risk (I1)

Most participants were happy with the level of warnings they received

> *And I would prefer to be pre-warned so I have the danger in the back of my mind.. [A1]*

> *I feel they have the balance about right - I have not been aware of any warnings that have been frivolous [A2]*

> *False alarms still need to be heeded, just in case - you never know which one will be real [D2]*

However, some thought there were too many warnings and pointed to the possible consequences:

> *I think too many warnings de-values them so that they become ignored (G2)*

> *Too many warning do lead to overkill and not listening, I have definitely reached this level. Too many official warnings that do not match the actual risk (N1)*

> *Warnings all the summer, not good, causes fear, complacency, bad for business and town. I work in a hospital; I just cannot not go to work, at every warning [G4]*

One of the recurring comments about reasons for the over-warning and false alarms was the event of Black Saturday and the subsequent over-use of the term 'catastrophic':

> *I think there has been an over-reaction since Black Saturday (E1)*

> *Many warnings are reactive to Black Saturday conditions … the authority has gone berserk - they are not realistic (N1)*

> *Bush fire ads on telly are still miles too soon for me..maybe in 7-10 years when people have forgotten they will be needed. Catastrophic days seem to have been wrongly assessed since Black Saturday. Panic merchants. (N1)*

The 'dilemma' that emergency authorities face when issuing warnings was acknowledged by several participants:

> *I think for the authorities, it's very hard to strike the right balance. If they don't give enough warnings, and a serious bushfire occurs, then they'll be criticised terribly [L1]*

> *I do worry about that there is a conflict between covering the 'risk' to the community (ie the fire itself) and the 'risk' to the authorities, organisations (liability, political) as the latter all too often gets priority and compromises the former [G2]*

> *I'd rather have a false alarm than not be notified of something, and it turns very nasty. Then, everyone would be criticising [them] for not being vigilant or communicative enough [F2]*

The last comment is representative of a common sentiment:

> *Just because it did not happen this time does not mean it will not happen next time (H1)*

Many of the comments, criticisms and opinions about bushfire warnings and participants' assessments of 'how to do things better' were in response to the over-warning and false alarm statements. They appear to be mostly closely associated with the characteristics of warning fatigue and it was not unexpected that over-warning and false alarm constituted two of the five bushfire warning fatigue subscales. They also demonstrate how closely inter-related false alarms and over-warnings are. In fact, both subscales had the highest internal consistency and as the principle components analysis showed, were 'more related' to the construct of warning fatigue than scepticism, helplessness and worry. Even though there was sympathy expressed by some participants for the difficult role disaster and emergency agencies have in warning the public, there was a conviction that too many warnings diluted the urgency of warnings and could lead to people ignoring them. Moreover, the actions associated with the warnings, (leave early, evacuate) were difficult to adhere to on every occasion. People in bushfire areas do not just have to leave their house: they have businesses, and children in day-care, animals to be re-located and jobs they have to go to.

'Over-warning' is more than just issuing too many warnings; it is disrupting peoples' lives on a regular basis. Whilst some people may be able to hear many warnings and not become 'fatigued', there are others who, when they are exhorted to leave yet again, find the process too troublesome, and so pay less attention over time to the warnings. This is not because they don't think the warnings are not important, but just not so important as to warrant the disruption they represent. Similarly, false alarms become the background to future warnings, and undermine the credibility of them more than any component in the warning fatigue construct. The comments about the 'catastrophic' warning are important to note because these are the warnings about which people need to take the most notice. If they used too often without the predicted disastrous outcome, they become just like any other warning, and are regarded (or disregarded) in the same way.

The Decrement of Bushfire Warning Fatigue in Context

At each time point, the participants were asked "Since the last survey, has anything changed for you that you'd like to comment on?" In terms of what the participants

were asked to talk about, this question was 'wide open'. Of the 34 participants, 28 commented at one or more time points of the survey and of those 80 percent mentioned the cooler weather conditions. They talked about the rain, how wet everything was and the cooler mild conditions:

> *.. things are still very green and there has been a fair bit of rain, so I'm not too worried at the moment [D2]*

> *All water tanks are full and the ground is soggy. [D4]*

> *it has rained a lot!!..It is still raining!!..The weather continues to be unbelievably benign! [J2]*

Sixty one percent of people talked about their perceived risk from bushfires, and most felt that, in comparison to previous bushfire seasons, their risk was low or had diminished throughout the fire season:

> *A wet, mild summer has decreased the immediate risk in this area [G1]*

> *I guess the main thing that has changed is that we've had so much rain - and now that it's late in the season, it seems as though there just isn't any fire risk [L1]*

> *Recent heavy rains have sharply decreased risks for March [L3]*

A similar number of participants also talked specifically about the fire season and compared it to previous fire seasons. Without exception this comparison showed that they thought the 2011 bushfire season was much different to the previous one, in that it was much wetter, had produced more fuel and they were less worried about bushfire than previous seasons:

> *There has been no fire season here to speak of.. Yes, we've had a negligible and wet fire season [D2]*

> *It is a much cooler and wetter summer this year so any immediate threat isn't present [S1]*

> *Very low risk season apart from just one day of high temps and strong north wind in February [L4]*

A major premise of warning fatigue is that, for the effect to have an impact, the salience of a threat needs to be high in the absence of an actual event. Not only was the 2011 fire season wetter, but as a result, there were fewer warnings. The number of comments that indicated how much attention the participants paid to the bushfire warnings and how little bushfire were 'on their mind', suggests that salience could be an important indicator for understanding warning fatigue:

> *I think the summer we've just had has pushed issues associated with bushfire into the background...thoughts of fire are a long way off [J2]*

Only that as summer proceeds and there are no fires and few severe or Code Red days I think many people tend to become complacent - all the warnings serve to keep them thinking about the risk [M1]

It has been a relatively mild summer so far from the perspective of bushfires so the sense of risk is not as heightened [P2]

The following comment suggests that bushfire risk was so low that other concerns that were normally regarded as less important, took precedence:

Therefore, the thought or threat of bushfire has not been particularly high in my or anyone else's minds..the whole thing has been a bit of a non-event..(and) I have a lot of other pressing things to get done at the moment [D2]

Chapter 4 clarified just how important anxiety was in people's ability to respond to warnings and objectively perceive of risk. A main narrative from the participants about the 2011 fire season was as it continued into the New Year, they started to relax about the fire risk. During the 2011 fire season there were many other types of warnings, normally associated with winter - flooding, severe hail storms, record rainfalls – and so any attention that the participants were paying to the fire risk would have been attenuated. This diminishing sense of risk from bushfire would have become especially clear as Victoria approached its traditionally worst months for bushfire (January and February) and everything was still so wet and green. Many of the participants talked about the decreased bushfire risk as a result of all the rain, and they were happy about that. It is reasonable to conclude that as the 2011 fire season progressed, the participants evaluated their bushfire risk rationally and appropriately and therefore, their responses to the statement in the survey that teased out their warning fatigue levels reflected this evaluation.

Discussion

One of the hypotheses arising from the development of a bushfire warning fatigue measure, was that bushfire warning fatigue would increase over time. It was assumed that the 2011 fire season would be an average fire season; that is that it would be reasonably hot, with a number of minor to moderate fires but with no major events. The outcome of this type of fire season would be that the Victorian public (and the participants of the survey) would be warned regularly, continually and somewhat insistently throughout the fire season about potential fire events that most often would not eventuate. Therefore, the threat of bushfire would be constantly salient but not a direct threat. What actually happened was very different and very unusual; it could be

said that the 2011 fire season started with a bang and ended with a whimper. This was a very good outcome for the residents living in bushfire-prone areas, but it was not a typical fire season and certainly not what could be predicted given the weather patterns normally present at this time of year.

If bushfire warning fatigue is usually high at the beginning of the fire season, regardless of how the fire season 'plays out', it could be expected to diminish. However, if bushfire warning fatigue is fundamentally dependent on the fire and weather conditions during the fire season, then it is possible that for a 'normal fire season', the results of the survey would have been quite different and analysis may have shown an increase in bushfire warning fatigue. The levels of bushfire warning fatigue could additionally be dependent on the number of similar past bushfire seasons; fire seasons which have not had major 'catastrophic' events such as the Black Saturday bushfires. The Victorian 2011 fire season began as past bushfire seasons normally have, with warnings about the heavy fuel loads produced during the winter months, and with the annual CFA public bushfire mitigation and prevention campaigns. These campaigns were heavily promoted from the beginning of November onwards and encompassed most forms of media: television, radio, newspaper, brochures (letterbox drops) and social media (Face Book/Twitter). Added to the saliency of the imminent bushfire season was the publication of fire information from local CFA: roadside billboards, CFA community meetings, warnings (Advice/Watch and Act and Emergency). Added to these warnings were the Total Fire Ban days and, when conditions become dire, 'Catastrophic' Days. Figure 5 shows that there were a fraction of total messages (Advice, Watch and Act and Emergency Alerts) sent by OSOM[193] in the 2011 fire season as compared to the number sent in the 2012 fire season.

---

[193] The OSOM was an outcome of the Royal Commission after the 2009 Black Saturday bushfires. It is a system for creating and sending messages using standard incident message templates that have been designed using the National Framework for Scaled Advice and Warnings. They include messages from: Country Fire Authority (CFA), State Emergency Service (SES), Department of Sustainability and Environment (DSE) and parks Victoria (PV).
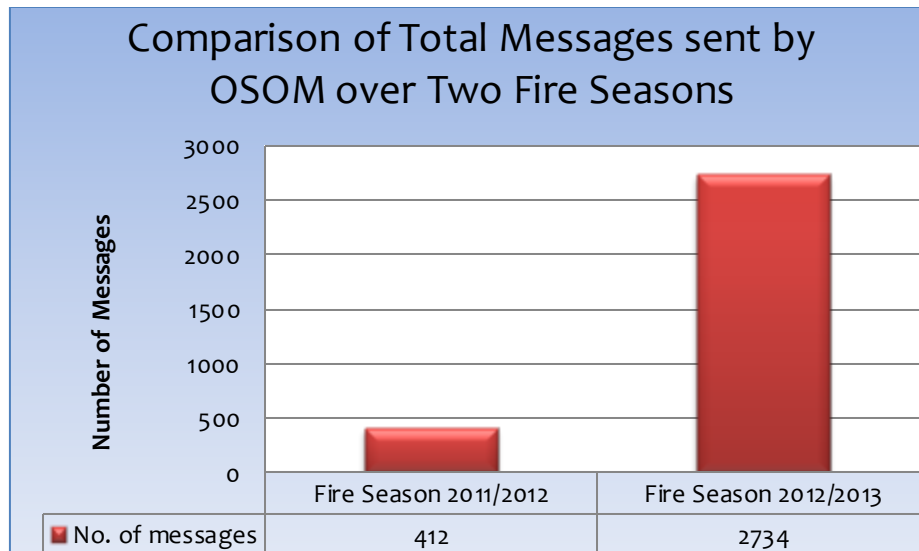
Figure 5: Comparison of Total Warning Messages sent during the 2011/12 and 2012/13 Fire Season

Figure 6 shows that the number of Emergency Alerts sent by CFA (which are only fire-related warnings) in the 2011 fire season were fewer than the following season (2012/2013). However, the State Emergency Service (SES) sent many more emergency alerts for this season; this is because the SES manage all potential threats and call-outs for flooding and storm-related incidents; these types of warnings over the 2011/2012 fire season far exceeded the 2012/2013 season totals.
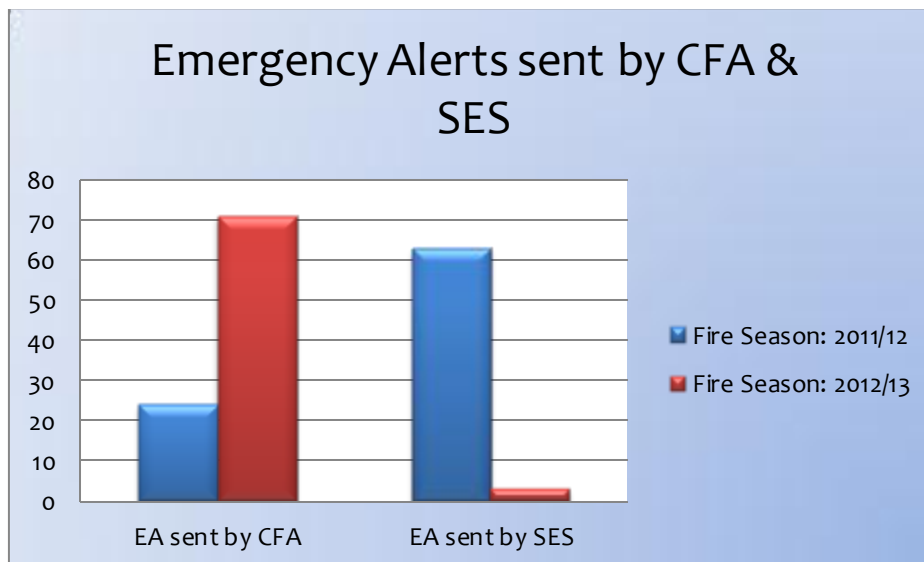
Figure 6: Comparison of Emergency Alerts sent by CFA and SES for the 2011/12 and 2012/13 Fire Season

As the 2011 fire season progressed into December and predictions about the hottest part of the season (January/February) began to be made, the unusually wet and cold conditions suggested to both the public and fire authorities alike that the likelihood of bushfires in early 2012 was waning. Certainly the major storm on Christmas Day 2011 added to this perception. With the memory of the Queensland floods still very fresh in

the minds of Australians, it appeared as if there was likelihood that flooding may become one of the 'risks' of the fire season!
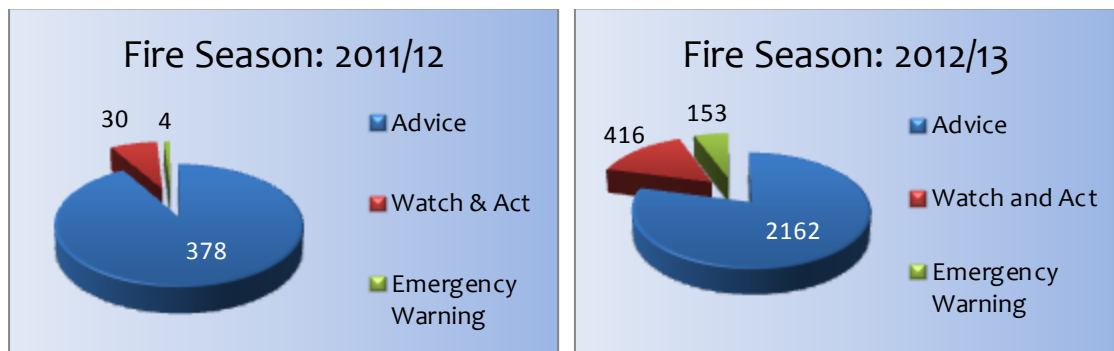
Figure 7: Total Types of Warnings sent during the 2011/2012 and 2012/2013 Fire Seasons

The usefulness of Figure 7 is that it shows the types of warnings issued for each fire season and demonstrates that for the 2011/2012 season, there were just four of the most urgent warnings issued compared to 153 the following season. This is a further confirmation how benign the 2011/2012 fire season was compared to other fire seasons.

The findings that bushfire warning fatigue decreased over the fire season, rather than increasing as predicted was unexpected, and raised some interesting questions as to why this was so. Through examining the participants' comments about the fire season, as they experienced it, some of these questions were answered, and yet more have been raised. The possibility that there are other factors that contributed to bushfire warning fatigue, apart from Helplessness, Trust, Over-warning, Scepticism and False Alarm, must be considered. The components that were discarded through the process of analysis (Risk Perception, Apathy, Worry, Localisation and Normalisation) may yet be factors that need to be reintroduced for subsequent research. However, the analysis of results definitively showed that, in its current design, the bushfire warning fatigue measure should not include these components. A reason for the exclusions may be that all of the items for each subscale were not consistently designed, and they did not measure the same component in the same way. It may also be that the statements elicited another type of response other than the one intended, confounding the results.

The context in which the participants were operating when completing the survey has been explained, mostly in terms of the weather during that time. What has not been considered was the types of media the participants were being exposed to, and the 'unofficial' warning messages they were hearing, especially prior to the fire season. If, as suggested, bushfire warning fatigue may be highest at the beginning of the fire

212

season, then understanding the media context of the preceding months may be important. For example, in October 2011 the ABC News published an article from a respected scientist warning of a catastrophic 2011 fire season:

> Retired CSIRO scientist David Packham says a repeat of the summer of 1974-75 is a strong possibility [and warned that] Australia faces a catastrophic bushfire risk, similar to a summer of the mid-1970s when 15 per cent of the continent went up in flames (ABC News 2011)

This very specific risk communication, whilst not 'official' in the traditional sense, still serves to warn the public about bushfires. These types of 'warnings' combined with more official public education campaigns may result in a public that become fatigued over the winter months. These are considerations for further research.

10: CONCLUSION

Discussion

> *This phenomenon [warning fatigue] is too complicated to be adequately studied in its 'natural environment'. That can be done later, when we become equipped with some knowledge about the relevant main effects and with some analytic tools to ask good questions* (Breznitz 1984:23)

This thesis studied warning fatigue in the 'natural environment' – in the everyday lives of people living in bushfire-prone areas of Australia. This research established that, for those interviewees who participated in the studies, warning fatigue was credited with inhibiting attention to bushfire warnings, changing the way they thought about their bushfire risk and affecting warning response. A major implication of this research is that warning fatigue can be operationalised, enabling disaster and emergency agencies who are concerned about warning fatigue in their communities, to adapt their risk communication accordingly. The following sections conclude the major findings of this thesis, the ways that the research has addressed the gaps in the disaster and warning response literature, and the implications of this research for communicating risk in other prolonged lead-time disaster scenarios.

A substantive search of the literature found that conventional wisdom assumed that warnings which were not followed by the predicated event reduced vigilance and preparation. Moreover, warning fatigue was considered a taken-for-granted phenomenon that, in everyday life, generated complacency about the risk, and scepticism about the veracity of the warnings. Interviews with people living in the bushfire-prone areas of Tasmania, Victoria, New South Wales and Queensland showed that these discourses about warning fatigue were echoed in their bushfire risk narratives. Warning fatigue was subsequently conceptualised as a multi-faceted phenomenon comprising five main components. The findings of a survey that used a self-report bushfire warning fatigue measure conducted over a six month bushfire season, found that warning fatigue changed over that period. The main reasons for that change are hypothesised to be related to the context in which the participants were living and the influence of 'unofficial' warnings which came mainly from the media prior to the bushfire season. This research has established that warning fatigue is evident when:

1) People are distrustful of the message source, which in turn, renders the message less credible.

2) People feel helpless and less self-efficacious in the face of warnings about imminent disasters of frightening proportions.

3) There have been multiple false alarms for similar threats with little or no explanation from authorities about the reasons for the false alarms.

4) There have been many and repeated warnings over a prolonged period and long in advance of the threatened event.

5) People become sceptical as a result of these factors combined with their own evaluation of their situation which is a combination of: multiple knowledges about their environment, their assessment of their ability to cope, the actions they took in a previous threat event (and the outcomes) and their perceived social resources.

However, since the first scientific study of warning fatigue by Breznitz in 1984, and despite few subsequent studies, disaster theorists have relegated warning fatigue to a myth. Regardless of the dismissal of warning fatigue from within the field of disaster theory, in the 'natural environment' academics, practitioners, disaster and emergency managers, and the public continue to believe in the face of a potential disaster, 'warning fatigue' (or the 'cry wolf effect') or is a real barrier to effective communication and timely decision-making. In the absence of knowing what warning fatigue is – what it 'looks like', what it comprises of, how strong an effect it may be, who is impacted by it and in what contexts – the influence that warning fatigue has upon risk communication and risk perception continues to be assumed and speculative. This thesis represents the first reported empirical examination of warning fatigue in the context of prolonged lead-time disasters. The phenomenon was hypothesised to be a unique combination of risk perception, frequency of warning messages, the type of disaster and warning lead-time. Australian bushfires exemplify a potential prolonged lead-time disaster and provided an ideal context in which to explore warning fatigue.

To date, disaster literature has made little distinction between rapid-onset disasters and those which have a prolonged lead-time. As discussed in chapter 3, typifying a disaster as having a prolonged lead-time is problematic and certainly, once a bushfire begins it can become a rapid-onset threat. However, more typically, disaster-level bushfires occur in Australia once every 10-20 years and as such (for the purposes of

understanding warning fatigue in this context) have been characterised as a prolonged lead-time threat. Making a distinction between types of disasters has implications for the way warnings are devised and communicated. Risk communication has become a 'catch-all' term for information about risk, but this thesis argues that risk should be communicated very differently depending on the type of threatened event. In rapid-onset scenarios (tornados, hurricanes, cyclones for example) studies have shown that risk communication is believed more and responded to more often than warning messages about prolonged lead-time disasters. This is primarily because rapid-onset threats often provide visual cues, are more likely to be of the magnitude predicted and have more certainty about when and where they will arrive. As the literature has shown, risk communication in these scenarios has more in common with crisis communication and is rarely (if ever) prone to warning fatigue. Prolonged lead-time disasters - bushfire, earthquakes, pandemics, volcanic eruptions for example - need a different risk communication; it is in this context that this thesis argues warning fatigue influences risk perception and warning response.
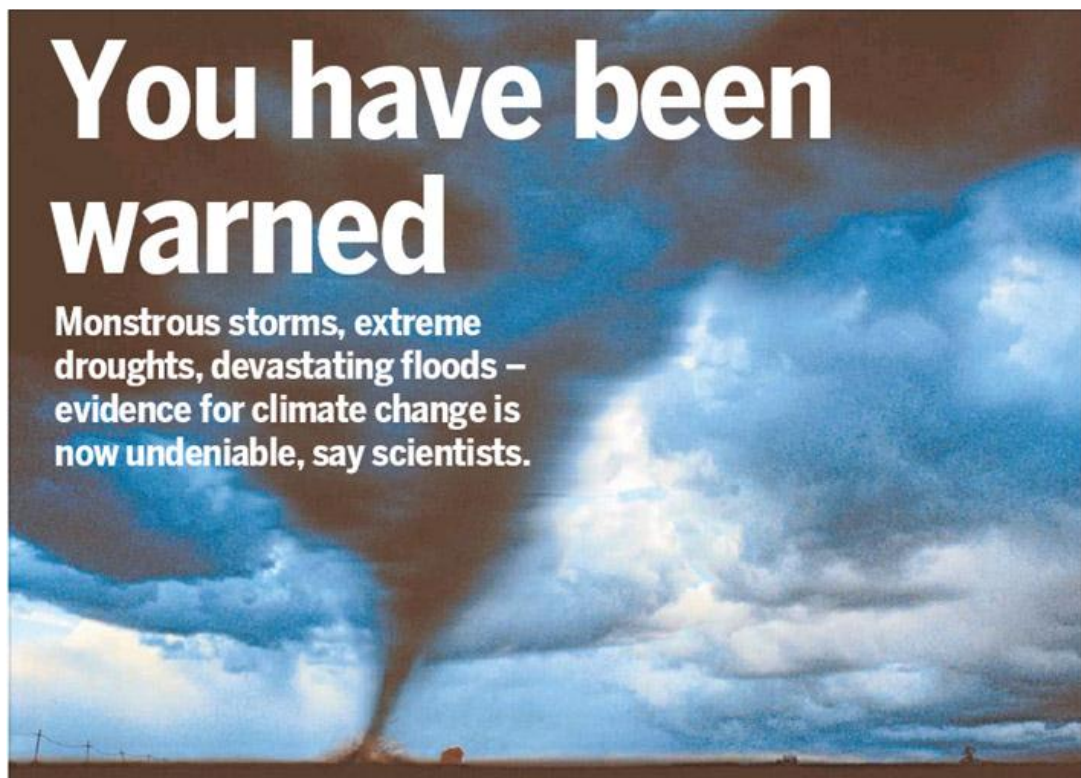

Figure 8: 'You Have Been Warned', Dominion Post, July 15, 2011, A1

Keeping a risk salient over long periods of time poses challenges for disaster and emergency authorities and this thesis has demonstrated that information about an uncertain threat is processed very differently compared with a warning about a threat

whose outcome is more conclusive. The headline and front page story in Figure 8 is typical of the type of risk information that the public sees. This is important to note because experts routinely use the media to communicate threat information, and the findings of this thesis suggest that experts may underestimate the effects that continued, non-specific information can generate. The public can regard generalised indeterminate threats to be of little importance compared with the demands of their day-to-day lives. The news story depicted is not an 'official warning' in the true sense. However, it is certainly a type of risk communication and the public often perceive it as such. The qualitative analyses of the three studies reported in this thesis showed that the participants did not generally differentiate between an 'official' and a 'non-official' warning. Therefore, this thesis suggests that after multiple 'non-official' warnings (and where no disaster eventuates), the public may dismiss the information as untrue and not relevant; they may downplay or even ignore the risk. Importantly, the next time a similar threat is warned about, their reaction most often could be the same. As the literature chapters showed, few studies had examined warning fatigue in either a rapid-onset or prolonged lead-time disaster scenario. The authors in the following literatures have highlighted short-comings in present knowledge about public warning response and decision-making and identified areas for further research; this thesis provides a way to address the knowledge gaps described below.

