HAZARD **NOTE**

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TOPICS IN THIS EDITION | COMMUNICATION | COMMUNITIES | WARNINGS

EMERGENCY WARNING MESSAGES: ENCOURAGING READINESS TO ACT

Warning messages contain clear instructions that...

assist community members to undertake **protective action**

build self-efficacy

produce appropriate **threat appraisal**

ABOUT THIS PROJECT

This is the second of three concurrent *Hazard Notes* for the Bushfire and Natural Hazards CRC project, *Creating effective multi-channel communication during disaster response and recovery*, conducted as part of the Communication and Warnings cluster. This research adopts a multi-hazards approach to examine the effectiveness of response and recovery communication in communities affected by natural hazards. It applies well-established risk communications and psychological theory of human behaviour to determine whether existing emergency messages could be revised to improve comprehension.

This *Hazard Note* details which types of specific messages encourage community readiness. *Hazard Note 79* outlines opportunities for emergency services to improve their communication and messaging. *Hazard Note 81* explores whether icons and graphics help to encourage action during emergencies.

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SUMMARY

In the six years since the *National Review of Warnings and Information* (Emergency Management Victoria 2014), Australian emergency service agencies have proactively adopted evidence-based practice to better construct their emergency warning messages. This research investigates how well current emergency warning messages, which have been optimised to match current best practice, encourage community members' readiness to act on emergency instructions.

Four types of warning messages were analysed: *Prepare to Evacuate (Bushfire)*, *Prepare to Evacuate (Flood)*, *Evacuate Now (Bushfire)* and *Evacuate Now (Flood)*. This research, conducted between September and October 2018, suggests that these warning types encourage appropriate protective action and thus readiness to act. They were found to be highly comprehensible and effective, provoke a moderate and appropriate threat appraisal, and contain instructions that participants perceived (i) they could execute well, (ii) would be highly protective and (iii) were low in cost (e.g. expense, difficulty, inconvenience). However, messages that contain higher perceived response costs, such as instructions that require financial expense, difficulty, or inconvenience to execute, are more likely to result in maladaptive coping such as denial, wishful thinking or fatalism.

CONTEXT

Since the *National Review of Warnings and Information* was published in 2014, emergency service agencies across Australia have iteratively redesigned their warning messages to incorporate evidence-based good practice in the construction of emergency warning messages. After five years of development and refinement, it is prudent to investigate whether the instructions included in current warning messages encourage readiness to act. This research draws on a socio-psychological model of precautionary adaption (Grothmann & Reusswig 2006), underpinned by Protective Motivation Theory (PMT; Rogers & Prentice-Dunn 1997; Rogers 1975, 1983) to investigate how well current emergency warning messages encourage community members' readiness to act on emergency instructions. More specifically, it investigates whether the written content of emergency warnings generate appropriate threat appraisal, coping appraisal and protective motivation.

BACKGROUND

Natural hazards provoke considerable uncertainty in the community, but community members sometimes 'under-react' when warned about imminent natural hazards. Consequently, it is critical to investigate

how warning messages can best generate an appropriate behavioural response. One key model that explains the motivation of community members to engage in protective action is Protection Motivation Theory (Prentice-Dunn & Rogers 1986; Rogers 1983).

Protection Motivation Theory proposes that individuals will engage in protective behaviour in accordance with:

- the perceived severity of the threat they face
- their vulnerability to the threat
- the perceived effectiveness of the protective behaviour proposed by the emergency service agency and
- their perceived self-efficacy (or ability) to engage in protective behaviour.

Clear, specific and consistent instructions are most likely to arouse a threat appraisal but also build self-efficacy, which in turn assists community members to undertake protective action. High perceived response costs, such as expense, difficulty or inconvenience, are more likely to result in maladaptive coping such as denial, wishful thinking or fatalism.

This research investigates how well current emergency warning messages encourage community members' readiness to act on emergency instructions by investigating whether their written content generates appropriate threat appraisal, coping appraisal, and protective motivation.

BUSHFIRE AND NATURAL HAZARDS CRC RESEARCH

To examine whether current emergency warning messages generate appropriate threat appraisal, coping appraisal and protective motivation, researchers conducted a survey of 1,595 Australians living across all states and territories from September to October 2018. Participants read one of four mock emergency warnings (see Figure 1, page four), about either a bushfire or a riverine flood, and were then asked a series of questions relating to their protective motivations.

