1. Introduction

Organizations such as FEMA and the National Weather Service (NWS) are conducting research to improve disaster preparedness among citizens and increase response rates to emergency warning systems. Understanding behavior among residents is crucial for emergency managers and disaster warning content providers to support safe decision-making during a disaster.

2. Method

Participants

Participants were residents of Madison County who remained at home at least two consecutive days during April 27th tornado Super Outbreak and aftermath. 11 Participants were selected for interview, although 1 participant was excluded from analysis due to a technical error. Age distribution was bipolar, with four participants between ages 22 and 31 and six between 51 and 62. Participants included 7 women and 3 men. Most were Caucasian, with only one African American participant. All participants reported household incomes of $30,000 and higher, and the majority (8) held bachelor degrees.

Interviews

Participants were interviewed by two experimenters while completing a written questionnaire about their experiences during the incident. Participants also created a narrative timeline of events during the incident which was visible at all times as a memory aid (Figure 2). Participants were provided opportunities to think aloud or discuss the incident with experimenters during discussion questions or in the course of completing the questionnaire. Interviews were recorded for audio and professionally transcribed.

Coding

MAXQDA 10 was used for textual analysis and coding of transcripts. A coding scheme was developed to label introspective or descriptive narratives and to examine whether residents were using KiW or KiH to make decisions. KiW and KiH codes were developed using an abstract, invented tasks (Klein et al., 1985/2010). A Cognitive Task Analysis (CTA) procedure is applied to NWS forecasters in charge of warning systems during severe weather incidents (Hahn et al., 2003). This method, a multiple pass interview was used to construct an incident narrative, identify critical decisions, and understand decision making among residents is crucial for emergency managers and disaster warning content providers to support safe decision-making during a disaster.

Figure 2: One participant’s timeline of critical events.

3. Results

Table 2 displays the frequency and nature of decisions described by participants. Common relations, or items cued in the same statement as a decision, are also shown. Relations serve to identify KiW and KiH salient to decisions.

- The most common decisions or actions included Sustaining Actions, Other Actions (which typically involved socializing) and Deliberative Actions. Mental model change points and types, as well as KiW and KiH, were the most common decisions or actions.
- All KiW codes with four relations (76.3% of all KiW relations to decisions) are shown. Environmental cues, peers, and the NWS are commonly related KiW sources. Knowledge of stocked goods and family limitations were also related.
- Only 3 KiH codes were related with decisions. Knowledge of sources of help (Family and Other Social Stakeholders) and experience from previous disasters were related KiH items.

4. Discussion

Decision-Making

The high frequency of consideration-based Sustaining and Deliberative actions, as opposed to more automatic responses such as Urgent actions, suggests that even novices have established, skill-based processes for acquiring and interpreting information which may reduce the cognitive effort of decision-making.

KiW and KiH

Statements about KiW were far more common than KiH, suggesting that residents rely heavily on external cues in (relatively) novel disaster scenarios. Reliance on familiar sources such as local media and peers further supports the idea that residents utilize experience when searching for information. The lower frequency of KiH may also reflect the prevalence of pre-existing attitudes towards information sources and channels suggests that even novices have established, skill-based processes for acquiring and interpreting information which may reduce the cognitive effort of decision-making.

Acknowledgments

This research was funded by the RCEU program with funds provided by the Presidents/Provosts office, funds provided by the Vice President for Research, funds provided by the Chemistry Department through their patent account, and external funding from the Alabama Space Grant Consortium. We are also grateful to Achay Crank, Jaclyn French, Jennifer Iser, and Krister Weger for assistance with data collection.

References


Figure 1: Decision points and related codes are displayed, organized by frequency within each category. Decision Frequency is shown in red, KiW codes in blue and KiH codes in green.

Figure 6

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Crank, Jaclyn French, Jennifer Isler, and Krister Weger for assistance with data collection.

Figure 1: A diagram of the PADM. (Linell, in press)

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