bushfire CRC

INFORMATION PROCESSING UNDER STRESS: COMMUNITY REACTIONS

FINAL PROJECT REPORT

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Cover: People need triggers to take different actions under a variety of conditions. Here residents evacuate late as a fire closes in.
Photo: Supplied.

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Team members

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Dr Patrick Dunlop is an Assistant Professor in the School of Psychology at the University of Western Australia. Patrick completed his PhD in Psychology at the University of Western Australia, which focused on the recruitment and assessment of candidates for fire fighter positions in Western Australia. Patrick is an expert in the areas of measurement, field research methods, and advanced statistical analyses. Following the completion of the Bushfire CRC work, Patrick will continue with the School of Psychology.

Professor Timothy Skinner is a health psychologist by background, and has spent the past 18 years undertaking research in promoting behaviour change. This has predominantly focused on the health domain, but for the past 3 years this has also included work on promoting bushfire preparedness, and understanding community responses to bushfires. More recently in January

2013 he was asked to lead the Tasmanian post bushfire debriefing survey for the Bushfires CRC. He has also worked on a range of national policy and guideline development programs, along with national level implementation programmes.

Professor David Morrison is an Organisational Psychologist by background. He began his career researching in the area of decision making under stress in complex industrial systems. In related themes he has researched in the area work design and performance with a focus on the effect of job demand, control, and supervisory behaviour. More recently research has been published on psychometric assessment faking in the measurement of personality. From 2005 -2012 David was the Head of the School of Psychology at UWA. His current appointment is as the Deputy Vice Chancellor for Research and Development at Murdoch Univeristy.

Damien Killalea is Director of Community Fire Safety at the Tasmania Fire Service. He is responsible for the development and implementation of policies, strategies and programs to increase community safety from fire. Damien is the Bushfire Cooperative Research Centre's user-leader for social research projects at the University of Western Australia and La Trobe University, which focus on how people and communities respond to the threat of bushfire. He is also chair of the Australasian Fire and Emergency Service Authorities Council's (AFAC) Community Safety Group, and plays a leading role in the development and review of national positions and strategies to improve community safety from fires in the built and natural environment.

1. Executive Summary

This report summarises the main studies and findings of 'The Information Processing Under Stress: Community Reactions' project, which was carried out between January 2011 and June 2014. This project was funded by the Bushfire CRC and sits within the research stream called 'Communicating Risk'. The project had a focus on improving the understanding of how residents living in bushfire (i.q. wildfire) prone areas can be motivated to prepare better for the bushfire season and make better decisions when a fire threatens their community. More specific, it aimed to address the following Problem Statements:

1. 'What are the ingredients of preparedness and good planning?'. More specific, 'Should preparedness be measured as a unitary construct or be divided into subtypes of preparedness?', and 'What constitutes a good fire plan?'
2. 'Why do people delay the decision of whether they will defend or evacuate in response to a fire?',
3. 'What factors, both situational and personality based, predict bushfire preparedness?', and
4. 'How effective are certain interventions in motivating residents to prepare?'.

To address these questions, the research team conducted three field studies, two workshops, and a laboratory experiment. The field-studies were run amongst residents of bushfire prone areas. The first was a single survey field-study undertaken in the weeks following the bushfires of February 2011 in the Perth Hills (e.g. Kelmscott, Red Hill, Roleystone), resulting in 1003 final responses. The second field-study was a two-wave longitudinal field-study undertaken at the start (T1: October 2011) and end (T2: March 2012) of the bushfire season in Western Australia. This study included residents from several fire prone areas in and around Perth (e.g. Brigadoon, Bunbury, Gelorup, Gidgegannup, Roleystone, Stratham), and resulted in a little over 200 final responses across the two waves. Finally, the third field-study was a three-wave longitudinal field-study undertaken at the start (T1: first surveys sent out in October 2012), second half

(T2: 10 weeks after initial survey was sent out) and end (T3: two weeks after second survey, last surveys sent out in March 2013) of the 2012-2013 bushfire season. This study included residents living in fire prone areas in six different States/Territories of Australia (ACT, NSW, SA, TAS, VIC, WA), and resulted in 465 final responses across the first two waves, and 354 responses in the third wave.

The first workshop was conducted amongst experts present at the AFAC community engagement technical group meeting in Adelaide in September of 2012, and the second workshop was conducted amongst experts present at the AFAC community engagement technical group meeting in Melbourne in March of 2013. Finally, the laboratory experiment was conducted amongst 137 first year Psychology students at the University of Western Australia between March and October of 2012.

Please see Section 3 for details about which Problem Statements were addressed by each study and workshop.

Key Findings

The key findings of the project related to each problem statement are listed below. Section 4 of this report contains more detailed information about these findings, and the studies that led to them. The corresponding subsections are mentioned in brackets.

- <u>What do preparedness and planning entail? [4A]</u>
    - We developed and validated a new measure of bushfire preparedness. The final measure takes two forms, one comprehensive tool for practitioners, and one short-form tool for researchers. Each of these two measures contains three sub-scales measuring three types of preparedness related to three different bushfire goals; namely (1) safe evacuation, (2) safe and successful active defence against the fire, and (3) improving property survivability in the absence of a defender. Results showed support for making this distinction in three different preparedness types rather than using a single measure of overall preparedness. [4A.1]

- When examining the question of what a good fire plan entails amongst experts, we concluded that a good fire plan would ideally suit the needs and abilities of all household members, consider pets and livestock, include a back-up plan, be flexible and adaptable so it can be adjusted to a variety of situations, and contain detailed information, such as which information sources would be used, what would be the triggers for action, transport arrangements, emergency contact numbers, safe place of last resort, etc. However, we also found that experts were aware of the complexities (e.g. different plans for a multitude of different situations, having confidence in one's ability to use the right triggers for action) involved in developing a good fire plan, and realised that many households may not have the capacity to develop one. [4A.2]

- <u>Why do people delay the decision of whether they will defend or evacuate in response to a fire? [4B]</u>
  - Most of the people who responded to our survey indicated they would delay their decision of whether to defend or evacuate till the day of the fire: 68.1 % in the first wave and 67.2% in the second wave.
  - The most important finding was that decision difficulty (as measured by the relative value of defending vs. evacuating) was the only significant predictor of why people delayed this decision regarding their action in response to a fire threat. ,
  - People were not more likely to delay this decision as a result of a lack of awareness of the likelihood and severity of bushfire risk in their community. They also were not more likely to delay this decision in order to avoid responsibility for decision outcomes.
  - In conclusion, this study showed that householders who delay their decision about either defending their home, or evacuating beforehand, are not necessarily unmotivated to think about bushfire, nor are they trying to hide from the reality of bushfire threat. What this study shows is that the extreme difficulty in making the decision to defend or evacuate causes paralysing indecision.