Mock emergency warnings not attributed to any particular emergency service were developed using examples of real emergency warnings issued by emergency services to improve realism and maximise the usefulness of the findings. Sample warnings were provided by Country Fire Service (SA), Department of Fire and Emergency Services (WA), Metropolitan Fire Brigade (VIC, now Fire and Rescue Victoria), Metropolitan Fire Service (SA), NSW State Emergency Service (SES), Tasmania SES, Victoria SES, and Queensland Fire and Emergency Services. The four mock emergency warnings comprised a *Prepare to Evacuate (Bushfire)* message, a *Prepare to Evacuate (Flood)* message, an *Evacuate Now (Bushfire)* message and an *Evacuate Now (Flood)* message.

▲ **Above:** THIS RESEARCH EXPLORED WHICH TYPES OF SPECIFIC MESSAGES ENCOURAGE COMMUNITY READINESS.

The survey captured each participant's demographic characteristics, message comprehension and effectiveness, threat appraisal (i.e. perceived probability and severity of event), coping appraisal (i.e. perceived self-efficacy, protective response efficacy and protective response cost), protection motivation, and maladaptive coping behaviour (i.e. fatalism, denial and wishful thinking).

RESEARCH FINDINGS

The results show that current warning messages encourage appropriate protective action and thus readiness to act. Current warning messages:

- are highly comprehensible and effective, with only marginal differences between the performance of bushfire and flood messages, and *Prepare to Evacuate* and *Evacuate Now* messages.

- provoke a moderate and appropriate threat appraisal (which comprises the perceived probability and perceived severity of the risk, as well as any fear it generates), again with only marginal differences between bushfire and flood messages, and *Prepare to Evacuate* and *Evacuate Now* messages.

- contain instructions that participants perceived (i) they could execute well (perceived self-efficacy), (ii) would be highly protective (protective response efficacy) and (iii) were low cost (response cost), again with only marginal differences between bushfire and flood messages, and *Prepare to Evacuate* and *Evacuate Now* messages.

Together, threat and coping appraisal accounted for nearly 60% of the variation in protection motivation, which demonstrates that emergency warning messages should aim to generate a moderate level of threat and also support appropriate coping behaviours in their instructions. Perceived response efficacy is most strongly associated with protection motivation.

While protection motivation is the most desirable outcome of a warning message, researchers also investigated the potential for three maladaptive coping responses: fatalism, denial and wishful thinking. Threat and coping appraisals accounted for just over 20% of the variation in fatalism, 34% of the variation in denial, and 15.7% of the variation in wishful thinking. Response cost has the strongest association with all three maladaptive coping responses, which suggests that reducing perceived response costs (in terms of the time, money or effort it takes to undertake suggested protective action) may reduce potential maladaptive responses.

These results show that the instructions contained in current warning messages do encourage readiness to act in the face of a bushfire and flood. Optimised emergency warning messages that contain clear instructions produce a moderate threat appraisal but also build self-efficacy, which assists community members to undertake protective action. Messages that contain higher perceived response costs, such as instructions that require financial expense, difficulty, or inconvenience to execute, are more likely to result in maladaptive coping such as denial, wishful thinking or fatalism.

HOW IS THIS RESEARCH BEING USED?

By adopting current evidence-based practice, Australian emergency service agencies have created effective emergency warnings that encourage readiness to act. Much of this good practice is currently shared across the emergency management sector and this research reinforces the effectiveness of this evidence-based approach. Further research could investigate additional mechanisms to encourage readiness to act on emergency instructions. Such mechanisms might involve adding design elements such as colour, icons or headers to emergency warning messages to improve their effectiveness (see *Hazard Note 81*). Given the strong performance of the message text, existing warning messages may now be effectively optimised for their ability to prompt behavioural intent.

FURTHER READING

Dootson P, Greer D, Tippett V & Miller S (2020) Addressing conflicting cues during natural hazards: lessons from emergency agencies, *Hazard Note 72*, Bushfire and Natural Hazards CRC, Melbourne, available at www.bnhcrc.com.au/hazardnotes/72

Emergency Management Victoria (2014) National review of warnings and information: final report, Victorian Government, Melbourne, Cube Group, available at knowledge.aidr.org.au/media/5659/national-review-warnings-information-final-report-anzemc-endorsed.pdf

Greer D, Dootson P, Mehta A & Tippett V (2020) Emergency warning messages: how do community members comprehend them?, *Hazard Note* 79, Bushfire and Natural Hazards CRC, Melbourne, available at www.bnhcrc.com.au/hazardnotes/79.

