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A model to explain information seeking behaviour by individuals in the response phase of a disaster

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ABSTRACT

This Australian study establishes a model that provides a foundation for communication channels and tools selection by agencies in the post-warning response phase of a disaster. The model, developed from disaster and information seeking literature, attempts to predict information source and channel selection by people after their community has received a warning for a disaster. It provides the coding framework for analysis of 51 semi-structured interviews with disaster-affected Australians. The interviews tested the model for accommodation of channels and sources that people chose, found most useful, and used most in bushfire, slow flood, flash flood, and cyclone situations. The order of initial sources was investigated and preliminary information seeking pathways established across disaster types. The disaster information seeking model supports this investigation of information seeking behaviour, though improvements are suggested. The resulting model could guide agency response communication for different disaster types.

1. Introduction

In a natural disaster, communication and interaction with affected and neighbouring communities is a critical component of emergency management (Gilbert, 1998; Haddow & Bullock, 2006; Landesman, 2005; McLennan, 2014; Quarantelli, 1986, 1988, 1989; Renckstorf & McQuail, 1996). Veil (2007) found that residents of one particular community affected by a disaster "considered communication a key aspect of the emergency response" (p. 337). The timely release of information helps reduce anxiety levels and "unnecessary care-seeking by threatened populations" and facilitates relief efforts (Wray, Kreuter, Jacobsen, Clements, & Evans, 2004, p. 232). Community disaster decision-making and the possession of information have been consistently connected. Access to information is critical for survival in some disasters (Legates & Biddle, 1999). For instance, in the 2009 Black Saturday bushfires in Victoria, Australia in which 173 people died, lack of information from agencies, including warning and post-warning information, was considered to have been a contributor to deaths in those fires (Teague, Ronald, & Pascoe, 2010). In 2018 bushfires in NSW, ongoing information was critical to farmers saving their livelihoods by moving and protecting animals, and lack of information for some people was blamed for the loss of houses (Whittaker & Taylor, 2018).

2. Problem statement

Research on information seeking behaviour in times of natural disasters is fragmented, producing little comprehensive understanding of what sources and forms of information people turn to when they face a disaster. Rarely have information seeking patterns across disasters types been compared in attempt to find differences or parallels. Further, the information seeking research studies that do exist in this area are not based on a theoretical framework. These gaps in knowledge can prevent agencies from undertaking communication that intersects with information seeking behaviours of communities. A model of information seeking that draws from research in both disaster behaviour and information seeking would offer agencies a method for predicting the most effective communication forms and sources with which to reach their target communities during a disaster.

3. Literature review

Despite the importance of timely and salient information delivery to communities during the response period of disasters, a very small number of studies have investigated information seeking behaviour across all sources and forms by people in this phase. In fact, a lack of research in this area has been identified (Steelman, McCaffrey, Velez, & Briefel, 2015; Wray & Jupka, 2004). The research that has been undertaken reveals that there are differences in information behaviour across disaster types, in both receipt of the first warning, and subsequent information seeking. For instance, tornado survivors report being alerted by others (Donner, Rodriguez, & Diaz, 2007; Eisenman, Cordasco, Asch, Golden, & Glik, 2007) and television (Chaney &

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Weaver, 2008; Comstock & Mallonee, 2005; Stokoe, 2016), but mainly by siren (Legates & Biddle, 1999; Paul & Stimers, 2011; Stokoe, 2016; U.S. National Weather Service, 2011). In a storm, television is the alert and main source (Burger, Gochfeld, Jeitner, Pittfield, & Donio, 2013; Drobot, Schmidt, & Demuth, 2008) and radio is also important (Burger et al., 2013). More urgent or unexpected disasters tend to feature other people as alert sources (Greenberg, Hofschire, & Lachlan, 2002; Palen, Vieweg, Liu, & Hughes, 2009) or television (Bracken, Jeffres, Neuendorf, Kopfman, & Moulla, 2005; Greenberg et al., 2002; Jones & Rainie, 2002; Stempel III & Hargrove, 2002. Other people and mainstream media such as radio and television were important in bushfire and hurricane (Boylan, Cheek, & Skinner, 2013; Burger et al., 2013; Cohen, Hughes, & White, 2007; Every et al., 2015; Mackie, McLennan, & Wright, 2013; Steelman et al., 2015; Sutton, Palen, & Shklovski, 2008; Taylor, Priest, Fussell Sisco, Banning, & Kenneth, 2009). Environmental factors (such as seeing smoke or fire, prolonged rain) can be important bushfire alert sources (Ryan, 2013; Smith, Taylor, & Thompson, 2015; Whittaker & Taylor, 2018).

