

LESSONS FROM THE FLOODSAFE PROGRAM: WHY PEOPLE DO AND DO NOT PREPARE FOR FLOODS

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Abstract

The Victoria State Emergency Service (VICSES) is the control agency for flooding in Victoria. As a part of their responsibility, VICSES aims to increase flood risk awareness and preparedness among members of the general public as well as decrease high risk behaviour during times of flooding.

The FloodSafe program is a community education and engagement program that enables VICSES staff and volunteers to work with community members to enhance preparedness. VICSES has been rolling out the FloodSafe program to communities across Victoria in its current format since 2012, following the *2010-2011 Review of the Flood Warnings and Response*, which recommended the implementation of the program to Victorians.

As a part of the program roll out, VICSES has undertaken a structured evaluation and research program to track progress and, more importantly, understand why and how changes in flood preparedness levels occur. These insights help us to understand how to build programs that target people at all different stages of the preparedness spectrum and lead to more resilient communities.

This paper discusses the results of the findings and draws on additional academic literature to help uncover why people do and do not prepare for floods and what we can do to encourage preparedness.

Introduction

Within the emergency management sector, an increasing amount of effort is being placed on the delivery of preparedness programs following the introduction of the *National Strategy for Disaster Resilience* (COAG, 2011).

During 2010-2011, Victoria experienced some of the worst flooding in the State's history. During these floods, one third of the state was affected by flooding. Flooding was widespread and reached across 70 local government areas. The floods had a significant impact on regional, urban and rural communities with nearly 4,000 houses damaged and a further 4,000 businesses and primary producers affected (Victorian Government, 2012). These floods caused more than \$269 million in agriculture sector losses, \$474 million in insurance claims and an estimated loss of \$176 million in tourism revenue (Insurance Council of Australia, 2011).

With over 150,000 properties in Victoria at risk of flooding in a 1% flood (Leigh and Gissing, 2006), Victoria will experience floods again. Given this, and the impacts felt over the 2010-2011 floods in the State, the *Review of the 2010-11 Flood Warnings and Response* recommended the roll out of the FloodSafe program across Victoria (Comrie 2012). Specifically, the review recommended *the state undertake a community education program to inform households of their respective flood risk. This may include information on rate notices of heights of houses above flood level and educating people about flash flooding* (Comrie, 2012, p 85). The review also specifically mentioned the roll out of the FloodSafe program. The review was also instrumental in the development of Emergency Management Reform in Victoria which led to the establishment of Emergency Management Victoria.

To enact this, VICSES sought funding through the *Natural Disaster Resilience Grants Scheme* to roll out the FloodSafe program with the intention of targeting over 50 communities known to be at-risk of flooding in metropolitan, regional and rural areas.

The FloodSafe program

The FloodSafe program is a national brand used by agencies with responsibility for flood preparednessⁱ. The program is delivered differently by different states but has the same key messages and aims.

The key aims of the FloodSafe program are to:

- Communicate the risk of floods at a local level.
- Raise awareness of the risk of flooding.
- Encourage people to undertake protective actions including developing a home emergency kit with essential items and writing a home emergency plan detailing what to do before, during and after a flood.
- Discourage people from undertaking risky behaviour such as driving through floodwater.

Following the recommendations from the review, the Victorian FloodSafe program aims to build people's understanding of flood risk. At the core of the program is the development of Local Flood Guides, which detail flood risk by locality as well as what to do before, during and after a flood. These guides are ideally developed in partnership with the community and delivered alongside a program of community engagement activities. The details of program delivery are outlined in the baseline survey (Victoria State Emergency Service, 2013a).

The program is one of a suite of programs that the agency has invested in. Other programs include targeted children and youth programs along with programs for Culturally and Linguistically Diverse communities.

