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ARTICLE

Walking the faultline of fear: how affect-inducing risk communication can help promote disaster preparedness

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Abstract

This paper uses New Zealand's AF8 [Alpine Fault Magnitude 8] program, designed to build resilience and preparedness for earthquakes, as a real-world example to explore how emotional appeals can affect preparedness intentions within the emergency management sector. Drawing on template analysis of 14 artifacts from AF8's communication material and 34 semi-structured interviews with emergency management stakeholders (the AF8 material's primary audience), the study examines how emotional appeals are strategically employed and perceived in practice. Findings contextualize theoretical understandings of how risk communication can balance fear and anxiety with positive emotions like fascination and confidence using tools such as vivid imagery, narrative framing, and certainty. The research offers empirical insights into how emotional appeals are used and perceived in risk communication, providing a foundation for developing future hazard communication strategies grounded in real-world application.

Keywords

Risk communication; Bridging research, practice and teaching

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1 ▪ Introduction

In 2023, natural disasters impacted people and infrastructure worldwide at an economic cost of US$202.7 billion [Centre for Research on the Epidemiology of Disasters, 2024]. Encouraging preparedness is critical to risk reduction efforts and is a key priority under the Sendai Framework for Disaster Risk Reduction [UN Office for Disaster Risk Reduction, 2015]. However, preparedness remains low globally [UN Office for Disaster Risk Reduction, 2022] and motivating mitigation action remains a significant communication challenge.

Disaster risk communication efforts have increasingly adopted novel approaches, such as emotional appeals, to improve risk awareness and motivate preparedness [Forsyth et al., 2023; McBride & Ball, 2022]. Emotional appeals involve communication techniques designed to evoke emotions like fear or hope to influence risk perception [Nabi, 2002]. Emotions play a critical role in how people assess and respond to risk, with several theoretical models highlighting different mechanisms of influence, including intuitive, affect-driven judgments [Slovic et al., 2004], cognitively appraised emotional responses [Lazarus, 1991], and persuasive messaging frameworks that balance fear with efficacy [Witte, 1992].

While these theories have advanced understanding of how emotion influences risk perception, research in disaster risk reduction has been dominated by quantitative designs focused on measuring change in knowledge [Johnson et al., 2014]. Research has often overlooked the content and emotional framing of messages themselves [Forsyth et al., 2023; Visschers et al., 2012].

This study addresses these gaps by examining emotional appeals in the communication of seismic risk by New Zealand's AF8 [Alpine Fault Magnitude 8] program. Using communication theory together with qualitative research methods, including interviews and document analysis, we examine how emotional appeals were used and perceived. Specifically, how emotional appeals were constructed and managed in AF8's communication materials and how emergency management stakeholders perceived and interpreted these emotionally oriented strategies.

2 ▪ Literature review

Described as the "faint whisper of emotion", affect plays a critical role in how individuals perceive risk, shaping both analytical and experiential risk judgments [Slovic et al., 2004, p. 312]. Affect heuristics serve as mental shortcuts, guiding decisions and helping individuals quickly categorize risks as either positive or negative based on immediate emotional reactions. These responses not only shape our perception of risk but also directly influence our behavior as we decide whether to tolerate, mitigate, or avoid risk [Loewenstein et al., 2001; Slovic et al., 2004]. However, affect alone provides a broad valence without explaining the distinct behavioral outcomes tied to discrete emotions.

Appraisal theorists advocate for a more nuanced understanding of specific emotions, which they describe as, cognitively appraised states such as fear, anger, or hope that act as motivators of behavior [Lazarus, 1991]. Importantly, emotions that share the same affective valence can elicit very different behavioral responses, for example, both fear and anger are negatively valenced but often lead to different outcomes in risk perception and decision-making [Lerner & Keltner, 2000]. Drawing distinctions between discrete emotions

allows risk communicators to anticipate more precisely how specific emotional appeals might affect how messages are received.

Fear is one of the most researched emotions in risk communication studies [Tannenbaum et al., 2015]. Although it can be a powerful motivator, fear can also lead to disengagement or avoidance if not carefully managed. The Extended Parallel Process Model (EPPM) explains these dynamics by framing fear as a necessary but insufficient motivator. It posits that fear appeals must be balanced with efficacy messages to avoid defensive reactions like denial or fatalism [Witte, 1992]. EPPM has been supported by hazard research which has found that without efficacy, fear-based appeals can lead to message avoidance and fatalism [McClure, 2017; Paton, 2005]. This interaction between threat perception and efficacy highlights the delicate balance communicators must achieve to motivate adaptive behavior without causing disengagement.

While fear dominates the research, it is not the only emotion that warrants consideration. Nabi and Myrick [2019] highlight the role of hope in balancing fear appeals, finding hope to be linked to self-efficacy and supported the promotion of adaptive behaviours in response to health threats. Sjöberg [2007] identified a positive correlation between audience interest and risk perception, with interest being considered a motivating emotion that drives engagement with an issue, even if that issue is negatively perceived, such as the threat of an earthquake or other natural hazard.

Understanding how emotions influence perception is essential for effective risk communication. Emotional responses are often triggered by vivid, personally relevant messages, particularly through narrative formats and scenario-based storytelling [Dahlstrom, 2014; Green et al., 2018; Stapel & Velthuijsen, 1996]. Visual aids like maps, videos, and images further amplify emotional impact [Dransch et al., 2010; Keller et al., 2006; Slovic et al., 2017] and personal experiences with similar events also shape how individuals respond [Siegrist & Gutscher, 2008; Visschers et al., 2012].