- <u>What factors, both situational and personality based, predict bushfire preparedness? [4C]</u>
    - When it comes to preparing for bushfires, we found that residents who were more indecisive in general tended to have less confidence in their ability to prepare well for bushfires, and this resulted in them completing fewer psychological planning actions (e.g. "Ensuring everyone in the household knows what to do") than those who were less indecisive. Also, those who were more anxious in general tended to worry about bushfires more, and this in turn may have led them to complete more psychological planning actions. [4C.1]
    - When examining the relationship between people's expectations around some of the key factors mentioned in the Prepare.Act.Survive. brochures[1] (e.g. risk perceptions, whether or not to rely on emergency services for a warning, etc.) and four different types of preparedness[2] (Defence Preparations, Evacuation Preparations, Property Preparations, and Psychological Planning), we found that risk severity (but not risk likelihood) was the strongest predictor of preparedness. That is, those who expected bushfires to have a more severe impact on their community generally were more prepared than those who expected a less severe impact. In addition, those who expected to lose water generally completed more psychological planning actions, and those who expected a loss of electricity completed more property preparations. [4C.2]
- <u>How effective are certain interventions in motivating residents to prepare? [4D]</u>

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[1] The Australian government policy on bushfire safety called "Prepare.Act.Survive." (PAS) offers residents a choice to stay and defend their home or evacuate early in the event of a bushfire threat. The brochures that are based on this policy provide residents with information on what to expect during a bushfire event and how to prepare for one (e.g. Department of Fire and Emergency Services of Western Australia (DFES), 2012).

[2] All survey studies were conducted before the finalization of our preparedness measure, and preparedness measures in these studies therefore differ slightly from the final measure.

- Based on the found relationship between expecting to lose water or electricity and preparing, we developed an intervention[3] that tried to increase preparedness by making residents more aware of the potential loss of water, electricity, and other services in a follow up study. However, when comparing final preparedness of those receiving the survey with the intervention paragraph to those receiving the survey without this particular paragraph (i.e. control condition), this intervention strategy showed no effect on preparedness of any sort. [4D.1]
- We therefore examined a number of alternative interventions that had been shown to be effective in changing behaviour in other areas such as health or education. First, we examined the influence of starting out with something easy versus something difficult, by letting residents focus on the three easiest versus most difficult uncompleted preparatory actions first. This influenced their intentions to complete uncompleted psychological planning actions, with those focusing on the easiest actions first having greater overall intentions, but it did not have an influence on actual preparedness behaviour two months later. More research is needed to examine how this intervention can be made more powerful and have an effect on behaviour too. [4D.2]
- We also examined the influence of letting participants interpret their preparedness to date in terms of commitment versus progress towards the goal of being well prepared for bushfires, as this had been shown to be effective in health and education settings. This intervention influenced residents' intentions to prepare their property and their actual preparedness in terms of psychological planning actions completed, but it did so in opposite directions. More specifically, residents who thought about how much they had done to prepare to date in terms of the progress they had made towards the

[3] The interventions mentioned in this report all entailed including one or several lines of text in the surveys that would differ between surveys, with different respondents receiving different versions. This allowed for testing whether respondents with certain survey versions increased their preparedness more than those receiving other versions.

goal of being prepared completed more psychological planning actions than those who thought about how much they had done to prepare to date in terms of how committed they were towards the goal of being prepared. However, those focusing on progress showed lower intentions to engage in tasks that prepared their properties. [4D.2]

- It became clear that the results around commitment and progress in these studies were inconsistent across studies, and dissimilar to the ones found in other sectors. This indicates that not all communication strategies will be effective in increasing preparedness, even if they have been shown to be effective in changing behaviours in other areas. [4D.2]

2. Previous State of Knowledge

Before starting this project, there was very little published academic research, especially quantitative studies, on how to motivate people to prepare better for the bushfire season, and understanding residents' decision making when it comes to making their fire plan and deciding on their intended fire response. Although agencies across Australia have been aiming to increase residents' preparedness and decision making for a long time through brochures, bushfire ready groups, and marketing campaigns, their strategies and approaches in designing the content of such communications had not been evaluated empirically in the peer-reviewed academic literature. In general, upon reviewing the literature on how people can be motivated to prepare for bushfires at the start of the current project, it was found that much of the extant literature was qualitative and tended to focus on single case studies of communities. With few exceptions (e.g. Bright & Burtz, 2005), it became evident that the quantitative literature had limited itself mainly to perceptions of risk and responsibility (Beringer, 2000; Martin, Bender, & Raish, 2007; Martin, Martin, & Kent, 2009; McCaffrey, & Shindler, 2011; McFarlane, McGee, & Faulkner, 2011), or had focused on measuring levels of preparedness and response after a bushfire had already occurred (e.g. Handmer, O'Neil, & Killalea, 2010).

The current project was developed to address the following Problem Statements:

1. 'What do preparedness and planning entail?'. More specific, 'Should preparedness be measured as a unitary construct or be divided into subtypes of preparedness?', and 'What constitutes a good fire plan?'
2. 'Why do people delay the decision of whether they will defend or evacuate in response to a fire?',
3. 'What factors, both situational and personality based, predict bushfire preparedness?', and
4. 'How effective are certain interventions in motivating residents to prepare?'.

The research conducted to address these Problem Statements is described in more detail in section 4.

3. Progression of Research

To address the four different Problem Statements, three different quantitative field-studies, a laboratory experiment, and two workshops were undertaken. They are described in chronological order below. Some studies were used to answer multiple Problem Statements, whereas others only focused on one Problem Statement. For each study and workshop, we have therefore mentioned the Problem Statements they addressed and the report sections containing specifics (i.e. how each study addressed the Statements and what conclusions they yielded) in brackets:

1. The first field-study that was used to address the Problem Statements was a single survey field-study undertaken in the weeks following the bushfires of February 2011 in the Perth Hills (e.g. Kelmscott, Red Hill, Roleystone). [‘What factors predict bushfire preparedness?’ – 4C.2]

2. The second field-study was a two-wave longitudinal field-study undertaken at the start (T1: October 2011) and end (T2: March 2012) of the bushfire season in Western Australia. This study included residents from several fire prone areas in and around Perth (e.g. Brigadoon, Bunbury, Gelorup, Gidgegannup, Roleystone, Stratham). [‘Why do people delay the decision of whether they will defend or evacuate in response to a fire?’ – 4B.1; ‘What factors predict bushfire preparedness?’ – 4C.1; ‘How effective are certain interventions in motivating residents to prepare? – 4D.1]

3. The laboratory experiment was conducted amongst first year Psychology students at the University of Western Australia between March and October of 2012. This study served as a pilot for the interventions tested in the third field-study [‘How effective are certain interventions in motivating residents to prepare?’ – 4D.2]

4. The first workshop was conducted amongst experts present at the AFAC community engagement technical group meeting in Adelaide in September of 2012. [‘What constitutes a good fire plan?’ – 4A.2]

5. The third field-study was a three-wave longitudinal field-study undertaken at the start (T1: first surveys sent out in October 2012), second half (T2: 10 weeks

after initial survey was sent out) and end (T3: two weeks after second survey, last surveys sent out in March 2013) of the 2012-2013 bushfire season. This study included residents living in fire prone areas in six different States/Territories of Australia (ACT, NSW, SA, TAS, VIC, WA). ['Should preparedness be measured as a unitary construct or be divided into subtypes of preparedness?' – 4A.1; 'How effective are certain interventions in motivating residents to prepare?' – 4D.2]

6. Finally, the second workshop was conducted amongst experts present at the AFAC community engagement technical group meeting in Melbourne in March of 2013. ['Should preparedness be measured as a unitary construct or be divided into subtypes of preparedness?' – 4A.1]

4. Research

This section of the report describes all of the research linked to the different Problem Statements (sections 4A, 4B, 4C, and 4D). There are subsections (e.g. 4A.1, 4A.2, etc.) underneath each Problem Statement section, which each describe a study that aimed to address the Problem Statement. Each of these sections contains a Research Purpose that describes the background and the more specific purpose of the study in relation to the Problem Statement, a Method section that outlines how we aimed to address the problem statement, and an Outcomes section that outlines the new state of knowledge by the end of the study, including main conclusions.

