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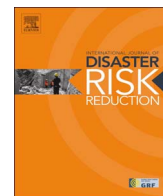
Disaster communication ecology and community resilience perceptions following the 2013 central Illinois tornadoes

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ABSTRACT

On November 17, 2013, a series of tornadoes struck several communities in central Illinois. Approximately four months following these tornadoes we surveyed residents in Washington and Pekin, Illinois to examine the relationships between disaster communication (i.e., tornado media use, tornado social media use, tornado talk, and tornado mental health talk) and community resilience perceptions. Results indicate disaster communication positively influences perceptions of communities as caring and capable of learning how to improve from a disaster. Our results advance the theorization of disaster communication ecologies and provide practical implications for public health and emergency management officials working to foster resilience at the community level.

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1. Disaster communication ecology and community resilience perceptions following the 2013 central Illinois tornadoes

On November 17, 2013, a series of tornadoes struck the Midwest United States. Some of the most severely damaged communities (i. e., Washington and Pekin, Illinois) were in central Illinois (see [40,45]). The tornado in Washington, Illinois was rated an EF-4 on the Enhanced Fujita Scale, and was one of only 22 EF-4 or higher tornadoes on record to occur in November, a month that is outside the typical U.S. tornado season [39]. In total, 1108 homes in Washington [40] and 147 homes in Pekin were damaged or destroyed [45]. The central Illinois tornadoes are examples of a larger pattern of increasingly common and more severe disasters occurring globally [23,25].

In response to the growing threat of natural disasters, academics and professionals have begun to emphasize the concept of community resilience, which is a process wherein communities collectively respond to significant events by harnessing a variety of adaptive capacities and community attributes (see [30,37]). Community resilience has also gotten the attention of federal governments and has been identified as a component of the National Disaster Recovery Framework (Federal Emergency Management [10]), the National Health Security Strategy (U. S. Department of Health and Human Services [43]), and the Obama administration's

National Security Strategy [31]. Central to a community resilience approach is the emphasis on community self-reliance in response to disasters [6,28].

An emphasis on community resilience presents opportunities for public relations practitioners, communication scholars, emergency management professionals, and municipal government officials to develop strategies that engage citizens in local resilience efforts. To develop strategies that foster various public participation in the disaster planning, response, and recovery processes, scholars and practitioners should examine the communication resources and processes that are associated with community resilience perceptions. Using communication infrastructure theory (CIT; [1]) as a theoretical framework, this study examines the effect of local media and residential storytellers on perceptions of community resilience in Washington and Pekin, Illinois approximately four months following the November 17, 2013 tornadoes. By studying the impact of these various information sources, this study seeks to better understand the influence that communication resources have to cultivate a "conscious awareness of community resilience", [33, p. 289] in what Perreault et al. [32] refer to as the *disaster communication ecology*.

2. Review of literature

2.1. Communication ecology

Generally, communication ecology refers "to the networks of

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communication connections that groups or individuals depend upon in order to achieve a goal", [4, p. 327]. Individual residents, community organizations, and local media are the agents or storytellers that form these connections within a communication ecology [1]. In the context of disasters, a disaster communication ecology may be comprised of the (1) individual residents, community organizations, and local media routinely found in communication ecologies and (2) disaster-specific communication sources that are only utilized during disasters (e.g., tornado sirens, emergency alerts, disaster social media apps; [16,32]. Connections formed in a disaster communication ecology can function to fulfill multiple community goals such as: exchanging and receiving information about a disaster, preparing or mitigating the threats posed by disasters, offering social support in the recovery phase, and making sense of the disaster through a communal narrative (see [13]).

2.2. Communication infrastructure theory (CIT)

CIT [1] is informed by a communication ecology perspective. There are two main components to CIT: a neighborhood storytelling network and the communication action context (CAC; [1,21]). A neighborhood storytelling network typically consists of meso-level storytellers, such as the local media and community organizations, and micro-level storytellers such as neighbors, families, and friends living in the same community [20]. Neighborhood storytelling networks are considered integrated when local media, community organizations, and residential storytellers communicate with one another. By communicating with different types of storytellers (i.e., residents, local media, and community organizations), communities are "constructing and reconstructing discourse about community identity, issue, and action strategies", [20, p. 177]. For example, integrated storytelling between community organizations and residents could take place when a community emergency response team (CERT) works with local neighborhood individuals to develop a disaster plan.