While the role of emotion in risk communication is well established in theory, its practical application remains challenging. As Nabi [2002] noted, understanding how specific message characteristics provoke emotional responses is critical. This distinction is particularly relevant in applied contexts, where the emotional intent of a message may not align with how it's received and could be counterproductive to encouraging preparedness [Forsyth et al., 2023]. Many studies focus on presenting factual information overlooking the emotional impact that the material itself can have [Visschers et al., 2012]. This points to the need for more empirical research to examine how emotional appeals are constructed and interpreted in hazard-specific communication.

As science communicators are increasingly expected to inspire action as well as present the facts, calls for evidence-based examples of alternative approaches have grown [Jensen & Gerber, 2020]. However, applied research often receives less academic attention, creating a gap between theory and practice [Besley & Dudo, 2022; Scheufele, 2022]. Bridging this gap requires learning from real-world examples to contextualise theory and demonstrate application in specific policy and practice settings [Burnside-Lawry et al., 2013]. This need is especially acute in the context of seismic risk communication which remains under-researched [Musacchio et al., 2023]. Here, we respond to the gap in knowledge by examining how emotional appeals are used in a successful real-world seismic risk

communication initiative. In doing so, we contribute empirical insights that help bridge the divide between theoretical models and practical application.

3 ▪ Context

New Zealand's location on the boundary of two tectonic plates makes it highly susceptible to seismic hazards [Te Ara, 2007]. Despite recent damaging earthquakes, many New Zealanders remain unprepared for the impacts caused by seismic and other natural hazards [National Emergency Management Agency, 2021].

New Zealand's Civil Defence and Emergency Management (CDEM) system is decentralised, with national policy set by the National Emergency Management Agency (NEMA) and local response delegated to sixteen regional CDEM Groups. These groups work with local government, emergency services, lifeline utilities, welfare agencies, iwi (Indigenous people), and the community. However, there are growing concerns about the system's ability to respond to large-scale events requiring interagency collaboration [Office of the Ombudsman, 2023].

One hazard that requires such collaborative planning is the 600-kilometer Alpine Fault in the South Island of the country. What makes the Alpine Fault especially significant is the unusually high scientific certainty about its past behavior. Evidence of 27 major earthquakes over 8,000 years [Clark et al., 2013], reveals a regular recurrence pattern [Berryman et al., 2012], with a 75% chance of a magnitude 8+ earthquake occurring in the next 50 years [Howarth et al., 2021]. This event would have widespread social and economic impacts [Orchiston et al., 2018]. In response, the AF8 program was established to communicate the scale and urgency of this risk and build emergency response capability.

3.1 ▪ *AF8 [Alpine Fault Magnitude 8] Program*

Launched in 2016, the AF8 program is a collaborative initiative combining scientific research with emergency management planning (Figure 1). Based on a scientifically credible scenario for a magnitude 8 earthquake [Orchiston et al., 2018], AF8 bridges traditional boundaries of policy, practice, and research to improve awareness and preparedness ahead of this potential earthquake.

AF8 has engaged extensively with the CDEM sector and wider public, using tools like planning frameworks, community roadshows, science presentations, and media campaigns. Although it has been recognized for its innovative approach [Lake-Hammond & Orchiston, 2023], its communication strategies have not been examined. As such, AF8 presents a valuable case for exploring how emotional appeals can be used in risk communication, with potential to inform both theory and future practice in disaster resilience.

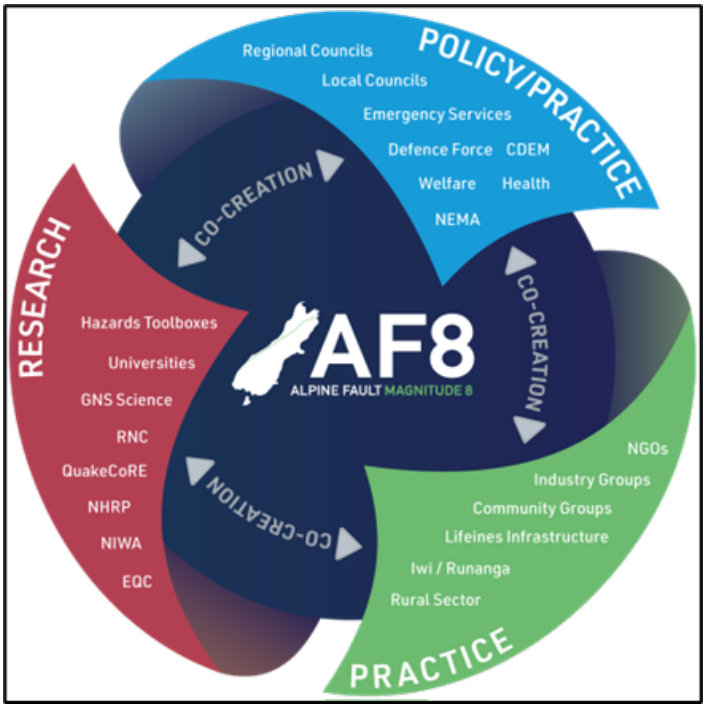

Figure 1. AF8 model of co-creation [Lake-Hammond & Orchiston, 2023].