There has been little research which has directly addressed the effects of warnings on decision-making (Lehto and Miller 1986), and empirical research on the effects of warning messages 'have been neither systematic nor conclusive' (Stewart and Martin 1994:1). Breznitz (1984) called the field research on warning fatigue 'limited' and Barnes et al. (2007) suggested that their conceptual model of warning accuracy (which showed false alarms on a warning continuum) be revised to 'more accurately represent the success of warnings' (1146). The link between false alarms and the perception of warning quality was also highlighted by Simmons and Sutter (2009) to be an area for future research as they had not been able to find direct evidence that 'false alarms affected the perceived credibility of warnings' (52). This thesis devised an adapted version of the Barnes et a. (2007) model which, in the context of false alarms, bought the public into the 'frame' and imagined how their response could be understood as an aspect of warning fatigue.

Little work has been done to explain individual variations in response to warnings, especially in relation to the timeliness component (Sorenson 2000). When pondering implications for public perception of risk from cyclone warnings, Reser (1996) argued that there needed to be a better understanding of how 'psychological and social factors interact with reception and response to warning communication' (207). Studies that clarify how warning messages are processed by individuals and how this processing affects response have been suggested as 'a particular fruitful avenue for further research' (Martin et al. 2009). Moreover, Martin et al. note that the only way to effectively communicate risk is to understand what things influence individual risk perception and risk reduction behaviours. The interdisciplinary methodology of this research sought to understand 'subjectivity in the social domain', thus teasing out individual response within the wider social environments.

In 2006 the U.S National Research Council committee on disaster research in the social sciences said that 'far less is known about how the characteristics of different hazard types affect disaster preparedness and response'. It suggested that understanding the relationship between these two aspects 'would directly facilitate the adoption of more effective disaster preparedness and mitigation practices'. The typology of disasters proposed in Chapter 3 clearly makes a distinction between different hazard types and because the members of the public think about their risk in very different ways, suggests that rapid-onset and prolonged lead-time disasters and warnings need to be differentiated. Importantly, in the context of Australian bushfires, Beatson and McLennan (2010) call for an 'understanding of how to enhance the likelihood that people will personalise and act upon warnings [because it would] improve bushfire community safety' (9). These calls from disaster and natural hazards literature for further research demonstrate that, by exploring risk perception and decision-making from the point of view of people who live in bushfire-prone areas of Australia, and by examining the role that warning fatigue plays in their responses to bushfire warnings, the importance of the topics addressed by this thesis contributes a valuable and distinct perspective to the existing body of knowledge.

The ways in which members of the public respond to disaster threats have been discussed in the literature which has largely concentrated on behavioural responses; intentions, preparedness, evacuation and survival factors. A few of these literatures

have examined these responses to media effects and the conventions of disaster reporting. Notably, these studies have been confined rather narrowly to the disciplines of the researchers involved - psychology, sociology, media and communication or disaster studies – and so the findings have been very 'discipline-centric'. A strength of the methodology used this thesis is that it drew upon inter-disciplinary understandings and did not privilege one 'knowledge' over another. The processes involved in risk perception are multi-faceted, and cannot be addressed nor understood without acknowledging the interplay between the psychological and the social. Individuals cannot be understood in isolation from their cultural and social environments and just as importantly, the meanings of risk and bushfire are not a 'given': they are constantly being defined and redefined as people interact with each other. Risk perception is both a subjective and social process. By drawing upon insights from both social psychology and sociology this thesis enabled an integrated understanding of the issues involved in disaster warning response. Additionally this trans-disciplinary approach revealed similarities in how public and individual risk responses are conceptualised within the different disciplines. This thesis used a mixed methods epistemology which applied both qualitative and quantitative methods to explore the phenomenon of warning fatigue. This allowed for a flexible yet complimentary approach which was able to examine the problem of seemingly ineffective disaster risk communication 'from many angles'. The integrated and inter-disciplinary philosophy that underpinned the methodology for this thesis affords relevant and practical research applicable to diverse audiences.

Reactions to repeated warnings in the subsequent absence of a threat have been thought by disaster theorists to involve elements of desensitisation, complacency, scepticism and apathy; these were evident in the interviews with participants living in bushfire-prone areas of Australia. Study (I) and (II) showed that, for people living in bushfire-prone areas of Australia, bushfire warning fatigue was credited with poor decision-making and a frequent disregard for the annual bushfire warnings. Study (III) culminated in a conceptualisation of warning fatigue and the design of a bushfire warning fatigue measure. Analysis of the literature and interview data revealed some common themes which were used as constructs of a multifaceted bushfire warning fatigue phenomenon. The facets or sub-themes were operationalised initially in a ten construct, 40-item self-report survey measure, which was used as the basis of a tool to

measure warning fatigue. This tool (BWFM) was used to measure bushfire warning fatigue over the annual bushfire season in Victoria. Quantitative analysis revised the self-report measure to comprise five inter-correlated aspects: Trust/Credibility, Over-Warning, False Alarms, Scepticism and Helplessness. The revised measure (BWFM-R) was used to investigate warning fatigue levels over time, finding a small but statistically significant change in bushfire warning fatigue over the fire season. The results suggest that warning fatigue is a quantifiable phenomenon that is able to be measured; furthermore that it changes over time.

It was conjectured early on in the thesis, that perhaps there would have been differences in responses between the first cohort of interviewees and the second. It was assumed (wrongly as it turned out) that those who were actively involved in personal and community bushfire preparation activities would be more 'engaged' in the issues of bushfire risk and thus more prepared for a bushfire event than those who were not. This was found to be an inaccurate representation of the two cohorts: the second group were just as engaged in issues of bushfire risk, and many of the themes and topics arising from the first interviews were reflected in the second. The second group did not give high priority to attending neighbourhood meetings to learn how to prepare, but this did not meant that they were less prepared or socially connected – their connections were typically people in their own social networks. However, there was a big difference in the way that they talked about their bushfire risk; possibly because of the more focused nature of the second study. Analysis of the second interview data set concentrated on the 'sense-making' of the participants as they rationalised, justified and reassured themselves about their continued decision to live 'in the bush'. Many of their responses echoed the psychosocial stress appraisals and the adaptive and maladaptive coping strategies discussed in chapter 4.

The scope of the research for this thesis was restricted to the definition of 'official' bushfire warnings as communicated by the Australian fire authorities. However, one of the main conclusions from the findings was that the role of the media may be crucial in influencing the public's 'level' of warning fatigue. Media stories about bushfires constitute much of the unofficial warning information the public are exposed to throughout the year and certainly, the participants in all three studies talked about the media a great deal. The results from Study (III) found that the participants' level of warning fatigue was highest at the beginning of the bushfire season and the direction

of this change unexpected. This is because warning fatigue was hypothesised to result from the public receiving multiple warnings about a threat which, over time, did not materialise. In the Australian bushfire context, it was imagined that as the bushfire season progressed without any disastrous bushfires, the continued warnings that bushfires were imminent would increase bushfire warning fatigue.

Therefore, a new hypothesis arising from the research is that year-round media stories about bushfires constitute unofficial warnings, so by the time the official bushfire public education programmes begin (just prior to the bushfire season), the public is weary of the bushfire rhetoric and 'react' accordingly to the spectre of 'yet another catastrophic' bushfire season. This could explain why the level of bushfire warning fatigue was highest at the beginning of the bushfire season and declined as the season progressed. Another factor that may have influenced this decrement is the context in which the survey was conducted. The 2011 bushfire season was unusually wet, with many more emergency warnings and callouts for flooding and wet weather-related events than for bushfires; as pertinent was that fewer bushfire risk warnings were issued. The public simply had 'other things to worry' about and, as discussed, made realistic assessments of their bushfire risk based on experience, information from their social networks and their knowledges of fire behaviour and immediate environments.

Implications and Recommendations

This research has challenged the long-held assumption that 'cry wolf effect' or warning fatigue is a disaster myth, and as such, should be placed in the same category as 'mass panic' and 'social disruption'. Disaster literature to date has repeated this assumption, yet paradoxically much of the literature has also adopted warning fatigue as 'conventional wisdom'. This literature expresses puzzlement as to why the public do not respond to disaster warnings in rational and recommended ways. This observation can be extended further to imagine that disasters which are 'a long time coming' are prepared for less and responded to quite differently than rapid-onset disasters. For example, even though scientists insist that the potential driver of increased disaster risk - climate change - is approaching faster than even before, for the majority of the public, this is a potential disaster which has little impact upon their daily lives; for most it will not affect them in their lifetime. Therefore, this re-theorisation of risk communication is valuable in establishing the influence of warning fatigue in prolonged lead-time threats such as climate change, which is an important consideration for further research.

As the third study demonstrated, warning fatigue was able to be operationalised using a self-report measure comprising five subscales; the analytic process discarded five other subscales originally thought to be a part of a global bushfire warning fatigue construct. These discarded subscales were Desensitisation/Normalisation, Risk Perception, Localisation/Relevance, Apathy, and Worry. It is worthwhile to ponder why these subscales did not 'make it' into the final measure and perhaps any future use of the bushfire warning fatigue measure (BWFM-R) needs to reconsider these subscales. It may be, for example, that the *way* in which the questions were asked for these subscales led to responses that were not a good indication of how the participants really thought about the particular subscales. It could be that the original idea to include the subscales, for example risk perception, was valid but the statements were not devised in ways that were specific enough to the participant's context. It may also be useful to consider other subscales related to the existing warning fatigue subscales. For example, self-efficacy could be thought of as on the 'helplessness' continuum. Perhaps if a warning fatigue measure was designed which included self-efficacy as a subscale, the measure would be more robust and the results more conclusive.

One of the findings of Study (III) - that bushfire warning fatigue decreased over the fire season - was an important albeit unexpected finding. The hypothesis that arose out of that finding was that the media act as 'unofficial' risk communicators in disaster scenarios. By reporting about bushfires during the winter months, for example by quoting predictions about the upcoming fire season from scientists and meteorologists, the media prime the public to think about bushfires. This keeps that risk of bushfires more salient than perhaps they need to be and encourages the public to pay attention to a threat that in the winter months is non-existent, and for the summer up ahead, is a long way off. This thesis suggests therefore, that an in-depth analysis of media reporting during the winter months would clarify the types of bushfire stories, the frequency of reporting and the strength of predictions about the upcoming bushfire risk. It would be equally useful to run the bushfire warning fatigue survey over this time period for three purposes: 1) to establish a bushfire warning fatigue baseline, 2) to measure the level of bushfire warning fatigue to explore any changes over time (and in what direction) and 3) to ultimately determine whether bushfire warning fatigue is more influenced by 'unofficial' than by 'official' risk communication.

This thesis argues that far from being a myth, warning fatigue can influence how the public perceive, interpret and respond to uncertain disasters. The uncertainties associated with prolonged lead-time disasters make it difficult for the emergency authorities and the public alike to know when to pay attention to disaster warnings. More specifically, this thesis proposes that trust, helplessness, over-warning, false alarms and scepticism play a large part in these perceptions and responses. A recommendation of this research is that, for disaster and emergency authorities who are concerned about warning fatigue, it is important to pay attention to the relationships between the emergency agencies and the community. The credibility of the warning source leads to greater trust in the veracity of the warnings. Emergency managers may also need to take into account the false alarm rates for similar disasters in the past. Moreover, when a false alarm happens (and for prolonged lead-time disasters this is more common than not), explanations to the public as to the reasons for the false alarm are imperative. Related to false alarms is the problem of over-warning; when events are warned about and do not happen. These warnings are sometimes interpreted by the public as 'happening too often' with the inference being that they are unnecessary. Disaster and emergency agencies must tread a fine line between over-warning and under-warning – it is not an enviable task or an exact science. This research has shown that over-warning contributes to warning fatigue and suggests that more research needs to be done to look at the specific content of the warnings. Perhaps only the most urgent threat situation needs to be warned about and more general information conveyed about less urgent threats. For example, participants from the second study wanted more specific information about fuel load and moisture content.

The timeliness of warnings is an important consideration for avoiding over-warning the public. The warnings not only need to be relevant to the location of the threatened community, but also communicated in time for the public to take avoidant action if necessary. If they are issued too early, the urgency to take action is compromised and the uncertainty of the threat is increased. Many studies including the ones conducted for this thesis, have found that the public can be sceptical about risk communication, especially when the media are involved. Transparency and honesty from the disaster agencies about their level of knowledge about the impending threat can go some way towards mitigating public scepticism. It is just as valuable to tell the public what is not

known about a possible threat, as it is to tell them what is known and what might happen. The helplessness and fatalism that many people feel in the face of a seemingly overwhelming disaster plays a part in creating a warning fatigue effect. Therefore, improving the self-efficacy 'component' of any disaster warning is crucial; warnings should have information about the threat but also include ways to protect and mitigate; these warnings could also detail actions to be avoided.

The sensational nature of the language used in warnings has been shown to undermine the message. In particular, as Sandman (2013) has pointed out, exaggerating the likelihood may be worse for generating warning fatigue, than overemphasising the magnitude. Whilst acknowledging that warning fatigue is a real phenomenon, he maintains that compared to warnings which overstate likelihood, when warnings dramatize or exaggerate how bad a disaster might be, warning fatigue becomes less of an issue. However, the analysis of the interview transcripts did not always reflect Sandman's (ibid.) premise and one of the strongest statements from a participant on any issue was about the overstatement of magnitude: '….[the] *radio saying 'oooh, 'catastrophic' , the world's going to burn you're all dead, best move'. When I hear that I think 'go to hell, I don't' believe you'* [RC]. In the context of warning fatigue, it would be useful to develop a study that teases out these two different types of warning messages and the public's responses to them.

The qualitative analysis of the data in all three studies showed that all the participants, regardless of their location, or how involved they were in their local Fireguard activities, were not just passive 'actors' in the bushfire risk scenarios in which they lived. Rather than just hearing warning messages (issued according to the FFDI guidelines and when the authorities thought it necessary), the participants were already actively making risk judgements and thinking about their risk in multiple ways. Bushfire warnings were just one of many indicators of impending risk that the participants were aware of and for many, they did not privilege the warnings over their own assessments of risk. This has implications for how the authorities warn about bushfire. Perhaps bushfire warnings need to be specifically local in their content, which could 'close the gap' between what the people are hearing from the authorities and what they see when they 'walk outside' and make their own assessments.

At the outset of this research it was noted that warning fatigue was imagined to be a myth by many disaster theorists; it was a concept 'in the shadows', the form of which was difficult to determine. This thesis began with no *a priori* assumption that warning fatigue *was* a phenomenon, or (if it was) that it had an effect upon risk perception and decision-making. This thesis sought to 'put flesh on the bones' of this myth, to draw it out of the shadows and bring the phenomenon into focus. In conclusion, this thesis argues that warning fatigue is contextual, it can change over time and may be influenced as much by official warnings as unofficial ones. Trust and credibility, over-warning, false alarms, scepticism and helplessness are not new factors in public warning response to disaster communication. However, this research demonstrates that they combine in a unique way to produce the phenomenon of 'warning fatigue'. It proposes that if emergency and disaster agencies differentiate between rapid-onset and prolonged lead-time disasters, understand the complexities of warning fatigue and design their warnings accordingly, then disaster risk communication will become more effective, increasing public engagement and improving disaster response.

Bibliography

'2009 Victorian Bushfires Royal Commission'. (2010). 2009 Victorian Bushfires Royal Commission Final Report, Government Printer for the State of Victoria, Melbourne. http://www.royalcommission.vic.gov.au/Commission-Reports/Final-Report [24 May 2012]

ABC (2004). 'Fire Authority wary of media, inquest told'. 18 March. http://www.abc.net.au/news/2004-03-18/fire-authority-wary-of-media-inquest-told/153920 [21 Oct 2012]

ABC (2011). 'Summer bushfires risk rivals the 1970s'. ABS News online. 6 Oct 2011. http://www.abc.net.au/news/2011-10-06/bushfires-summer-csiro-warning/3317630 [15 June 2013].

ABC (2012). '75 perish in the Ash Wednesday bushfires'. 80 Days that Changed our Lives. http://www.abc.net.au/archives/80days/stories/2012/01/19/3411671.htm [6 Mar 2012]

Abdi, H. & Williams, L. J. (2010). 'Principal component analysis'. *Wiley Interdisciplinary Reviews: Computational Statistics*, 2 (4), pp. 433–459.

Abramson, L.Y., Seligman, M.E.P. & Teasdale, I. (1978). 'Learned helplessness in humans: Critique and reformulation'. *Journal of Abnormal Psychology*, 87, pp. 49-59.

Adam, B., Beck, U. & van Loon, J. (2000). *The risk society and beyond: Critical issues for social theory*. London: Sage Publications Limited.

Aguirre, B. E.& Best, E. (2012). 'How not to learn, resilience in the study of disaster'. Paper presented at the proceedings of the 37th Natural Hazards Research and Applications Workshop, (USA). Boulder, Colorado.

Aguirre, B. E., Dynes, R. R ., Kendra, J. & Connell, R. (2005). 'Institutional resilience and disaster planning for new hazards: Insights from hospitals'. Journal *of Homeland Security and Emergency Management*, 2 (2), pp. 1-17.

Ajzen, I.(2011). 'The theory of planned behaviour: Reactions and reflections'. *Psychology & Health*, 26 (9), pp.1113-1127.

Alba, J. W. & Hutchinson, J. W. (2000). 'Knowledge calibration: What consumers know and what they think they know'. *Journal of Consumer Research*, 27 (4), pp. 123–155.

Alicke, M. D., Klotz, M. L., Breitenbecher, D. L., Yurak, T. J., & Vredenburg, D.S. (1995). 'Personal contact, individuation, and the better-than-average effect'. *Journal of Personality and Social Psychology*, 68, pp. 804-825.

Alreck, P. L., & Settle, R. B. (1995). '*The survey research handbook: Guidelines and strategies for conducting a survey'*. 2nd Edition. Illinois: Irwin.

Anderson-Berry, L.J. (2003). 'Community vulnerability to tropical cyclones: Cairns, 1996-2000'. *Natural Hazards,* 30 (2), pp. 209-232.

Anderson, W.A. (1970). 'Tsunami warning in Crescent City, California and Hilo, Hawaii'. In National Research Council (ed.), *Human Ecology. Vol. VII, The Great Alaska Earthquake of 1964,* pp. 116-124. Washington, D.C.: National Academy of Sciences.

Andrews, G., Tennant, C., Hewson, D. & Vaillant, G. (1978). 'Life event stress, social support, coping style, and risk of psychological impairment'. *Journal of Nervous Mental Disorders,* 116, pp. 307-316.

Antonovsky, A. (1979). *Health, stress, and coping.* San Francisco: Jossey-Bass.

Aron, A. & Aron, E. N. (2002). *Statistics for psychology,* 3rd edition. New Jersey: Prentice Hall.

Aronsen, E. (1969). 'The Theory of Cognitive Dissonance: a Current perspective'. In Leonard Berkowitz (ed.), Advances in Experimental Social Psychology, Volume 4. New York: Academic Press Inc.

Assman, J. (1997). *Moses the Egyptian: the memory of Egypt in western monotheism.* Massachusetts: Harvard University Press.

Atwood, L.E. (1994). 'Illusions of media power: The third person effect'. *Journalism Quarterly,* 71 (2), pp.269-281.

Atwood, L.E. & Major, A.M. (1998). 'Exploring the "Cry Wolf" hypothesis'. *International Journal of Mass Emergencies and Disasters*, 16 (3), pp.279-302.

Avis, N., Smith, K. & McKinlay, J. (1989). 'Accuracy of perceptions of heart attack risk: What influences perceptions and can they be changed?' *American Journal of Public Health*, 79, pp. 1608-1612.

Baker, G. W. & Chapman, D. W. (1962). *Man and society in disaster.* New York: Basic Books.

Bandura, A. (1977). *Social learning theory.* Englewood Cliffs, NJ: Prentice Hall.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory.* New Jersey: Prentice-Hall.

Barnes, R. B., Gruntfest, E.C., Hayden, M.H., Schultz, D.M. & Benight, C. (2007). 'False alarms and close calls: A conceptual model of warning accuracy'. *Weather and Forecasting,* 22, pp.1140-1145.

Beatson, R. & McLennan, J. (2010). 'Understanding community bushfire safety issues from social psychological perspectives: A discussion Paper'. Community Bushfire Safety – Theories to Guide Research and Practice, BushfireCRC. http://www.bushfirecrc.com/managed/resource/socpsych_theories_discussionpaper_.pdf [12 Oct 2013]

Beck, U. (1992). *Risk society: Towards a new modernity*. London: Sage Publications.

