Expressions of risk awareness and concern through Twitter: On the utility of using the medium as an indication of audience needs

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ABSTRACT

Twitter is increasingly gaining momentum as a trusted source for news and information. A significant body of research suggests that during crises and emergencies, people rely on the medium for timely updates and real time information. Simultaneously, Twitter content may be a useful tool for identifying specific audience needs and concerns. The current study quantitatively analyzed tweets related to Hurricane Sandy in the days leading up to landfall. Areas examined include expressions of risk awareness and concern, and the ways in which these statements differ across age, sex, ethnicity, and language group. The findings are discussed in terms of the ways in which emergency managers may be able to use the systematic analysis of Twitter content in identifying audience needs.

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1. Introduction

Social networking sites are increasingly gaining credibility as information sources. Microblogging sites such as Twitter allow us to access information from both official organizations and public citizens, instantaneously covering events as they happen. At the same time, the information broadcast on Twitter may help to provide a sense of the needs and responses of those affected by large scale events as they are taking place. Thus, the possibility exists that crisis managers and emergency responders may be able to use Twitter as a bellwether for the specific needs and concerns aired by varying publics during crises and disasters.

The current study offers a content analysis of information that was tweeted in the time leading up to the landfall of Hurricane Sandy in 2012. It describes the relative frequency of expressions of risk awareness and concern, building off of past psychometric work in risk analysis categorizing different types of risk perception. It explores differences in these risk perceptions across age, sex, ethnicity, and language group. These differences are discussed in the utility of the study of Twitter content in evaluating the needs and concerns of different sectors of the audience, and the ways in which this information may be used to inform emergency management operations.

1.1. Identifying different types of risk

A substantive body of work in the risk communication literature has examined risk perceptions primarily in terms of fear (Reynolds & Seeger, 1995). This is somewhat problematic, as this literature often works under the assumption that the induction of any negative emotion can be qualified as fear, and that any type of fear will have relatively similar effects on response to one's surroundings. (Dillard, Plotnick, Godbold, Freimuth, & Edgar, 1996; Higbee, 1969).

More recent research on audience responses to threats and risks has moved toward a more sophisticated understanding of the concept (Trumbo & McComas, 2003). For example, one research program has argued that responses to risk can be broadly categorized into two dimensions: knowledge and dread (Slovic, 1994). Dread is defined as the perception of the likelihood that a risk will harm those who are not directly involved. Conversely, knowledge is the cognitive understanding of the effects that a risk may have on those whom it will affect. Trumbo and McComas (2003) argue for another dimension of risk perception, this one detailing the perception of the number of people who are likely to be affected by the risk at hand; this is consistent with other research in the risk analysis canon (Slovic, Fischhoff, & Lichtenstein, 1986).

Sandman's (1999) Risk = Hazard + Outrage offers similar arguments for the multi-faceted nature of risk perception, arguing that alarm, magnitude, and probability are critical components in what we can expect from audiences under duress. Sandman, Miller, Johnston, and Weinstein (1993), add that outrage, or the affective

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experience of risk perception, may include a range of emotions such as anger, suspicion, fear, distrust, and contempt.

Evaluating these affective responses associated with risk perception is critical in determining how to respond, as they are likely to moderate cognitive perceptions of the risk at hand and subsequent responses to that risk. Some research indicates that those experiencing negative affect of one kind or another may be likely to overestimate the potential impact of a threat, particularly if that threat involves a loss of personal control (Johnson & Tversky, 1983; Lerner & Keltner, 2000).

1.2. Demographic differences in needs and response

Complicating matters further is a long history of research indicating differences in disaster preparation, information needs, and likely responses across demographic and cultural groups. These differences in response are likely to beget different psychometric responses, which are key considerations for emergency planners and responders attempting to motivate people to action. In terms of preparedness, Caucasians tend to be better prepared for crisis and disasters than members of other communities, likely due to economic advantages and a history of structural inequality among non-whites (Fothergill, Maestas, & Darlington, 1999; Spence, Lachlan, & Burke, 2008).

Past scholarship on ethnicity and crisis response also suggests that inequities are critical in terms of evacuation and access to basic relief supplies (Gladwin, & Peacock 1997; Peacock, 2003). There is also evidence of difference across ethnicity in risk perception and response. Hohm (1976) offers data suggesting that during crises African Americans tend to indicate less concern than do Caucasians. Other studies suggest similar discrepancies in risk expression regarding environmental risks, and argue this lack of concern is related to a lack of knowledge or understanding about the risk at hand (Van Ardosol, Sabagh, & Alexander, 1965).