4 ▪ Methodology

Conducted as part of a broader qualitative case study, this study draws on document analysis and interviews with emergency management stakeholders. The first phase of data collection involved document analysis, which provided insight into the messages stakeholders were exposed to. This phase then informed the development of interview questions to explore how these materials were received and interpreted. Findings from both sources were triangulated to enrich understanding of AF8's risk messaging strategies.

The lead author brought an outsider-within perspective to the study [Collins, 1986], drawing on prior experience in emergency management and stakeholder engagement in local government sector. This primarily facilitated access to participants and enabled richer contextual understanding of the institutional environment surrounding the AF8 program. Additionally, the second author held a significant role as a scientist with the AF8 program, but did not participate in data collection or analysis. This dual familiarity with the emergency management sector and the internal workings of AF8 offered a deep understanding of the context, which would have been inaccessible to other researchers without this prior experience.

4.1 ▪ *Analysis of communication material*

Fourteen communication artifacts were identified by reviewing AF8's digital media and engagement resources, including public documents, YouTube videos, presentations, webpages, and a messaging guide. Selection was guided by the researchers' prior understanding of which materials had been designed to engage stakeholders. These artifacts represent the primary vehicles through which AF8 communicated risk messaging to

the sector and thereby offered insight into its communication strategy. A full list is provided in Appendix A.

Analysis of the artifacts was undertaken using template analysis [King & Brooks, 2017], a well-established method that was selected for its flexibility in accommodating both inductive and deductive coding [Brooks et al., 2015; Burton & Galvin, 2019]. The analysis began with a deductive coding process derived from risk communication literature and iteratively grouped into themes based on their relevance to the first research question. Oral artifacts were transcribed prior to coding, with the analysis primarily focused on the sentence level. Visual elements (e.g., images, maps, and animations) were included in the analysis using the same coding template applied to textual data. Each visual artifact was coded based on what it was communicating in context.

A subset of the data was analyzed and the template iterated as new themes were developed. To minimize biases, we followed a process of intercoder consistency rather than intercoder reliability [O'Connor & Joffe, 2020; Thomas & Harden, 2008]. Specifically, the author and a senior qualitative researcher independently applied the template to a subset of data which was discussed and reviewed following Lincoln & Guba's [1985] peer debriefing process. This process provided a reliability check to ensure consistent interpretation, which helped further refine the coding framework. The template was iterated three times before being applied to the full dataset. The final themes created were managing uncertainty, visual aids, agency, storytelling, past experience, and tone. Descriptions of these themes and their theoretical sources are provided in Table 1.

Table 1. Themes in AF8's communication artifacts.

Theme	Description of coding category	Sources
Managing uncertainty	Messages that address the likelihood, inevitability of hazards and/or their impacts. This includes messages that emphasize the probability of occurrence using language that reflects varying degrees of certainty.	[Jones, 2019; Kahneman & Tversky, 2013; Visschers et al., 2009]
Agency	Messages that promote efficacy through the ability to take mitigation action to reduce the impact of hazard.	[J. Becker et al., 2013; Paton & Johnston, 2001; Witte, 1992]
Storytelling	Messages that use narrative techniques to communicate hazards or risks, often by portraying them as specific events or scenarios, or the use of characters to humanize the message.	[Dahlstrom, 2014; Green et al., 2018; Shepherd et al., 2018]
Past Experience	Messages drawing on past events to support risk communication (e.g., Christchurch and Kaikoura earthquakes).	[J. S. Becker et al., 2017; Slovic et al., 2004]
Tone	Delivery of messages where a specific emotional tone is evident, such as enthusiasm and positivity.	[Visschers et al., 2012]
Visual Aids	Use of visual tools (e.g., maps, images, animation, graphs etc.) to support risk communication.	[Dransch et al., 2010; MacEachren et al., 2005; Slovic et al., 2017]

4.2 ▪ *Interviews*

To gain insights into how AF8's communication efforts were perceived by stakeholders, semi-structured interviews were conducted with 34 participants from the emergency management sector. Participants were selected based on their level of engagement with the AF8 program, identified through regional CDEM Groups and AF8's existing network. Snowball sampling [Patton, 1990] was used, with interviewees recommending additional participants. While this approach enabled access to stakeholders and extended study participation, it also carried limitations, particularly the potential for selection bias and homogeneity of perspectives. These risks were partially mitigated by ensuring a diverse range of roles and regions were represented (Table 2).

Table 2. Roles of participants.

Organization/Role Represented	# of Participants	Regions Represented
Regional Emergency Managers	10	Southland (1), Otago (2), West Coast (2), Canterbury (2), Marlborough (2), Nelson/Tasman (1)
National Emergency Management Agency	4	National
Partner Agencies (Fire, Police, Paramedic)	4	National
Lifeline Utilities	3	National
Local Government (Elected Politicians)	2	Otago, Southland
Community Response Groups	2	Otago, West Coast
Researchers/Scientists	2	National
AF8 Staff	2	N/A
Local Council Staff	2	West Coast, Nelson/Tasman
Tourism Agency	1	Southland
Iwi Representative	1	South Island
Rural Support	1	Marlborough

Participants were invited to take part in face-to-face interviews that explored their emotional reactions to the communication and their views on why AF8 had succeeded in raising the profile of the Alpine Fault risk.