Subsequent and main information sources also differ across disaster types. After hearing of an approaching tornado, some (Donner et al., 2007) will look outside to confirm that what they have heard. Environmental cues play an important role in information collection after a flooding alert (Ryan, 2013). For storm, radio, friends and neighbours, and television are key sources and forms (Burger et al., 2013; Cretikos et al., 2008; (Burger et al., 2013; Cretikos et al., 2008; Queensland Inspector-General Emergency Management, 2017). Internet and social media sources confirm information and facilitate further information seeking across a range of disasters (Greenberg et al., 2002; Legates & Biddle, 1999; Lindell, Lu, & Prater, 2005; Nogami & Yoshida, 2014; Prater, Wenger, & Grady, 2000; U.S. National Weather Service, 2011). This includes the important role of weather agency websites in flooding (Ryan, 2013), and storm and cyclone (Queensland Inspector-General Emergency Management, 2017). Peers are confirmation and main sources in bushfires (Heath et al., 2011; Mackie et al., 2013; McLennan, 2014; McLennan, Dunlop, Kelly, & Elliott, 2011; McLennan, Elliott, & Omodei, 2012; Smith et al., 2015; Steelman et al., 2015; Trigg et al., 2015), although environmental cues, radio, and agency websites were also important. Television and radio were main sources for storm (Burger et al., 2013; Drobot et al., 2008), tornado (Chaney & Weaver, 2008; U.S. National Weather Service, 2011), terrorist attack (Greenberg et al., 2002), tsunami and earthquake (Nogami & Yoshida, 2014; Perry, 2007) and hurricane (Perez-Lugo, 2004; Prater et al., 2000).

4. Defining the disaster context

Western agencies generally use some form of the prevention, preparation, response and recovery (PPRR) model to describe and guide disaster management (Emergency Management Australia n.d.; Public Safety Canada, 2017; U.K. Cabinet Office, 2013; U.S. Federal Emergency Management Agency, 2018). Phase classifications are necessary in disaster management because of the different agencies and approaches required in each phase. In disaster social science, socio-temporal models have emerged based on the effect of different stages of disaster on populations and their subsequent behaviour (Perry & Quarantelli, 2005). These models generally start with a pre-disaster phase, then outline different variations of the following: detection of the threat and warnings, followed by the apprehension phase when people are in a state of heightened awareness, then the dislocation phase on or after impact, then a reaction phase (which sees the organisational response proceed), the remedy phase that includes response and recovery efforts, and finally, rehabilitation (Barton, 1970; Carr, 1932; Dynes, 1970; Powell, 1954; Stoddard, 1968; Turner, 1976). Because the warning phase has already been well studied, the phases addressed by this study are the apprehension phase after threat has been detected and the initial warning received, and the dislocation and reaction phases. While the alert source is important in the information behaviour sequence, the focus of the current research is on the search for information post-warning.

5. Model development

In the first stage of the research, models were explored that might explain the process of information searching during the relevant phases of a disaster and supported adaptations of these for disaster. Once a model was selected, it was used as the basis for interviews of disaster-experienced people so that shortcomings and strengths of the model could be identified. The third stage focused on determining whether the disaster version of the information seeking model was effective in illustrating disaster information seeking activity, and if not, what adaptations could be made to make it more useful.

5.1. Disaster information seeking models

A number of models in the disaster, crisis, or risk behaviour fields incorporate some aspect of information seeking, specifically in the apprehension, dislocation and reaction phases that occur after a threat is realised. One of these, the risk communication for natural hazards model, presents an attempt to understand information seeking behaviour and the process involved and influences on the sources and forms of information selected by the individual. It was first proposed by Mileti and Sorensen (1990), and improved by Mileti, Fitzpatrick and O'Brien (Mileti, 1995; Mileti & Fitzpatrick, 1992; Mileti & O'Brien, 1992) and despite its name deals with an occurring disaster or emergency (a realised risk). This model was developed from observation of human behaviour in disaster (Blake, Galea, Westeng, & Dixon, 2004; Mileti & O'Brien, 1992; Mileti & Sorensen, 1990) and in it the researchers developed a sequence of behaviour that emerges in a disaster, including information seeking:

1. Receiving an alert.
2. Believing the alert is credible/confirming the threat.
3. Personalising the threat.
4. Determining whether protective action is needed.
5. Determining whether protective action is feasible.
6. Deciding what action to take, and taking action.

A more recent model that attempted to explain the role of social networks in distributing information during all phases of disaster was the social-mediated crisis communication (SMCC) model (Austin, Fisher Liu, & Jin, 2012). This model focuses on social networks, especially social media, and the central, facilitating role of this form in the passage of information through networks. However, this model becomes hard to examine in a disaster situation if social media or other social networking opportunities are curtailed (through lack of power, web connection, or other infrastructure problems), which is still a possibility even in well-resourced countries and with ubiquitous use of smartphones around the world. In addition, recent studies have shown that social media, with the exception of apps (Whittaker & Taylor, 2018), still play a minor role in the suite of media and information sources and forms for some events (Burger et al., 2013; Queensland Inspector-General Emergency Management, 2017).

A third important development in this field was the protective action decision making (PADM) model (Lindell & Perry, 2012), which describes the role of information in decision-making within the three phases of disaster to be considered in the present research. This model has been used to measure perceived efficacy, preparedness intentions, risk perception, and hazard-related attributes. The focus on complex decision making in the PADM model resulted in a lack of detail within the model that might explain or track the process of information seeking, but that focus will be useful for researchers wanting to understand how people use information in their decision-making processes.