Evaluation methodology

When commencing the FloodSafe program in Victoria, a robust evaluation framework was put in place, which saw an extensive baseline survey undertaken (Victoria State Emergency Service, 2013a). The purpose of this survey was to gauge levels of preparedness and knowledge and understanding of flood risk and terminology. The baseline was undertaken targeting communities who were due to have the FloodSafe program delivered to allow a comparison. This also means that everyone surveyed through this process lives in a township with a known flood risk. This does not mean, however, that the individual's property was at risk of flooding.

This survey was undertaken using a quantitative approach and was commissioned through Colmar Brunton Social Research Company. The company surveyed 1273 participants across Victoria via telephone and asked questions to gauge levels of preparedness such as whether they had an emergency kit or plan, how prepared they felt they were, as well as, their knowledge and understanding of floods, their flood risk, flood warnings and common flood terminology. The selection of participants was at random based on postcodes to cover areas VICSES were planning on engaging with.

At the same time, the FloodSafe materials were tested qualitatively with focus groups to gauge whether they increased understanding of risk and what the overall messages people took away from reading them were. Focus groups took place across Victoria to gain insights from people living in a range of different communities with different flood risks including Seymour, Echuca, Warrnambool, Elwood and Manningham. Participants were selected at random based from postcode and incentivized to attend.

The materials tested in the 120-minute focus groups were the local flood guides, home emergency plan booklets and the emergency toolkits (printed flipchart). This component was also completed by Colmar Brunton Social Research Company.

The final report and findings of these activities were delivered to VICSES in 2013.

The program was then rolled out in the first round of townships across the State and in 2014, a formative evaluation of the program was undertaken with a selection of townships where the program had been delivered (Victoria State Emergency Service, 2014).

A final evaluation is due to take place once the program is completed in 2016.

In addition to the FloodSafe evaluation program, further research insights were procured to inform the agency's mass media campaigns following evaluations of the FloodSafe Week media campaign in 2013 (Victoria State Emergency Service, 2013b) highlighting areas for improvement. This led to a further quantitative survey undertaken on behalf of VICSES by NewFocus of 1277 Victorians (Victoria State Emergency Service, 2015). The survey was completed by phone and participants were selected at random.

This survey was broader than floods encompassing perceptions of bushfires, storms, floods, earthquakes and tsunamis. The survey also asked people why people say they have or have not prepared for emergencies.

Key findings from the 2013 baseline survey (Victoria State Emergency Service, 2013a)

Levels of preparedness for floods are low. The report found that only 30% of people had developed a home emergency kit, with none of these containing all the recommended items. 31% of people claimed to have a home emergency plan, with just 25% of those (8% of people in total) having a written plan as recommended. 35% of people self-report being "totally unprepared" for flood.

People understand the risks of driving, riding and walking through floodwater. Driving through floodwater is the number one cause of flood fatalities in Australia (Coates, 1999, Haynes, 2009). In the survey, only 1% of respondents reported that they believed driving through floodwater is safe. In this case, understanding the risk did not equate to action with only 45% of people responding that they would never drive, ride or walk through floodwater. A further 49% of people stated they would only enter floodwater if they had no other option.

Driving through floodwater risk varies in sex and age. Female respondents were more likely (49%) to say they would never drive, ride or walk in floodwater than males (40%). Younger age groups surveyed (15-19 and 20-29 year olds) were less likely to say that they would never drive or ride through floodwater (29% and 27% respectively compared to 45% overall). This highlights the need to educate youth about the issue and supports the findings of the most recent flood fatality analysis by Haynes et al (2016).

Flood risk is not salient. Despite only surveying people in communities with a known flood risk, only 3% of people reported that it was extremely likely that they would be flooded in the future. 52% of people stated that it was extremely unlikely they would be flooded and a further 28% of people stated it was somewhat unlikely.

Results

Key findings from the formative evaluation (Victoria State Emergency Service, 2014)

Information provided was well received. When received, 21% of respondents reported that they read the information and kept it for future reference. Of these, 91% of people stated that the information was easy to understand and 90% said the information was helpful or very helpful.

