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Eliciting mental models to understand how different individuals affected by disaster risk understand science, and scientific uncertainty

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Communicating the uncertainty associated with forecasts is crucial to effective crisis response management, but it is particularly challenging when time frames are too short to articulate the complexities of the information. However, not communicating uncertainties is problematic. For technical experts, interdependencies amongst event characteristics over time creates evolving uncertainties that may eclipse those associated with modelled outcomes. For the public and emergency decision-makers, the lack of uncertainty awareness may result in future alternative courses of action not being identified and assessed, reducing the efficacy of decisions and action plans. Furthermore, revealing uncertainty can both increase or decrease the credibility and trustworthiness of the communicator. Some individuals will devalue a message when uncertainty is communicated, while others may devalue the message when they expect uncertainty and it has *not* been communicated. If we are to develop effective ways to communicate uncertainty in a crisis, research needs to understand the reasons for these differences.

Key influences include how perceptions of science, its uncertainty, and the scientific process, act as a lens through which scientific information is interpreted. This lens can warp communicated information, particularly when uncertainty is high: during a crisis, people may not take appropriate safety actions based upon scientific advice if the message contradicts or fails to accommodate, their existing perceptions of the science. Forecasts, warnings, and other communication products must address these existing perceptions if they are to be effective. These perceptions are represented in people's mental models of how they think the world works, including their model of scientific processes, motivations, beliefs, and values, which vary across disciplines and organizations due to epistemic differences. We will report on the initial findings from a study that a) identifies the appropriate methodology to elicit mental models of science in the public and professional populations, and b) uses this to explore how mental models of scientific uncertainty are held by the public, emergency managers, scientists, engineers, and key decision-makers involved in hazard response. Our aim is to identify the shared concepts underlying these mental models, so forecast messaging can be effectively crafted to include uncertainty in a way that aligns with individuals' mental models. Through this we offer strategies to enhance individual decision-making under uncertainty in ways that develop the trust that the public and decision-makers have in forecasts.