4A. The Ingredients of Preparedness and Good Planning

4A.1 Developing a measure of Bushfire Preparedness

Research Purpose:

One of the primary goals of the line of research described in this report was to learn about the factors that predict and influence bushfire preparedness levels amongst bushfire prone community members. One problem that the research team immediately faced, however, was that there was little clarity on what exactly is meant by the term bushfire preparedness. Further, the manner in which preparedness had been assessed in the few quantitative studies that existed had varied considerably from study to study. When taking a quantitative approach to construct measurement, however, the standardisation of the construct's definition and its measurement is of paramount importance. Indeed, the consequences of any absence of clarity in definition or inconsistency in measurement are that it becomes very difficult to compare the results of different studies of preparedness, making broad generalisation impossible.

Further, no distinction had been made to date in the peer-reviewed academic literature between preparing for different courses of action (e.g. preparing to defend vs. preparing to leave early). Since the present research project was focused, in part, on preparedness for bushfire, it was vital that some consistency

be introduced to the definition and measurement of this construct. In this study, we sought to resolve the issues described above by: (1) developing a new formal definition of bushfire preparedness which could be applied as a standard for researchers and practitioners, (2) proposing a new typology of bushfire preparedness that makes distinctions between different household bushfire goals, namely, safe evacuation, safe and effective active defence, and improving the probability of property survivability in the absence of a defender, and (3) constructing two new standardised measures of preparedness for use by researchers and practitioners.

Method:

The methodology of this study consisted of four steps, which are described below. In the first step, the research team proposed a new formal definition of bushfire preparedness, along with an appropriate typology of preparedness actions. To develop the formal definition of bushfire preparedness, the research team drew from literature published by emergency services agencies from around the world, in reviewing this material we found it tended to place an emphasis on protecting property and life. Additionally, consideration was made for the fact that preparedness ought to comprise both physical *and* mental (cognitive) actions e.g. planning (e.g. McNeill, Dunlop, Heath, Skinner, & Morrison, 2013). As such, bushfire preparedness was defined as any prior "cognitive or physical action that will reduce the risk to the householders' lives and/or the property in the event of a wildfire". In defining bushfire preparedness, a further distinction was made between three different types of preparatory actions that could serve different household bushfire-related goals, namely preparing to evacuate safely, preparing to successfully, but safely, actively defend a property against a bushfire, and to prepare in a manner which will improve a house's chances of surviving a fire without an active defender present.

In the second step of the research, the research team identified and collated a large number of actions that householders could undertake in order to better

prepare for bushfire. To achieve this goal, preparedness actions were sourced from community safety materials published by emergency services authorities and existing academic research papers that included a preparedness measure. In total, 118 unique preparedness actions were identified (the full set of actions will be available to download with the manuscript).

After assembling a set of preparedness actions from a comprehensive search of existing materials, in the third step of this study, a group of 11 emergency services experts was assembled. These experts were asked to evaluate the importance of each of the 118 actions in relation to the three household goals described in the first phase: (1) evacuating safely and early, (2) actively defending safely and successfully, and (3) improving the chances of a house surviving a fire without a defender present. The experts rated each action in terms of the implications of *not* completing that action prior to the day of a fire occurring in Severe bushfire danger conditions. Ratings were made on a scale from 0 ([not taking this action] would not make any difference) to 4 (would make it impossible or near impossible [to achieve this household goal]). At this point, preparedness actions that were deemed relatively unimportant by the experts were removed from consideration.

In the final step, a questionnaire was administered to a sample of 354 residents of bushfire prone areas in the latter part of the 2012-2013 bushfire season (T3 in the 2012-2013 survey study). Respondents were asked to indicate whether or not they had engaged in each of the bushfire preparedness actions. The responses to these questionnaires were then used to identify actions that were: redundant with other actions[4], were engaged in by almost all households, or engaged in by very few households.

A final set of items was then selected for inclusion in two measures of bushfire preparedness. The first measure was a comprehensive assessment of bushfire preparedness intended for use by practitioners. Unlike most existing preparedness measures, the comprehensive assessment developed in this study

[4] Items that were correlated at greater than 0.7 were considered redundant, since it was unlikely that both items collectively provided substantively additional information over and above just one of them.

weights different actions according to their relative importance; that is more important actions attract a higher value in terms of overall preparedness. The second measure was a brief assessment of bushfire preparedness that was intended for use by researchers. This second assessment was designed to capture as much variability in preparedness across households whilst keeping its overall length to a minimum (the final set of actions will be available to download with the manuscript).

Outcomes:

This phase resulted in:

- a new formal definition of bushfire preparedness that can be considered for adoption as a standard by researchers and industry practitioners.
- a new typology of bushfire preparedness that allows householders to prepare in a manner that serves three different bushfire goals; namely (1) safe evacuation, (2) safe and successful active defence against the fire, and (3) improving property survivability in the absence of a defender.
- a new checklist of bushfire preparedness that can be used by industry practitioners or householders to undertake a more comprehensive evaluation of the preparedness of their households.
- a new briefer checklist of bushfire preparedness that can be used by researchers, to enable the standardisation of the assessment of this construct across studies, but also with the benefit of keeping the overall questionnaire length at a minimum.

The final measures are available for use from the Bushfire CRC. In addition, a manuscript on the above research entitled 'Preparing… for what? Developing multi-dimensional measures of community wildfire preparedness for researchers and practitioners' has been submitted to a peer-reviewed journal. A copy of the manuscript can be made available upon request to the authors. Finally, results will also be published in a Fire Note.

4A.2 What constitutes a proper Bushfire Response Plan

Research Purpose:

In addition to learning more about bushfire preparedness levels, the research in this report also focused on gaining a better understanding of how people intend to respond to fires, and how their intended response plans may be improved. To do so it was important to first understand what a bushfire response plan should ideally entail, and what barriers may exist for householders in forming one.

Method:

To address this problem statement, we organised a workshop that took place on September 11, 2012 in Adelaide. Attendees were all members of the AFAC Community Engagement Technical Group.

During the workshop attendees were divided into three subgroups. We then asked the attendees three questions that were closely related to the problem statement. (1) What are the key ingredients of a good fire plan? (2) What are the difficulties householders may face in the construction of such an 'ideal' plan? (3) What can be done to tackle these problems householder may be facing in constructing their fire plan? And what is your agency currently doing/planning to do to tackle them?

They received about 15 minutes per question and wrote down their answers on butcher paper. After the 15 minutes were over, each group was asked to present their answers.

Outcomes:

Below are the questions and the main answers given by the groups.

1. What are the key ingredients of a good fire plan?

- Suit the needs and abilities of all household members, and consider all living beings (e.g. pets).

- Include a back-up plan, or a range of options of what could be done in response to a fire.
- Be flexible and adaptable so it can be adjusted to a variety of situations.
- Contain detailed information, such as which information sources would be used, what would be the triggers for action, transport arrangements, emergency contact numbers, safe place of last resort, etc.