Information did not lead to action. Despite ease and helpfulness of the materials provided these did not equate to action. The report found that of those who had read the information, only around 15% of people undertook any action. Actions included undertaking property maintenance, checking insurance and seeking further information online. Reasons as to why people did not undertake actions are not well known.

The program successfully raised awareness of flood risk. Of those surveyed, 85% of residents reported that they were aware that their community could flood compared to 64% in the baseline survey.

There were positive relationships between engagement and preparedness activities. The report found that people who had interacted with VICSES were more likely to have a home emergency kit (28% vs. 14%) and were more likely to look for information about flood warnings than those who hadn't. Increased interactions were associated with higher levels of preparedness, highlighting the importance of social interaction for people when they are making judgements about risks they are uncertain of. Interactions could include receiving information, meeting volunteers at events and activities directly related to the program.

Participation levels are relatively low. The report found almost 30% of people were aware of activities being run by VICSES however only 6% of people attended them.

The program maintained and improved VICSES' reputation. 28% of people said that their interactions with VICSES had improved their perceptions of VICSES. A further 71% said their perceptions had remained the same, with those qualifying that they already had positive perceptions of VICSES.

Key findings from the community awareness survey (Victoria State Emergency Service, 2015)

Flood risk is significantly less salient than storms and bushfire risk in Victoria. Only 27% of people in Victoria believe floods are likely to occur (41% for bushfire and 81% for storms). This risk was related to location.

Floods are not seen as severe. Only 34% of people reported that if a flood occurred, the consequences would be severe or very severe.

Time elapsed influences perceptions. Both the likelihood and severity perceptions decreased as time lapsed from the last major hazard event.

People's perceptions do not translate to action. 45% of people stated they believed it was important to be prepared for floods (67% for storms). Of those who said it was important, only 50% had taken any action to prepare. Additionally, of those who had taken steps it was not always related to emergency preparedness. This suggests that decision making about taking action on preparedness is based on more than people's perception of risk and the importance of preparedness.

People's understanding of preparedness is not the same as that of the emergency services. When asked to rate levels of preparedness, those who state they are either prepared or very prepared have usually only undertaken some actions recommended by emergency services such as regular property maintenance and having a torch. There is often no clear indication as to whether they undertake these items to prepare for emergencies or for other reasons, e.g. having a torch for black outs.

It's not cool to talk about preparedness. Only 17% of people said they would consider talking about the importance of preparedness with family/friends and only 11% would talk about it with their neighbours.

There are a number of perceived barriers to preparedness. When asked why they hadn't prepared, people reported time, cost and motivation as barriers to preparedness.

Discussion

Psychology of preparedness

These results are consistent with psychological theories about emergency preparedness. There are several models that have been developed to explain people's behaviour, or lack of behaviour, in relation to undertaking what is seen as a desirable action. These models attempt to explain why there isn't a relationship between the dissemination information and adoption of recommended actions and what other factors need to be addressed.

The earliest of these models, the Health Belief Model (Rosenstock, 1965) was developed in the 1950s in an attempt to explain the lack of compliance by the public to undertake key public health prevention strategies including immunisation and screening programs (Rosenstock, 1974). The model attempts to explain and predict the likelihood of people undertaking preventative strategies based on their perceptions of their susceptibility along with their perceptions of the severity, benefits and barriers to undertaking or not undertaking the recommended behaviour. Since the Health Belief Model's inception, it has been widely used to design health promotion programs and interventions which are aimed at encouraging behaviour change (Carpenter, 2010).

Additional models which help to explain the psychological processes people need to go through before they will undertake an action, such as preparing for floods, include:

- The Theory of Planned Behaviour (Ajzen, 1991)
- Protection Motivation Theory (Rogers, 1983)
- Extended Parallel Process Model (Witte, 1992)
- Person Relative to Event Theory (Mullis, 1995)
- Protective Action Decision Model (Lindell and Perry, 2012)
- Social-Cognitive Model (Paton, 2003).