_____ (1996). `Risk Society and the Provident State'. In S. Lash, B. Szerszynski and B. Wynne (eds.), *Risk, Environment and Modernity*, pp. 27-43. London: Sage.
_____ (2009). *World at risk*. Cambridge: Polity Press.

Beehr, T. A & McGrath, J. E. (1996). 'The methodology of research on coping: Conceptual, strategic and operational-level issues'. In M.Zeidner & N.S.Endler (eds.), *Handbook of coping – theory, research, applications*. pp.65-82, New York: Wiley Publications.

Benford, R. D. (1997). 'An insider's critique of the social movement framing perspective'. *Sociological Inquiry*, 67, pp.409–30.

Benoit, W. L. (1997). 'Image repair discourse and crisis communication'. *Public Relations Review*, 23 (2), pp. 177–186.

Bennett, W. L. & Lawrence, R. G. (1995). 'News icons and the mainstreaming of social change'. *Journal of Communication*, 45 (3), pp. 20-39.

Berger, J. M. & Palmer, M. L. (1992). 'Changes in and generalization of unrealistic optimism following experiences with stressful events: Reactions to the 1989 California Earthquake'. *Personality and Social Psychology Bulletin*, 18, pp. 39-43.

Beringer, J. (2000). 'Community fire safety at the urban/rural interface: The bushfire risk'. *Fire Safety Journal*, 35 (1), pp. 1-23.

Bernard, H. (1988). *Research methods in cultural anthropology*. California: Sage Publications.

Bettman, J.R., Payne, J.W. & Staelin, R. (1986). 'Cognitive considerations in designing effective labels for presenting risk information'. *Journal of Public Policy and Marketing*, 5, pp.1-28.

Bird, C. M. (2005). 'How I stopped dreading and learned to love transcription'. *Qualitative Enquiry*, 11, pp.226-248.

Blaikie, P., Cannon, T., Davis, I. & Wisner, B. (1994). *At risk: Natural hazards, people's vulnerability, and disasters.* London, Routledge.

Blanchard, B. & Ryan, R. L. (2003). 'Community perceptions of wildland fire risk and fire hazard reduction strategies at the wildland-urban interface in the northeastern United States'. In *Proceedings of the 2003 Northeastern Recreation Research Symposium*, pp. 284-294.

Blanchi, R., Leonard, J., Haynes, K., Opie, K., James, M. & Dimer de Oliveira, F. (2014). 'Environmental circumstances surrounding bushfire fatalities in Australia 1901– 2011.' *Environmental Science & Policy*, 37, pp. 192-203.

Blakely, W. F. (1965). '*A Key to the eucalypts: With descriptions of 522 species and 150 varieties*'. 3rd Edition. Canberra: Forest and Timber Bureau.

Blong, R.J. (1984). *Public views on disaster Response and the news media: some Australian Examples*. Mt Macedon, Australia: Australia Counter Disaster College.

Bolin, R. & Klenow, D. L. (1982-83). 'Response of the elderly to disaster: An age-stratified analysis'. *The International Journal of Aging and Human Development*, 16 (4), pp.283-296.

Bonyhady, T. & Griffiths, T. (2002). Words for country: landscape and language. Sydney: UNSW Press.

Boyatzis, R. E. (1998). *Transforming qualitative information: thematic analysis and code development.* New York: Sage.

Boyer, K.K., Olson, J.R. & Jackson, E.C (2001). 'Electronic surveys: Advantages and disadvantages over traditional print surveys'. *Decision Line*, pp. 4-7.

Brandtstädter, J. (1992). Personal control over development: Implications of self-efficacy. In R. Schwarzer (ed.), *Self-efficacy: Thought control of action*, pp. 127-145. Washington, DC: Hemisphere.

Braun, V. & Clarke, V. (2006). 'Using thematic analysis in psychology'. *Qualitative Research in Psychology*, 3. pp. 77-101.

Brehm, J. W. (1966). *A theory of psychological reactance.* New York: Academic Press.

Brehm, J. W., & Brehm, S. S. (1981). *Psychological reactance: A theory of freedom and control.* San Diego, CA: Academic Press.

Brehm, J.W. & Cohen, A.R. (1962). *Explorations in cognitive dissonance.* New Jersey: John Wiley & Sons Inc.

Breznitz, S. (1984). *Cry wolf: The psychology of false alarms.* London: Lawrence Erlbaum Associates.

Brickman, P., & Campbell, D. T. (1971). 'Hedonic relativism and planning the good society'. In M.H. Appley (ed.), *Adaptation-level* theory, pp. 287–305. New York: Academic Press.

Brockner, J. & Elkind, M. (1985). 'Self-esteem and reactance: further evidence of attitudinal and motivational consequences'. *Journal of Experimental Social Psychology*, 21, pp.356-361.

Brown, J. & Damery, S. (2002). 'Managing flood risk in the UK: towards an integration of social and technical perspectives'. *Transactions of the Institute of British Geographers,* 27 (4), pp. 412-426.

Building Commission Victoria. (2010). 'Publications and Fact Sheets'. Official website. 19 November 2010. http://www.buildingcommission.com.au/www/html/2436-publications-and-fact-sheets.asp

Bureau of Meteorology. (1982). Climate statistics for Australian locations. http://www.bom.gov.au/climate/averages/tables/cw_086071_All.shtml

_____ (1983). Climate Education. 'The Melbourne Dust Storm of 1983'.http://www.bom.gov.au/lam/climate/levelthree/c20thc/storm7.htm

_____ (2003). 'Annual climate summary - 2003'. http://www.bom.gov.au/climate/annual_sum/2003/index.shtml [15 May 2011]

_____ (2009). 'Bushfires in Victoria, 7-8 February 2009'. http://www.bom.gov.au/vic/sevwx/fire/20090207/20090207_bushfire.shtml [22 May 2011]

_____ (2013). 'Bushfire Weather'. http://www.bom.gov.au/weather-services/bushfire/about-bushfire-weather.shtml [30 June 2011]

Burr, V. (2003). *Social constructionism*. (2nd edition), London: Routledge.

Burton, I. & Kates, R.W. (1964). 'The Perception of natural hazards in resource management'. *Natural Resources Journal*, 3 (3), pp. 412-441

Burton, I., Kates, R.W., White, G.F. (1993). The Environment as Hazard. 2nd edition. London: The Guilford Press.

Bushnell, S. & Cottrell, A. (2007). 'Living with bushfires: What do people expect?' In D. King & A. Cottrell (eds.), *Communities Living with Hazards, Centre for Disaster Studies*, pp. 215-253. Townsville: James Cook University.

Buss, D. M., Craik, K. H. & Dake, K.M. (1986). 'Contemporary worldviews and perception of the technological system'. In V.T.Covello & J.Mumpower (eds.), *Risk evaluation and Management*, pp.93-130, New York: Plenum.

Button, G. V. (2002). 'Popular media reframing of man-made disasters'. In S. M. Hoffman & A. Oliver-Smith (eds.), *Catastrophe and Culture: the Anthropology of Disasters*, pp.143-158. Santa Fe: School of American Research Press.

Byrne, D. (1964). 'Repression–sensitization as a dimension of personality'. In B. A. Maher (ed.), *Progress in Experimental Personality Research,* 1, pp. 169–220. New York: Academic Press.

Campbell, A. (2003). 'Learning to live with fire'. In G. Gary, D. Lindenmayer & S. Dovers (eds.). *Australia Burning: fire ecology, policy and management issues*, Melbourne: CSIRO Publishing.

Carroll, J. (1982). *Intruders in the bush: The Australian quest for identity*. Melbourne: Oxford University Press.

Carroll, J. (ed.). (1992). *Intruders in the bush: The Australian quest for identity*, 2nd edition. Melbourne: Oxford University Press.

Cameron, D. (2001). *Working with spoken discourse*. London: Sage Publications.

Carson, C. (2004). 'The information unit: effective information flow to the community at risk during the onset of wildfire in Victoria'. AFAC Conference, *Are we prepared for future challenges?,* Perth, Western Australia.

CFA (2013). 'Fire Ready Kit'. Staying informed: Section Four, page 31. http://www.cfa.vic.gov.au/fm_files/attachments/plan_and_prepare/frk_2013/713 _CFA_2014_Section_4_web.pdf [26 May 2012]

Chaiken, S., Liberman, A. & Eagly, A. H. (1989). 'Heuristics and systematic information processing within and beyond the persuasion context'. In J. S. Uleman & J. A. Bargh (eds.), *Unintended thought: Limits of awareness, intention, and control*, pp. 212-252, New York: Guilford Press.

Chamberlain, E. R., Doube, L., Milne, G., Rolls, M. & Western, J. S. (1981). *The experience of cyclone Tracy.* Department of Social Security, Canberra: Australian Government Publishing Service.

Clode, D. (2010). *A future in flames.* Melbourne: Melbourne University Press.

Coates, L. (1999). 'Flood fatalities in Australia, 1788-1996'. *Australian Geographer*, 30 (3), pp. 391-408.

Cockburn, P. (2011). 'Catastrophe on camera: Why media coverage of natural disasters is flawed'. The Independent, 20 January 2011. http://www.independent.co.uk/news/media/tv-radio/catastrophe-on-camera-why-media-coverage-of-natural-disasters-is-flawed-2189032.html [16 Nov 2012]

Cohen, B.C. (1963). *The Press and foreign policy.* Princeton: Princeton University Press.

Cohen, D. & Crabtree, B. (2008), 'Semi-structured Interviews'. *Qualitative research guidelines project*. Robert Wood Johnson Foundation. http://www.qualres.org/HomeSemi-3629.html [21 Sept 2013]

Cohen, E., Hughes, P. & White, P. B. (2006). 'Battling ferocious flames: bushfire in the media'. *The Australian Journal of Emergency Management*, 21 (1), pp. 47-52.

_____(2006a). 'Media and bushfires: A community perspective of the media during the Grampians Fires 2006'. *Environmental Hazards*, 7, pp. 88-96.

Cohen, L., & Manion, L. (2000). *Research methods in Education*. 5th Edition. London: Routledge.

Coleman, C-L. (1993). 'The influence of mass media and interpersonal communication on societal and personal risk judgements'. *Communication Research*, 20, pp. 611-628.

Collins, P. (2006). *Burn: The epic story of bushfire in Australia.* Sydney: Allen and Unwin.

Cook, G., Bradstock, R. & Williams, D. (2010). 'Climate change, sea change & tree change: Bushfire and cyclone risk management'. Paper presented at the *Australasian Fire and Emergency Service Authorities Council Conference* in Darwin, November. Melbourne: The Commonwealth Scientific and Industrial Research Organisation.

Coombs, W. T. (2004). 'Impact of past crises on current crisis communications: Insights from: Situational crisis communication theory'. *Journal of Business Communication,* 41, pp. 265–289.

Coopersmith, S. (1967). *The antecedents of self-esteem.* San Francisco: W. H. Freeman.

Corbin, C. (1972). 'Mental practice'. In W. Morgan (ed.) *Ergogenic aids and muscular performance,* pp.93-118. New York: Academic.

Covello, V. (2002). 'Message mapping, risk and crisis communication'. Paper Presented at the *World Health Organization Conference on Bio-terrorism and Risk Communication*, Geneva, Switzerland.

Covello, V., & Sandman, P.M. (2001). 'Risk communication: Evolution and revolution'. In A. Wolbarst (ed.), *Solutions in an Environment in Peril*. Baltimore: John Hopkins University Press.

Cronin, K. (2007). *Risk communication and dialogue - A critical exploration of communication practices in the management of technological risk*. Thesis submitted in fulfilment of the requirements for the degree of Doctor of Philosophy, Victoria University, Wellington.

Cunningham, C. & Kelly, S. (2001). *Attrition of community knowledge of bushfire hazards: A case study of the Blue Mountains, New South Wales, Australia*. http://www.wsc.mass.edu/garp/faculty/sk/australia.htm [28 Sept 2013]

Curran, J. (2002). *Media and power.* London: Routledge.

Dake, K. (1991). 'Orienting dispositions in the perception of risk: An analysis of contemporary worldviews and cultural biases'. *Journal of Cross-Cultural Psychology,* 22, pp. 61-82.

Dake, K. (1992). 'Myths of nature: culture and the social construction of risk'. *Journal of Social Issues,* 48 (4), pp.21-37.

Dake, K. & Wildavsky, A. (1991). 'Individual differences in risk perception and risk-taking preferences'. In B. J. Garrick & W. C. Gekler (eds.), *The analysis, communication and perception of risk,* New York: Plenum.

Damasio A. R. (1994). *Descartes' error: Emotion, reason and the human brain*. New York: Grosset/Putnam.

Dash, N. & Gladwin, H. (2007). 'Evacuation decision making and behavioral responses: Individual and household'. Paper presented at the *Hurricane Forecast Socioeconomic Workshop*, February 16–18 2005, Pomona, California.

Davies, J. C., Covello, T.V. & Allen, F. W. (1986). 'Risk Communication'. Proceedings of the National Conference on Risk Communication held in Washington, D.C., January 29-31'. Washington, D.C: The Conservation Foundation.

Day Sclater, S., Yates, C., Price, H. & Jones, D. W. (2009). 'Introducing psychosocial studies of emotion'. In S. Day Sclater, D.W. Jones, H. Price & C. Yates (eds.), *Emotion: New Psychosocial Perspectives,* New York: Palgrave Macmillan.

'Developing a Unified All-Hazards Public Warning System' (2002). *Workshop on effective hazards warnings.* A Report by The Workshop on Effective Hazard Warnings, PPW Report 2002-02, pp.39, Partnership for Public Warning, Maryland.

Devereux, E. (2007). *Understanding the media.* 2nd edition, London: Sage Publications.

Dickenson, S. (2013). *Impact of social networks on information flow in fire-risk communities*. Thesis submitted in fulfilment of the requirements for the degree of Doctor of Philosophy, School of Social and Political Sciences, University of Melbourne, Victoria.

Donnell, A. J., Thomas, A. & Buboltz, W. C. Jnr. (2001). 'Psychological reactance: factor structure and internal consistency of the Questionnaire for the Measurement of Psychological Reactance'. *Journal of Social Psychology,* 141(5), pp:679-87.

Dow, K. & Cutter, S. L. (1998). 'Crying wolf: Repeat responses to hurricane evacuation orders'. *Journal of Coastal Management*, 26, pp.237-252.

Dowd, E. T., Wallbrown, F., Sanders, D., & Yesenosky, J. M. (1994). Psychological reactance and its relationship to normal personality variables. *Cognitive Therapy and Research*, 18, pp. 601-612.

_____(2000). 'Public orders and personal opinions: Household strategies for hurricane risk assessment'. *Environmental Hazards*, 2, pp. 143-155.

Downs, A. (1972). 'Up and down with ecology: The "Issue-Attention Cycle". *The Public Interest,* 28 (Summer), pp. 38-50.

Drabek, T. E. (1986). *Human system responses to disaster.* New York: Springer-Verlag.
_____ (1996). *Disaster evacuation behaviour: Tourists and other transients.* Institute of Behavioral Science, University of Colorado, Boulder.

_____ (2010). *The human side of disaster.* Florida: CRC Press.

Driscoll, M. P. (2004). *Psychology of learning for instruction.* 3rd edition. Upper Saddle River, NJ: Allyn & Bacon.

Dudo, A.D., Dahlstrom, M. F. & Brossard, D. (2007). 'Reporting a potential pandemic: A risk-related assessment of avian influenza coverage in U.S. newspapers'. *Science Communication*, 28, pp. 429-54.

Dunwoody, S. & Neuwirth, K. (1991). 'Coming to terms with the impact of communication on scientific and technological risk judgments'. In L. Wilkins & P. Patterson (eds.). Risky Business: Communicating Issues of Science, Risk, and Public Policy, pp. 11-30. New York: Greenwood Press.

Dynes, R. R. (1970). *Organised behaviour in disaster*. Lexington: D.C.Heath.

Eagly, A. H., Wood, W., & Chaiken, S. (1978). 'Causal inferences about communications and their effect on opinion change'. *Journal of Personality and Social Psychology*, 36, pp. 424 – 435.

Earthquake: The role of personal experience'. *Basic and Applied Social Psychology*, 21 (2), pp.119-129.

Eder, K. (1996). *The social construction of nature.* London: Sage Publications.

Edwards, D. (2005). 'Discursive psychology'. In K.L Fitch and R.E Sanders (eds.) *Handbook of Language and Social Interaction*, pp. 257-273. New Jersey: Erlbaum.

Edwards, J. A. (1993). 'Principles and contrasting systems of discourse transcription'. In J. A. Edwards & M. D. Lampert (eds.), *Talking data: Transcription and coding in discourse research,* pp. 3-32. Hillsdale, NJ: Lawrence Erlbaum.

Eiser, R. J., Bostrom, A., Burton I., Johnston, D. M., McClure J., Paton, D., van der Pligt, J. & White, M. P. (2012). 'Risk interpretation and action: A conceptual framework for responses to natural hazards'. *International Journal of Disaster Risk Reduction*, 1, pp.1-12.

Ellis, S., Kanowski, P. & Whelan, R. (2004). 'National inquiry into bushfire mitigation and management (COAG Inquiry)'. Canberra: Commonwealth of Australia. www.coagbushfireenquiry.gov.au/findings.htm [09 Oct 2013].

Emergency Management Australia. (2006). Hazards, disasters and your community: A booklet for students and the community. http://www.em.gov.au/Documents/Hazards,%20Disasters%20and%20Your%20Community.pdf [22 May 2012]

Emmerson, G. (2010). 'Introduction to survey design'. NZSSN 2011 Short Course Summer Program, Course Booklet.

Eriksen, C. & Gill, N. (2010). 'Bushfire and everyday life: Examining the awareness-action gap in changing rural landscapes'. *Geoform*, 41, pp. 814-825.

Fairfax Media. (2009). 'Worst day in history': Brumby warns of fire danger'. The Age, National, 6 February. http://www.theage.com.au/national/worst-day-in-history-brumby-warns-of-fire-danger-20090206-7zf1.html [14 June 2011]

Felz, D.L. & Landers, D.M. (1983). 'Effects of mental practices on motor skill learning and performance: a meta-analysis'. *Journal of Sport Psychology*, 5, pp.25-57.

Festinger, L. (1957). *A theory of cognitive dissonance*. California: Stanford University Press.

Finucane, M. L., Alhakami, A., Slovic, P. & Johnson, S. M. (2000). 'The affect heuristic in judgments of risks and benefits'. *Journal of Behavioral Decision Making*, 13 (1), pp.1-17.

Fischer, H.W. III. (2008). 'Response to disaster: Fact versus fiction and its perpetration'. *The Sociology of Disaster*. 3rd edition, New York: Lanham.

Fischer, H.W. & Bischoff, B.E. (1987). 'Perpetrating the community breakdown model: Portrayal of behavioural response to natural disasters in the national print media'. Paper presented at the *Annual Meeting of the Mid-South Sociological Association*.

Fischhoff, B. (2002). 'Risk perception, risk communication, risk taking'. *Journal of Psychology and Financial Markets,* 3, pp. 102-111.

Fischhoff, B. (2003). Hindsight ≠ foresight: The effect of outcome knowledge on judgment under uncertainty, *Quality & Safety in Health Care*, 12, 304-312

Fischhoff, B., and Beyth, R. (1975). "I knew it would happen" Remembered probabilities of once-future things'. *Organizational Behaviour and Human Performance*, 13, 1-16

Fischhoff, B., Slovic, P. & Lichtenstein, S. (1978). 'Fault trees: Sensitivity of estimated failure probabilities to problem representation'. *Journal of Experimental Psychology: Human Perception and Performance,* 4(2), pp. 330-344.

Fischhoff, B., Slovic, P., Lichtenstein, S., Read, S. & Combs, B. (1978). 'How safe is safe enough? A psychometric study of attitudes towards the technological risk and benefits'. *Policy Sciences*, 9, pp.127-152.

Fiske, J. (1987). *Television culture : Popular pleasures and politics*. New York: Methuen.

Fleishman, J. A. (1984). 'Personality characteristics and coping patterns'. *Journal of Health and Social Behavior,* 25, pp. 229-244.

Flannery, T. F. (1994). *The future eaters: an ecological history of the Australasian lands and people.* Sydney: Reed New Holland.

_____ (2002). 'The day, the land, the people'. 2002 Australia Day Address delivered at The Conservatorium of Music, Sydney. http://www.australiaday.com.au/whatson/australiadayaddress2.aspx?AddressID =12 [14 Dec 2013]

Flint, C. G. & Luloff, A. E. (2005). 'Natural resource-based communities, risk, and disaster: An intersection of theories'. *Society and Natural Resources*, 18(5), 399-412.

Flórez, K. R., Aguirre, A. N., Viladrich, A., Céspedes , A., De La Cruz, A. A. & Abraído-Lanza, A.F. (2009). 'Fatalism or destiny? A qualitative study and interpretative framework on Dominican women's breast cancer beliefs'. *Journal of Immigrant and Minor Health*, 11 (4), pp: 291–301.

Flynn, J., Burns, W., Mertz, C.K. & Slovic, P. (1992). 'Trust as a determinant of opposition to a high-level radioactive waste repository: Analysis of a structural model'. *Risk Analysis*, 12 (3), pp.417–429.

Folkes, V. S. (1988). The availability heuristic and perceived risk. *Journal of Consumer Research*, 15 (1), pp.13-23.

Fontaine, K. & Smith, S. (1995). 'Optimistic bias in cancer risk perception: a cross-national study'. *Psychological Reports*, 77, pp.143-146.

Fowler, C. (2013). 'Ignition Stories: Indigenous Fire Ecology in the Indo-Australian Monsoon Zone'. North Carolina: Carolina Academic Press.

Freund, A. M. & Riediger, M. (2001). 'What I have and what I do: The role of resource loss and gain throughout life'. *Commentary*, Max Planck Institute for Human Development and Education, Berlin. http://library.mpib-berlin.mpg.de/ft/af/AF_What_2001.pdf [11 Sept 2012]

Freudenberg, W. (1992). 'Nothing recedes like success?:Risk analysis and the organizational amplification of risk'. *Risk: Issues in Health and Safety*, Winter, pp. 1-35.

Friedman, S., Gorney, C., & Egolf, B. (1987). 'Reporting on radiation: A content analysis of Chernobyl coverage'. *Journal of Communication*, 37 (3), pp. 58-79.

Frith, H., Harcourt, D. & Fussell, A. (2007). 'Anticipating an altered appearance: Women undergoing chemotherapy treatment for breast cancer'. *European Journal of Oncology Nursing*, 11 5), pp. 385-391.

Galtung, J. & Ruge, M. (1965). 'The structure of foreign news: The presentation of the Congo, Cuba and Cyprus crises in four foreign newspapers'. *Journal of International Peace Research*, 1, pp.64-90.

Gamson, W.A. (1992). *Talking politics*. New York: University Press.