2. What are the difficulties householders may face in the construction of such an 'ideal' plan?

- The difficulty/complexity of constructing multiple action plans. Too many options in 'what to do'.
- Related to this, it was perceived that many families experience communication issues over simple things, so would their communication skills cope with complex contingency plans?
- It was also felt many people/households lacked the confidence to read/identify the triggers for different actions.

3. What can be done to tackle these problems householder may be facing in constructing their fire plan? And what is your agency currently doing/planning to do to tackle them?

- The groups identified that the problems associated with delaying the decision about defending or evacuating are unlikely to be reduced by forcing people to choose 'defend' or 'evacuate', or by increasing their risk perception.
- They suggested that fire plans of indecisive householders could be improved by transforming their decision delay into a contingency plan that spells out under which circumstances they would defend, and under which circumstances they would evacuate.
- However, they indicated that making contingency plans could be problematic due to obstacles such as complexity, and the lack of the necessary support from brigades or fire agencies in helping householders to develop their contingency plans.
- In response to this, it was suggested that one way to overcoming the

complexity issue would be to have brigades advise residents on how to identify appropriate triggers and therefore appropriate actions to take under a variety of conditions. In Victoria, households can already get personalised advice on whether they should even consider defending their house.

- Over the longer term, it was suggested that agencies could eventually reduce the community's reliance on the agencies' advice by establishing better links with the community and increasing community-driven education. Community members could then use this knowledge to help individual households to develop good contingency plans.
- It was also suggested that fire agencies and brigade members model this activity by developing their own contingency plans, which they then communicate to the community.
- Finally, it was suggested that random fire drills across neighbourhoods could help households to practise and improve their plans. This is already undertaken in NSW.

4B. Delaying the Decision of Defence versus Evacuation

4B.1 The difficulty of deciding between defending and evacuating

Research Purpose:

Australian residents of bushfire prone areas have a choice to defend their home or evacuate early. The AFAC 2012 Position on Bushfires and Community Safety recommends residents of these areas decide before the start of the fire season whether they will stay and defend their property or leave early, and prepare for their intended response in an appropriate manner. However, past research has found that most residents delay deciding on defending versus evacuating (e.g., they instead intend to wait and see what the fire is like before deciding; Dunlop, McNeill, Skinner, & Morrison, 2012). In addition, research has shown that delaying this decision is associated with reduced levels of preparedness for both defence and evacuation (Dunlop, McNeill, Skinner, & Morrison, 2012), and an increased risk of late evacuation on the day of a fire. It is therefore important to understand what causes people to delay this decision.

Method:

The current study empirically examined what predicts this decision delay regarding one's fire-response by measuring two personality traits, namely Need for Cognition (Cacioppo, Petty, & Kao, 1984;) and Indecisiveness (Frost & Shows, 1993), and three decision-related factors (Decision Relevance, Anticipated Responsibility for Outcomes, and Option Distinctiveness, based on Anderson, 2003). The predicted relationships are depicted in Figure 1.

We collected data via two waves of questionnaires that were sent to households in bushfire prone areas in rural and peri-urban communities in Western Australia. Study areas included Gelorup, Stratham, College Grove (all to the south-west of Perth), Gidgegannup, Brigadoon, Red Hill (north-east of Perth), Roleystone and Kelmscott (south-east of Perth). We sent out the first wave of questionnaires just prior to the 2011-2012 Western Australian bushfire season (September, 2011) and the second wave was sent out in the final month of the bushfire season (March, 2012). Only participants who provided responses at wave 1 received a follow-up questionnaire.

We sent out 1700 surveys at the start of wave 1, and the final data-set contained 182 participants (98 males, 84 females; M_{age} = 54.00, SD = 12.83). The response rates were 20.6% at wave 1 and 54.0% at wave 2.

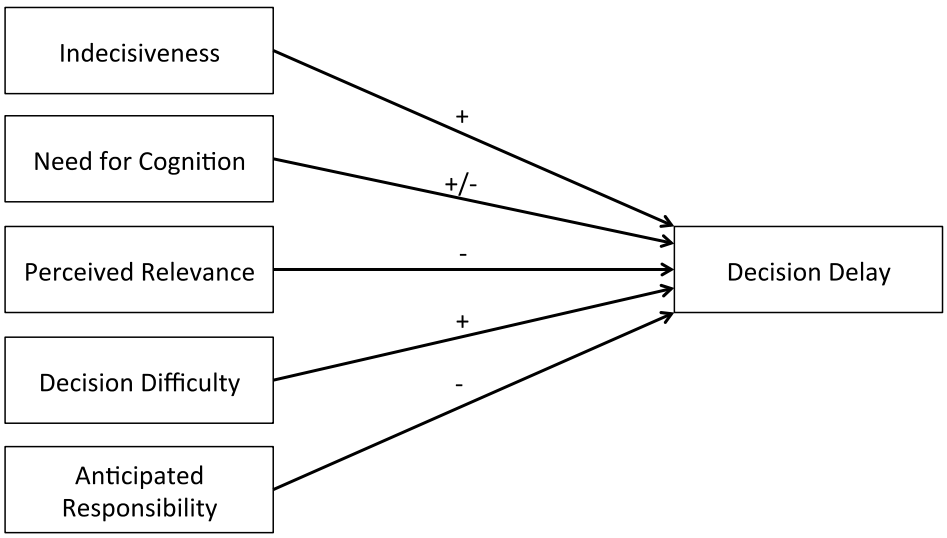

Figure 1. The hypothesized relationships between Indecisiveness, Need for Cognition, Perceived Relevance, Decision Difficulty, and Anticipated Responsibility on the one hand, and Decision Delay on the other.

The wave 1 survey measured general indecisiveness (Frost and Shows, 1993), which was predicted to have a positive relationship with decision delay, and need for cognition (Cacioppo and Petty, 1982). It also measured perceived relevance of the decision (i.e. risk-perception), which was predicted to have a negative relationship with decision delay, and decision difficulty due to a lack of difference in attractiveness between the option of defending a house or evacuating, which was predicted to have a positive relationship with decision delay. To gauge decision difficulty, researchers measured how much value people expected to derive from defending their house versus evacuating early. These value scores were based on the sum of the importance of several fire outcomes (e.g. saving the house, saving livestock, keeping the children safe) multiplied by the likelihood of achieving these outcomes by either defending or evacuating.

The wave 2 survey measured another plausible cause of indecision: the avoidance of responsibility for bad outcomes. To understand whether avoiding responsibility was a motive for decision delay, the study asked people to indicate who would be responsible for saving their house and for saving their lives during a fire (government, themselves, or a mix of both). Theory would predict that people might delay their decision as a means of avoiding responsibility for any negative outcomes resulting from their decision, such as their house burning down as a result of having chosen to evacuate. This is because outcomes resulting from a decision lead to greater perceived responsibility compared with outcomes resulting from decision avoidance. The main dependent variable, respondents' intended response to a bushfire, which included several options marked as decision delay (e.g. wait and see), was measured both at wave 1 and wave 2.

