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Chairman Inglis, Ranking Member Hooley, my home state Oklahoma Congressman Lucas, and members of the Subcommittee, good morning. I want to thank you for inviting me to share my thoughts on the role of social science research in disaster preparedness and response. It is a privilege to testify before you this morning, not only as a research faculty member of the University of Oklahoma and incoming president of the National Communication Association, but also as a social scientist interested in the intersection of communication research and disaster preparedness and response.

You asked that I respond to four questions in my brief five minute presentation. I will address each one in turn. However, before doing so I want to comment on the status of research on risk and crisis communication. Our research group at the University of Oklahoma has discovered well over 120 different systemic bodies of work on risk and crisis communication. These are not single research projects but theories, concepts, and lines of thought pertaining specifically to risk and crisis communication. Like other scientific communities, varying opinions are common with occasional disagreement over fundamental issues; however, I find that level of contentiousness healthy, especially in light of how far communication science has progressed in the last ten years. In a briefing delivered to Congress last year, I termed this state of affairs as an “embarrassment of riches.” Let me give you illustration of what I am referring to. The Figure One reflects the state of the field about a decade ago. The risk/crisis communication process was conceived of as relatively direct and linear. The Figure Two demonstrates the complexity of the field of risk and crisis communication today. As you can see, we have substantive theoretical research from which to work. In the time I have remaining allow me to unpack a few of these issues.

First, how do individuals respond to warnings and other risk communications? How important is the perception of risk - rather than a quantitative estimate of it - in determining individual or societal response to a natural hazard or disaster? And how do responses vary, based on individual cultural, economic and experiential differences?

Risk communication and crisis communication have been studied for a couple of decades but after the 9/11 and anthrax crises in 2001, and now more recently with the tsunami, Katrina, Wilma, and Rita, a renewed emphasis has been placed on understanding how public officials communicate risk and warnings to the public. The most recent iteration is President Bush communicating risk messages about the potential for an Avian Bird Flu Pandemic. In many ways, risk communication can cultivate a “culture of awareness” that Jay Wilson alluded to earlier this year at a hearing of your House Science Committee on the subject of tsunami preparedness.

Risk Perception

Substantial research has been devoted to risk perception factors (Ropeik & Slovic, 2003) that include an individual’s perception of dread (the significance of the threat), their sense of control (the extent to which they feel they have some level of management over the threat), whether the threat is man-made or natural. Other issues pertinent to risk perceptions include: does it affect children, is the risk novel or new, and what is the risk probability (can it happen to me)? Additional factors weighing into the risk perception equation includes the magnitude of the perceived risk--people have a tendency to overestimate small risks and underestimate large risks (LaFountain, 2004); gender--white males seem to perceive risks differently than other groups — on average, they perceive risks as much smaller and much more acceptable than do other people; and sociopolitical factors such as power, status, ethnicity, culture, education, and trust are known to influence people’s perception and acceptance of risk (Flynn, Slovic, & Mertz, 1994).

A different line of research has demonstrated a “negativity bias” where people weigh negative information more strongly than positive information (Flynn et al., 2002), while other studies reveal an opposite pattern where people feel a sense of self-efficacy toward risks leading to an “optimistic bias.” Given the varying perception levels among certain groups, it is concerning that the National Research Council reports that much of the forecast delivery messages are designed for “the educated, the affluent, the cultural majority, and the people in power,” with the least effective messages oriented for minorities, the elderly, and the poor (NRC, 1999, p. 86).

One of the more interesting and potentially frustrating perceptions that some individuals formulate is “intuitive epidemiology” (Kalichman & Cain, 2005). These lay-experts have been exposed to enough of risk message regarding the threat and have formulated their estimation of how serious and likely the threat is for them. If an individual from a non-metropolitan area is introduced to risk messages about the potential for an avian flu pandemic, s/he may deduce that since their exposure rate is minimal they are not really obligated to take the precautions offered by the risk communication. Risk communicators should take into account these intuitive epidemiologists as they design their messages for a potentially recalcitrant audience.

