CHOOSING POWERFUL WORDS THAT SIGNAL RISK AND ENCOURAGE ACTION

ABOUT THIS PROJECT

This research was conducted as part of the Bushfire and Natural Hazards CRC project, *Effective risk and warning communication during natural hazards*. Researchers used risk communication and behavioural theories to determine whether risk and warning communications can be reinforced or adapted to better support community understanding, decision-making and protective behaviour during bushfire and flood emergencies.

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SUMMARY

During natural hazard emergencies, the words used in warning communications can powerfully convey risk and encourage immediate behaviours, such as moving to a safer area or avoiding floodwaters. When bushfires and floods remain sustained threats, adapting word choice while still reflecting hazard severity can help reduce warning fatigue.

This *Hazard Note* reports on how words and phrases can be used to signal risk, warning and trigger behavioural response during bushfire and flood emergencies. Researchers worked with the emergency management sector to introduce signal words, more commonly associated with chemical and pharmaceutical product labels, into the natural hazard domain.

The words tested reflected hazard impact, location, timing and behavioural connotations. Action phrases (sometimes called calls-to-action) related to bushfires and floods were also examined. The results show a range of words and action phrases that effectively signal risk, making them ideal for a range of risk and warning communication products. Findings have been used to support the calls-to-action component in the new Australian Warning System.

The companion *Hazard Note 111* examines the effectiveness of different emergency alerts structures for bushfire and flood.

BACKGROUND

Signal words such as *danger* and *caution* are an iconic part of warning labels and information on pharmaceutical and chemical products, often featuring alongside symbols and colours to gain attention and indicate a level of risk to guide behaviour. For example, *caution* and *note* indicate low risk, whereas *danger* and *deadly* indicate high risk. A range of signal words within risk categories (e.g. low versus high risk) can also reduce habituation and avoid message fatigue. Given that signal words are designed to convey quantification of risk and behavioural connotations, their application naturally translates from product to natural hazard warnings.

However, in product warnings, a singular signal word is often the primary or dominant feature, while natural hazard warnings are likely to comprise multiple signal words and phrases to reflect the complex nature of the hazard and behaviours required for safety. This study provides an evidence base for the selection of powerful signal words (e.g. *evacuate*) and action phrases (e.g. *evacuate now*) for bushfire and flood warnings.

Following the 2019-20 bushfires, the Royal Commission into National Natural Disaster Arrangements in Australia identified opportunities for national consistency of risk and warning communication as part of a new warning system. This research provides an evidence base to support inputs into ongoing and future risk and warning communication for bushfires and floods. In doing so, it translates the concept of signal words from product-based safety sciences into the natural hazard domain to support warning products and public safety.

BUSHFIRE AND NATURAL HAZARDS CRC RESEARCH

Via a national online survey, 856 participants were asked to evaluate a range of signal words (e.g. bushfire, severe, widespread, prepare) and action phrases (e.g. prepare to evacuate). These words and phrases reflected the different components of warnings including location, impact, time and actions (as per best practice guidance and instructions when developing warnings).

Participants were presented with a signal word or action phrase and asked to evaluate the extent to which it indicated a warning, risk and the need for behavioural response (i.e. 1 = no indication of warning/risk/behaviour and 9 = always having an indication of warning/risk/behaviour).

These words and action phrases were divided into three tiers (high, moderate and low) to reflect the three-tiered warning system in Australia.

RESEARCH FINDINGS

Hazard-oriented words
Researchers considered two hazard-oriented words: *bushfire* and *flood*. The word *flood* indicated a moderate level of warning, risk and need for behavioural response, and *bushfire* showed a similar pattern for indication of warning and need for behavioural response but signalled a high indication of risk.

Impact words
A range of impact words were examined: *severe, deadly, catastrophic, destructive, dangerous, damaging* and *extreme*. Of these words, c*atastrophic, deadly, destructive* and *severe* signalled high

END-USER STATEMENT

This research has informed recent changes to bushfire warnings issued by Queensland Fire and Emergency Services. It has helped us select words that convey meaning for community members, operational personnel and sector partners to create a shared understanding of risk during bushfires. Importantly, the signal words will help ensure people take the protective actions needed to stay safe during bushfires.

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indication of warning, risk and need for behavioural response. Depending on their use within a warning, these words could be used interchangeably and may reduce message habituation and avoid message fatigue, effectively keeping people safer.

Interestingly, the words *extreme* and *dangerous* signalled high risk and warning but only moderate need for behavioural response. The word *damaging* signalled moderate warning, risk and need for behavioural response.

Location words

None of the location words assessed – *widespread, close* and *local* – signalled high levels of warning, risk or need for behavioural response. The words *close* and *widespread* were considered moderate. However, given their meanings are disparate, they may not be easily substituted within a message. The word *local* signalled low warning, risk and need for behavioural response.

Timing words

Of the four timing words examined – *urgent, immediately, now* and *early* – *urgent* and *immediately* indicated high levels of warning, risk and need for behavioural response, and present opportunity for interchangeable use or emphasis within warnings. The word

now signalled moderate levels and *early* signalled low levels, both across all measures.

Action phrases

Results showed that, like signal words, action phrase classifications were mostly consistent across all measures.

The three phrases with the strongest indicators of warning, risk and need for behavioural response were *evacuate now, leave immediately* and *leave now*. These three phrases performed similarly and reflect the same protective behaviour intention, indicating an opportunity for their substitution in warnings.

Preparation-based phrases were examined for their potential substitution. *Prepare to evacuate* and *prepare to leave* signalled a high indication of warning, risk and need for behavioural response. *Prepare to evacuate* performed more strongly than *prepare to leave*, however it was also located in close signal proximity to evacuation-based phrases – an important consideration for use within warnings.

Action phrases such as *shelter indoors now* and *seek shelter* were indicated as having high indication of warning, risk and need for behavioural response. Yet, their signal was lower than evacuation-based phrases.

Information-seeking phrases such as *monitor conditions* and *seek information* signalled moderate indication of warning, risk and need for behavioural response and performed similarly to each other. This finding indicates their potential for substitution.

Of note, the researchers expected all action phrases to indicate a high tier for need for behavioural response. However, participants noted only a moderate signal for phrases such as *move indoors*, *seek information* and *monitor conditions*.

HOW IS THE RESEARCH BEING USED?

This research has informed recent changes to bushfire warnings issued by Queensland

Fire and Emergency Services and contributes an evidence base to support national warning frameworks and guide the design of emergency alerts, where brevity is critical, including being used to support the calls-to-action component in the new Australian Warning System. Improvements to Emergency Alert messages, together with enhancements to the national warning system, will continue to support the community to make informed decisions under stress, saving lives and property.

FURTHER READING

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, available at www.bnhcrc.com.au/hazardnotes/79.

Greer D, Dootson P, Miller S & Tippett V (2020) Emergency warnings messages: encouraging community readiness to act, *Hazard Note* 80, Bushfire and Natural Hazards CRC, available at www.bnhcrc.com.au/hazardnotes/80.

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, available at www.bnhcrc.com.au/hazardnotes/81.

Mehta A, Murray S, Bradley L, Weeks CS & Liuzzo (2022) Creating effective emergency alerts, *Hazard Note 111*, Bushfire and Natural Hazards CRC, available at www.bnhcrc.com.au/hazardnotes/111.

Tippett V, Greer D, Mehta A, Dootson P, Bradley L, Miller S & Murray S (2021) Towards protective action: effective risk and warning communication during natural hazards, final project report, Bushfire and Natural Hazards CRC, available at www.bnhcrc.com.au/publications/biblio/bnh-8131.