Interviews were also analyzed using template analysis, thereby maintaining methodological coherence. An initial a priori template was developed based on themes from the communication artifacts (e.g. uncertainty, visuals, storytelling, agency, past experience, and tone) This was inductively expanded during the analysis to include participants' affective responses, including fear/anxiety, confidence, fascination, or feeling empowered to act.

Intercoder consistency was conducted, with two coders independently applied the coding template to a subset of the interview data. Differing interpretations were resolved through discussion, and the template was iterated ten times to refine definitions and sub-themes.

Ethics approval was granted by the University of Otago's Human Ethics Committee (D24/018). Participants provided informed consent, and anonymized data was securely stored in accordance with university protocol.

5 ▪ Results

This section presents an integrated analysis of the communication artifacts and interview data. Findings are grouped into three interconnected areas, message content, format, and delivery, to illustrate how AF8 communicated Alpine Fault risk and how these messages were perceived. Within each theme, insights from the document analysis were paired with interview data to show how risk messages were constructed and how they were perceived. This approach allowed us to compare communication strategies with stakeholder interpretation.

5.1 ▪ *Message content*

AF8 employed various messaging strategies to balance urgency, certainty, and efficacy. By framing the risk with certainty and highlighting its potential catastrophic impacts, AF8 generated a sense of urgency, characteristic of fear-based messaging. However, this fear was balanced with messages of agency, providing stakeholders with steps for risk mitigation to enhance their sense of self efficacy. Consistent with EPPM, this dual approach seemed to evoke both concern and confidence, encouraging proactive engagement with the risk.

5.1.1 ▪ *Communicating urgency through certainty*

AF8's management of uncertainty was a dominant feature of its communication, particularly in explaining the likelihood of a future earthquake. Uncertainty often evokes an emotional response due to the unpredictability of the event's timing and severity [Jones, 2019]. AF8 favoured narrative over numeric expressions of probability, by using positive likelihood and certainty framing. Phrases such as 'likely,' 'high chance,' and 'may' were commonly used to describe potential outcomes of the event, for example:

> There are likely to be thousands of minor and moderate injuries, at least hundreds of serious injuries, hundreds of entrapped individuals, and hundreds of fatalities due to building failures, landslides/rockfalls, road/bridge damage nearer to the Alpine Fault and in vulnerable buildings and terrain further distant from the fault. SAFER Framework [Alpine Fault Magnitude 8, 2018c, p. 6].

In contrast, the possibility of a large earthquake occurring was framed with certainty. Narrative describing the regular recurrence of earthquakes over thousands of years, was frequently used as evidence of the inevitability of future earthquakes, as this example demonstrates:

> This is telling us that over the last 8,000 years these events have been happening regularly through time and there's no reason why they should stop happening now. So, in other words, an Alpine Fault earthquake is inevitable in future, and we have to start thinking about getting prepared for that. Science Talk [Alpine Fault Magnitude 8, 2018b].

In the interviews, many participants referenced the certainty of an impending Alpine Fault earthquake as being particularly impactful, as one participant noted:

> The likelihood of the severity is extremely compelling and gets everyone to listen, that's the most powerful way to get people thinking about it. People understand that, and that gets them on board. It's the sense of inevitability — this is something that has a pattern of happening. It's always had a pattern of happening. It's going to happen. (Participant 32).

5.1.2 ▪ *Communicating efficacy through agency*

AF8's messaging consistently emphasized agency, i.e. what individuals and communities can do to mitigate the impacts of the earthquake. This provided a sense of empowerment, reinforcing the idea that, while an Alpine Fault earthquake is inevitable, there are opportunities to reduce its impacts. Communication provided actionable guidance, from individual steps to coordinated inter-agency planning, for example:

> That's one of the key aspects of AF8 …it's about partnerships, about working together. So, they need to take that and look at what it means for them and their partners. What are the things they can take from that, that are clear that they need to be able to do now, or if they don't have the capability, how they will grow that capability? Perhaps acquire more resources, build other partnerships, enable communities to be more resilient so they can connect with those in need. SAFER Framework Video [Alpine Fault Magnitude 8, 2018a].

This sense of empowerment resonated with interview participants. Many described a shift from fear toward confidence, as messages made the risk feel manageable:

> It's about getting people to not be overwhelmed with it or scared by it. Knowing that you can still do something about it might be the tiniest thing in the world, but you can still have some control over how you react to it. I think the way it is messaged has been really important. (Participant 20).

Understood as a social emotion providing a sense of assurance or capability [Barbalet, 1993], confidence was gained through engagement with the program. By providing knowledge and empowerment, the program fostered belief in participants' ability to prepare, for example:

> The program is presented on the basis that an emergency will occur, but it also offers clear steps on how to be prepared. This gives people confidence, as they feel empowered with knowledge about what to do, what to expect, and how they can contribute. (Participant 22).

Feelings of confidence were also linked to a broader sense of collective efficacy. Participants emphasized how collaboration with other CDEM partners through the program fostered resilience by reinforcing a coordinated response. One participant described this reassurance:

> It's quite comforting knowing that there's an external organization taking this seriously and coordinating the efforts of many others. Feeling that it is a coordinated response, that's the key. (Participant 31).

Another highlighted the motivational effect on high-risk communities close to the Alpine Fault, emphasizing feelings of empowerment:

> It's motivated many of our communities with high-risk profiles. They know that if we don't help ourselves, we aren't going to be in a good state. So, it's about empowering and understanding that gives us the motivation to exercise, train, build networks in a community, build our social capital. (Participant 33).