Outcomes:

- Most of the survey respondents indicated they would delay their decision of whether to defend or evacuate: 68.1 % in October 2011, and 67.2% in March 2012. Across the two survey periods, about 23% expected they would defend their property throughout the fire, and about 6% expected to leave as soon as they knew there was a fire threatening their town or suburb. Less than 1% would not be home as they would leave their property on days of extreme and catastrophic fire danger, and less than 2% ticked the 'other' box (these were all volunteer fire-fighters who would be out fighting any fire).
- The most important finding was that decision difficulty (as measured by the relative value of defending vs. evacuating) was the only significant predictor of why people delayed deciding on their action in response to a fire threat. More specifically, if defending held significantly higher perceived value to the householder than evacuating, then they were more likely to plan to defend. If defending held significantly lower perceived value to the householder than evacuating, then they were more likely to plan to evacuate. However, when they perceived defending and evacuating as holding an equal value, then they were very likely to delay their decision until the time of an actual fire threat.
- People were not more likely to delay this decision as a result of a lack of awareness of the likelihood and severity of bushfire risk in their community.
- People were not more likely to delay their decision motivated by responsibility avoidance, so they were not delaying their decision in order to avoid feeling bad for having made the wrong decision (e.g. deciding to evacuate and ending up with their house in flames). Furthermore, measured differences in personality did not play a role in the decision delay.
- In conclusion, this study showed that householders who delay their decision about either defending their home, or evacuating beforehand, are not necessarily unmotivated to think about bushfire, nor are they

trying to hide from the reality of bushfire threat. In fact, they are just as aware of the likelihood and severity of bushfire threat as those who intend to respond to a fire threat with a concrete action: either defending or evacuating. They also feel just as responsible for bad outcomes (e.g. losing their house or being injured). What this study shows is that the extreme difficulty in making the decision to defend or evacuate causes paralysing indecision.

A manuscript on the above research entitled 'Predicting Delay in Residents' Decision on Defending versus Evacuating through Antecedents of Decision Avoidance' has been accepted for publication in the *International Journal of Wildland Fire* (see McNeill, Dunlop, Skinner, & Morrison, in press). A copy of the article can be made available upon request to the authors. In addition, a summary of the findings is available in the form of a Fire Note (issue #112), which is available on the Bushfire CRC website.

4C. Factors Predicting Bushfire Preparedness

4C.1 Personality driven barriers: How do anxiety and indecisiveness cause inaction.

Research Purpose:

When it comes to preparing for bushfires, some people are less likely than others to perform the necessary actions. In order to overcome the resulting under-preparedness, it is important to understand why.

Two personality factors that can be expected to have a relationship with inaction are indecisiveness (Frost & Shows, 1993) and trait-anxiety (Spielberger, Gorsuch, & Lushene, 1970). People who are high on indecisiveness tend to worry more about making mistakes, have lower perceptions of self-efficacy with regards to making sound decisions, and generally lack decision confidence. People who are high on trait-anxiety generally experience more anxiety related symptoms such as feeling nervous and restless. We wanted to test whether these personality factors would be able to predict inaction regarding the preparation

for bushfires, and if so, why these personality differences would lead to lower preparedness.

Method:

We constructed hypotheses based on previous psychological research, and set out to test the model in Figure 2. More specific, we tested whether indecisiveness and trait-anxiety would lead to lower preparedness through planning (as predicted in the hypothesized model), and whether this could be caused by the fact that those higher in these personality factors tend to have lower perceptions of control over bushfire outcomes. In other words, do these individuals perform fewer planning actions (e.g. ensuring everyone in the household knows what to do) because they feel like they cannot control the outcomes of bushfires through preparing. Second, we wanted to test whether trait-anxiety might also lead to lower preparedness by increasing the amount of bushfire related worry.

These hypothesised relationships were examined in the same two-wave surveys as the ones mentioned in section 4B.1, during the 2011-2012 bushfire season (see method section of 4B.1 for details on timing and location). The wave 1 survey measured Indecisiveness, Perceived Control, and Bushfire Worry; the wave 2 measured Trait-Anxiety and Preparedness through Planning. The final data set contained 224 participants (52.2% males; M_{age} = 54.81, SD = 12.56). This is slightly larger than that of 4B.1 due to more people filling out the measures relevant to the 4C.1 research. The response rates were 20.2% (N = 344) at wave 1 and 73.8% (N = 254) at wave 2.

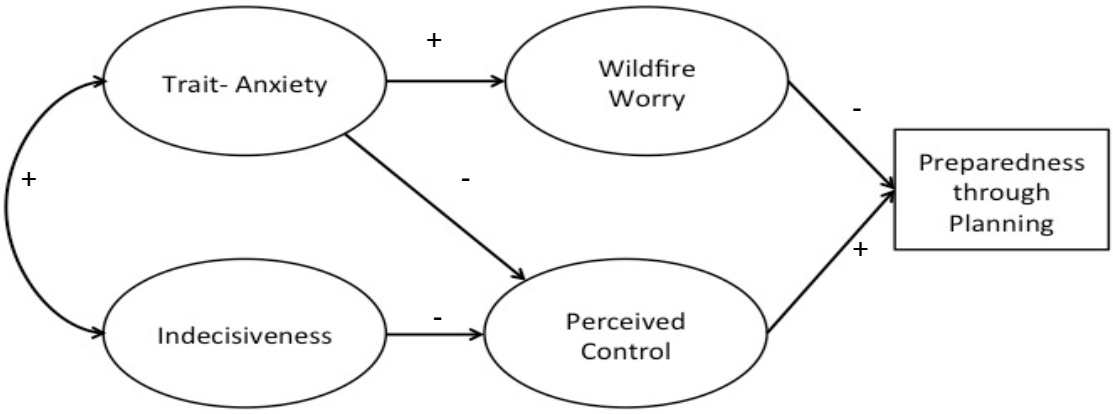

Figure 2. The hypothesized relationships between Indecisiveness, Trait-anxiety, Perceived Control, Worry, and Preparedness through Planning.

<u>Outcomes:</u>

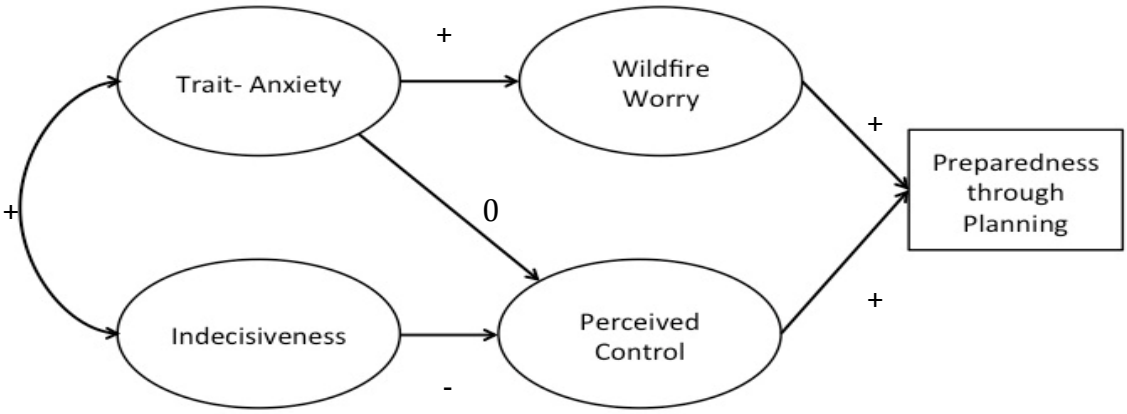

Figure 3. Found relationships between Indecisiveness, Trait-anxiety, Perceived Control, Worry, and Preparedness through Planning.