An integrated storytelling network is found within a communication action context (CAC). A CAC includes a variety of psychological, economic, technological, and physical factors that promote or constrain communication among micro- and meso-level storytellers (i.e., residential storytellers, local media, and organizations; [1,20]). For example, the safety of public spaces may influence people's ability to talk about current community issues. Likewise, access to technology affects whether residents and organizations can communicate with and access local media.

Ultimately, in order for a communication infrastructure to be robust, micro- and meso-level storytellers need to be a part of an environment where communication can freely flow between stakeholders in the community. Thus, when a storytelling network is integrated and the CAC is conducive to exchanging information, a communication infrastructure can foster a sense of community or neighborhood belonging ([1,20,21]).

2.3. CIT outcomes

Research has found that an integrated storytelling network placed in a CAC that promotes communication can result in normative outcomes beyond neighborhood belonging. These outcomes include civic engagement [20,21,7], and disaster preparedness [22].

2.4. CIT and civic engagement

There is an indirect relationship between an integrated storytelling network and civic engagement. This means that as storytelling networks become integrated, neighborhood belonging increases. As neighborhood belonging increases, collective efficacy also increases. This increase in efficacy then leads residents to participate or engage in the community [20].

The relationship between communication infrastructure and civic engagement has been studied in several community traumatic experiences such as natural disasters (e.g., [19]) and terrorist attacks (e.g., [7,9]). Regardless of whether the disaster was natural or man-made, integration in both online and offline communication infrastructures resulted in higher levels of civic participation in the post-event phase of the disaster. For instance, connection to a neighborhood storytelling network and an Internet community was found to be associated with higher levels of civic participation such as giving, volunteering, and sharing information after a major earthquake occurred [19]. Following the September 11, 2001 terrorist attacks, Cohen et al. [7] found that the more often individuals talked with other neighborhood storytellers and read newspapers, the more likely individuals were to engage in civic behaviors like attending a candlelight vigil, contributing to a memorial fund, or donating blood. Similarly, Dutta-Bergman [9] found that those who engaged in online conversation about the September 11, 2001 terrorist attacks were more likely to attend community meetings in order to talk about the attacks in person than those who were not involved online. Additionally, those who posted their thoughts online, such as through chat rooms, were more likely to write to a newspaper or other news outlet in order to express their views [9]. These studies provide empirical support for the theoretical assumption that integration within a storytelling network is positively related to civic engagement.

2.5. CIT and disaster preparedness

A robust communication infrastructure directly and indirectly influences people's disaster preparedness both in the event and post-event phases of a disaster [22,44]. Disaster preparedness is a process that includes a set of actions taken before, during, and after a disaster to mitigate the negative consequences of a disaster [18]. Communication among different types of storytellers (i.e., residents, local media, community organizations) indirectly predicts disaster preparedness in three ways. First, an integrated storytelling network is related to higher levels of social risk perception, which is an individual's perception that a disaster is likely to occur and will have negative consequences for one's community. Social risk perception can serve as a predictor of pre-disaster preparedness [22]. However, previous research has questioned the effectiveness of social risk perception as a mediator between disaster communication ecologies and disaster preparedness [3,8]. For instance, even though nearly 40% of respondents to a national telephone survey believed natural disasters were more likely to occur in the future, more than 25% of those participants were unwilling to help pay for their community's disaster preparedness resources [8]. Further, Bourque et al. [3] found risk perception's influence on engaging in disaster preparedness is dependent on other variables like the perceived effectiveness of preparedness actions and knowledge about disasters. Given the mixed findings on social risk perception and disasters, researchers have also considered the indirect relationship among disaster communication, neighborhood belonging, and disaster preparedness. That is, as local media, organizations, and residents communicate with one another, a sense of belonging increases. In turn, neighborhood belonging predicts event-phase preparedness, which includes activities like checking in on others, confirming one is safe, and using media to learn what is happening during the disaster [22]. Finally, when individuals observe others modeling preparedness behavior in a disaster communication ecology, individuals are able to confirm that these behaviors are appropriate and effective [44]. Such observations also result in individuals searching for more