Finally, transparency also played a critical role in fostering agency. Participants valued AF8's willingness to be candid about the catastrophic nature of the risk, viewing this openness not as alarming but as empowering. As one participant noted, public risk communication in the sector has often been cautious, but AF8 demonstrated that *"people can handle it if it's wrapped around with the right communication."* This suggests that clear, honest information, when carefully framed, can enhance a community's sense of control and self-efficacy. By trusting the public with complex, potentially distressing information, communities were able to make informed decisions about how to respond and prepare collectively.

While participants generally viewed AF8's messaging as empowering, deeper concerns about systemic readiness within the sector were also raised. One emergency manager expressed anxiety about inter-agency coordination, stating:

> The thing that scares me the most about AF8 is the inability of our regions and agencies to work together… it keeps me awake at night and it is really having quite a pronounced effect on my physical health. (Participant 23).

This highlights a paradox; that even while messaging can foster a sense of individual and organizational agency, it can also expose weaknesses and limitations in broader institutional capacity and capability, which can generate feelings of anxiety and stress.

5.1.3 ▪ *Communicating emotion through past experience*

The AF8 program began in 2016, the same year as the Mw7.8 earthquake struck the coastal South Island town of Kaikoura, and five years after the 2011 Christchurch earthquake sequence. AF8 communications drew heavily on these past earthquakes, allowing them to serve as affective anchors [Slovic et al., 2007] for participants, making the Alpine Fault scenario feel both plausible and imminent. For many participants, these past events did not just inform their understanding of earthquakes, they made the risk feel real. References to Christchurch and Kaikoura evoked emotional memories of damage, disruption, and challenging recoveries. As this participant described:

> The Christchurch or Canterbury earthquake sequence and the Hurunui Kaikoura earthquake — that's what's made it real to people. They now understand what an earthquake will do and also the cascading hazards and the complicators and just how hard it is to recover. (Participant 24).

5.2 ▪ *Message format*

The emotional aspects contained within AF8's messaging were supported through tools and techniques AF8 used to communicate them, specifically visuals and narrative formats.

5.2.1 ▪ *Emotional impact enhanced through visuals*

Visual tools were heavily relied on to support AF8's communication strategies, enhancing emotional appeal and providing localised geographical context. Maps of potential shaking intensity illustrated the spatial distribution caused by strong ground motions (Figure 2), while photographs and other imagery were used to depict the impacts of large earthquakes (Figure 3). This visual material provided proximity and helped ground abstract concepts in real-world imagery.

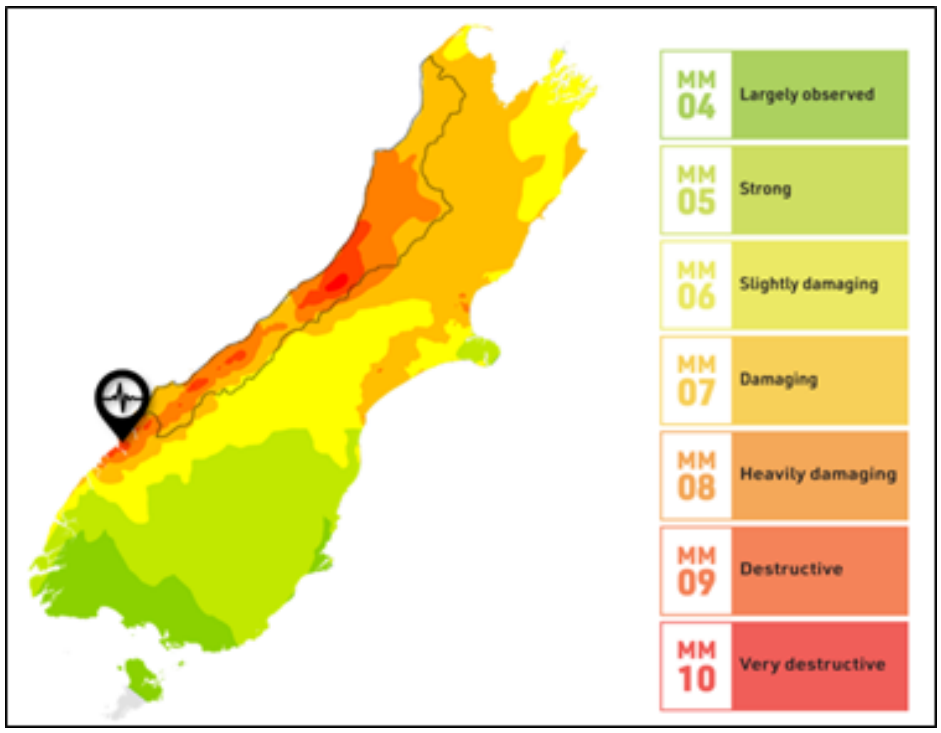

Figure 2. Map showing projected intensity of shaking across New Zealand's South Island based on the AF8 hazard scenario [Alpine Fault Magnitude 8, 2018c, p. 11].

Figure 3. Example of photo illustrating an earthquake-induced landslide across a river, resulting in potential landslide dam break risk for communities downstream [Alpine Fault Magnitude 8, 2018c, p. 11]. Image credit Dougal Townsend GNS Science.

Figure 4. Screenshot of Alpine Fault modelling animation [Alpine Fault Magnitude 8, 2018d].