Gamson, W.A., Croteau, D., Hoynes, W. & Sasson, T. (1992). 'Media images and the social construction of reality.' Annual Review of Sociology 18, pp.373-93.

Gao, H., Barbier, G. & Goolsby, R. (2011). 'Harnessing the crowdsourcing power of social media for disaster relief, cyber physical social systems'. D. Zeng (ed.). http://wordpress.vrac.iastate.edu/REU2011/wp-content/uploads/2011/05/Harnessing-the-Crowdsourcins-Power-of-Social-Media-for-Disaster-Relief.pdf [22 Sept 2013]

Gardner, P.D., Cortner, H. J. & Widaman, K. (1987). 'The risk perceptions and policy response toward wildland fire hazards by urban home-owners'. *Landscape and Urban Planning*, 14, pp.163-172.

Gibbs, L. (2002). *Aesop's fables: A new translation*. Oxford: Oxford University Press.

Giddens, A. (1991). *Modernity and self-Identity: Self and society in the late modern age*. Cambridge: Polity Press.

Giddens, A. & Pierson, C. (1991). *Conversations with Antony Giddens: Making sense of modernity*. Cambridge: Polity Press.

Gilbert, J.B. (2004). 'The bushfire risk: Community awareness and perception on the rural-urban fringe of Melbourne'. London: University College.

Glanz, K. & Schwartz, M. (2008). 'Stress, coping and health behavior'. In K. Glanz, B. Rimer, and K. Viswanath, (eds.). *Health Behavior and Health Education: Theory, Research and Practice*, 4th edition, pp. 210–236. San Francisco: Jossey Bass.

Goffman, I. (1974) *Frame analysis*. New York: Harper & Row.

Golding, D. (1992). 'A social and programmatic history of risk research'. In S.Krimsky, & D. Golding (eds.), *Social Theories of Risk*, pp. 210-222. , Connecticut: Praeger Publishers.

Gough, J. (2000). 'Perceptions of risk from natural hazards in two remote New Zealand communities'. *The Australasian Journal of Disaster and Trauma Studies*, 2, pp.1-12.

Goodrick, D. & Emmerson, G. (2008). 'Mixed methods: From analysis to publication'. Course publication for New Zealand Social Sciences Network Workshop, February, Wellington.

Green, J., Franquiz, M. & Dixon, C. (1997). 'The myth of the objective transcript: Transcribing as a situated act'. *TESOL Quarterly,* 31, pp. 172-176.

Greeno, J. G. (1989). 'A perspective on thinking'. *American Psychologist*, 44 (2), pp. 134–141.

Greenglass, E. (2002). 'Proactive coping'. In]E. Frydenberg (ed.), *Beyond coping: Meeting goals, vision, and challenges*, pp. 37-62. London: Oxford University Press.

Gruntfest, E. & Carswell, K . (2001). *Impacts of a false alarm: The January 29, 2000 Ventura, California experience.* M.S. thesis. Dept. of Geography and Environmental Studies, University of Colorado at Colorado Springs.

Gullatte, M.M., Magee, M., Brawley, O., Kinney, A., Powe, B. & Mooney, K. (2010). 'Religiosity, spirituality, and cancer fatalism beliefs on delay in breast cancer diagnosis in African American women'. *Journal of Religion and Health*, 49 (1), pp. 62-72.

Gunther, A. G. (1991). 'What we think others think: Cause and consequence in the third-person effect'. *Communication Research*, 18, pp. 355-372.

Gutteling, J. M. & Weigman, O. (1996). Exploring risk communication. *Advances in Natural and Technological Hazards Research*, 8, Boston: Kluwer Academic Publishers. pp 32-40.

Hall, C. M. (2002). 'Travel safety, terrorism and the media: The significance of the issue-attention cycle'. *Current Issues in Tourism*, 5 (5), pp. 458-466.

Handmer, J.W. (2000). 'Are Flood Warnings Futile? Risk Communication in Emergencies'. *The Australian Journal of Disaster and Trauma Studies*, 2000-2, pp. 1-14.

Handmer, J. (1992). 'Can we have too much warning time?: A study of Rockhampton'. *Macedon Digest*, 7 (2), pp. 8-10.

Handmer, J., O'Neill, S. & Kallalea, D. (2010). 'Review of fatalities in the February 7 2009 bushfires'. *Final Report prepared for the Victorian Bushfires Royal Commission*, Centre for Risk and Community Safety RMIT University, Melbourne.

Handmer, J. & Penning-Roswell, E. (1990) *Hazards and the communication of risk*. J.Handmer & E. Penning-Roswell (eds.), Aldershot: Gower Technical.

Handmer, J. & Tibbits, A. (2005). 'Global environmental change: Part B'. *Environmental Hazards*, 6 (2), pp. 81-91.

Hansen, J., Marx, S., Weber, E. U. (2004). 'The role of climate perceptions, expectations, and forecasts in farmer decision making: The Argentine Pampas and South Florida'. *International Research Institute for Climate Prediction* (IRI), Technical Report 04-01, Palisades, New York.

Harre, R. (1974). 'Blueprint for a new science'. In A. Nigel (ed.) *Reconstructing Social Psychology*, Balitmore: Penguin Books.

Hart, L. (1962). *Strategy*. New York: Praeger.

Haslam, N. (2005). 'Dimensions of Folk Psychiatry'. *Review of General Psychology*, 9(1), pp. 35-47.

Haynes, K., Handmer, J., McAneney, J., Tibbits, A. & Coates, L. (2010). 'Australian Bushfire fatalities 1900-2008: exploring trends in relation to the 'Prepare, stay and defend or leave early' policy'. *Environmental Science and Policy*, 13, pp. 185-194.

Helweg-Larsen, M. (1999). '(The lack of) optimistic biases in response to the 1994 Northridge Earthquake: The Role of Personal Experience'. *Basic and Applied Social Psychology*, 21 (2), pp.119-129.

Heimer, C. (1988). 'Social structure, psychology and the estimation of risk'. *Annual Review of Sociology*, 14, pp.491-519.

Heine, S. J., Lehman, D. R. (1995). 'Cultural variation in unrealistic optimism: Does the West feel more vulnerable than the East? *Journal of Personality and Social Psychology*, 68(4), pp. 595-607.

Helson, H. (1964). *Adaptation-level theory*. New York: Harper and Row.

Henderson, B. & McKinney, P. (2003). 'Talk is cheap'. *Fire Chief*, 47 (9), pp.54-55.

Henderson, S. (1977). 'The social network, support and neurosis: The function of attachment in adult life'. *British Journal of Psychiatry*, 131, pp. 185-191.

Hennessy, K., Lucas, C., Nicholls, N., Bathols, J., Suppiah, R. & Ricketts, J. (2005). 'Climate change impacts on fire-weather in south-east Australia'. CSIRO Marine and Atmospheric Research and the Bushfire CRC and Australian Bureau of Meteorology, Victoria.

Hepworth, D.H., Rooney, R.H., Dewberry Rooney, G., Strom-Gottfried, K. & Larsen, J.A. (2010). *Direct social work practice: Theory and skills*. 8th edition, California: Brooks/Cole.

Hillis, W.E. (1967). 'Polyphenols in the leaves of eucalyptus: A chemotaxonomic Survey—II: The Sections Renantheroideae and Renantherae'. *Phytochemistry*, 6 (22), pp.259-274.

Hobfoll, S.E. (1989). 'Conservation of resources: A new attempt at conceptualizing stress'. *American Psychologist*, 44(3), pp. 513-524.

Hoffman, S.M. (2002). 'The monster and the mother: The symbolism of disaster'. In S. M. Hoffman & A. Oliver-Smith (eds.), *Catastrophe and Culture: the Anthropology of Disasters*, pp. 113-141. Santa Fe: School of American Research Press.

Holahan. C. J. & Moos, R.H. (1987). 'Personal and contextual determinants of coping strategies'. *Journal of Personality and Social Psychology*, 52 (5), pp.946-955.

Hong, S. M., & Faedda, S. (1996). Refinement of the Hong psychological reactance scale. *Educational and Psychological Measurement*, 56, pp. 173-182.

Hong, S. M. & Ostini, R. (1989). 'Hongs Psychological Reactance Scale: A further analytic validation'. *Psychological Reports*, 70, pp. 707-710.

Horowitz, M. (1976). *Stress response syndromes*. New York: Aronson.

_____ (1979). 'Psychological response to serious life events'. In V. Hamilton & D. M. Warburton (eds.), *Human stress and Cognition: An information processing approach*, pp. 237-265. Chichester: Wiley.

Howard, G. S. (1984). 'A modest proposal for a revision of strategies for counselling research'. *Journal of Counselling Psychology*, 31 (4), pp. 430-441.

Howarth, C. (2006). 'A social representation is not a quiet thing: Exploring the critical potential of social representations theory'. *British Journal of Social Psychology*, 45, pp.65-86.

Hovland, C. R. & Weiss, W. (1952). 'The influence of sources credibility on communication effectiveness'. *Public Opinion Quarterly*, 15, pp. 635-650.

Hughes, ,P & White, P.B. (2005). 'Bushfires and the media'. Report prepared for the Bushfire Cooperative Research Centre, Media Studies Program, La Trobe University, Melbourne. http://www.latrobe.edu.au/humanities/research/research-projects/past-projects/bushfires-and-the-media [27 Sept 2013]

IPCC (2007). 'Climate change 2007: The physical science basis'. Contribution of Working Group I to the *Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge University Press.

Iyengar, S. (1991). *Is anyone responsible?: How television frames political Issues*. London: The University of Chicago Press.

Jacoby, L.L. (1983). 'Perceptual enhancement: Persistent effects of an experience'. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 9 (1), 21-38.

Janis, I. L. (1962). 'Psychological effects of warnings'. In G. Baker and D. Chapman (eds.), *Man and Society in Disaster*, pp. 55-91. New York: Basic Books.

Johnson, B. B. & Sandman, P. M. (1992). *Outrage and technical detail: The impact of agency behavior on community risk perception*. New Jersey: New Jersey Department of Environmental Protection and Energy Division of Science and Research.

Johnson, C.E. (2011). 'The role of worst case scenarios in bushfire decision making: Research findings and recommendations'. Paper presented at the *2011 AFAC conference*, Sydney.

Joffe, H. (2003). 'Risk: From perception to social representation'. *British Journal of Social Psychology*, 42, pp.55-73.

Jones, R. (1969). 'Fire Stick farming'. *Australian Natural History,* pp. 224-228.

Joubert, C. E. (1990). 'Relationship among self-esteem, psychological reactance and other personality variables'. *Psychological Reports*, 66, pp. 111-119.

Jovchelovitch, S. (1996). 'In defence of representations'. *Journal for the Theory of Social Behaviour*, 26 (2), pp. 121-135.

Kahnemen, D. (2011). *Thinking, fast and slow*. New York: Farrar, Straus and Giroux.

Kahneman, D., Slovic, P. & Tversky, A. (1982). *Judgement under uncertainty: Heuristics and biases*. Cambridge: Cambridge University Press.

Kahneman, D., & Miller, D.T. (1986). 'Norm theory: Comparing reality to its alternatives'. *Psychological Review*, 93, 136–153.

Kahneman, D. & Tversky, A. (1979). 'Prospect theory: An analysis of decision under risk'. *Econometrica*, 47, pp. 263-291.

Kaplan, S. (1995). 'The restorative benefits of nature: Toward an integrative framework'. *Journal of Environmental Psychology*, 15, pp.169-182.

Kasperson. J.X., Kasperson, R.E and Turner, II, B.L. (eds.) (1995). *Regions at risk: Comparisons of threatened environments.* Tokyo: United Nations University Press.

Kasperson, R.E. (1988) The social amplification of risk: A conceptual framework. *Risk Analysis,* vol 8 pp. 177-87.

_____ (1992). 'The social amplification of risk: progress in developing an integrative framework'. In S. Krimsky & D. Golding (eds.), *Social Theories of Risk*, Westport Ct: Praeger.

Kasperson, R.E. & Kasperson, J.X .(1996). 'The social amplification and attenuation of risk'. *The Annals of the American Academy of Political and Social Science*, 545, pp. 95-105.

Kates, R.W. (1962). Hazard and choice perception in flood plain management. University of Chicago, Department of geography research, Paper no. 78.

_____ (1985). 'The interaction of climate and society'. In R.W. Kates, J.H. Ausubel & M.Berberian (eds.), *Climate Impact Assessment: Studies of the Interaction of Climate and Society*, pp. 3-36. Massechussettes: John Wiley.

Kazdin, A.E. (1978). 'Covert modelling: The therapeutic application of imagined rehearsal'. In J. L. Singer and K. S. Pope (eds.), *The power of human imagination: new methods in psychotherapy (Emotions, personality and psychotherapy)*, pp.255-278. New York: Plenum.

Kelly, G. A. (1955). *The Psychology of personal constructs*. New York: W.W.Norton.

Kitzinger, J. (2000). 'Media templates: Patterns of association and the (re)construction of meaning over time'. *Media, Culture and Society*, 22 (1), pp. 64-84.

Knight, S. (1996). 'Our land our life' card. Aboriginal and Torres Strait Islander Commission, Canberra. http://www.creativespirits.info/aboriginalculture/spirituality/ [26 Jan 2012]

Krimsky, S. (1992). 'The role of theory in risk studies'. In S.Krimsky, & D. Golding (eds.), *Social Theories of Risk*, pp. 210-222. Connecticut: Praeger Publishers.

Krohne, H.W. (2002). 'Stress and coping theories'. Johannes Gutenberg-Universität Mainz Germany. http://userpage.fu-berlin.de/~schuez/folien/Krohne_Stress.pdf [20 Sept 2012]

Kruglanski, A. W. & Ajzen, I. (1983). 'Bias and error in human judgment'. *European Journal of Social Psychology*, 13, pp.1-44.

Krusel, N. & Petris, S.N. (1992). 'A study of civilian deaths in the 1983 Ash Wednesday bushfires Victoria, Australia'. *CFA Occasional Paper No 1.* Mount Waverley: Country Fire Authority.
http://www.cfa.vic.gov.au/publications/casestudykrusel.htm [14 July 2013]

Kumagai, Y., Carroll, M.S. & Cohn, P. (2004). 'Coping with interface wildfire as a human event: Lessons from the disaster/hazards literature'. *Journal of Forestry*, 102(6), 28-32.

Kunda, Z. (1990). 'The case for motivated reasoning'. *Psychological Bulletin*, 108 (3) pp.480-498.

Lachlan, K.A & Spence, P.R. (2007). 'Hazard and outrage: Developing a psychometric instrument in the aftermath of Katrina'. *Journal of Applied Communication Research,* 35 (1), pp. 109-123.

Lang, K. & Lang, G. E. (1989). 'Collective memory and the news'. *Communication*, 11, pp.123-139.

Lapadat, J. C. & Lindsay, A. C. (1999). 'Transcription in research and practice: From standardization of technique to interpretive positionings'. *Qualitative Inquiry,* 5 (1), pp. 64-86.

Larson, J.F. (1980). 'A review of the art in mass media reporting'. In *Disasters and the Mass Media: Proceedings of the Committee on Disasters and the Mass Media Workshop,* February 1979. Washington, D.C.: National Academy of Sciences.

Lazarus, R.S (1966). *Psychological stress and the coping process*. R. Lazarus, (ed.) New York: McGraw-Hill.

_____ (1991). *Emotion and adaptation*. New York: Oxford University Press.

Lazarus, R. & Folkman, S. (1984). *Stress, appraisal, and coping*. New York: Springer Verglag.

Lehto, M.R & Miller, J.M. (1986). *Warnings volume 1: Fundamentals, design and evaluation methodologies.* Minnesota: Fuller Technical Publications.

Leiss, W. (1996) Three phases in the evolution of risk communication practice. *Annals of the American Academy of Political and Social Science,* vol 545 (May) pp. 85-94.

Lemke, J. L. (1995). *Textual politics: Discourse and social dynamics*. London: Taylor & Francis.

Lewin, K. (1948). *Resolving social conflict*. New York: Harper and Row.

Lewis, H. T. (1989). 'Burning the top end: Kangaroos and cattle'. In J.E Lotan, B.M Kilgore, W.C Fischer and R.W Mutch (eds.), Proceedings, Symposium and Workshop on Wilderness Fire, *WAIT Environmental Studies Group Report No 14,* Western Institute of Technology, Perth.

Lewis, H. T. (1989) Ecological and Technical Knowledge of Fire: Aborigines versus Park Rangers in Northern Australia, *American Anthropologist*, 91(4), pp.940-961.

Levi-Strauss, C. (1962). *Structural anthropology.* New York: Basic Books.

Lin, N., Simeone, R., Ensel, W., and Kuo, W. (1979). 'Social support, stressful life events, and illness: A model and an empirical test'. *Journal of Health and Social Behavior*, 20, pp.108-119.

Lindell, M.K., Perry, R.W. (2000). 'Household adjustment to earthquake hazard: A review of the literature'. *Environment and Behavior*, 32 (4), pp. 461–501.

Lippmann, W. (1922). *Public opinion.* New York: Macmillan.

Liu, Y., Goodrick, S. & Heilman,. W.E. (2013). 'Wildland fire emissions, carbon and climate: Wildfire-climate interactions'. *Forest Ecology and Management* (In Press).

Lofstedt, R. (2003) Risk communication: Pitfalls and promises. *European Review*, 11 (3), pp. 417-35.

Luke, R. H. & McArthur, A.G. (1978). *Bushfires in Australia*. Canberra: Australian Government Publishing Service.

Lupton, D. & Tulloch, G. (2003). *Risk and everyday life.* London: Sage Publications.

Lupton, D. & Tulloch, J. (2002). 'Risk is part of your life: Risk epistemologies among a group of Australians'. *Sociology*, 36(2), 317-334.

Luthans, F. & Youssef, C.M. (2004). 'Human, social, and now positive psychological capital management: Investing in people for competitive advantage'. *Organizational Dynamics*, 33(2) pp. 143-160.

Lyne, A. (1996). 'An Introduction to the Eucalypts: The Genera Eucalyptus, Corymbia and Angophora'. *Centre for Plant Biodiversity Research and Australian National Herbarium*, Canberra.

McCaffrey, S. (2004). 'Thinking of wildfire as a natural hazard'. *Society and Natural Resources*, 17(6), 509-516.

McCombs, M. & Reynolds, A. (2002). 'News influence on our pictures of the world'. In B. Jennings & D. Zillman (eds.), *Media effects: Advances in theory and research*. New Jersey: Lawrence Elbaum.

McDaniels, T. L., Axelrod, L. J., Cavanagh, N. S. & Slovic, P. (1997). 'Perception of ecological risk to water environments'. *Risk Analysis*, 17 (3) pp. 341-352.

McEwan, I. (1997). *Enduring love.* London: Jonathan Cape.

McGee, T.K. & Russell, S. (2003). 'It's just a natural way of life…: An investigation of wildfire preparedness in rural Australia'. *Environmental Hazards*, 5(1), 1-12.

McGregor, J. (2002).' Restating news values: Contemporary criteria for selecting the news'. In M. R.Power, (ed.). Proceedings of ANZCA 2002 Conference - Communication: Reconstructed for the 21st Century. http://www.bond.edu.au/hss/communication/ANZCA/journpapers.htm. [26 Sept 2013]

McGuire, W. (1969). 'The nature of attitudes and attitude change'. In G. Lindzey & E. Aronson, (eds.), *Handbook of Social Psychology*, 3, Eading MA: Addison-Wesley.

McKay, J.M. (1983). 'Newspaper reporting of bushfire disaster in south eastern Australia-Ash Wednesday'. *Disasters,* 7 (3), pp.283–291.

McKay, J.M. (1996). 'Reflecting the hazard or stating old views: Newspaper and bushfires in Australia'. *International Journal of Mass Emergencies and Disasters,* 14 (3), pp. 305-319.

McKinlay, A. & Potter, J. (1987). 'Social representations: a conceptual critique'. *Journal for the Theory of Social Behaviour,* 17, pp. 471-88.

McLennan, J., Elliott, G. & Omodei, M. (2012). 'Householder decision-making under imminent wildfire threat: stay and defend or leave? *International Journal of Wildland Fire*, 21, pp.915–925.

McLennan, J., Elliot, G., Omodei, M., Dunlop, P. & Suss, J. (2011). 'Bushfire survival-related decision ,making: What the stress and performance research literature tell us'. Proceedings of *Bushfire CRC & AFAC Conference Science Day*, R.Thornton (ed.), Sydney, Australia.

McLennan,J., Omodei, M., Elliott, G. & Holgat, A. (2011). 'Deep survival: Experience of some who lived when they might have died in the 7 February 2009 Bushfires'. *Australian Journal of Emergency Management,* 26 (2), pp. 1-6. http://www.em.gov.au/Publications/Australianjournalofemergencymanagement /Pages/AJEMvolume26/DeepSurvivalExperienceofsomewholivedwhentheymigh thavediedinthe7February2009Bushfires.aspx [23 Sept 2013]

McLennan, J., Omodei, M., Elliott, G., McNeill, I., Dunlop, P.& Suss, J. (2011). 'Bushfire survival-related decision-making: what the stress and human performance literature tells us'. In Proceedings of the *Bushfire Cooperative Research Centre & AFAC 2011 Conference Science Day*. (ed.) R.P. Thornton, pp. 307–319. Bushfire Cooperative Research Centre: Melbourne. http://www.bushfirecrc.com/ managed/resource/307-319_bushfire_survival- related_decision_making [3 July 2013]

Mackie, B. (2009). *Health risk communication: Reporting of Avian influenza in New Zealand newspapers 2002-2008.* A thesis submitted in fulfilment of the requirements for the degree of Master of Arts in Sociology, School of Social and Political Sciences, University of Canterbury.

_____ (2012). 'Warning fatigue, the myths of 'Cry Wolf'. *Fire Australia,* Joint publication of the FPA Australia, AFAC, BushfireCRC and IFE Australia, Summer, pp.42-43.

MailOnline. (2013). 'Italian scientists and one official jailed for six years for failing to predict 2009 earthquake that killed 300'. December 8, News Home.http://www.dailymail.co.uk/news/article-2221417/Italian-scientists-guilty-manslaughter-LAquila-quake-trial.html [08 Dec 2013]

Manuti, A., Traversa, R. & Mininni, G. (2012). 'The dynamics of sense making: A diatextual approach to the intersubjectivity of discourse'. *Text & Talk*, 32 (1), pp.39–61.

Marks, L.A., Kalaitzandonakes, N., Wilkins, L. & Zakharova, L. (2007). 'Mass media framing of biotechnology news'. *Public Understanding of Science*, 16, pp. 183-203.

Markus, H & Kitayama, S. (1991). 'Culture and the self: Implications for cognition, emotion, and motivation'. *Psychological Review*, 98, pp. 224-253.

Marshall, D.P. (1994). 'Panic Television: Bushfires and the Media Future' *Meanjin*, Spring, pp. 537-543.