The latter two, the Protection Action Decision Model and the Social-Cognitive Model have specifically been developed to look at the challenge of emergency preparedness and what beliefs people need to have about preparedness before they will undertake action.

Using these models to understand flood behaviour

Several of these models have been used internationally in the context of determining whether or not they can predict people's behaviour in terms of flood preparedness and other hazards (Ejeta et al., 2015).

The Theory of Planned Behaviour (Ajzen, 1991) has been shown to predict people's behaviour to flooding and assist in the development of successful program interventions in England (Bichard and Thurairajah, 2014). This study trialled behaviour change strategies based on the theory of planned behaviour. The results showed that while many residents understood the risk and knew they would be flooded in the future,

many did not take action to prepare their homes for flood. The results found that residents who didn't prepare didn't believe they had control over the consequences of a flood and were less likely to take action if their neighbours didn't. Additionally, the perceived barriers and costs reported by residents indicated that preparing was too hard to justify for many residents.

This finding can be applied to the FloodSafe program in Victoria. To put together the recommended home emergency kit, a resident must first understand what needs to go in the kit for their home or business before purchasing the elements from a number of different places, which can be time consuming and costly for some households. The study in England found that incentives and discounts are effective in alleviating these barriers (Bichard and Thurairajah, 2014).

Protection Motivation Theory (Rogers, 1983) was used to predict the likelihood of people undertaking protective behaviours to floods in Germany (Grothmann and Reusswig, 2006). In this study, perceptions of risk, vulnerability, severity and efficacy of preparedness measures were studied alongside socio-demographic factors. The study found that the psychological factors in Protection Motivation Theory such as the perceived severity of the flood were much more likely to predict behaviour than socio-demographic factors.

Another study looking at the links between flood risk perceptions and undertaking mitigation actions to ascertain why high perceptions of risk do not lead to people undertaking protective behaviours (Bubeck et al., 2012). The study concluded, as with others, that the perceptions of the effectiveness of preparedness measures, perceptions of responsibility and the associated costs were much more likely to predict behaviour.

The Social-Cognitive Model of disaster preparedness (Paton, 2003) has been used to predict behaviour for earthquakes (Paton, 2005), tsunami (Paton, 2011) and floods (McIvor et al., 2012). In the study looking at the Model's efficacy for predicting flood preparedness behaviour, the study found that community participation, outcome expectancy (the belief that the behaviour will change the outcome), self-efficacy and response-efficacy (belief that they have the skills to prepare combined with the resources to prepare) and normative factors such as trust in the agency delivering the message and empowerment were directly related to people's intentions to prepare.

Applying these models to the FloodSafe program

As demonstrated, there are several conceptual models which help us to understand why people do and do not prepare for floods. When compared with the findings from the FloodSafe research, the models help to explain behaviours and attitudes.

While people need to believe that there is a risk of flooding, which the program is currently achieving, there are several other key factors which need to be addressed before people will change their behaviour. These include:

- People need to believe that undertaking preparedness behaviour will make a difference to them (outcome expectancy).
- People need to believe that they have the skills to prepare for emergencies (self-efficacy) and they also need to have the resources to prepare.
- People need to believe it is their responsibility to prepare (responsibility). This was not directly asked in the survey as a question, but when asked why they had or had not prepared, it was a common indicator.
- People are more likely to change their behaviour if those around them are changing theirs (normative factors).

Furthermore, risk awareness is delicate. Research has also shown that if people are too scared of an emergency, they will slip into fatalism, where they believe they have no control over the outcome (Paton, 2003).

This is further demonstrated in the survey undertaken by VICSES (2015) where participants were asked why they hadn't prepared for emergencies. The top eight reasons given for not preparing were:

1. I don't believe there is a risk
2. There is not much I can do to prepare
3. I am insured
4. I don't know what to do
5. I can't afford to be prepared
6. I rent
7. I don't have information
8. I don't have time

Comparing these with the Social-Cognitive Model (Paton, 2003) further highlights that key components such as responsibility, self-efficacy and outcome expectancy remain current in the public's psyche (see Table 1).