We examined the hypothesized relationships through structural equation modelling (the resulting relationships are presented in Figure 3). We found significant support for the following:

- There was no significant unique relationship between trait-anxiety scores and perceived control (0), but there was a significant relationship between trait-anxiety and worry (+). More specific, those who scored higher on trait-anxiety worried more about bushfires than those who scored lower on trait-anxiety.
- There was a significant unique relationship between indecisiveness and perceived control (-). More specific, the more indecisive people perceived themselves as less able to control bushfire outcomes by preparing than the less indecisive.
- There was a significant unique relationship between worry and preparedness through planning (+). More specific, those who worried more about bushfires completed a higher percentage of preparedness actions than those who worried less.

- Finally, there was a significant unique relationship between perceived control and preparedness through planning (+). More specific, those with higher perceptions of control performed a higher percentage of preparedness actions than those with lower perceptions of control.
- In sum, this study supported two main conclusions, namely 1) people who were generally more indecisive performed a lower percentage of planning activities because they perceived themselves as less able to control bushfire outcomes by preparing, and 2) residents who were generally more anxious, worried more about bushfires, and those who worried more about bushfires tended to complete more preparedness actions.

A manuscript on the above research entitled 'Predicting Risk-Mitigating Behaviors from Indecisiveness and Trait-Anxiety: Two Cognitive Pathways to Inaction' has been submitted to a peer-reviewed journal. A copy of the manuscript can be made available upon request to the authors.

4C.2 How do the expectations raised in the Prepare.Act.Survive brochure relate to preparedness levels (Phase 5).

Research Purpose:

Another focus of the research described in this report was to examine the effectiveness of existing communications in motivating preparedness behaviours. We therefore examined the relationship between residents' expectations linked to recommendations in the Western Australian 'Prepare. Act. Survive.' brochure (version 2, October 2010)[5] and their level of preparedness. In addition, the intention was to gain a more precise picture of the interaction between these hazard expectations and several specific types of preparatory actions: preparedness to defend, preparedness to evacuate, survivability of the

[5] Different agencies across Australia all use their own version of the brochure, and make them available to residents of fire prone areas at the start of each fire season. We chose the brochure that was sent out to the participants in our study area during the 2010-2011 fire season, since we wanted to examine whether residents' expectations that were potentially shaped by their local brochure were related to their levels of preparedness.

house/property, and preparedness through planning.

Method:

Two weeks after the Perth Hills' bushfire in early February of 2011, our research team mailed out 3000 surveys to affected communities, focusing on the link between householders' awareness of expectations raised in the Western Australian 'Prepare. Act. Survive.' brochure and the number of preparatory actions that households had completed prior to the fires. Each survey contained a cover letter explaining the intentions of the project. A total of 1003 completed surveys were returned, providing a strong response rate of just over 33%.

The surveys quantitatively measured respondents expectations related to recommendations by the 'Prepare. Act. Survive.' Brochure, including their perceived risk (i.e. likelihood and severity of bushfire threat to their community), perceived safety responsibility, reliance on an official warning, and the ongoing availability of essential services, such as electricity and water, if a fire were to happen.

The survey then went on to measure four forms of preparedness, namely preparing for defence (e.g. obtained and prepared firefighting equipment such as hoses and a pump), preparedness for evacuation (e.g. have an evacuation route mapped out), increasing fire survivability of the house (e.g. removed bushes close to the house and cut back overhanging tree branches), and psychological planning (e.g. discussed what you would do with all members of the household). These were measured by asking people to indicate which preparatory actions they had completed at the time of the fire. The end scores were the percentages of completed actions for each subtype of preparedness after factoring out the actions that were not applicable to their household.

Outcomes:

- Expectations regarding the severity of a bushfire threat predicted all four

types of preparatory actions, with higher threat perceptions being related to higher preparedness.

- However, even though expectations relating to the likelihood of bushfire threat were associated with all types of preparedness, this factor did not uniquely predict any type of preparedness after controlling for the other factors.
- Residents who perceived themselves as more responsible for their own safety on average completed more preparatory actions for all types of preparedness, but this factor had no unique predictive power above and beyond the other factors. In contrast, residents who were more inclined to expect that they could rely on an official warning on average carried out fewer preparatory actions for all types of preparedness, and this factor uniquely predicted general survivability of the house.
- Perceived availability of a number of essential services throughout a bushfire were linked with the four types of preparatory actions to varying degrees. When examining their unique predictive power, expecting to lose water predicted higher psychological planning, whereas expecting loss of electricity predicted higher house resilience.
- In sum, this study showed that awareness of information in the brochure had different relationships with preparedness, both depending on the type of information/expectation and the type of preparedness. This study formed a good starting point for the next study, which looked at whether increasing some of the expectations raised in the brochure would actually cause an increase in preparedness.

A manuscript on the above research entitled 'Expecting the Unexpected: Predicting Physiological and Psychological Wildfire Preparedness from Perceived Risk, Responsibility, and Obstacles' has been accepted for publication in *Risk Analysis* (see McNeill, Dunlop, Heath, Skinner, & Morrison, 2013). A copy of the article can be made available upon request to the authors. In addition, a summary of the findings is available in the form of a Fire Note (issue #108), which is available on the Bushfire CRC website.

4D. Intervention Effectiveness in Increasing Preparedness

4D.1 Increasing obstacle awareness

Research Purpose:

The study presented in Section 4C.2 showed how expectations regarding the loss of services during bushfires were related to different types of preparedness. However, one of the limitations of this research was that it was correlational in nature. It therefore did not allow us to conclude that different expectations regarding the loss of services were actually responsible for differences in preparedness. A follow-up study was therefore designed to test whether changing people's expectations regarding loss of services would actually cause differences in preparedness.

Method:

Data were collected in the same two-wave surveys as 4B.1 and 4C.1, during the 2011-2012 bushfire season (see method section of 4B.1). The final data set was slightly larger than that of 4B.1 due to more people filling out the measures relevant to the research question. It contained 254 respondents, 52% were Male and 48% Female. The average age of the matched respondents was 55.1 years. The experimental manipulation text, which is shown below, was included in approximately half of the surveys distributed during wave 1.

> *"Many people don't realise that there's a good chance that they will lose their services when a bushfire occurs. For example, in the February 2011 fires in the Roleystone and Kelmscott area, 1 in every 5 households lost their water supply, 71% of houses lost electricity, 36% lost their landline phone, mobile phone coverage was decreased to about 25% of usual coverage, and 46% of households with internet lost their connectivity."*

In addition to our manipulation, the following variables (relevant to our problem statement) were measured at wave 1: expectations regarding utility loss and risk, and their nominated bushfire response plans. Finally, the following

variables were measured at wave 2: expectations regarding utility loss and risk, their nominated bushfire response plans, and an objective assessment of residents' level of bushfire preparedness.