Marshall, G. & Lang, E.L. (1990). 'Optimism, self-mastery and symptoms of depression in women professionals'. *Journal of Personality and Social Psychology*, 59, pp 132-139.

Martin, W.E., Martin, I. M. & Kent, B. (2009). 'The role of risk perceptions in the risk mitigation process: The case of wildfire in high risk communities'. *Journal of Environmental Management*, 91, pp. 489–498.

May, T. (2002). *Qualitative research in action.* London: Sage.

Meacham, B.J. (2004). 'Understanding risk: Quantification, perceptions, and characterization'. *Journal of Fire Protection Engineering*, 14(3), 199-227.

Merz, J. (1983). 'A questionnaire for the measurement of psychological reactance'. *Diagnostica*, 29(1), pp. 75-82.

Middleton, D. & Edwards, D. (1990). *Collective remembering.* London: Sage.

Mileti, D. S.(1999). *Disasters by design: A Reassessment of natural hazards in the United States.* Washington, D.C.: The Joseph Henry Press.

Mileti, D.S & O'Brien, P.W. (1992). 'Warnings during disaster: Normalizing communicated risk'. *Social Problems*, 39 (1), pp. 40-57.

Mileti, D.S.& Peek, L. (2000). 'The social psychology of public response to warnings of a nuclear power plant accident'. *Journal of Hazardous Materials*, 75, pp. 181–194.

Mileti, D. S. & Sorenson, J. (1990). *Communication of emergency public warnings: A social science perspective and state-of-the-art assessment.* Tennessee: Oak Ridge National Laboratory.

Miller, J. D. (1987). 'Reaching the attentive and interested public for science'. In S M Friedman, S Dunwoody and C L Rogers (eds.), *Scientists and journalists: reporting science as news*, pp. 55-69. New York: Free Press.

Miller, N.E. & Dollard, J. (1941). *Social learning and imitation.* New Haven: Yale University Press.

Miller, S.I., Carter, W. & Stephens, R.G. (1984). 'Report of the Bushfire Review Committee on Bushfire Disaster Preparedness and Response in Victoria, Australia, following the Ash Wednesday Fires, February 16, 1983'. Melbourne: Ministry for Police and Emergency Services.

Miller, S. M. (1987). 'Monitoring and blunting: Validation of a questionnaire to assess styles of information seeking under threat'. *Journal of Personality and Social Psychology*, 52, pp. 345–353.

Mills, C. Wright. (1959). *The sociological imagination.* New York: Oxford University Press.

Moloney, G. & Walker. I. (2002). 'Talking about transplants: Social representations and the dialectical, dilemmatic nature of organ donation and transplantation'. *British Journal of Social Psychology*, 41, pp.299–320.

Monat, A., Averill, J.R. & Lazarus, R.S. (1972). 'Anticipatory stress and coping reactions under various conditions of uncertainty'. *Journal of Personality and Social Psychology*, 24, pp.237-253.

Monthly Weather review, Bureau of Meteorology (1982): Victoria; December. http://www.bom.gov.au/climate/mwr/ [16 Nov 2013]

Montz, B.E. (1993). 'Hazard area disclosure in New Zealand: The impacts on residential property values in two communities'. *Applied Geography*, 13(3), 225-242.

Moore, D.P. & Moore, J.W. (1996). 'Post hurricane burnout: An island township's experience'. *Environment and Behavior*. 28, pp. 134-155.

Moscovici, S. (1973). 'Foreword'. In C. Herzlich (ed.), *Health and illness: A social psychological Analysis*, London: Academic Press.

_____ (1984). 'The phenomenon of social representations'. In R. Farr & S. Moscovici (eds.), *Social Representations*, pp. 3–69. Cambridge: Cambridge University Press.

_____ (1993). *The invention of society: Psychological explanation to social phenomena*, Cambridge: Polity Press.

_____ (1998). 'The history and actuality of social representations'. In U. Flick (ed.), *The psychology of the social*, Cambridge: Cambridge University Press.

Mullen, B. & Suls, J. (1982). 'The effectiveness of attention and rejection as coping styles: A meta-analysis of temporal differences'. *Journal of Psychosomatic Research*, 26, pp. 43–49.

Murdock, G., Horlick-Jones, T. & Petts, J. (2001) *Social amplification of risk: The media and the public*. London: HSE Books.

National Research Council. (2006). *Facing hazards and disasters: Understanding human dimensions*. Washington: The National Academies Press.

Neuman. W. L. (1994). *Social research methods: Quantitative and qualitative approaches*. Boston: Allyn and Bacon.

Neustadt, R.E. & May, E.R. (1988). *Thinking in time: The uses of history for decision makers*. New York: The Free Press.

Nicholson, J. (1994). 'Mass evacuation: Is total evacuation of a community threatened by wildfire a sound strategy? Paper presented to Institution of Fire Engineers, New South Wales Branch, State Conference, Sydney.

Nigg, J. M. (1995). 'Risk communication and warning systems'. In T. Horlick-Jones, A. Amendola & R. Casale (eds.), *Natural Risk and Civil Protection*, London: E & FN Spon.

Nunn, A. (2009). *Eating disorder and the experience of self: An interpretative phenomenological analysis.* A Thesis submitted in partial fulfilment of the requirements of the University of Hertfordshire for the degree of Doctor of Clinical Psychology.
https://uhra.herts.ac.uk/dspace/bitstream/2299/4513/1/Amanda%20Nunn%20-%20DClinPsy%20research%20thesis.pdf [27 May 2010]

Odgers, P. & Rhodes, A. (2002). *Community response to the New South Wales bushfires 2001-2002.* Melbourne: The Australasian Fire Authorities Council.

Olick, J. L. (2007). 'Collective memory. *International Encyclopaedia of the Social Sciences, 2nd edition*'.
http://www.virginia.edu/sociology/publications/faculty%20articles/OlickArticles/galecm.pdf [13 Jan 2012]

Packham, D. (1992). 'Bushfires in Australia'. *Australian Planner*, 30 (1), pp. 8-12.

Pajares, F. & Miller, M. D. (1994). 'The role of self-efficacy and self-concept beliefs in mathematical problem-solving: A path analysis'. *Journal of Educational Psychology*, 86, pp.193-203.

Pajares, F. & Schunk, D. H. (2001). 'Self-beliefs and school success: Self-efficacy, self-concept, and school achievement'. In R. Riding & S. Rayner (eds.). *Self-perception*, pp. 239-266) London: Ablex Publishing.

Palen, L. (2008). 'Online social media in crisis events'. *EDUCAUSE Quarterly*, 31 (3), pp. 76-78.

Palmlund, I. (1992). 'Social drama and risk evaluation'. In S.Krimsky, & D. Golding (eds.), *Social theories of risk*, pp. 210-222, Connecticut: Praeger.

Pan, Z. (2008). Framing of the news. In *The International Encyclopaedia of Communication Online.* W. Donsbach (ed.). Malden: Wiley/Blackwell Publishing.

Parducci, A. (1995). *Happiness, pleasure, and judgment: The contextual theory and its applications.* Mahwah, NJ: Erlbaum.

Park, A. (2006). 'Surveys and secondary data sources: Using survey data in social science research in developing countries'. In E. Perecman & S. R. Curran (eds.), *A handbook for social science field research*: Essays & bibliographic sources on research design and methods, pp. 118-142. London: Sage Publications Inc.

Parker, D. & Handmer, J. (1997). 'The role of unofficial flood warning systems.' *Journal of Contingencies and Crisis Management,* 6(1), pp.45-60.

Parsons S.K., Cruise P.L., Davenport, W.M & Jones, V. (2006). 'Religious beliefs, practices and treatment adherence among individuals with HIV in the Southern United States'. *AIDS Patient Care & STDs,* 20(2), pp. 97-111.

Paton, D. (2006). 'Warning Systems: Issues and considerations for warning the public'. *Bushfire Cooperative Research Centre Report*, Program C: Community Self Sufficiency for Fire Safety, (November).

Peacock, E.T. & Wong, P.T.P. (1996). 'Anticipatory stress: The relation of locus of control, optimism and control appraisals to coping'. *Journal of Research in Personality,* 30 (2), pp.204-222.

Pearlin, L. & Schooler, C. (1978). 'The structure of coping'. *Journal of Health Social Behaviour,* 19, pp.2-21.

Pechmann, C. (2001). 'A comparison of health communication models: Risk learning versus stereotype priming'. *Media Psychology*, 3, pp.189-210.

Perse, E.M. (2001). *Media effects and society.* London: Lawrence Erlbaum Associates.

Peters, B.G. & Hogwood, B.W. (1985). 'In search of the issue attention cycle'. *The Journal of Politics,* 47 (1), pp. 238-53.

Pidgeon, N., Kasperson, R.E. & Slovic, P. (2003) *The social amplification of risk.* Cambridge: Cambridge University Press.

Potter, J. (1996). *Representing reality: Discourse, rhetoric and social construction.* London: Sage.

_____ (2012). 'Discourse analysis and discursive psychology'. In H. Cooper, (ed.), *APA handbook of research methods in psychology: Vol. 2. quantitative, qualitative, neuropsychological, and biological*, pp. 111-130. Washington: American Psychological Association Press.

Punongbayan, R. S. & Newhall, C.G. (1999). 'Early warning for the 1991 eruptions of Pinatubo Volcano : A success story'. In *Proceedings of the WMO/UNESCO sub-forum on Science and Technology in support of Natural Disaster Reduction* , pp. 140-149. Geneva, World Meteorological Organisation. http://w1npp.org/wx1gyx.org/topics/WMO/181168~1.PDF#page=154. [14 June 2011]

Pyne, S. (1995). *World fire: The culture of fire on earth.* New York: Henry Holt and Company.

Pyne, S.J (1998). *Burning bush: A fire history of Australia*. Washington DC: University of Washington Press.

Pyszczynski, T. & Greenberg, J. (1987). 'Toward and integration of cognitive and motivational perspectives on social inference: A biased hypothesis-testing model'. In L. Berkowitz (ed.), *Advances in experimental social psychology.* 20, pp. 297-340, New York: Academic Press.

Quarantelli, E.L. (1990). 'The warning process and evacuation behaviour: The research evidence'. Prelim paper #148, Disaster Research Centre University of Delaware.

Quarantelli, E.L. (1995). 'What is a Disaster'. International Journal of Mass Emergencies and Disasters, 13 (3), pp. 221-229.

Quarantelli, E. L. & Dynes, R. R. (1972). 'When disaster strikes (it isn't much like what you've heard and read about)'. *Psychology Today*, 5, pp.66-70.

Ratcliff, R. & McKoon, G. (1988). 'A retrieval theory of priming in memory'. *Psychological Review*, 95 (3), pp.385—408.

Rayner, S. (1992). 'Cultural theory and risk analysis'. In S. Krimsky & D. Golding (eds.), *Social Theories of Risk*, pp. pp. 83-115. Connecticut: Praeger.

Reker, G.T & Wong, P.T.P (1984). 'Personal optimism, physical and mental health: the triumph of successful aging'. In J. E. Birren & J. Livingston (eds.), *Cognition stress and aging,* pp.134-173, New York: Prentice-Hall.

Renn, O. (1992). 'Concepts of risk: a classification'. In S.Krimsky, & D. Golding (eds.), *Social Theories of Risk*, pp. 53-79. Connecticut: Praeger Publishers.

Renn, O., Burns, W.J., Kasperson, R.E., Kasperson, J.X. & Slovic, P. (1992) The social amplification of risk: Theoretical foundations and empirical applications, *Journal of Social Issues*, vol 48 (4) pp. 137-60.

Renn, O. & Levine, D. (1991). 'Credibility and trust in risk communication'. In R. E. Kasperson & P. J. M.Stallen (eds.), *Communicating Risks to the Public*, pp. 175 – 218. Dordrecht : Kluwer.

'Review of fatalities in the February 7, 2009, bushfires', Centre for Risk and Community Safety, RMIT University Melbourne and Bushfire CRC, *Final Report prepared for the Victorian Bushfire Royal Commission,* 13 April 2010. http://www.bushfirecrc.com/managed/resource/review-fatalities-february-7.pdf [6 Feb 2013]

Reser, J. (1996). 'Coping with natural disaster warnings: The nature of human response and psychological preparedness'. Conference on Natural Disaster Reduction, Gold Coast. Australia.

Reynolds, B. & Seeger, M. W. (2005). 'Crisis and emergency risk communication as an integrative model'. *Journal of Health Communication*, 10 (1), pp.43–55.

Rhatigan, R., Barnes, L.R & Gruntfest, .E. (2004). *Looking back at Superstorm '93: Perspectives of emergency managers in Southern Appalachia*. http://ccb.colorado.edu/superstorm/ss93Final.pdf [5 July 2011]

Rhodes A (2005) Stay or go: what do people think of the choice? Presentation at the Annual BushfireCRC Conference, Auckland. http://www.bushfirecrc.com/managed/resource/stay_or_go_-_ar.pdf

Riad, K. J. & Norris. F. (1998). 'Hurricane threat and evacuation intentions: An analysis of risk perception, preparedness, social Influence and resources'. Preliminary paper #271, University of Delaware Disaster Research Center.

Roche, J.P.,& Muskavitch, M.A.T. (2003). 'Limited precision in print media communication of the West Nile virus risk'. *Science Communication*, 24, pp. 353-365.

Rohrmann, B. (2008). 'Risk perception, risk attitude, risk communication, risk management: A conceptual Appraisal'. Keynote address at the congress of The International Emergency Management Society TIEMS-2008 in Prague/Czechia, University of Melbourne. http://www.rohrmannresearch.net/pdfs/rohrmann-rrr.pdf [18 Feb 2009]

Rose, D., Efraim, D., Gervais, M-C., Joffe, H., Jovchelovitch, S. & Morant, N. (1995). 'Questioning consensus in social representations theory'. *Papers on Social Representations*, 4 (2), pp. 150-176.

Roth, S. and Cohen, L. J. (1986). 'Approach, avoidance, and coping with stress'. *American Psychologist*, 41 (7), pp.813-819.

Rotter, J.B. (1954). *Social learning and clinical psychology*. New York: Prentice-Hall.

Roulston, M. S.& Smith,. L.A. (2004). 'The boy who cried wolf revisited: The impact of false alarm intolerance on cost–loss scenarios'. *Weather and Forecasting*, 19 (2), pp.391-397.

Russell-Smith, J., Whitehead, P.J., Cook, G.D., Hoard, J.L. (2003). 'Response of eucalyptus-dominated savanna to frequent fires: lessons from Munmarlay 1973-1996'. *Ecological Monographs*, 73, pp. 349-375.

Saarinen, T. F. & Cooke, R. U.(1971). 'Public perception of environmental quality in Tucson, Arizona'. *Journal of the Arizona Academy of Science*, 6, pp. 250-274.

Safer Cities. (2007). 'The boy who cried, "Wolf!" or Why a community-based alert system is a good idea'. *Case studies on mitigating disasters in Asia and the Pacific*, 18, Program for Hydro-meteorological Disaster Mitigation in Secondary Cities in Asia.
http://www.preventionweb.net/files/globalplatform/entry_bg_paper~SaferCities18.pdf [11 Nov 2013]

Sandman, P.M. (1993). *Responding to community outrage: effective strategies for effective risk communication*. Virginia: American Industrial Hygiene Association.

_____ (2004). 'Crisis communication: A very quick introduction', *The Synergist*, pp.26-28. http://www.psandman.com/col/crisis.htm [18 October 2012]

_____ (2004a). 'Is outrage part of risk or part of risk perception? Selected Guest Comments and Responses, April 2004.
http://www.psandman.com/gst2004.htm#biosolid [8 Nov 2012]

_____ (2005). 'The flu pandemic issue-attention cycle: where does scepticism fit? Selected Guest Comments and Responses, December 2005.
http://www.psandman.com/gst2005.htm [26 Sept 2013]

_____ (2005a). 'Adjustment reactions: The teachable moment in crisis communication'.
http://www.psandman.com/col/teachable.htm [26 Nov 2008]

_____(2008). 'The dangers of excessive warnings … and of over-reassurance'. 2008 Guestbook
Comments and Responses, http://www.psandman.com/gst2008.htm [06 July 2011]

_____ (2011). 'Why U.K. nurses resisted swine flu vaccination – and why health care workers resist flu vaccination'. 2011 Guestbook and responses,
http://www.psandman.com/gst2011.htm [06 July, 2011]

_____ (2012). 'Warning fatigue: when bushfire warnings backfire'. 2012 Guestbook Comments and Responses, http://www.psandman.com/gst2012.htm [24 July 2013]

_____(2013). 'Is 'superbug' a dangerous exaggeration?" 2013 Guestbook Comments and Responses, htttp://www.psandman.com/gst2013.htm#superbug [29 Sept 2013]

Salwen, M.B & Dupagne, M. (2003).News of Y2K and Experiencing Y2K: Exploring the Relationship between the Third-Person Effect and Optimistic Bias, *Media Psychology,* 5 (1), pp. 57-82.

Sattler, D.N., Adams, C.F. & Watts, B. (1995). 'Effects of personal experience on judgments about natural disasters'. *Journal of Social Behavior and Personality*, 10, pp. 891–898.

Sattler, D.N., Kaiser, C.F. & Hittner, J.B. (2000). 'Disaster Preparedness: Relationships Among Prior Experience, Personal Characteristics, and Distress'. *Journal of Applied Social Psychology*, 30 (7), pp.1396–1420.

Savage, R. P., Baker, J., Golden, J.H., Kareem, A. & Manning, B.R. (1984). *Hurricane Alicia: Galveston and Houston, Texas, August 17-18, 1983*. Washington, DC: National Academy Press.

Scanlon, T.J. & Alldred. S. (1982). 'Media coverage of disasters: the same old story'. *Emergency Planning Digest,* pp.363-375.

Schauble, J. (2008). *Red steers and exploding houses: Cultural interpretation of bushfire and community understanding.* A thesis submitted in fulfilment of the requirements for the degree of Master of Arts, School of Social and Environmental Enquiry, Faculty of Arts, University of Melbourne.

Scheier, M.F. & Carver, C.S. (1985). 'Optimism, coping and health: assessment and implications of generalized outcome expectancies'. *Health Psychology,* 4, pp.219-247.

Scheier, M.F. & Carver, C.S. (1987). 'Dispositional optimism and physical well-being: the influence of generalized outcome expectancies on health'. *Journal of Personality*, 55, pp.169-210.

Schoch-Spana, M. (2005). 'Public responses to extreme events: Top 5 disaster myths'. In L. G. Canton (ed.), *Emergency Management: Concepts and Strategies for Effective Programs,* New York: John Wiley & Sons, Inc.

Schudson, M. (1989). 'How culture works: perspectives from media studies on the efficacy of symbols'. *Theory and Society*, 18, pp. 153-180.

Schuman, H. & Presser, S. (1981). *Questions and answers in attitude surveys*. New York: Academic Press.

Schwarzer, R. (1994). 'Optimism, vulnerability, and self-beliefs as health-related cognitions: A systematic overview'. *Psychology and Health*, 9, pp.161-180.

Schwarzer, R. (1998). 'Stress and coping resources: Theory and review'. http://userpage.fu-berlin.de/~gesund/publicat/ehps_cd/health/stress.htm [20 Sept 2012]

Schwarzer, R. (1999). 'Proactive coping theory'. Paper presented at the 20th International Conference of the Stress and Anxiety Research Society (STAR), Cracow, Poland, July 12-14, 1999.

Schwarzer, R. (2000). 'Manage stress at work through preventive and proactive coping'. In E. A. Locke (ed.), *The Blackwell handbook of principles of organizational behaviour,* pp. 342-355. Oxford: Blackwell Publishers.

Schwarzer, R., Bäßler, J., Kwiatek, P., Schroder, K. & Xin Zhang, J. (1997). 'The assessment of optimistic self-beliefs: Comparison of the German, Spanish, and Chinese Versions of the General Self-efficacy Scale'. Applied Psychology: an International review, 46 (1), pp.69-88.

Schwarzer, R. & Luszczynska, A. (2008). 'Reactive, anticipatory, preventive, and proactive coping: A Theoretical Distinction'. *The Prevention Researcher*, 15 (4) pp. 22-24.

Schwarzer, R.N. & Knoll, N. (2003). 'Positive coping: Mastering demands and searching for meaning'. In S.J. Lopez & C.R. Snyder (eds.), *Positive psychological assessment: A handbook of models and measures*, pp. 393-409. Washington, DC: American Psychological Association.

Seligman, M.E.P. (1975). *Helplessness: On depression, development, and death*. San Francisco: W.H. Freeman.

Sharma, U. & Patt, A. (2012). 'Disaster warning response: the effects of different types of personal experience'. *Natural Hazards,* 60, pp. 409-423.

Short, P. (1979). 'Victims and helpers'. In R.L.Heathcote & b.G.Thoms (eds.), *Natural Hazards in Australia*, pp; 448-459. Canberra: Australian Academy of Sciences.

Sims, J.H. & Baumann, D.D. (1983). 'Educational programs and human response to natural hazards'. *Environment and Behavior*, 15 (2), pp. 165–189.

Simmons, K.M. & Sutter, D. (2009). 'False alarms, tornado warnings and tornado casualties'. *Weather, Climate and Society*, 1, pp.38-53.

Singer, B.D. & Green, L. (1972). *The social functions of radio in a community emergency*. Toronto: Copp Clark.

Singer, E. & Endreny, P. M. (1993). *Reporting on risk.* New York: Russell Sage Foundation.

Sjöberg, L. & Engelberg, E. (2010). 'Risk perception and movies: A study of availability as a factor in risk perception'. *Risk Analysis*, 30 (1), pp. 95–106.

Slovic, P. (1987). 'Perception of risk'. *Science*, 236 (4799), pp. 280-285.

_____ (2000). *The Perception of Risk.* London: Earthscan Ltd.

Slovic P., Fischhoff B. & Lichtenstein, S. (1980). 'Facts and fears: Understanding perceived risk'. In R. C. Schwing & W. A. Albers, Jr. (eds.), *Societal Risk Assessment: How Safe Is Safe Enough?* pp. 181-214. New York: Plenum Press.

_____ (1982). 'Why study risk perception?' *Risk Analysis.* 2 (2), pp.83–93.

Slovic P., Fischhoff B., Lichtenstein, S. & Roe, F. J. C. (1981). 'Implications [and discussion]'. *Proceedings of the Royal Society, London*, 376, pp. 17-34.

Slovic, P., Finucane, M.L., Peters, E. & Macgregor, D.G. (2007). 'The Affect Heuristic'. *European Journal of Operational Research*, 177 (3), pp.1333–1352.

Slovic, P., Kraus, N., Lappe, H. & Major, M. (1991). 'Risk perception of prescription drugs: report on a survey in Canada'. *Canadian Journal of Public Health*, 82, S15-20.

Slovic, P., Kunreuther, H. & White, G. F. (1974). 'Decision processes, rationality and adjustment to natural hazards'. In G. F. White (ed.), *Natural hazards: Local, national, global,* pp. 187-205. New York: Oxford University Press.