Perceptual Distance

What we call perceptual distance is the extent to which risk message recipients find a risk salient or important whenever they hear about it. Do their perceptions lead them to believe that the risk is going to have any impact on their lives? We conducted a study a few years ago of local television newscasts where we asked individuals to rank the importance or the saliency of various news items during a 6:00 pm newscast (Behnke, O’Hair, & Hardman, 1990). We found that high on the viewers list of most important items, those most salient to them, was an 18-wheeler turning over on I-10. Conversely, much lower on their list was an item focusing on the tragic deaths of US servicemen that same day. They did not experience enough perceptual nearness to that particular news item, but they certainly perceived that an overturned 18-wheeler in their community could have implications for them. In other words, risk and crisis communicators oftentimes overestimate what the public is going to perceive as important simply because the communicators themselves think that an issue is salient.

Studies have been conducted at the University of Oklahoma on temporal displacement. Our interest was in determining the effect of time on specific events--the two events that we were focusing upon were the Oklahoma City bombing and the 9/11 crises. Study participants reported that the longer away they were from these particular events the less significant they found them to be in their lives. Temporal displacement reduced the saliency of these events in their lives. We are only beginning to understand the conceptual and practical implications of such findings.

How is risk communicated in an uncertain environment? What role does the media play in risk communication and the formation of public views and behavior?

Media Use

People depend on multiple sources of information for risk information including TV, radio, newspapers, friends, and the Internet (Rodriquez, 2004; Stempel & Hargrove, 2002). Previous research indicates that some people first learn of disasters from others (Greenberg, Hofschire, & Lachlan, 2002). For example, instant messaging was a prevalent means of warning during the tsunami disaster. Other research has revealed a “hierarchy of resort.” Some people first turn to broadcast media, then to print, Internet, and interpersonal sources. These latter sources serve to confirm, reassure and get more in depth information. Alternatively, there are other groups of the isolated, impoverished, minority and rural segments who rely on interpersonal and community

sources of information first (Glik, 2005). In other research, women were more likely than men to seek information from the media pertaining to family management needs; they appear to assume more responsibility for dealing with the adaptation to a crisis (Seeger, Vennette, Ulmer, & Sellnow, 2002). As media convergence continues to evolve, more individuals are likely to access media that offers multiple options for information acquisition (Greenberg, Hofschire, & Lachlan, 2002).

Uncertainty and Media Access

In the wake of multiple disasters in the last five years, most people assume they live in an uncertain if not risky environment. Multiple studies have demonstrated that people cope by blocking information from their awareness and strive for a “new normalcy.” This phenomenon has motivated our research team to envision a Complacency-Curiosity-Immediacy-Criticality (C-C-I-C) Framework that integrates individual risk forecasting, information management processes, and media access (O’Hair, 2005). When risk probability is low, risk messages are unlikely to resonate with individuals who will have little motivation to seek or process information from media sources. When risk probability is heightened, individuals become curious, process risk messages more directly, and may seek additional information from the media. As the threat of risk becomes more salient individuals become more immediate in their desire for information and will intensify their media exposure. In the last stage, when threat seems imminent, the process of information seeking becomes acute and media access becomes vigorous if not frantic.

Sensationalizing Risk

It is obvious that the media construe risk information according to their own perspective. Often, their viewpoint operates from the “sensationalism principle”, where their interest is not in perceiving risk information at face value, but rather casting the context through political and human interest lenses frequently omitting risk factors (LaFountain, 2004). This was particularly evident during coverage of Katrina where “opinionated journalism” became accepted even among many of the more harsh media critics. It was difficult for journalists to separate their human emotions from their reporting.