Cultural differences may also be evident in the acceptance and belief in risk messages, and this may translate into very different reactions in the face of an impending crisis. Evidence suggests that members of historically underrepresented groups may be less likely to accept risk messages as credible, or to act upon those messages, and that they may not do either until verifying the information through trusted interpersonal channels (Spence, Lachlan, & Griffin, 2007). This need for interpersonal confirmation leads to delays in response time (Fothergill et al., 1999; Lindell & Perry, 2004).

Further, there may be specific underrepresented communities who are less likely to consume English language media, which leads to challenges in the dissemination of risk messages. During Katrina, nearly a third of the Latino population of New Orleans was identified as speaking English "less than very well" (Hilfinger-Messias & Lacy, 2007). Latino respondents affected by Katrina were likely to indicate that they were not adequately prepared and/or were unaware of the full implications of not evacuating (Hilfinger-Messias & Lacy, 2007). Another study suggests that about 32% of the population affected by Hurricane Andrew was heavily dependent on Spanish language media for information concerning the storm (Gladwin & Peacock, 1997).

1.3. Gender differences and crisis response

A significant body of research has also suggested gender differences in the information needs and concerns aired during and after crises and emergencies (Seeger, Venette, Ulmer & Sellnow, 2002). For example, one study examining information seeking following a terrorist event (Keinan, Sadeh, & Rosen, 2003) suggested that men may gravitate toward visual media, while women preferred print and radio. Research also suggests that women are more inclined to seek out crisis information from social networks (Turner, Nigg, Paz, & Young, 1981), and then turn to media for confirmation. It seems plausible then that Twitter, as a medium, could be especially attractive to women due to its social networking characteristics.

There are also specific, predictable differences between men and women in terms of their informational needs following disasters and emergencies. For example, after Katrina women reported that they were more inclined than men to seek information concerning evacuation attempts, rescue efforts, obtaining shelter, the location of friends and family, the impact of the storm on others, the widespread impact of the storm, and where to obtain medical care (Spence et al., 2008).

Further, research suggests that men may be more likely to attend to crisis information involving behavioral advocacy, or those that will lead to specific actions (Hoffner, Fujioka, Ibrahim, & Ye, 2002). At the same time, however, some research indicates that males are more likely to channel information concerning a crisis or emergency event into blame or outward expressions of hostility or aggression toward others (Baukus & Strohm, 2002; Brody & Hall, 2000; Greenberg, Hofschire, & Lachlan, 2002). In short, women seem more inclined to seek out information pertaining to survival and emotional needs, while men seem more inclined to channel any information received toward anger or hostility.

1.4. Why focus on these differences?

There is a significant threat posed by the failure to consider the informational needs and desires of diverse audiences during crises and disasters. Singularized messages that fail to address specified needs may lead to scenarios in which some affected audiences are ill informed, confused, or resort to antisocial responses, thus actually increasing the level of harm presented by the crisis at hand. Sandman (2003) and colleagues have argued that crisis messages should alert and reassure people at the same time, and that they should induce an appropriate amount of fear among those affected – enough to adequately motivate the audience to action, but not so much that they resort to antisocial behavior or abandon hope altogether. The goals are expressed through the conceptual formula Risk = Hazard + Outrage. This program of research defines Hazard as the assessment of risk parameters associated with the crisis, while Outrage is the degree of negative affect that may be associated with responses to the event (Lachlan & Spence, 2007; Sandman, Weinstein, & Hallman, 1998; Sandman, Weinstein, & Klotz, 1987). Others have extended the definition of Outrage to include the specific actions of individuals to the messages they receive (Lachlan, & Spence, 2007; Lachlan & Spence, 2010). If audiences are not responding appropriately, and this can be attributed to a lack of knowledge about the parameters of the event, then they should be provided with information. Once that vector is addressed, then negative affective responses can be considered.

Within this framework, specific behavioral advice couched in a degree of alarm that is enough to motivate but not to paralyze should lead audiences to make ideal decisions concerning the protection of life, health, and property. Of course, what constitutes an appropriate level of negative affect is likely to vary across different groups, as are the specific types of information that may be necessary or desired. Risk messages that encourage tangible responses, alongside a moderate level of negative affect, will engender empowerment, and individuals will be more inclined to act the manner desired due to their perception of control over their own fate. (Seeger, Vennette, Ulmer, & Sellnow, 2002). Failing to do so may be disastrous. Further complicating the matter is the placement of the appropriate information for a specific audience within a morass of Tweets related more to affective release.