Slovic, P. & Peters, E. (2006). 'Risk perception and affect'. *Current Directions in Psychological Science*, 15 (6), pp.322-325.

Slovic, P. & Weber, E. U. (2002). 'Perception of risk posed by extreme events'. Paper prepared for discussion at the 'Risk Management strategies in an Uncertain World conference, April 12-13, 2002, New York.

Smith, C. (1992). 'Media and apocalypse: News coverage of the Yellowstone Forest Fires, Exxon Valdez Oil Spill, and Loma Prieta Earthquake'. In *Contributions to the Study of Mass Media and Communications*, London: Greenwood Publishing Group.

Smith, J.A. & Osborn, M. (2003). 'Interpretative phenomenological analysis'. In J.A. Smith (ed.), *Qualitative Psychology: A Practical Guide to Methods*, London: Sage.

Sorenson, J. H. & Mileti, D. S. (1988). 'Warning and evacuation: Answering some basic questions'. *Industrial Crisis Quarterly*, 2, pp.195-209.

Sorenson, J.H. (2000). 'Hazard warning systems: Review of 20 years of Progress'. *Natural Hazards Review*, May, pp.119-125.

Spittal, M.J., McClure, J., Siegert, R.J. & Walkey, F.H. (2005). 'Optimistic bias in relation to preparedness for earthquakes'. *The Australasian Journal of Disaster and Trauma Studies,* 2005-1.

Stenner, P. (2007). 'The adventure of psychosocial studies: re-visioning the space between the psychic and the social'. Inaugural lecture, University of Brighton. http://www.brighton.ac.uk/sass/contact/staffprofiles/stenner/inaugural_lecture.pdf [10 Dec 2013]

Stewart, D.W. & Martin, I.M. (1994). 'Intended and unintended consequences of warning messages: A review and synthesis of empirical research'. *Journal of Public Policy & Marketing*, 13, (1), pp. 1-19.

Stirling, S. (2011). 'After multiple warnings and no tornadoes, N.J. forecasters worry about warning fatigue'. The Star-Ledger, August 10. http://www.nj.com/weather-guy/index.ssf/2011/08/after_multiple_warnings_and_no.html [05 June 2013]

Stuff. (2013). 'False Tsunami alarms wakes Bay of Plenty'.
http://www.stuff.co.nz/national/9229226/False-tsunami-alarm-wakes-Bay-of-Plenty [07 May 2011]

Sudman, S. & Norman, M. B. (1982). *Asking questions: A practical guide to questionnaire design.* San Francisco: Jossey Bass Publishers.

Sutton, P., Palen, L. & Shklovski, I. (2008). 'Backchannels on the Front Lines: Emergent Uses of Social Media in the 2007 Southern California Wildfires'. In F. Fiedrich and B. Van de Walle (eds.) *Proceedings of the 5th International ISCRAM Conference – Washington, DC,* May 2008.
https://www.cs.colorado.edu/~palen/Papers/iscram08/BackchannelsISCRAM08.pdf. [12 Oct 2013]

Svenson, O. (1985). 'Cognitive strategies in a complex judgement task: Analysis of concurrent verbal reports and judgements of cumulated risk over different exposure times'. *Organizational Behavior and Human Decision Processes,* 36, pp. 1-15.

Sweller, J. (1988). 'Cognitive load during problem solving: Effects on learning'. *Cognitive Science,* 12 (2), pp. 257–285.

Takeshita, T. (1993). 'Agenda-setting effects of the press in a Japanese local election'. *Studies of Broadcasting,* 29, pp. 193-216.

Taylor, S.E. (1983). 'Adjustment to threatening events: A theory of cognitive adaption'. *American Psychologist,* (Nov). pp. 1163-1173.

Taylor, S.E. (1989). *Positive illusions: Creative self-deception and the healthy mind.* New York: Basic Books.

Taylor, S. E & Armor, D.A (1996). 'Positive illusions and coping with adversity'. Journal of Personality, 64 (4), pp.873–898.

Taylor, S. & Gollwitzer, P. M. (1995). 'Effects of mindset on positive illusions'. *Journal of Personality and Social Psychology,* 69, pp.213-226.

Taylor, S.E, Kemeny, M.E., Reed, G.M., Bower, J. E. & Gruenewald, T.L. (2000). 'Psychological resources, positive illusions, and health'. *American Psychologist,* 55 (1), pp. 99–109.

Teague, B., McLeod, R. & Pascoe, S. (2010). '2009 Victorian Bushfires Royal Commission – Final Report'. Government Printer, Melbourne.

Tekeli-Yesil, S. (2007). 'Factors affecting peoples' mitigation activities and preparedness for an earthquake in Istanbul, a qualitative study'. Institute of Social and Preventive Medicine, University of Basel, Switzerland.
http://www.ehs.unu.edu/file/get/3836 [12 Sept 2012]

Telg, R. (2010). 'Risk and Crisis Communication: When Things Go Wrong'. The Agricultural Education and Communication Department, University of Florida. http://edis.ifas.ufl.edu/pdffiles/WC/WC09300.pdf [06 May 2010]

Tesser, A. (1988). 'Towards a self-evaluative maintenance model of social behavior'. In L. Berkowitz (ed.), *Advances in Experimental Social Psychology*, 21, pp. 181-227. Florida: Academic Press.

The Australian Government. 'The Australian Bush'. http://australia.gov.au/about-australia/australian-story/austn-bush [15 May 2012]

Tibbits A. & Whittaker, J. (2007). 'Stay and defend or leave early: policy problems and experiences during the 2003 Victorian bushfires'. *Environmental Hazards,* 7, pp. 283–290.

Tibbits, A., Handmer, J., Haynes, I., Lowe, T. & Whittaker, J. (2008). 'Prepare, stay and defend or leave early: Evidence for the Australian approach'. (In) J. Handmer & K. Haynes (eds.), Community Bushfire Safety, CSIRO publishing.

Tierney, K.J. (1994). *Emergency preparedness and response. Practical Lessons from the Loma Prieta Earthquake.* Washington, DC: National Academy Press.

Tierney, K., Bevc, C. & Kuligowski, E. (2006). 'Metaphors matter: Disaster myths, media frames, and their consequences in Hurricane Katrina'. *The ANNALS of the American Academy of Political and Social Science,* 604 (1), pp. 57-81.

Tucker, R. K. & Byers, P. Y. (1987). 'Factorial validity of Merz's psychological reactance scale'. *Psychological Reports*, 61, pp. 811-815.

Tullis, P. (2013). 'Into the wildfire: What science is learning about fire and how to live with it'. *The New York Times Magazine*, (Sunday Magazine, 19 Sept), MM26.

Turner, B.A. (1978). *Man-made disasters.* London: Wykeham Science Press.

Turner, G. (1986). *National fictions: Literature, film and the construction of Australian narrative*, Sydney: Allen & Unwin.

Turner, R.H. (1983). 'Waiting for disaster: Changing reactions to earthquake forecasts in Southern California'. *Int. Journal of Mass Emergencies and Disasters*, 1 (2), pp. 307-334.

Turner, R.H., Nigg, J.M. & Paz, D.H. (1986). *Waiting for disaster.* Los Angeles: University of California Press.

Turner, R H., Nigg, J. M., Paz, D. H. & Young, B. S. (1979). *Earthquake threat: The human response in Southern California.* The Institute for Social Science Research, University of California at Los Angeles.

Twerski, A.D., Donaher, W.A., Piehler, H.R. & Weinstein, A.S. (1976). 'The use and abuse of warnings in products liability : Design defect litigation comes of age'. *Cornell Law Review*, 61 (4), pp. 495-540.

USNews. (2012). 'Frankenstorm' Threat Launches Mass Evacuations. Saturday, 27 Oct 2012. http://www.cnbc.com/id/49579735/039 [02 Feb 2014]

Valentine, P.V. & Smith, T.E. (2002). 'Finding Something to Do: The Disaster Continuity Care Model'. *Brief Treatment and Crisis Intervention,* 2, pp.183-196.

Weaver, J.F., Gruntfest, E. & Levy, G.M. (2000). 'Two floods in Fort Collins, Colorado: Learning from a natural disaster'. *Bulletin of the American Meteorological Society,* 81, pp.2359-2366.

Weber, E. (2006). 'Experience-based and description-based perceptions of long-term risk: Why global warming does not scare us (yet)'. *Climate Change,* 77, pp.103-20.

Weber, E. U. (1997). 'Perception and expectation of climate change: Precondition for economic and technological adaptation'. In M. Bazerman., D. Messick., A. Tenbrunsel & K. Wade-Benzoni (eds.), *Psychological and Ethical Perspectives to Environmental and Ethical Issues in Management,* pp. 314-341. San Francisco: Jossey-Bass.

Weick, Karl E. (1999). 'Sense-making as an organizational dimension of Global Change'. In D. L. Cooperrider & J. E. Dutton, (eds.), *Organizational Dimensions of Global Change,* pp. 39–56. California: Sage.

Weinstein, N.D. (1989). 'Optimistic biases about personal risks'. *Science,* 246 (4935), p.1232-1233.

Weinstein, N.D. (1989). 'Effects of personal experience on self-protective behavior'. *Psychological Bulletin*, 105 (3), pp. 31–50.

Wenger, D., Sykes, J. D., Sebok ,T. D. & Neff, J. L. (1975). 'It's a matter of myths: An empirical examination of individual insight into disaster response'. *Mass Emergencies*, 1, pp.33-46.

Wetherell, M. (2006). 'Interpretive repertoires'. In V. Jupp (ed.), *The SAGE Dictionary of Social Research Methods*. pp. 153-155. London: Sage Publications.

Wetherell, M. (2008). 'Subjectivity or psycho-discursive practices? Investigating complex intersectional identities'. *Subjectivity*, 22, pp.73–81.

Wetherell, M. (2012). *Affect and emotion: A new social science understanding*. London: Sage Publications Ltd.

Wetherell, M., Taylor, S. & Yates, S. J. (eds.). (2001). *Discourse as data: A guide for analysis.* London: Sage.

Wetherell, M., Taylor, S., & Yates, S. J. (eds.). (2001). *Discourse theory and practice: A reader.* London: Sage Publications.

Wettenhall, R.L. (1975). *Bushfire disaster – an Australian community in crisis.* Sydney: *Angus* and Robertson.

Wheaton, B. (1983). 'Stress, personal coping resources, and psychiatric symptoms: An investigation of interactive models'. *Journal of Health and Social Behavior*, 24, (3), pp. 208-229.

Whelan, R.J., Roberts, D.G., England, P.R. & Ayre, D.J. (2006). The potential for genetic contamination vs. augmentation by native plants in urban gardens. Biological Conservation, 128 (4), pp. 493–500.

Whittaker, J., Haynes, K., Handmer, J. & McLennan, J. (2013). Community safety during the 2009 Australian 'Black Saturday' bushfires: an analysis of household preparedness and response. *International Journal of Wildland Fire*, 22, pp. 841-849.

Whittaker, J., McLennan, J., Elliott, G., Gilbert, J., Handmer, J., Haynes, K. & Cowlishaw, S. (2009). 'Victorian 2009 bushfire research response: Final Report'. Bushfire CRC Post-fire Research Program in Human Behaviour. Bushfire CRC: Melbourne. http://www.bushfirecrc.com/managed/resource/chapter-2-human-behaviour.pdf [14 Oct 2013]

Wickland, R. A. (1974). *Freedom and reactance*. Maryland: Lawrence Erlbaum Associates Inc.

Winkler, J.D., Kanouse, D.E. & Ware, J.E. (1982). 'Controlling for acquiescence response set in scale development'. *Journal of Applied Psychology,* 67(5), pp. 555-561.

Williams, B., Greenberg, M. & Kahn, M. (1999). 'Risk perception in context: The Savannah River Site stakeholder study'. *Society for Risk Analysis*, 200, pp. 1019-1035.

Wilson, R. S. & Arvai , J. L. (2006). 'When less is more: How affect influences preferences when comparing low and high-risk options'. *Journal of Risk Research,* 9 (2), pp: 165–178.

Wilson, T. D. & Gilbert, D. T. (2008). 'Explaining away: A model of affective Adaptation'. *Perspectives on Psychological Science,* 3 (5), pp.370-386.

Wills, T. A & Filer, M. (2001). 'Social networks and social support'. In A. Baum, T. A. Revenson & J. E. Singer (eds.), *Handbook of health psychology*, pp. 209-234. New Jersey: Erlbaum.

Winter, G. & Fried, J.S. (2000). 'Homeowner perspectives on fire hazard, responsibility, and management strategies at the wildland-urban interface'. *Society and Natural Resources*, 13 (1), pp. 33-49.

Wisher, B. (2004). *At Risk-Natural Hazards, People's Vulnerability and Disaster.* Wiltshire: Routledge.

Appendices

1. Study I

1.1 Ethics Approval

Social Science Ethics Officer
Private Bag 01 Hobart
Tasmania 7001 Australia
Tel: (03) 6226 1832
Fax: (03) 6226 7148
marilyn.pugsley@utas.edu.au

HUMAN RESEARCH ETHICS COMMITTEE (TASMANIA) NETWORK

31 March 2011

Professor Douglas Paton
Psychology
Private Bag 1342
Launceston Tasmania

Dear Professor Paton

Re: APPROVAL FOR AMENDMENT TO CURRENT PROJECT
Ethics Ref: H0011379 - Risk perception, preparedness and resource theories: The Australian bushfires
Amendment : Changes of wording of title of research, info sheet, consent form and second round of questions

We are pleased to advise that the Chair of the Tasmania Social Sciences Human Research Ethics Committee approved the Amendment to the above project on 26/3/2011.

Yours sincerely

Marilyn Pugsley
Ethics Officer

A PARTNERSHIP PROGRAM IN CONJUNCTION WITH THE DEPARTMENT OF HEALTH AND HUMAN SERVICES

1.2 Consent Form

Telephone Interview Consent Form

School of Psychology
University of Tasmani

Risk perception and Warnings: the Australian bushfires

1. I have read and understood the 'Information Sheet' for this study.
2. The reasons for the study, what it will involve, and the possible effects of the study have been explained to me.
3. I understand that an interview/interviews will be conducted with me to obtain an understanding of my views on bushfire preparedness. It is my understanding that the interview(s) will take approximately 30-40 minutes to complete.
4. With my agreement, the interview can be recorded. I understand that I have the right to request that the interview is not recorded.
5. I agree that information gathered for the study may be published provided that I cannot be identified as a participant. I also understand that while my interview will be recorded, my anonymity will be assured, as it is not necessary to record my name or any other identifying information in this recording.
6. I understand that all research data will be securely stored at the School of Psychology, University of Tasmania in a secure location for a period of five years and that the recordings and the data will be destroyed at the end of five years.
7. I understand that no psychological distress or inconvenience beyond the normal experience of everyday life is expected.
8. Any questions that I have asked about this process have been answered to my satisfaction.
9. I agree to participate in the interview session and understand that my participation is voluntary, that **I may withdraw at any time and withdraw any information/data supplied to date** without being penalised or disadvantaged in any way.

☑**I am happy to have the interview tape recorded:** (circle one)   **Yes**   **No**

☑Name of participant :…..……………………………………………………..….(please print)

☑Signature of participant:…..…………………………..…. Date:..…………………………

☑Contact Number: (hm)..……………….....................(mobile)……………………………………

☑Preferred time to call (Day/time)..……………........./…………...............

Statement by investigator:
I have explained this project and the implications of participation in it to this interviewee and I believe that the consent is informed and that he/she understands the implications of participation.

Name of Investigator:..…………………………………..Signature .…………………………………

Date:..…………………………………....

Please post to: **Brenda Mackie,**
          33 Sinclair Ave, Lower Templetstowe, Melbourne, Victoria 3107.

School of Psychology
University of Tasmania

"Risk perception and Warnings: the Australian bushfires"

TELEPHONE INTERVIEW INFORMATION SHEET

Invitation
You are invited to participate in a research study that intends to examine factors that influence individual and community bushfire preparedness. This study is being conducted by Brenda Mackie to fulfil the requirements for a PhD in Psychology, and is being supervised by Professor Douglas Paton.

Objective of the Study
This research will assess factors that influence how and why people make decisions about preparing or not preparing for bushfires. Warnings are an integral part of decision making and the telephone interview will include questions that will hopefully initiate discussion about what warnings mean, how they are understood and whether they are effective in enabling people to make decisions which enhances safety in the event of a bushfire.

The information produced by this research will be used to improve the effectiveness of bushfire risk messages by tailoring the information content and the ways in which it is delivered to the public. This will also help ensure that targeted public education programs can be developed which will meet the needs of the community.

What's involved as a participant?
As a participant you will be asked to take part in a telephone interview between you and the researcher, to be conducted, at a time that suits you between April and May 2011.

With your permission, telephone interviews will be digitally recorded. While we will need a name and telephone number to conduct the interview, no personal or identifying information will be used in the transcript of your interview. This will ensure that your interview data remain anonymous.

What will happen to the information provided?
The information collected will be used to inform the analysis and findings for the researchers PhD which will, in due course, be published by the University of Tasmania http://www.library.utas.edu.au/. (This is the link where the thesis will be found). The data will be stored for five years in a locked cabinet, and all raw data will be destroyed at the end of the five-year period.

If you would like to participate in this study, please complete the attached consent form.

Thanking you in advance for your assistance in this project.

Brenda Mackie

The above project has received ethical approval from the Human Research Ethics Committee (Tasmania) Network. If you have concerns or complaints about the conduct of this study you should contact the Executive Officer of the HREC (Tasmania) Network on (03) 6226 7479 or email human.ethics@utas.edu.au.

Improving Community Bushfire response

*What do you think of the bushfire warnings?
*What's wrong or right with them?
*Do you feel as if you have been 'over-warned'?
If you have an opinion on any or all of the above questions, then I would love to talk to you!

Why is this important?
Preparing is seen as an important factor helping communities safeguard their wellbeing and minimise disruption (e.g., damage to property, loss of work) should a bushfire threaten them.
The recent report from the Royal Commission recommended that more research be done that looks at whether the way that people process warnings make a difference in how decisions about preparing for bushfires are made.

What's the aim of my research?
This research will investigate factors that impact on the decision-making and risk-assessment processes in regards to bushfires.
It is hoped that the results from the research will enhance the effectiveness of bushfire risk messages by tailoring the information content and the ways in which it is delivered to the public.

Benefit to the community?
The information provided by community members will be used to help develop more effective and targeted bushfire public education programs for the community and contribute to bushfire communication research.

How can you help?
This research needs to know what people think about warnings and a great way to do this is through interviews which would take about 45 minutes and be conducted via the telephone. The telephone interview will include questions that will cover issues of 'how to do things better' and participants' concerns and opinions.

You will be eligible if you:
- **Are a community member living in a bushfire-risk area**
- **Are willing to be interviewed by telephone before the fire-season**

If you wish to be involved or want more information please contact:

Brenda Mackie :-   bamackie@utas.edu.au

This study has been approved by the University of Tasmania Human Resources Ethics Committee and is supervised by Professor Douglas Paton.

1.5 Interview Protocol

Telephone Interview Schedule – Questions and prompts
(Pre Bushfire Season)

**Bushfire and understanding and preparation.
****Bushfire warnings and perceptions of risk.

1. How long have you lived in _____?
   - [Do you live in _____ all year round or is this mainly a holiday residence?]
   - Why do you live in/did you move to_____?

2. Have you or any of your family experienced a bushfire? (details/tell me about it)
   - [So], do you think it's something you need to pay attention to? Why/why not?

3. Do you believe there is a bushfire risk in your community?
   - Did you consider this when you moved to the area?
   - Have you built your house with, or made any renovations that incorporate building design characteristics that are considered bushfire safe?

4. In regards to the upcoming bushfire season, have you begun preparing for, or thought about how you might prepare for bushfires? Why? Why not?

5. (If you do prepare) **when** do you normally begin making preparation for the bushfire season? [and]what sort of things do you do to prepare?
   - Yourself/your family
   - Your property
   - Are there any limitations to your ability to prepare?
   - Do these preparations include a bushfire plan?

6. So does doing these things make your feel safer about the prospect of possible bushfires?

7. How prepared do you think you and your family are, compared to others. Why?
   - What about your **community** compared to others?

8. [Are you involved in any active community-safety activities in relation to bushfires?]

9. Whose responsibility do you believe it is to ensure the bushfire preparedness of the community?

10. Is there anything that prompts you to begin thinking about/preparing for the upcoming bushfire season? (Media/Weather/Friends/family/neighbours)

11. Where do you go to get information about bushfires? (media/friends/internet/community forums)
    - Do you think the information's adequate? Why? (want more info, less info)
    - Do you differentiate between information and warning?

12. Do you know about the Royal Commission report and its findings? Tell me about that.
13. What do you think about the way the media reports issues to do with bushfires?

14.[Do you make a distinction between what the media are saying and reports that come directly from the Royal Commission (or they one-in-the-same?)]

15. What do you think about how bushfires are warned about?
- (for example) there is a recommendation that, if you plan to leave, you need to leave early. What does 'early' mean to you?

16. Does **'prepare to leave early or stay and defend'** imply that if you're prepared, you'll be OK?

17. Tell me about some bushfire warnings that you know about.
- Are you aware that they've been changed recently to include a 'catastrophic' category? (for Tasmania) 'Code red' for Victoria. What is your understanding of this word?
- Do you think there is a possibility that (because of this new category) people will ignore the less severe ratings and wait until they hear 'Code Red' to act?

18. Do you know what the 'Fire Danger Rating' means? (the numbers that have accompanied the categories)
- (so, if they do) do these numbers mean more to you that the categories (high, very high, severe)

19. When do you start to think that you may need to act – very high/severe/extreme/catastrophic
- [and/or] are those categories reassuring to you that the danger hasn't reached the maximum?

20. If there was a serious bushfire unfolding in your vicinity, what warnings do you think you will get? [list] -
- Do you think there would be a serious fire that you weren't warned about?

21. How would you like warnings about possible bushfires to be told to you? For example, only if the authorities are really sure it's going to happen, ('leave now') or lots of warnings over a period of time that includes information such as temperature, wind, moisture, likelihood?

22. Do you think there can be too many warnings? Why/Why not?

23. Can you remember being warned of the likelihood of a bushfire, and it not eventuating?
- Does that make you more or less inclined to pay attention to the next one?

24. Are there other 'risks' to yourself or your family that you think about?
- Have you prepared for any of those? If so, in what way?

25. Any other comments?

2. Study II

2.1 Ethics Approval

UC✦
UNIVERSITY OF
CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

HUMAN ETHICS COMMITTEE

Secretary, Lynda Griffioen
Email: human-ethics@canterbury.ac.nz

Ref: HEC 2011/20

8 April 2011

Brenda Mackie
School of Social & Political Sciences
UNIVERSITY OF CANTERBURY

Dear Brenda

The Human Ethics Committee advises that your research proposal "Risk perception and warning fatigue: the Australian bushfires" has been considered and approved.