AF8 also repeatedly used an animation depicting a rupture scenario along the Alpine Fault (Figure 4). It simulated the intensity of shaking as seismic waves travelled from the modelled epicentre and across the South Island. A timer demonstrated how many minutes of shaking could be expected during the earthquake (more than 3 minutes in some locations).

The value of using visual tools including maps, images, graphs, and most notably the animation, came through strongly in the interviews, with almost all participants referring to them. One participant explained the effect of AF8's visual material by referring to two specific items: a graph showing the recurrence interval of Alpine Fault quakes; and the rupture animation. *"The first speaks to Hokuri Creek and shows the frequency of 26 events over the last 8000 years… Straight away, you don't need to say anything more."* The second, more visceral moment came with the animation, they commented: *"that's just something so visceral, it grabs people when they see it, and they're just like, 'Holy crap'."*

It was common for participants to reflect on the impact the animation had and its ability to trigger strong reactions, often resembling concern or anxiety, for example:

> The earthquake simulation, that was always like the 'oh shit' moment. You show that to somebody and they go. 'Oh shit'. (Participant 5).

Another described the visceral nature of the visuals as supporting them to imagine what the event would feel like:

> I can visually think of what it might be like, and I can feel what it would be like to be a community living in that area. (Participant 4).

These responses illustrate how the proximity and realism embedded in the visuals fostered an emotional connection to the event. By providing a tangible sense of the locations that would be impacted and in what ways, these visuals bridged the gap between abstract risk and lived experience, amplifying the emotional engagement of participants.

5.2.2 ▪ *Fostering engagement through narrative*

Narrative techniques played a deliberate and central role in AF8's communication strategy, particularly through the use of episodic, cinematic techniques, and character-driven storytelling. Rather than simply presenting data, AF8 structured its messaging in ways designed to foster emotional connection, increase relatability, to make seismic risk more tangible.

Episodic framing, described by Shepherd et al. [2018] as a way to make risk more tangible by situating it within a larger historical or situational context, was most evident in AF8's face-to-face presentations, which contextualized paleo-seismic evidence about the Alpine Fault's history. A key feature of all AF8's presentations included detailed evidence of past earthquakes along the fault to illustrate the regularity of seismic events over time, reinforcing the inevitability of a future earthquake:

> Previously we'd known about three earthquakes on the Alpine Fault from the northern section of the fault. But after investigating and dating the layers here at Hokuri Creek and John O'Groats it pushed back our knowledge over 8000 years. What you see here is pretty unequivocal evidence that there is a repetitive cycle of events on the Alpine Fault, 27 earthquakes over the last 8000 years. A long history of significant earthquakes, remarkably regular through time. [Alpine Fault Magnitude 8, 2019].

AF8's Program Manager described intentionally using cinematic narrative conventions [Moin, 2024] to keep audiences emotionally engaged and cognitively oriented. This approach followed a three-stage arc of introduction, crisis, and resolution.

> You start and everybody's happy and you get introduced to the characters and the lovely family. Then they have some kind of crisis…Then you spend the rest of the film finding some resolution…That's like the AF8 scenario.

This narrative mirrored classical storytelling techniques, fostering a sense of journey. As the Program Manager noted, the aim was to translate scientific complexity into a more relatable, impactful form.

> We start with what is the Alpine Fault. What does it look like?…And then the risk is exposed…But then you go into the resolution of what can we do about it? That's the way I always frame it because that's why those cinema formulas are so popular, as people can follow a narrative like that.

By structuring the message in this way, AF8 enhanced emotional impact, reflecting evidence that narrative framing improves engagement with risk communication.

Character-driven storytelling also helped humanize science, such as the story of geologist Harold Wellman's early work discovering the fault. These stories served to make the science more relatable, inviting audiences to view geology as a field of discovery shaped by people, not just field evidence and data, for example:

> He saw evidence in the landscape of a very long linear feature which he started to think might represent a very large fault… He observed the distinctive rocks down in the Red Mountains in Fiordland also popped up again in northwest Nelson… they had been split apart by about 800 kilometres. [Alpine Fault Magnitude 8, 2019].

Many interviewees commented on the strong 'story' AF8 had to tell, emphasizing its importance as a communication tool to help connect audiences with the science for example:

> If we can tell a story maybe people might buy into it more because then they're not realising that it's a science thing if it's a story…The key is storytelling. (Participant 28).

5.3 ▪ *Message delivery*

Finally, the way AF8's science communicators conveyed the message was also a key factor in how emotional appeals were managed, building trust and fostering engagement through positivity and enthusiasm.

5.3.1 ▪ *Building trust and credibility through relationality*

Trust was expressed in two different ways by participants, both of which were closely tied to the relational nature of the program. Firstly, a feeling of trust was expressed towards the AF8 program and its importance in driving change:

> To spend the time and the energy connecting with the various parts, the stakeholders and the community. And obviously on top of that, they need the right information that flows in. So, they're telling a good story. They need to be competent. That builds a trust between an individual and a group or a community that enables change because that's what we're after. We're actually trying to change behaviour in the end. (Participant 19).

Secondly, increased trust in emergency management partners was identified as an outcome of engagement in the program, as explained by this participant:

> The cohesiveness between the civil defence groups grew much stronger and there was never an issue of 'Oh, I'm not going to ask for help as they might see that I'm not doing very well, and I don't want them to see my failings.' That got less and less as a level of trust grew. (Participant 2).