Outcomes:

- There was no significant main effect of the manipulation on expectations of loss of water, loss of electricity, loss of landline phone, loss of mobile phone or loss of internet connectivity. These results suggest that the presence or absence of the information about the likelihood of utility loss had no substantive causal impact on respondents' expectations about the likelihood of losing these utilities in the event of a fire.
- There was a significant main effect of providing the information on one risk perception item measuring the severity of impact of bushfire on town/suburb ('If a bushfire were to occur in your town or suburb, how severe would the impact of it be on your town or suburb?). Those residents who received the information reported significantly higher levels of expectation of severity ('high severity') than those in the non-manipulation group ('somewhat high'). This would suggest that presenting information about utility loss increases participants' estimations of the severity of a bushfire.
- Presenting residents with information regarding the possible loss of utilities during a fire did not appear to influence their intended fire plans at wave 1 or wave 2 (several months after wave 1).
- Participants were also asked at wave 2 about the likely impact that the loss of each utility would have on their ability to enact their fire response plan. No main effect was found for the inclusion of the manipulation text. This would suggest that providing information on the chances of utility loss does not have a lasting impact on residents' expectations about their ability to cope with the loss of a particular utility, or their preparedness for such an event.
- Finally, residents were asked to indicate which bushfire preparedness

actions they had completed at the end of the Wave 2 survey. The list included 68 actions, and was sorted into 5 different bushfire preparedness dimensions: vegetation management, home improvement, evacuation, planning, and active defending. Preliminary analysis suggests that the presence of the text had no significant impact on the levels of preparedness of households.

A full report on the above research entitled 'Understanding Community Bushfire Resilience: Investigating the Relationship between Utility Loss Expectations and Household Bushfire Preparedness Expectations' is available from the Bushfire CRC website.

4D.2 Testing the Effectiveness of Task Difficulty, Behaviour Interpretation, and Social Comparison Interventions on Bushfire Preparedness

Research Purpose:

Despite frequent campaigns about the adverse consequences of not preparing for bushfire, and being aware of the need to prepare, many people living in fire prone areas continue to be underprepared for bushfire. One reason could be that people generally have many goals competing for their attention, time, and resources, and other goals may simply be getting priority over the bushfire preparation goal.

In light of this, Fishbach and colleagues (2009) suggest that the way people interpret recently completed goal related behaviours could influence which goal they will pursue next. More specifically, when people feel they have done very little towards a goal, interpreting this lack of behaviour in terms of progress ("I have made little progress to this goal") motivates them to do more for the goal, whereas interpreting this in terms of commitment ("I guess I'm just not very committed to this goal") makes them do less. When people feel they have done quite a bit already, on the other hand, the effects are opposite with a progress interpretation ("I have made substantial progress to this goal") leading to a lowered chance of additional goal pursuit, whereas a commitment interpretation

("I must be very committed to this goal") leads to an increased chance of additional behaviours.

Two studies (a pilot experiment and a field-study) were set up to test whether the interpretation mechanisms above could be used to motivate bushfire preparedness, and what the role of task difficulty would be. Our expectations are depicted in Figure 4.

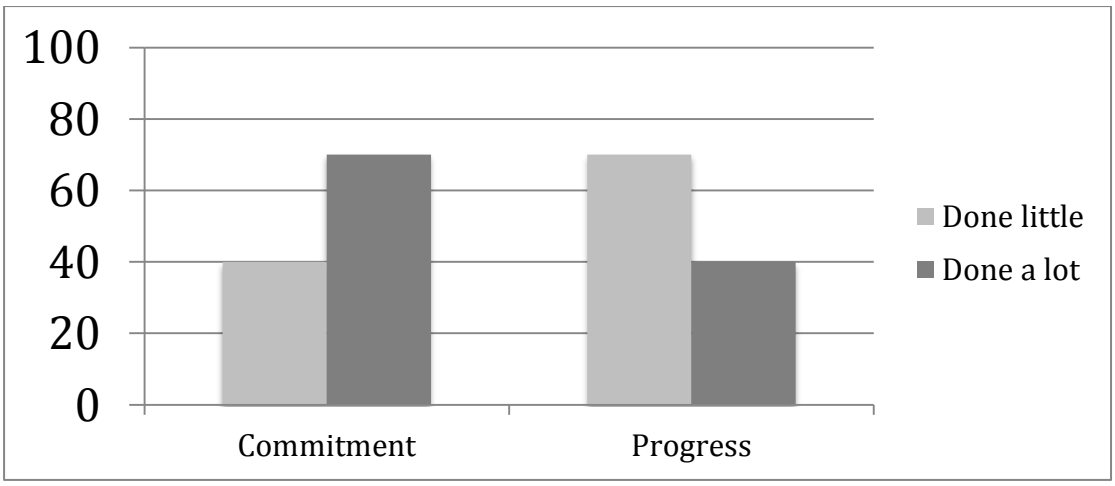

Figure 4. Percentage of actions performed.

Method:

The pilot study was run amongst 137 first year Psychology students at UWA. We manipulated whether participants felt they had done very little vs. a lot, whether they interpreted this in terms of commitment vs. progress, and whether the subsequent goal-related behaviour was easy vs. difficult. This was done by presenting different versions of information to the students on a computer. We then measured the extent to which participants performed the goal-related behaviour[6]. The main finding from this study was that the commitment/progress framing in combination with perceptions of having done very little vs. a lot had no influence on behaviour. A possible explanation for this was that participants did not openly state their intentions to perform the behaviour after the manipulations. This was therefore adjusted in the field-study.

[6] Since few students live in a bushfire prone area, we selected environmental behaviour as the focus goal instead of bushfire preparedness.

For the field-study we tested the effect of the three different interventions (Past Behaviour – done little vs. a lot; Interpretation in terms of commitment vs. progress; and Difficulty of subsequent behaviour – easy vs. difficult) on bushfire preparedness in a two-wave longitudinal study across six states and territories (ACT, NSW, SA, TAS, VIC, WA) during the 2012-2013 bushfire season.

In wave 1 (start of the season), participants started with filling out some demographics and general information, and then identified which of 34 preparatory actions they had already completed. Eight of these actions measured Psychological Planning (e.g. You have thought carefully about what each person in your household would need to do in the event of a bushfire"), and 26 actions measured Property Preparedness (e.g. "Fine fuels (e.g., leaves, twigs and long grass) are cleared for a distance of at least 20m around the house").

Next, the first manipulation (Difficulty) asked approximately half of the respondents to rank the three most *difficult* preparedness activities they had not yet completed, and the other half were asked to rank the three *easiest* preparedness activities they had not yet completed.

In the second intervention (Past Behaviour), respondents were provided with the following piece of text, with approximately half receiving the 25% estimate figure and the other half receiving the 75% estimate figure.

"Previous research into community preparedness for bushfires in Australia has shown that many households in bushfire prone areas complete around 25%/75% of the activities listed on the previous pages.

Participants were then asked: "What would your guess have been?"

('Much less than 25/75%', 'Somewhat less than 25/75%', 'Around 25/75%', 'Somewhat more than 25/75%', 'Much more than 25/75%').

Respondents in the 25% condition should feel that they had done relatively more than those in the 75% condition.

Finally, for the third intervention (Interpretation), approximately half of

respondents were asked to indicate their level of agreement with the following statement on the response anchors 'Strongly disagree', 'Moderately disagree', 'Slightly disagree', 'Neither agree nor disagree', 'Slightly agree', 'Moderately agree' and 'Strongly agree':

'I have made a lot of progress towards being prepared for bushfires'.