Greer D, Dootson P, Miller S & Tippett V (2020) Emergency warning messages: do colours and icons improve community readiness to act?, *Hazard Note* 81, Bushfire and Natural Hazards CRC, Melbourne, available at www.bnhcrc.com.au/hazardnotes/81.

Grothmann T & Reusswig F (2006) People at risk of flooding: why some residents take precautionary action while others do not. *Natural Hazards, 38*, pp.101-120. DOI: 10.1007/s11069-005-8604-6

Prentice-Dunn S & Rogers RW (1986) Protection Motivation Theory and preventive health: beyond the health belief model. *Health Education Research: Theory and Practice, 1*(3), pp.153-161.

Rogers, RW (1983) Cognitive and physiological process in fear appeals and attitude change: a revised theory of protective motivation. In Cacioppo BL & Petty LL (Eds.) *Social Psychophysiology: A Sourcebook* (pp. 153-176), London, UK: Guilford.

END-USER STATEMENT

"VICSES and QUT have been collaborating on a range of risk communication research projects to ensure Victorians continue to receive high-quality information and warnings during emergencies. This project has examined the effectiveness of current warning messages and the extent to which individuals perceive risk and take action. The innovative research led by A/Prof Dominique Greer, in conjunction with the VICSES Communications and Community Resilience Directorate, has reaffirmed that VICSES warnings are highly effective when they contain clear instructions. The research findings will support VICSES to further refine its robust warnings doctrine and templates to ensure people can continue to make informed decisions, take action to protect their lives and property and avoid engaging in fatalism during emergencies. VICSES looks forward to continuing to work alongside QUT to ensure it can continue to deliver on its vision of 'safer communities – together'."

Jacob Riley, Senior Advisor, Readiness and Intelligence, Victoria State Emergency Service

SAMPLE WARNING USED IN THE RESEARCH

EVACUATE NOW
Fire services advise there is a bushfire approaching your local area.

Follow your bushfire survival plan now. If you do not have a plan, your safest option is to **leave immediately** if it is clear to do so. If you cannot leave, **identify where you will seek shelter** from the bushfire. If you are not in the area, **do not return**, as conditions are too dangerous.

Fire crews are working to contain the fire but firefighters may not be able to protect every property. You should not expect a firefighter at your door. Power, water, and mobile phone service may be lost.

People in the area will be affected by smoke, which will reduce visibility and air quality.

An evacuation centre has been opened at the local community centre.

Call Triple Zero (000) immediately if you believe you are under threat.

How to Evacuate:
• If the way is clear, leave now for a safer place.
• Check for road closures and then advise family and friends of your intended travel route.
• Put on protective clothing (e.g., a long-sleeved cotton shirt, boots with thick soles).
• Take the items you need to be away from home for three days.
• Include clothing, medications, important documents (e.g., passports, birth certificates), food and water, and personal care essentials like nappies.
• Secure your pets for safe transport.
• Drive with caution in low-visibility conditions.
• Drink plenty of water to stay hydrated.
• Listen to your local radio station or visit the Rural Fire Service (RFS) website for regular updates.
• If you cannot leave, you need to get ready to shelter in your home and actively defend it.
• If your home catches on fire and the conditions inside become unbearable, you need to get out and go to an area that has already been burnt.

Keep up to Date:
• Following EMS on Facebook (@EmergencyManagementService) and Twitter (@AusEMS)
• Staying tuned to your local radio station. Find your local ABC radio station at https://radio.abc.net.au/help/offline and your local commercial radio station at http://www.commercialradio.com.au/find-a-station/queensland
• Visiting the EMS website at www.emsfire.gov.au/maps
• For bushfire preparation tips, visit the EMS website at www.emsfire.gov.au/bushfiresafety
• For information about road closures, call 13 55 77 or visit www.traffic.gov.au

Note: This warning has been stylised for the purpose of this Hazard Note but the text and ordering of information is as used in the research.