Please note that this approval is subject to the incorporation of the amendments you have discussed with the Chair of the Human Ethics Committee and provided in your email of 31 March 2011.

Best wishes for your project.

Yours sincerely

pp [signature]

Dr Michael Grimshaw
Chair, Human Ethics Committee

Telephone Interview Consent Form

"Risk Communication and Warning Fatigue: the Australian bushfires"

1. I have read and understood the 'Information Sheet' for this study.
2. The reasons for the study, what it will involve, and the possible effects of the study have been explained to me.
3. I understand that an interview/interviews will be conducted with me to obtain an understanding of my views on bushfire preparedness. It is my understanding that the interview(s) will take approximately 30-40 minutes to complete.
4. With my agreement, the interview can be recorded. I understand that I have the right to request that the interview is not recorded.
5. I agree that information gathered for the study may be published provided that I cannot be identified as a participant. I also understand that while my interview will be recorded, my anonymity will be assured, as it is not necessary to record my name or any other identifying information in this recording.
6. I understand that all research data will be securely stored at the School of Social and Political Sciences, University of Canterbury in a secure location for a period of five years and that the recordings and the data will be destroyed at the end of five years.
7. I understand that no psychological distress or inconvenience beyond the normal experience of everyday life is expected.
8. Any questions that I have asked about this process have been answered to my satisfaction.
9. I agree to participate in the interview session and understand that my participation is voluntary, that **I may withdraw at any time and withdraw any information/data supplied to date** without being penalised or disadvantaged in any way.

☑**I am happy to have the interview tape recorded:**   (circle one)   **Yes   No**

☑Name of participant :……………………………………………………………..(please print)

☑Signature of participant:………………………………..... Date:………………………….

☑Contact Number: (hm)…………………....………………….(mobile)……………………………………….

☑Preferred time to call (Day/time)………………........./……………..............

Statement by investigator:
I have explained this project and the implications of participation in it to this interviewee and I believe that the consent is informed and that he/she understands the implications of participation.

Name of Investigator:………………………………..Signature ………………………………

Date:………………………………....

Please post to: **Brenda Mackie,**
33 Sinclair Ave, Lower Templetstowe, Melbourne, Victoria 3107.

"Risk Communication and Warning Fatigue: the Australian bushfires"

TELEPHONE INTERVIEW INFORMATION SHEET

Invitation
You are invited to participate in a research study that intends to examine factors that influence individual and community bushfire preparedness. This study is being conducted by Brenda Mackie to fulfil the requirements for a PhD in Media and Communications, and is being supervised by Dr Donald Matheson.

Objective of the Study
This research will assess factors that influence how and why people make decisions about preparing or not preparing for bushfires. Warnings are an integral part of decision making and the telephone interview will include questions that will hopefully initiate discussion about what warnings mean, how they are understood and whether they are effective in enabling people to make decisions which enhances safety in the event of a bushfire.

The information produced by this research will be used to improve the effectiveness of bushfire risk messages by tailoring the information content and the ways in which it is delivered to the public. This will also help ensure that targeted public education programs can be developed which will meet the needs of the community.

What's involved as a participant?
As a participant you will be asked to take part in a telephone interview between you and the researcher, to be conducted, at a time that suits you in late May 2011.

With your permission, telephone interviews will be digitally recorded. While we will need a name and telephone number to conduct the interview, no personal or identifying information will be used in the transcript of your interview. This will ensure that your interview data remain anonymous.

What will happen to the information provided?
The information collected will be used to inform the analysis and findings for my PhD which will, in due course, be published by the University of Canterbury. The data will be stored for five years in a locked cabinet, and all raw data will be destroyed at the end of the five-year period.

If you would like to participate in this study, please complete the attached consent form.

Thanking you in advance for your contribution to this project.

Brenda Mackie

Researcher: brenda.mackie@canterbury.ac.nz
Primary Supervisor: donald.matheson@canterbury.ac.nz

Warnings and Risk Communication: the Australian Bushfires

To better understand how warnings about bushfires and other potentially serious threats can be better communicated, Brenda Mackie, a doctoral student from the University of Canterbury, would like to talk to people who:

- DON'T attend community meetings about bushfire safety (and don't intend to)
- HAVEN'T made any changes to their home to prevent against bushfire damage
- ARE willing to be interviewed by telephone late May/early June

Benefit to you?
Most research to date has come from those who are very involved in bushfire prevention activities but these people are a minority. Getting 'the other side of the story' will provide a valuable and unique perspective on warnings and risk communication, the findings of which will be used to help develop more effective bushfire education strategies for your community and contribute to bushfire communication research.

For more information please contact: brenda.mackie@canterbury.ac.nz
Interviews will be recorded and participation is voluntary and confidential. Participants can choose to withdraw at any time.

2.5 Interview Protocol

Questions for second round of interviews

1) Are you involved in any active community-safety activities in relation to bushfires?
- If yes, what and why and who
- If no, why not [can you anticipate circumstances that would increase your interest to do so?]

2) Do you believe there is a bushfire risk in your community? [get them to quantify this if possible}
- "if 1 was no real risk, and 10 was a huge risk, where would you put yourself in terms of worrying about bushfire?"
- Are there other risks to you and your family that seem more important to think about than bushfires? – if yes, explore why
- Why do you think you don't need to worry?

3) Do you 'stop' to think about bushfires?
[If yes, try and get them to put a number on it – per day – from 0-5]
- Why do you [for ex: only when you hear or read something]

4) Compared to yourself/your family, how prepared do you think others are?
- How confident are you that you could survive a severe bushfire, such as one like Black Saturday? [very, reasonably, not very]
- How does this make you feel (in terms of safety) in the event of a possible bushfire?

5) Considering what you have told me about how prepared you are, how did you think a bad bushfire might affect you?
- Do you think t he fire brigade will be able to help you? [tease out responsibility + self-efficacy]
- Do you know anything about the way fire behaves?

6) Where were you when Black Saturday occurred?
- What about your family?
- Did you have a fire plan?
- What did you actually do?
- Do you have a fire plan **now** that is different to before

7) How do you decide if there is a danger or not, from a threatened bushfire?
- How would you know?

8) Did the events of Black Saturday make a difference to how you **think** about risk from a bushfire [try to get a before and after opinion]

9) Have the Black Saturday bushfires influenced what you do to manage risk from a bushfire
- Yes/no – why/why not?

10) What do you know, if anything, about the CFA? [Country Fire Authority]
- Are you aware of any of their recommendations for fire safety? [get them to describe – top 5?]
- Do you do all those things?

11) Are you aware of the recommendation "stay and defend or prepare to leave early"
- What does 'early' mean to you?
  - What would you **do** if you received a warning?
  - Do you think it's useful/do-able [tease out 'attachment to place']

12) What do you think about how bushfires are warned about?
- What warnings **do** you know about?
- Do you think there is a difference between a warning and an alert [get them to explain]

13) Are you aware of changes to warning categories?
- [if yes] get them to describe
- What do they mean to you?
- How might they influence what you do?

14) Are you aware that the fire danger categories have been changed recently to include to 'Catastrophic/Code Red' category?
- What do you think catastrophic means? [not a catastrophic day but the word 'catastrophic']
- What do you plan to do on these Code Red days?
- Do you differentiate between these days and a normal fire danger day?
- Do you think there is a difference between a total fire ban day and a catastrophic day? Do you think there is a possibility that the other/lesser ratings (severe/extreme) will have less impact now that there is this catastrophic category?
- High/severe/extreme – what are the differences between these? Actions?

15) Where do you go to get information about bushfires? (tease this out - media/friends/internet/community forums)
- What do you think of it? Why?
- How credible/believable/up to date do you think [the source] is?
- How do they influence your actions (why/why not)

16) Do you read newspaper reports about bushfire, and what do you think? [info vs warning]
- What do you think about the way the media reports issues to do with bushfires? [really tease this out much more than last time]

17) Can you remember being warned about the likelihood of a bushfire, and it not eventuating?
- What did you think when you heard it?
- Does that make you more or less inclined to pay attention to the next warning?
- How much credibility do you attach to the next warning? [more/same/less]

18) If you could design a warning system that would get your attention, what would that be/look like? For example…. [but try not to prompt]
- Would there be lots of warnings?
- Use scientific language
- Only a few warnings but very strong language

3 Study III

3.1 Ethics Approval

UC
UNIVERSITY OF
CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

HUMAN ETHICS COMMITTEE

Secretary, Lynda Griffioen
Email: human-ethics@canterbury.ac.nz

Ref: HEC 2011/20

31 October 2011

Brenda Mackie
School of Social & Political Sciences
UNIVERSITY OF CANTERBURY

Dear Brenda

Thank you for your request for an amendment to your research proposal "Risk perception and warning fatigue: the Australian bushfires".
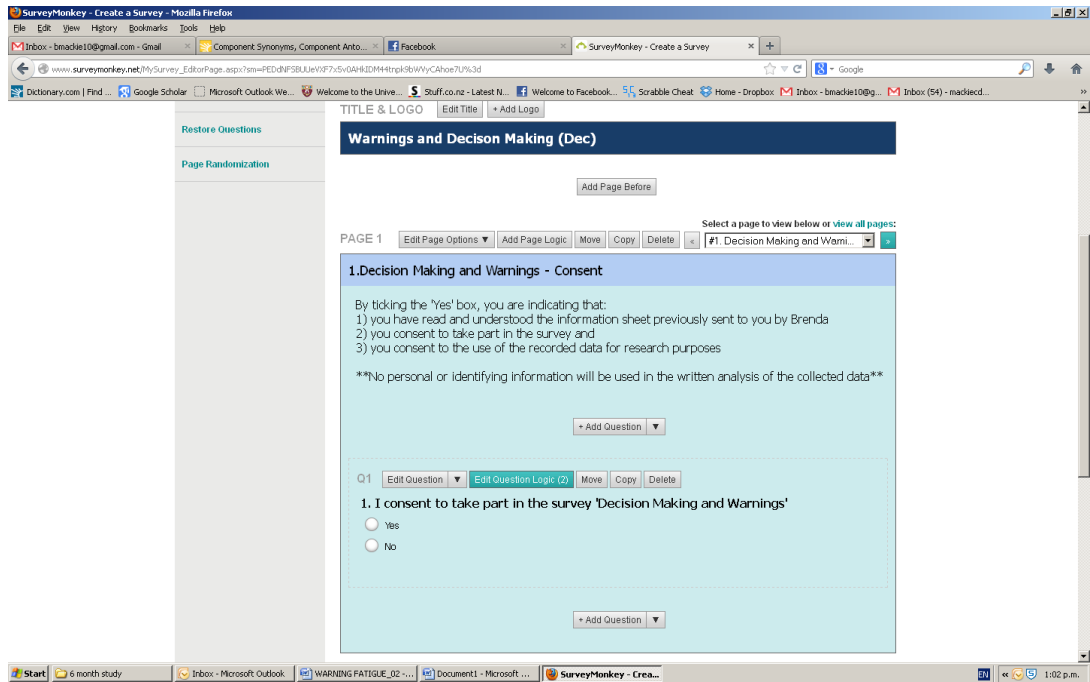
I am pleased to advise that this request has been considered and approved by the Human Ethics Committee.
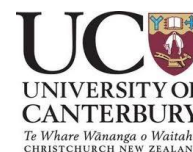
Yours sincerely

Michael Grimshaw
Chair
University of Canterbury Human Ethics Committee

3.2 Consent Form

"Risk Communication, Perception and Decision Making: the Australian bushfires"

ONLINE SURVEY INFORMATION SHEET

Invitation
You are invited to participate in a research study that examines factors that influencing individual perception of warnings and their influence on decision making. This study is being conducted by Brenda Mackie to fulfil the requirements for a PhD in Media and Communications, and is being supervised by Dr Donald Matheson.

Objective of the survey
This survey will assess factors that influence how and why people make decisions about preparing or not preparing for bushfires. Warnings are an integral part of decision making and this online survey poses questions that explore what warnings mean, how they are understood and will hopefully highlight issues that inhibit or enable decision making in the event of a bushfire.

The information produced by this research will be made available by the Bushfire Cooperative Research Centre to agencies interested in improving the effectiveness of bushfire risk messages and understanding how best these messages can be delivered to the public. This will also help ensure that targeted public education programs can be developed which will meet the needs of the wider community.

What's involved as a participant?
As a participant you will be asked to take an online survey, once a month over the 2011-2012 fire season (December 2011-May 2012). The survey takes approximately 20 minutes the first time, and about 10-15 minutes for the subsequent survey. You can withdraw your participation at any time without penalty, including the withdrawal of any data provided up to the final collation of data.
No personal or identifying information will be used in the written analysis of the collected data.

What will happen to the information provided?
The information collected will be used to inform the analysis and findings for the researchers PhD which will, in due course, be published by the University of Canterbury. The data will be stored for five years in a locked cabinet, and all raw data will be destroyed at the end of the five-year period.

☑ **To show that you have read this information sheet and consented to take part in the survey, you will be asked to tick the 'Consent' box, at the beginning of the Survey.**

Thanking you in advance for taking part in this survey.

Brenda Mackie

This research study has received Ethics approval from the University of Canterbury Human Ethics Committee (ref 2011/20).

3.4 Recruitment (i) – CFA website

CFA Home   CFA Mobile   CFA Members   3:26:PM Friday 29 Nov 2013

CONNECT
News - Multimedia - Chat

FOR EMERGENCIES
DIAL '000'

| HOME | NEWS | PICS |

This is an online news archive
For the latest CFA news head to
news.cfa.vic.gov.au

Home > News > Participants needed - online survey

- View All
- General Interest
- Local News
- Brigade magazine
- Google CFA News Feed
- Connect RSS Feeds
- Browse by District / Category

Share
- Tweet this story
- Digg it
- Share on Facebook
- Email this story

Participants needed - online survey

Posted by Brenda Mackie
Wednesday, 30 November 2011

Brenda Mackie is doing research into how individuals interpret bush fire warnings.

I'm a second year BushfireCRC PhD student wanting to contact anybody who may be interested in doing an online survey about how people interpret warnings in relation to bushfires. It has been approved by University of Canterbury ethics committee.

I want to send the survey to interested participants once a month for 6 months - it takes about 20 minutes the first time and 15 minutes thereafter. This would begin the 3rd week of December. If you know of anyone who:

1) are OVER 20 AND UNDER 60

2) HAVE LIVED FOR 3 YEARS OR MORE in

3) a SEMI-RURAL OR RURAL area

4) are INTERNET-SAVVY

5) NOT OVERLY INVOLVED in local CFA or community fire-mitigation groups.

I would love to hear from them ASAP. Could you kindly get them to email me at bmackie10@gmail.com

Related Stories

CFA CALD Spokespersons Training Day

Cricketers bat for fire safety

Summer fire campaign TV ads launch

Bayswater Community Festival

2 House Fires In One Night

Location:	General
Categories:	Community Safety, Planning & Research
More in this category:	CFA CALD Spokespersons Training Day	Cricketers bat for fire safety

Last modified on Wednesday, 30 November 2011 13:20

Read 1360 times

Comments (0)

Subscribe to this comment's feed

Write comment

You must be logged in to post a comment. Please register if you do not have an account yet.

274

3.5 Recruitment (ii) – email from colleague in DEPI (Department of Environment and Primary Industries)

Dear All

As part of a Bushfire CRC funded project a doctoral researcher, Brenda Mackie, is seeking participants in a project that explores the meaning, understanding and effectiveness of fire warnings, and how they enable people to make decisions which enhance safety in the event of a bushfire.
As Brenda is currently based in New Zealand I am trying to assist her in locating up to 50 research participants to take part in a short online survey that will be conducted once a month, over a period of several months -in order to understand perceptual changes over the fire up-coming season (at the participants convenience of course).

I am hopeful that considering your location and experience that you may be able to nominate and provide Brenda with contact details for 1-4 people who might/or have agreed to participate. The time burden on participants would not be more than 15 minutes a month over four to five months, and in my experience Brenda is a thoughtful and respectful communicator.
Each participant would then be contacted by Brenda who would obtain their consent and provide them with the further detail and appropriate information and guarantees around privacy and use of information. Ethics for this has study has already been approved by Canterbury HEC (2011/20).

The parameters for the participants sought is:
.   Not employees or volunteers in a fire related
organisation (including CFA), or regular participants in community fire
forums such as learning Networks or Community Fireguard- we are looking
for "Joe Public" - friends, relatives, neighbours, that person who wants
to shape the world but doesn't connect with or engage in the current
forums?
.   Aged over 18 and NOT retirees;
.   Based in a peri-urban, or rural locations (this can
include rural towns); and
.   No gender specificity required.

The information produced by this research will be used to improve the effectiveness of bushfire risk messages by tailoring the information content and the ways in which it is delivered to the public. This will also help ensure that targeted public education programs can be developed which will meet the needs of the community.
Please send any leads you might have to Brenda at: brenda.mackie@canterbury.ac.nz

This will ensure their privacy is protected. Brenda is at a point with her PhD where the opportunity to explore her topic in more depth has coincided with the upcoming fire season, but obviously, as the fire season is upon us, time is 'of the essence'. If you have any questions please feel free to contact me- and any help you provide will be deeply appreciated.

Cheers
XXXXXXX (Contacts Name)

3.6 Interview Protocol

Upgrade   BMackie10

Home   My Surveys   Survey Services   Plans & Pricing   + Create Survey

You have a **BASIC** account | To remove the limits of a BASIC account and get unlimited questions, upgrade now!

Warnings and Decison Making (Dec)
Education   Design Survey | Collect Responses | Analyze Results

Edit Survey   Preview Survey | Send Survey »

To change the look of your survey, select a theme below.

| Pilot | ▼ | Edit Theme | Create Custom Theme |

TITLE & LOGO   Edit Title   Upgrade to Add Logo »

Warnings and Decison Making (Dec)

+ Add Page

PAGE 1   Edit Page Options ▼ | Add Page Logic | Move | Delete   Show this page only

1. Decision Making and Warnings - Consent

By ticking the 'Yes' box, you are indicating that:
1) you have read and understood the information sheet previously sent to you by Brenda
2) you consent to take part in the survey and
3) you consent to the use of the recorded data for research purposes

No personal or identifying information will be used in the written analysis of the collected data

Upgrade to Add More Questions

Q1   Edit Question   ▼ | Edit Question Logic (2) | Move | Delete

1. I consent to take part in the survey 'Decision Making and Warnings'

   Yes

   No

Upgrade to Add More Questions

+ Add Page

PAGE 2   Edit Page Options ▼ | Add Page Logic | Move | Delete   Show this page only

2. Decision Making and Warnings - Note

Thank you for agreeing to take part in this survey - it should take you about 20 minutes.
Each question requires an answer, additionally, where a "please explain" box is provided, please DO NOT skip this bit: your
reasons for giving your answers are as important as the answers themselves. Most often, a couple of sentences will suffice.

Upgrade to Add More Questions

+ Add Page

3. Demographic information

Upgrade to Add More Questions

Q2   Edit Question   ▼   Add Question Logic   Move   Delete

2. What is your gender?

Male

Female

Upgrade to Add More Questions   Split Page Here

Q3   Edit Question   ▼   Add Question Logic   Move   Delete

3. Do you have any dependents?

               Yes   No

*

If Yes, how many?

Upgrade to Add More Questions   Split Page Here

Q4   Edit Question   ▼   Add Question Logic   Move   Delete

4. What is your age bracket?

20-29

30-39

40-49

50-59

over 60

Upgrade to Add More Questions   Split Page Here

Q5   Edit Question   ▼   Add Question Logic   Move   Delete

5. Are you:

Married

Single

Partnered

Upgrade to Add More Questions   Split Page Here

Q6   Edit Question | ▼ | Add Question Logic | Move | Delete

6. Property. Do you:

Own

Rent

Lease

Upgrade to Add More Questions   Split Page Here

Q7   Edit Question | ▼ | Add Question Logic | Move | Delete

7. How long have you lived in the area

Less than 2 years

2-5 years

5-10 years

More than 10 years

Upgrade to Add More Questions   Split Page Here

Q8   Edit Question | ▼ | Move | Delete

8. What is your postcode?

Upgrade to Add More Questions

+ Add Page

PAGE 4   Edit Page Options ▼ | Add Page Logic | Move | Delete   Show this page only

4. Experience

Upgrade to Add More Questions

Q9   Edit Question | ▼ | Add Question Logic | Move | Delete

9. Are bushfires a regular occurrence in your area?

Yes

No

Upgrade to Add More Questions   Split Page Here

Q10   Edit Question | ▼ | Move | Delete

10. What bushfires have you knowledge of?

Upgrade to Add More Questions | Split Page Here

Q11 | Edit Question ▼ | Add Question Logic | Move | Delete

11. Have you personally experienced any bushfires?

Yes   No

*

IF YES, then when was that?

Upgrade to Add More Questions | Split Page Here

Q12 | Edit Question ▼ | Add Question Logic | Move | Delete

12. Were you affected by the bushfire?

Yes   No

*

If Yes, then how?

Upgrade to Add More Questions | Split Page Here

Q13 | Edit Question ▼ | Add Question Logic | Move | Delete

13. Do you have a bushfire plan?

Yes

No

Upgrade to Add More Questions | Split Page Here

Q14 | Edit Question ▼ | Add Question Logic | Move | Delete

14. If you answered YES, is this plan different post Black Saturday?

Yes   No

*

Please tell me more about this

Upgrade to Add More Questions

+ Add Page

PAGE 5   Edit Page Options ▼   Add Page Logic   Move   Delete   Show this page only

5. Decision Making and Warnings

The questions in this section are multi-choice (one answer per question).
Where there is a comment box attached to a question, PLEASE do not skip this – even one sentence is useful.

Upgrade to Add More Questions

Q15   Edit Question ▼   Add Question Logic   Move   Delete

15. I am confident I could protect myself from bushfires

Strongly Disagree	2	3	Neither Agree nor Disagree	5	6	Strongly Agree

Upgrade to Add More Questions   Split Page Here

Q16   Edit Question ▼   Add Question Logic   Move   Delete

16. I've lived with bushfire risk for ages, and it doesn't overly bother me

Strongly Disagree	2	3	Neither Agree nor Disagree	5	6	Strongly Agree

I am interested in why you answered in the way you have. Could you please tell me more about this?

Upgrade to Add More Questions   Split Page Here

Q17   Edit Question ▼   Add Question Logic   Move   Delete

17. Since Black Saturday, the emergency services have over-reacted to the danger of bushfires

Strongly Disagree	2	3	Neither Agree nor Disagree	5	6	Strongly Agree

Upgrade to Add More Questions   Split Page Here

Q18   Edit Question ▼   Add Question Logic   Move   Delete

18. There are not enough bushfire warnings

Strongly Disagree	2	3	Neither Agree nor Disagree	5	6	Strongly Agree

Can you please tell me more about why you answered in this way?