The other half of respondents were asked to indicate their level of agreement with a different statement:

'I am very committed to be prepared for bushfires'.

Subsequently, respondents were asked to take their progress vs. commitment to being prepared into account and indicate the likelihood of them carrying out the actions they had not completed yet, starting with the three actions they listed earlier as either easiest or most difficult.

Then in wave 2 of the survey (8-10 weeks after wave 1), participants were asked to again indicate which of the 34 preparatory actions they had completed at the time of that survey.

The study resulted in a final N of 465 cases (194 males, 271 females). Distribution by State is represented in Figure 2. The average age across respondents was 54.22 (Standard Deviation=13.42).

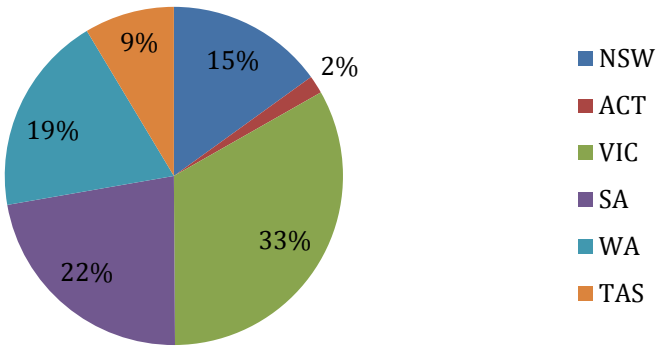

Figure 5. Distribution of responses to W2 by State.

Outcomes:

Results showed that asking residents to think about their levels of preparedness in terms of their progress versus commitment to the goal of being well prepared might not be an effective way to increase bushfire preparedness, even though past research in other areas such as health behaviours claims it to be effective.

- First, the data showed that progress had both a positive and negative effect on preparedness when compared to commitment, indicating that framing effects on different types of preparedness were not consistent.
- More specific, people who thought about how much they had done to prepare to date in terms of progress completed more psychological planning actions than people who thought about how much they had done to prepare to date in terms of how committed they were towards the goal of being prepared.
- However, those thinking about progress towards the goal (rather than commitment to it) showed lower intentions to engage in tasks that prepared their properties.
- Second, there was no sign of the predicted interaction of a commitment versus progress mindset with perceptions of how much one had done to date. Past research suggests that having done very little to date should increase behaviour for those with a progress mindset and decrease behaviour for those with a commitment mindset, whereas having done a lot to date should increase behaviour for those with a commitment mindset and decrease behaviour for those with a progress mindset (see Figure 4). However, no such interaction pattern was found.
- Finally, we explored the influence of task difficulty, and found that letting residents focus on the three easiest tasks that still need completing led to greater intentions to complete psychological planning actions than letting residents focus on the three most difficult tasks first. However, the current study did not find effects of this manipulation on actual preparedness by the end of the season. This could be due to the fact that the strength of the intervention was limited as it was only a small activity carried out at Wave 1.

A report on the pilot study entitled 'The Effects of Past Behaviour Interpretations and Task Difficulty on Goal Pursuit – An Experimental Pilot', and a report on the field-study entitled 'Testing the Effectiveness of Task Difficulty, Behaviour Interpretation, and Social Comparison Interventions on Bushfire Preparedness – An Experimental Field Study' are available from the Bushfire CRC website.

5. Conclusions

All in all this project has increased our understanding of why some people prepare for bushfires more than others, and why many people postpone the decision around defending versus evacuating until the day of a bushfire.

We now know:

- There is value in conceptualising preparedness in terms of multiple types, rather than thinking of it as a single construct;
- Residents who delay the decision regarding defending versus evacuating until the day of a bushfire, do so as a result of decision difficulty rather than as a result of low risk awareness.
- People who are generally more indecisive tend to plan less for bushfires, and this is mostly due to the fact that they have low perceptions of control over bushfire outcomes.
- Perceived threat severity is a better predictor of bushfire preparedness than perceived threat likelihood.
- Goal progress/goal commitment interventions used in health and education may not be effective tools for behaviour change in a hazard preparedness setting.

We now have:

- A validated set of measures of preparedness that can be used by practitioners and researchers.

<u>Implications and Applications:</u>

This project has resulted in the development of a validated measure of preparedness, and shows that there is value in conceptualising preparedness in terms of multiple types, rather than thinking of it as a single construct. We anticipate that the development of the standardised measures of preparedness will provide future researchers of community bushfire safety with a useful

means of measuring this important variable. Further, practitioners may find standardised measures useful for evaluating the effectiveness of community interventions. Indeed, by separating preparedness for active defence from evacuation and improving property survivability, practitioners will be well-placed to investigate the efficacy of interventions that are designed with specific results in mind (e.g. improving a community's preparedness to evacuate).

Also, this project has shown that residents who delay the decision regarding defending versus evacuating until the day of a bushfire, do so as a result of decision difficulty rather than as a result of low risk awareness. Running campaigns that focus on increasing people's awareness of risk, or try to force them to decide may therefore not be the most effective strategy. Rather, campaigns could focus on increasing the value of evacuating over defending, and acknowledging the difficulty residents may face when making this decision. Also, they could focus more on motivating residents to form contingency plans and decide ahead of time under which conditions residents will defend, and under which they will evacuate. This leaves the final decision to the day of a bushfire, but relieves residents of complex decision making in a high stress situation.

Thirdly, this project has provided insights into what factors are related to preparedness. For one, it has shown that individual differences in indecisiveness can explain differences in preparedness. More specific, people who are generally more indecisive appear to plan less for bushfires, and this is mostly due to the fact that they have low perceptions of control over bushfire outcomes. Second, it has shown that threat severity is a better predictor of preparedness than threat likelihood. Understanding the factors that predict preparedness is an important first step in the development of interventions and communications that aim to change preparedness.

Another implication of the research carried out in this project is that finding a significant relationship between factors such as risk perception or awareness of a potential loss of services on the one hand, and preparedness on the other, does not necessarily mean that trying to increase these perceptions or awareness will automatically increase preparedness as well. When it comes to intervention

development, research thus needs to test how interventions can be made most effective in changing perceptions, and what types of perceptions are actually causal in increasing preparedness.

Finally, this research has shown that interventions used in health and education may not always be effective for a hazard preparedness setting. More specifically, past research in health and education settings had shown that when people have done little to complete a goal to date, asking them about their goal progress will motivate them to do more, whereas asking them about their goal commitment will motivate them to do less. When people have already done a lot to complete a goal, on the other hand, it showed that asking them about their goal progress will motivate them to do less, whereas asking them about their goal commitment will motivate them to do more. When these ideas were applied to the goal to be prepared for bushfires, we did not find any effects for such an interaction between perceptions of having done a little versus a lot and interpreting this in terms of progress versus commitment. Also, the effects that we found were opposite for property preparedness versus psychological planning. Since these results cannot be explained with past research and do not seem to show a consistent pattern, more research is needed to understand what is going on.

All in all, the application of psychological research theory and techniques has provided a greater understanding of why decisions around defending versus evacuating are being made, and what factors may motivate bushfire preparedness. In addition, this project is the first to have conducted intervention testing in a bushfire preparedness setting. Therefore, although none of the interventions thus far have been effective in increasing all types of preparedness, and more research is needed to find more effective communication strategies, these studies form an important starting point.

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