5.3.2 ▪ *Balancing negative affect with messages of positivity*

Despite the potential devastation of the Alpine Fault earthquake, AF8 maintained a generally positive tone, particularly the aesthetic and economic aspects of New Zealand's location on a tectonic plate boundary. For example, the following statement highlighted the natural beauty and scientific interest of the Alpine Fault while acknowledging its role in shaping the renowned mountain landscape of the South Island:

> The Alpine Fault is the longest natural straight line visible from space, without it and the large earthquakes it generates, Te Waipounamu, our beautiful South Island would look very different or not even exist. [Alpine Fault Magnitude 8, 2024].

This positive tone also carried through to some of the imagery which included postcard style imagery showcasing the natural beauty of the Southern Alps, a landscape created by the Alpine Fault (Figure 5).

Figure 5. Example of postcard style imagery used in AF8 communication [Alpine Fault Magnitude 8, 2018c].

5.3.3 ▪ *Fascination through enthusiasm*

The presentation of Alpine Fault science also involved instances of enthusiasm being expressed by scientists. The tone used was often animated, as highlighted by the following example from a science presentation:

> It has exposed an amazing prehistoric record of earthquakes going back thousands of years which is an incredible record of past Alpine Fault earthquakes…I can't tell you how incredibly unique and amazing this data set is for faults and earthquakes around the world. It's very rare to find evidence like this. Science Presentation [Alpine Fault Magnitude 8, 2018b].

Positivity and enthusiasm were echoed in the perceptions of several interviewees, particularly in their reflections on how the scientists' passion enhanced the authenticity and engagement with the program. Fascination was often referred to in parallel with fear or anxiety, a blend of curiosity and concern acting to pull participants in to learn more, for example:

> There's a feeling of fascination which pulls you in but also anxiety, which kind of makes you pause and think, 'Oh my God' and that often empowers people. (Participant 27).

6 ▪ Discussion

AF8's use of emotional appeals was not limited to a single emotion or strategic approach, rather it integrated message content, format, and delivery to appeal to a range of discrete

emotions encompassing fascination, fear, trust, and confidence. Illustrative of emotional flow [Nabi, 2002], these appeals worked together to influence stakeholders' responses. By evoking different emotions to spark interest, balance fear with efficacy [Witte, 1992], and leverage affective cues [Slovic et al., 2002], AF8 was able to engage and sustain attention, convey the urgency of the seismic risk while fostering a sense of empowerment.

A defining feature of AF8's message content was its use of certainty. The Alpine Fault presents a unique case as one of the few geological features with such a high level of certainty regarding the likelihood of a future rupture. This enabled AF8 to communicate with a level of confidence uncommon in hazard contexts. Rather than dwelling on uncertainties, such as timing or intensity, AF8 used certainty framing to highlight the inevitability of an earthquake. Certainty framing operates as a heuristic that taps into the desire for definitive outcomes, even undesirable ones [Kahneman & Tversky, 2013]. Reducing uncertainty enhances perceived control [Jones, 2019], which in turn supports the development of self-efficacy, a central determinant in EPPM [Witte, 1992]. However, while certainty framing can be effective in the short term, there are potential long-term consequences to consider. While a future Alpine Fault earthquake is certain across geological time, human timescales are much shorter. If the event does not occur for many decades there is a risk that it may lead to message fatigue, a state of motivational exhaustion from overexposure to a repeated message over a long period of time [So et al., 2017]. This can result in disengagement and resistance, undermining communication effectiveness.

Efficacy messages were evident in AF8's communication which emphasized preparedness steps to reduce the impacts of the earthquake. Stakeholders reported that these messages fostered a sense of confidence, not only in their own ability to act, but also in the coordinated, collective efforts encouraged by the program. Confidence, while not a basic emotion [Lazarus, 1991], has been described as a social emotion that offers positive assurance and encourages action [Barbalet, 1993]. In this way, confidence functioned similarly to hope appeals [Nabi & Myrick, 2019], operating as a positive, activating emotion that balanced fear with a sense of optimism, empowering participants to believe in their capacity to prepare both individually and collectively.

Communication formats and tools used by AF8 enhanced emotional engagement, including scenarios, storytelling, and visual aids. The use of scenarios is widely recognized as an effective mechanism for shaping risk perception [Stapel & Velthuijsen, 1996; Visschers et al., 2012]. Stakeholders noted how AF8 effectively employed a scientifically credible scenario to paint a vivid picture of the potential impacts of an Alpine Fault earthquake. This scenario was combined with storytelling, employing episodic framing to make the scenario feel more personal and relatable. Narratives enable others to mentally step into the storyteller's world to imagine how they might be personally affected, enhancing engagement and motivating intentions to undertake risk mitigation behaviours [Dahlstrom, 2014; Green et al., 2018].

Dynamic visuals, particularly animation, activate the affect heuristic, where vivid, easily imagined representations intensify emotional responses [Slovic, 2007]. AF8 capitalised on this by leveraging compelling imagery to vividly convey the consequences of an earthquake. Maps and images localized the threat, which was complemented by the animation, a tool that participants found highly impactful. With its ability to show ground shaking over the minutes after the earthquake initiated, and the progression of seismic waves across the landscape, it effectively demonstrated the scale of the impacts across the South Island and provided a

unique opportunity to immerse people in the earthquake scenario. These moving visuals captured attention, created urgency, and deepened the emotional impact.