Upgrade to Add More Questions | Split Page Here

Q19 | Edit Question ▼ | Add Question Logic | Move | Delete

19. In my area, I expect a bushfire like Black Saturday will happen again in my lifetime

| Strongly Disagree | 2 | 3 | Neither Agree nor Disagree | 5 | 6 | Strongly Agree |

Upgrade to Add More Questions

+ Add Page

PAGE 6 | Edit Page Options ▼ | Add Page Logic | Move | Delete   Show this page only

6. Decision Making and Warnings (continued)

Upgrade to Add More Questions

Q20 | Edit Question ▼ | Add Question Logic | Move | Delete

20. At the moment, I'm concerned about the bushfire risk in my area

| Strongly Disagree | 2 | 3 | Neither Agree nor Disagree | 5 | 6 | Strongly Agree |

Upgrade to Add More Questions | Split Page Here

Q21 | Edit Question ▼ | Add Question Logic | Move | Delete

21. The warnings are issued mostly because the officials want to 'play it safe'

| Strongly Disagree | 2 | 3 | Neither Agree nor Disagree | 5 | 6 | Strongly Agree |

Upgrade to Add More Questions | Split Page Here

Q22 | Edit Question ▼ | Add Question Logic | Move | Delete

22. Bushfire warnings don't take the particulars of my area into consideration

| Strongly Disagree | 2 | 3 | Neither Agree nor Disagree | 5 | 6 | Strongly Agree |

Please tell me more about this

[Upgrade to Add More Questions] [Split Page Here]

Q23 [Edit Question ▼] [Add Question Logic] [Move] [Delete]

23. Each time I hear a bushfire warning, I feel worried

| Strongly Disagree | 2 | 3 | Neither Agree nor Disagree | 5 | 6 | Strongly Agree |

*

[Upgrade to Add More Questions] [Split Page Here]

Q24 [Edit Question ▼] [Add Question Logic] [Move] [Delete]

24. No matter how much I prepare, I don't think it will be enough

| Strongly Disagree | 2 | 3 | Neither Agree nor Disagree | 5 | 6 | Strongly Agree |

*

I am interested in why you answered in the way you have. Could you please tell me more about this?

[Upgrade to Add More Questions]

[+ Add Page]

PAGE 7 [Edit Page Options ▼] [Add Page Logic] [Move] [Delete]   Show this page only

7. Decision Making and Warnings (continued)

[Upgrade to Add More Questions]

Q25 [Edit Question ▼] [Add Question Logic] [Move] [Delete]

25. The bushfire warnings are just 'background noise' to the concerns of my life

| Strongly Disagree | 2 | 3 | Neither Agree nor Disagree | 5 | 6 | Strongly Agree |

*

[Upgrade to Add More Questions] [Split Page Here]

Q26 [Edit Question ▼] [Add Question Logic] [Move] [Delete]

26. Bushfire warnings are always accurate

| Strongly | | | Neither Agree | | | Strongly |

Disagree   2   3   nor Disagree   5   6   Agree

*

Can you please tell me more about why you answered in this way?

[   ]

Upgrade to Add More Questions   Split Page Here

Q27   Edit Question ▼   Add Question Logic   Move   Delete

27. Because of the number of warnings we get, I tend to 'turn off'

Strongly Disagree   2   3   Neither Agree nor Disagree   5   6   Strongly Agree

*

Upgrade to Add More Questions   Split Page Here

Q28   Edit Question ▼   Add Question Logic   Move   Delete

28. Catastrophic warnings are issued because of Black Saturday rather than realistic conditons

Strongly Disagree   2   3   Neither Agree nor Disagree   5   6   Strongly Agree

*

Upgrade to Add More Questions   Split Page Here

Q29   Edit Question ▼   Add Question Logic   Move   Delete

29. On a day to day basis, I don't give bushfires alot of thought

Strongly Disagree   2   3   Neither Agree nor Disagree   5   6   Strongly Agree

*

Please tell me more about this

[   ]

Upgrade to Add More Questions

+ Add Page

PAGE 8   Edit Page Options ▼   Add Page Logic   Move   Delete   Show this page only

8. Decision Making and Warnings (continued)

Upgrade to Add More Questions

Q30 | Edit Question ▼ | Add Question Logic | Move | Delete

30. Living in the city has more risks than the threat of bushfires in my area

| Strongly Disagree | 2 | 3 | Neither Agree nor Disagree | 5 | 6 | Strongly Agree |

*

Upgrade to Add More Questions | Split Page Here

Q31 | Edit Question ▼ | Add Question Logic | Move | Delete

31. I rely on my own assessment of conditions more than the official advice

| Strongly Disagree | 2 | 3 | Neither Agree nor Disagree | 5 | 6 | Strongly Agree |

*

I am interested in why you answered in the way you have. Could you please tell me more about this?

[text box]

Upgrade to Add More Questions | Split Page Here

Q32 | Edit Question ▼ | Add Question Logic | Move | Delete

32. I don't worry about bushfires

| Strongly Disagree | 2 | 3 | Neither Agree nor Disagree | 5 | 6 | Strongly Agree |

*

Upgrade to Add More Questions | Split Page Here

Q33 | Edit Question ▼ | Add Question Logic | Move | Delete

33. For me, local radio is less relevant for fire information than the official channels

| Strongly Disagree | 2 | 3 | Neither Agree nor Disagree | 5 | 6 | Strongly Agree |

*

Upgrade to Add More Questions | Split Page Here

Q34 | Edit Question ▼ | Add Question Logic | Move | Delete

34. There are too many bushfire warnings

| Strongly Disagree | 2 | 3 | Neither Agree nor Disagree | 5 | 6 | Strongly Agree |

*

Please tell me more about this

[text box]

Upgrade to Add More Questions

+ Add Page

PAGE 9   Edit Page Options ▼   Add Page Logic   Move   Delete   Show this page only

9. Decision Making and Warnings (continued)

Upgrade to Add More Questions

Q35   Edit Question   ▼   Add Question Logic   Move   Delete

35. If a major bushfire occurred, there is little I could do to defend my house

| Strongly Disagree | 2 | 3 | Neither Agree nor Disagree | 5 | 6 | Strongly Agree |

*

Upgrade to Add More Questions   Split Page Here

Q36   Edit Question   ▼   Add Question Logic   Move   Delete

36. Most of the time, the bushfire warnings don't apply to me

| Strongly Disagree | 2 | 3 | Neither Agree nor Disagree | 5 | 6 | Strongly Agree |

*

Please explain

Upgrade to Add More Questions   Split Page Here

Q37   Edit Question   ▼   Add Question Logic   Move   Delete

37. I've survived fires in the past, and expect to again

| Strongly Disagree | 2 | 3 | Neither Agree nor Disagree | 5 | 6 | Strongly Agree |

*

Upgrade to Add More Questions   Split Page Here

Q38   Edit Question   ▼   Add Question Logic   Move   Delete

38. I don't mind how many bushfire warnings there are

| Strongly Disagree | 2 | 3 | Neither Agree nor Disagree | 5 | 6 | Strongly Agree |

*

Upgrade to Add More Questions | Split Page Here

Q39 | Edit Question ▼ | Add Question Logic | Move | Delete

39. I am tired of the emergency services telling me how to respond to bushfire risk

| Strongly Disagree | 2 | 3 | Neither Agree nor Disagree | 5 | 6 | Strongly Agree |

Upgrade to Add More Questions

+ Add Page

PAGE 10 | Edit Page Options ▼ | Add Page Logic | Move | Delete   Show this page only

10. Decision Making and Warnings (continued)

Upgrade to Add More Questions

Q40 | Edit Question ▼ | Add Question Logic | Move | Delete

40. The authorities can be relied upon to give accurate bushfire warnings

| Strongly Disagree | 2 | 3 | Neither Agree nor Disagree | 5 | 6 | Strongly Agree |

Upgrade to Add More Questions | Split Page Here

Q41 | Edit Question ▼ | Add Question Logic | Move | Delete

41. The concern about bushfires is out of proportion to the real risk

| Strongly Disagree | 2 | 3 | Neither Agree nor Disagree | 5 | 6 | Strongly Agree |

Upgrade to Add More Questions | Split Page Here

Q42 | Edit Question ▼ | Add Question Logic | Move | Delete

42. False alarms affect how I respond to subsequent warnings

| Strongly Disagree | 2 | 3 | Neither Agree nor Disagree | 5 | 6 | Strongly Agree |

Can you please tell me more about why you answered in this way?

Upgrade to Add More Questions | Split Page Here

Q43 | Edit Question ▼ | Add Question Logic | Move | Delete

43. I take more notice of bushfire warnings if they are issued by my local authorities

| Strongly Disagree | 2 | 3 | Neither Agree nor Disagree | 5 | 6 | Strongly Agree |

*

Upgrade to Add More Questions

+ Add Page

PAGE 11 | Edit Page Options ▼ | Add Page Logic | Move | Delete   Show this page only

11. Decision Making and Warnings (continued)

Upgrade to Add More Questions

Q44 | Edit Question ▼ | Add Question Logic | Move | Delete

44. Thinking about bushfires stresses me out

| Strongly Disagree | 2 | 3 | Neither Agree nor Disagree | 5 | 6 | Strongly Agree |

*

Could you please tell me more about this?

[text box]

Upgrade to Add More Questions | Split Page Here

Q45 | Edit Question ▼ | Add Question Logic | Move | Delete

45. I always follow the advice of official warnings about bushfires

| Strongly Disagree | 2 | 3 | Neither Agree nor Disagree | 5 | 6 | Strongly Agree |

*

Upgrade to Add More Questions | Split Page Here

Q46 | Edit Question ▼ | Add Question Logic | Move | Delete

46. Black Saturday showed that bushfire risk for my area is much higher than I thought

| Strongly Disagree | 2 | 3 | Neither Agree nor Disagree | 5 | 6 | Strongly Agree |

*

Upgrade to Add More Questions | Split Page Here

Q47   Edit Question ▼ | Add Question Logic | Move | Delete

47. False Alarms can lead to complacency

| Strongly Disagree | 2 | 3 | Neither Agree nor Disagree | 5 | 6 | Strongly Agree |

*

Could you please elaborate?

Upgrade to Add More Questions | Split Page Here

Q48   Edit Question ▼ | Add Question Logic | Move | Delete

48. Bushfire warnings are only issued when there is a real threat

| Strongly Disagree | 2 | 3 | Neither Agree nor Disagree | 5 | 6 | Strongly Agree |

*

Upgrade to Add More Questions

+ Add Page

PAGE 12   Edit Page Options ▼ | Add Page Logic | Move | Delete   Show this page only

12. Decision Making and Warnings (continued)

Upgrade to Add More Questions

Q49   Edit Question ▼ | Move | Delete

49. Using the scale below, please answer the following questions

	I disagree ALOT	I disagree a little	Neither agree nor disagree	I agree a little	I agree ALOT
In uncertain times, I usually expect the best					
I am good at turning the other cheek					
If something will go wrong for me it will					
I am always optimistic about my future					
I find it easy to say 'sorry'					
I hardly ever expect things to go my way					
I enjoy my own company					

I rarely count on good things
happening to me

I think I am a kind and thoughtful
friend

Overall, I expect more good things
to happen to me than bad

Upgrade to Add More Questions

+ Add Page

PAGE 13 Edit Page Options ▼ | Add Page Logic | Move | Delete   Show this page only

13. Optional Feedback

If relevant, I'd really welcome your feedback on these last two questions

Upgrade to Add More Questions

Q50 Edit Question | ▼ | Move | Delete

50. Has answering this survey raised any issues you would like to tell me about?

Upgrade to Add More Questions | Split Page Here

Q51 Edit Question | ▼ | Move | Delete

51. In terms of bushfire warnings, is there anything you think needs to be addressed?

Upgrade to Add More Questions

+ Add Page

PAGE 14 Edit Page Options ▼ | Move | Delete   Show this page only

14. THANK YOU!

I really appreciate your interest in my research and for taking the time to do this survey.

Upgrade to Add More Questions

+ Add Page

4 Fire Danger Ratings

Stay aware of the Fire Danger Rating and know what to do.

The Fire Danger Rating predicts how a fire would behave if one started, including how difficult it would be to put out. The higher the rating, the more dangerous the conditions. The rating is your trigger to act, so to stay safe you need to stay aware of the Fire Danger Rating in your district. During the fire season, the Fire Danger Rating will feature in weather forecasts and be broadcast on radio and TV and appear in some newspapers. It can also be found on the websites of the CFA, Department of Sustainability and Environment and Bureau of Meteorology or by calling the Victorian Bushfire Information Line on **1800 240 667**

	WHAT DOES IT MEAN?	WHAT SHOULD I DO?
CODE RED	These are the worst conditions for a bush or grass fire. Homes are not designed or constructed to withstand fires in these conditions. The safest place to be is away from high risk bushfire areas.	Leaving high risk bushfire areas the night before or early in the day is your safest option – do not wait and see. Avoid forested areas, thick bush or long, dry grass. Know your trigger – make a decision about: – when you will leave – where you will go – how you will get there – when you will return – what you will do if you cannot leave
EXTREME	Expect extremely hot, dry and windy conditions. If a fire starts and takes hold, it will be uncontrollable, unpredictable and fast moving. Spot fires will start, move quickly and come from many directions. Homes that are situated and constructed or modified to withstand a bushfire, that are well prepared and actively defended, may provide safety. You must be physically and mentally prepared to defend in these conditions.	• Consider staying with your property only if you are prepared to the highest level. This means your home needs to be situated and constructed or modified to withstand a bushfire, you are well prepared and you can actively defend your home if a fire starts. • If you are not prepared to the highest level, leaving high risk bushfire areas early in the day is your safest option. • Be aware of local conditions and seek information by listening to ABC Local Radio, commercial radio stations or Sky News TV, go to **cfa.vic.gov.au** or call the Victorian Bushfire Information Line on **1800 240 667**
SEVERE	Expect hot, dry and possibly windy conditions. If a fire starts and takes hold, it may be uncontrollable. Well prepared homes that are actively defended can provide safety. You must be physically and mentally prepared to defend in these conditions.	• Well prepared homes that are actively defended can provide safety – check your bushfire survival plan. • If you are not prepared, leaving bushfire prone areas early in the day is your safest option. • Be aware of local conditions and seek information by listening to ABC Local Radio, commercial radio stations or Sky News TV, go to **cfa.vic.gov.au** or call the Victorian Bushfire Information Line on **1800 240 667**
VERY HIGH / HIGH / LOW-MODERATE	If a fire starts, it can most likely be controlled in these conditions and homes can provide safety. Be aware of how fires can start and minimise the risk. Controlled burning off may occur in these conditions if it is safe – check to see if permits apply.	• Check your bushfire survival plan • Monitor conditions • Action may be needed • Leave if necessary

PREPARE. ACT. SURVIVE. FireReady Victoria

CFA

For more information contact: **1800 240 667 www.cfa.vic.gov.au**

290

5 Item Content: Bushfire Warning Fatigue Subscales (BWFM).

Note: (R) indicates that the item is reverse-scored.

Subscale	Items
Helplessness	I am confident I could protect myself from bushfires (R)
	No matter how much I prepare, I don't think it will be enough
	If a major bushfire occurred, there is little I could do to defend my house
	I rely on my own assessment of conditions more than the official advice (R)
Desensitisation /Normalisation	I've lived with bushfire risk for ages, and it doesn't overly bother me
	The bushfire warnings are just 'background noise' to the concerns of my life
	Living in the city has more risks than the threat of bushfires in my area
	I've survived fires in the past, and expect to again
Trust	Since Black Saturday, the emergency services have over-reacted to the danger of bushfires
	I rely on my own assessment of conditions more than the official advice
	I am tired of the emergency services telling me how to respond to bushfire risk
	The authorities can be relied upon to give accurate bushfire warnings (R)
Over-Warning	There are not enough bushfire warnings (R)
	At the moment, I'm concerned about the bushfire risk in my area (R)
	Because of the number of warnings we get, I tend to 'turn off'
	There are too many bushfire warnings
Risk Perception	In my area, I expect a bushfire like Black Saturday will happen again in my lifetime (R)
	The concern about bushfires is out of proportion to the real risk
	Black Saturday showed that bushfire risk for my area is much higher than I thought (R)
	Most of the time, the bushfire warnings don't apply to me
Localisation /Relevance	Bushfire warnings don't take the particulars of my area into consideration
	For me, local radio is less relevant for fire information than the official channels (R)
	Most of the time, the bushfire warnings don't apply to me
	I take more notice of bushfire warnings if they are issued by my local authorities
Apathy	On a day to day basis, I don't give bushfires a lot of thought
	I always follow the advice of official warnings about bushfires (R)
	I've lived with bushfire risk for ages, and it doesn't overly bother me
	I've survived fires in the past, and expect to again
Scepticism	The warnings are issued mostly because the officials want to 'play it safe
	Bushfire warnings are always accurate (R)
	Catastrophic warnings are issued because of Black Saturday rather than realistic conditions
	Bushfire warnings are only issued when there is a real threat
False Alarm	I don't mind how many bushfire warnings there are (R)
	False alarms affect how I respond to subsequent warnings
	False Alarms can lead to complacency
	There are too many bushfire warnings (R)
Worry	Each time I hear a bushfire warning, I feel worried (R)
	I don't worry about bushfires
	Thinking about bushfires stresses me out (R)
	On a day to day basis, I don't give bushfires a lot of thought

6 Item Content: Revised Bushfire Warning Fatigue Subscales (BWFM-R).

Subscale	Items
Helplessness	I am confident I could protect myself from bushfires (R)
	No matter how much I prepare, I don't think it will be enough
	If a major bushfire occurred, there is little I could do to defend my house
	I rely on my own assessment of conditions more than the official advice (R)
Trust	Since Black Saturday, the emergency services have over-reacted to the danger of bushfires
	I rely on my own assessment of conditions more than the official advice
	I am tired of the emergency services telling me how to respond to bushfire risk
	The authorities can be relied upon to give accurate bushfire warnings (R)
Over-Warning	There are not enough bushfire warnings (R)
	At the moment, I'm concerned about the bushfire risk in my area (R)
	Because of the number of warnings we get, I tend to 'turn off'
	There are too many bushfire warnings
Scepticism	The warnings are issued mostly because the officials want to 'play it safe
	Bushfire warnings are always accurate (R)
	Catastrophic warnings are issued because of Black Saturday rather than realistic conditions
	Bushfire warnings are only issued when there is a real threat
False Alarm	I don't mind how many bushfire warnings there are (R)
	False alarms affect how I respond to subsequent warnings
	False Alarms can lead to complacency
	There are too many bushfire warnings (R)

7. Hurricane Sandy Public Information Statement

PUBLIC INFORMATION STATEMENT
NATIONAL WEATHER SERVICE MOUNT HOLLY NJ
241 PM EDT SUN OCT 28 2012

...AN EXTREMELY DANGEROUS STORM TO IMPACT THE AREA...

SANDY IS EXPECTED TO SLAM INTO THE NEW JERSEY COAST LATER MONDAY
NIGHT, BRINGING VERY HEAVY RAIN AND DAMAGING WINDS TO THE REGION.
THE STORM IS A LARGE ONE, THEREFORE DO NOT FOCUS ON THE EXACT CENTER
OF THE STORM AS ALL AREAS WILL HAVE SIGNIFICANT IMPACTS.

THIS HAS THE POTENTIAL TO BE AN HISTORIC STORM, WITH WIDESPREAD WIND
DAMAGE AND POWER OUTAGES, INLAND AND COASTAL FLOODING, AND MASSIVE
BEACH EROSION. THE COMBINATION OF THE HEAVY RAIN AND PROLONGED WIND
WILL CREATE THE POTENTIAL FOR LONG LASTING POWER OUTAGES AND SERIOUS
FLOODING.

PREPARATIONS SHOULD BE WRAPPING UP AS CONDITIONS ARE EXPECTED TO
WORSEN TONIGHT AND ESPECIALLY ON MONDAY.

SOME IMPORTANT NOTES...

1. IF YOU ARE BEING ASKED TO EVACUATE A COASTAL LOCATION BY STATE
AND LOCAL OFFICIALS, PLEASE DO SO.

**2. IF YOU ARE RELUCTANT TO EVACUATE, AND YOU KNOW SOMEONE WHO RODE
OUT THE `62 STORM ON THE BARRIER ISLANDS, ASK THEM IF THEY COULD DO
IT AGAIN.**

3. **IF YOU ARE RELUCTANT, THINK ABOUT YOUR LOVED ONES, THINK ABOUT
THE EMERGENCY RESPONDERS WHO WILL BE UNABLE TO REACH YOU WHEN YOU
MAKE THE PANICKED PHONE CALL TO BE RESCUED, THINK ABOUT THE
RESCUE/RECOVERY TEAMS WHO WILL RESCUE YOU IF YOU ARE INJURED OR
RECOVER YOUR REMAINS IF YOU DO NOT SURVIVE.**

4. SANDY IS AN EXTREMELY DANGEROUS STORM. THERE WILL BE MAJOR
PROPERTY DAMAGE, INJURIES ARE PROBABLY UNAVOIDABLE, BUT THE GOAL IS
ZERO FATALITIES.

5. IF YOU THINK THE STORM IS OVER-HYPED AND EXAGGERATED, PLEASE ERR
ON THE SIDE OF CAUTION.

WE WISH EVERYONE IN HARMS WAY ALL THE BEST. STAY SAFE!

NWS MOUNT HOLLY, NJ

Dr Jeffrey D. Kepert
Head, High Impact Weather Research

Australian Government
Bureau of Meteorology

Weather and Environmental Prediction
Centre for Australian Weather and Climate Research
Bureau of Meteorology
GPO Box 1289 Melbourne VIC 3001
Level 6, 700 Collins Street, Docklands VIC 3008
Tel: +61 3 9669 4492 | J.Kepert@bom.gov.au
www.bom.gov.au | www.cawcr.gov.au

8. Lyrics to 'Waltzing Matilda'.

Once a jolly swagman camped by a billabong
Under the shade of a coolibah tree,
And he sang as he watched and waited till his billy boiled:
"Who'll come a-waltzing Matilda, with me?"

[Refrain]
Waltzing Matilda, waltzing Matilda
You'll come a-waltzing Matilda, with me
And he sang as he watched and waited till his billy boiled:
"You'll come a-waltzing Matilda, with me."

Down came a jumbuck to drink at that billabong.
Up jumped the swagman and grabbed him with glee.
And he sang as he shoved that jumbuck in his tucker bag:
"You'll come a-waltzing Matilda, with me."

[Refrain]

Up rode the squatter, mounted on his thoroughbred.
Down came the troopers, one, two, and three.
"Whose[N 1] is that [N 2] jumbuck you've got in your tucker bag?
You'll come a-waltzing Matilda, with me."

[Refrain]

Up jumped the swagman and sprang into the billabong.
"You'll never take me alive!" said he
And his ghost may be heard as you pass by that billabong:
"Who'll come a-waltzing Matilda, with me?"

[Refrain]