Reason for not undertaking preparedness actions	Social-cognitive model variable
I don't believe there is a risk	Risk perception
Not much I can do to prepare	Outcome expectancy
I am insured	Responsibility
I don't know what to do	Self-efficacy
I can't afford to be prepared	Response efficacy
I rent	Responsibility
I don't have information	Self-efficacy
I don't have time	Response efficacy / outcome expectancy / risk perception – people need to believe something is important and they will make time.

Table one: comparison of survey participants' responses to psychological processes in the Social-Cognitive Model.

Redefining the problem as a behaviour change problem

Given the desire led by the *National Strategy for Disaster Resilience* (COAG, 2011) to educate the community to encourage preparedness, preparedness programs can be viewed as an attempt to change behaviour, including encouraging people to undertake protective actions (e.g. cleaning gutters) as well as discouraging people from undertaking dangerous behaviour (e.g. not driving through floodwater). Paired with the proven efficacy of the psychological models of behaviour, these begin to provide a clear path to improving preparedness through behaviour change methodology.

Programs have long focussed on the promotion of risk awareness. This is underpinned by a hypothesis that behaviour is predicted by a person's perception of the risk, and if they understand the risk and consequences appropriately, they will adjust their behaviour. As demonstrated in the results of the FloodSafe program, this has proven untrue.

If we view people's decision making about preparedness in line with the models, we can begin to design interventions which target the perceived barriers and real barriers

to preparedness. Successful behaviour change approaches have been applied in the injury prevention, health promotion and road safety fields (Gielen, 2003, Carpenter, 2010). Work has also been undertaken in applying these in emergency management and disaster preparedness settings around the globe (Morrissey, 2003, Paton, 2011, McIvor et al., 2012). There is a growing body of evidence supporting the efficacy of these approaches to emergency preparedness (Bichard and Thurairajah, 2014, Monroe et al., 2013).

Conclusion

Changing the approach to flood preparedness programs

While these models help us to understand why people undertake certain behaviours, many do not provide guidance on how to develop theory-based interventions (Michie et al., 2005). Due to this, developing targeted interventions will require us to draw on a number of different techniques described in other sections of the literature and through utilising techniques from other sectors, for example, the work health and safety promotion sector.

The first stage in designing any behaviour change based intervention is to define the problem you are trying to change (Michie et al., 2005). In the case of flood preparedness, the problem has been defined that people are not prepared for emergencies. In response to this, the emergency management sector has long pushed for the production of home emergency kits and preparing a home emergency plan with the notion that if people have these things they will respond better in an emergency. Kohn et al. (2012) undertook a systematic literature review and determined there was not a large amount of evidence supporting the efficacy of these preparedness measures.

The additional problem has been defined that people simply do not understand what to do in an emergency (Victoria State Emergency Service, 2013, Comrie, 2012, COAG, 2011). This has resulted in extensive education based programs which prompt the understanding of risk. The results from the evaluations undertaken by Victoria State Emergency Service (2013, 2014, 2015) suggest that risk understanding is not the barrier to emergency preparedness.

This intention to action gap is a critical part of the solution. In a recent study, McLennan et al. (2015) surveyed people's intended actions for bushfire in South-East Australia. The results found very different psychological motivations between those who were planning on taking the recommended action of leaving early and those who planned to stay and defend their property despite warnings against doing so. The study concluded that programs and emergency services need to provide resources for both groups of people as their motivations were significantly different.

This culminates in a number of barriers to emergency preparedness, both physical and psychological. In order to affect change and promote emergency preparedness, programs need to break down barriers for people to encourage them to prepare.

Next steps

This work is a part of a larger study which will look to develop a flood preparedness program which is based on the theoretical underpinning outlined within this paper. Further work needs to be done to understand the barriers to preparedness from a psychological perspective.

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¹ In Western Australia, it is called the FloodSmart program