Finally, the delivery of AF8's messages was also significant in supporting the program's emotional flow. Communicators convey affective cues, whether intentionally or not [Visschers et al., 2012]. For AF8, there was a high sense of trust by emergency managers in the program and those delivering it, which played an important role in how emotional appeals were received. Trust is critical in the way risk messages are received and acted upon [Balog-Way et al., 2020]. While often described in rational or cognitive terms, Engdahl and Lidskog [2014] emphasize that trust is something people feel and that can be developed through relationships and emotional experiences. This was reflected by stakeholders who highlighted the relational nature of the AF8 program and the networks it supported. There are cases when it is unclear whether it is the communication or the wider context of the case that generates emotive responses. While this is not always clear, we have attempted to focus on cases where it is clear communication is at least part of the factor.

AF8 science communicators not only provided credible scientific explanations, but they were also relatable through their enthusiasm and positivity. Unlike most risk communication, which focuses on likely negative outcomes, AF8 emphasized the long-term economic benefits and natural beauty of the landscape shaped by the Alpine Fault. Acknowledging the fault's role in shaping the environment helped the public accept the risk as integral to the environment they live in. Research has demonstrated that communication delivered with enthusiasm enhances audience engagement [Martín-Sempere et al., 2008; Poliakoff & Webb, 2007]. In the case of AF8, enthusiastic delivery and positive framing were factors that supported the development of a constructive curiosity about the risk. Several interviewees expressed a sense of fascination, which appeared to enhance their engagement with the program. These positive emotional appeals helped make the subject more approachable, encouraging stakeholders to engage with the material rather than avoid it.

7 ▪ Conclusion

This research provides evidence that AF8 effectively used emotional appeals, through message content, format, and delivery, to communicate risk in a way that balanced stakeholders' feelings of fear and urgency with those of fascination, trust, and confidence in their ability to take action.

The AF8 program provides a real-world example of how emotional appeals, both positive and negative, can enhance engagement in hazard risk communication. It employed strategies such as storytelling, vivid imagery, and past earthquake experiences to increase interest and relatability. Certainty framing conveyed the inevitability of the threat, while messages emphasizing trust, positivity, and empowerment reinforced agency. These elements combined to foster engagement and heighten urgency.

There are some limitations of the current study. As a single qualitative case study, the findings are illustrative rather than generalizable. The study does not assess causality and recognizes that emotional responses are subjective and shaped by individual experience. Without longitudinal data, it is unclear how such engagement may evolve through time. This study considered the impact the program had within the emergency management sector. Although this group includes community groups, their involvement in the sector means they

already have an interest in disaster preparedness and may hold positive views towards the AF8 program. Future research could build on this study by exploring how the program resonated emotionally with households and individuals. Specifically, investigating how different demographic groups (e.g., based on age, experience with past earthquakes, or socioeconomic status) respond to these messages could provide more nuanced insights into how emotional appeals impact diverse populations. Additionally, further work using dedicated visual analysis methods and frameworks could provide deeper insights into how visual communication shapes affective responses.

While context-specific to AF8 and the South Island of New Zealand, the risk communication tools and approaches used by the program could be tested and adapted in other hazard contexts globally. We echo Visschers et al.'s [2012] call for greater focus on the role of affect in evaluating risk communication. Research into a broader range of communication styles, emotional appeals, and audience responses would refine understanding of how affect-inducing strategies can be tailored to diverse contexts. Such insights could inform communication strategies that support preparedness intentions, ultimately contributing to community resilience.

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A ▪ AF8 communication artifacts analysed

Table 3. AF8 communication artifacts analysed.

Document	Source
AF8 SAFER Framework	https://af8.org.nz/media/tmkaaiwe/af8-safer-framework-2018-lr.pdf
AF8 Website: • Homepage • What is AF8 • AF8 Scenario • Explore the Science • Response Planning	http://www.af8.org.nz
AF8 Roadshow Recording — Twizel 2019	https://www.facebook.com/share/v/1ASbjVAWrA/
AF8 Science Talk — Planning for the next big earthquake	https://youtu.be/s2-YL2IkAXc?si=AI9RB-zvC6qWrGpn
AF8 Science Talk — What will a large earthquake feel like?	https://youtu.be/rnf5Oc37Zic?si=92K2uIkQsSrYPCYc
AF8 Science Talk - Impacts of an Alpine Fault Quake	https://youtu.be/tOqtZviGuZA?si=dsRuD3hOYcxWkimS
AF8 Science Talk — Evidence for past large earthquakes on the Alpine Fault	https://youtu.be/puakq2Ixkg4?si=tplnnuA-mv41G35n
AF8 SAFER Framework Video	https://youtu.be/EOkNiBOztkc
AF8 Short Stories — What is the Alpine Fault	https://youtu.be/mSidKstEI2U?si=Ssi7B-02WCPK6_sj
AF8 Short Stories — Business Resilience	https://youtu.be/O--JrnURgXw?si=iELnoRubITv04B0E
AF8 Short Stories — Building Community Resilience	https://youtu.be/mcsa3fp3qOk?si=qs6smQA6VyolTAGN
AF8 Short Stories — A multi agency response	https://youtu.be/BioO9N-WxmQ?si=UrikazlSD3fOkU7s
AF8 Master Presentation Slides & Presenter Notes	Provided by AF8
AF8 Consistent Messaging Guide	Provided by AF8

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