Message Framing

Message framing is a preeminent characteristic of risk communication. For example, the public does not want to be patronized. “Don’t worry. We’re from the government, we’re here to help” (Rowan, 2004). Most of us here certainly know how to frame messages. We don’t frame the same message to our spouses as we do with our children or with constituencies or colleagues. The media have become extraordinarily facile at message framing as have political campaign managers. Previous research indicates there are three ways that the media typically frame messages. The first type is a thematic frame, where general issues are relayed. Another framing strategy is episodic where the message emphasizes specific episodes, emphasizing specific people, specific perpetrators, and victims—a human element frame so to speak. The third type of frame is termed strategic, and this is where the story is slanted in a particular way, often negatively. Our research has demonstrated that taking the same basic message by framing it differently will evoke different cognitive and emotional responses in the receiver. The most recent instantiation of framing came during coverage of Hurricane Katrina where the media portrayed an America divided along racial lines. Following the coverage, an early September Pew survey, for example, demonstrated that two-thirds of African Americans, but fewer than one-in-five whites, said that the government warning and response would have been faster had most victims been white. Regardless of where your own opinions reside on this particular issue, it is important to understand the challenge of message framing as we manage risks.

Constructive Media

In the aftermath of Katrina reporters became interviewees rather than their normal role of interviewer. Media also provide emotional support and companionship to victims who feel isolated and alone. Another positive characteristic of the media in relations to their reporting on disasters involves their ability to impart helpful information to victims:

“Effective warnings broadcast through the media are widely credited with reducing casualties from hurricanes, tornadoes, and floods. By reporting extensively on disasters and the damage they create, the media can help speed assistance to disaster-stricken areas, and post disaster reporting can provide reassurance to people who are concerned about the well-being of their loved ones” (Mileti, 1999, p. 225).

We have come to learn that journalistic and broadcast activities create what we have termed the “Paradox of Media Coverage” (O’Hair, 2005). On one hand, media serve a number of valuable if not essential functions for consumers, government officials and other organizations, as we have observed above. Alternatively, media often frame their messages in ways that omit critical information, overemphasize certain circumstantial features, sensationalize the situation, galvanize distrust among those whose job it is to mitigate the threat, and politicize the context of the disaster event (Covello & Sandman, 2001).

Media Preparedness

One last observation is in order that concerns the media. Media organizations and their members do not seem to be any better prepared for disasters and emergencies than other members of the risk community. The Disaster Research Center at the University of Delaware conducted a study of media organizations located in disaster-prone cities to determine their level of preparedness. The study discovered that only 33% of the radio stations, 54% of the television stations and only three of five newspapers reported disaster plans of any kind. Those media organizations with disaster plans had not given sufficient thought to critical issues and in many cases, the plans consisted of brief procedures and a list of phone numbers, although many of these lists did not include the most relevant local emergency agencies (Quarantelli, 2002). In a separate study focusing on journalists and their preparation for disaster conditions, researchers found that these media representatives were among the least prepared among those involved in local response and exhibited the greatest amount of fear and stress under simulated emergency conditions (DiGiovanni, Reynolds, Harwell, Stonecipher, & Burkle, 2003).

What lessons have we learned from effective - and ineffective - risk communications about natural hazards or disasters? How are these lessons being used to improve future risk communications?

Effective Messages

A synthesis of the public health research literature on risk messages revealed a hierarchy of successful message properties: (Glik, 2005)

- Survival first – tell people what to do, where to go, what to expect
- Provide meaning – tell people why they need to these things
- Assurance – tell people that something is being done by someone or some organization.

A GAO report citing extant risk communication research suggests that the most important principles for communicating risk and threat information involves the following: (1) messages should be consistent, accurate, clear, and provided repeatedly through multiple methods, (2) information should be timely, and (3) information should be specific about the threat, including the

nature of the threat, when and where it is likely to occur, and directions on preventive measures or protective responses (2004, p. 15).

Jargon, euphemisms, and acronyms do not always resonate with people. Do most people understand the difference between tornado warning and watch? What about terrorist's warnings green and yellow? Shelter-in-place means "go to a shelter" for some people. Research has shown that disaster warnings need to be clear, consistent, communicated over multiple media, by a variety of relevant and trusted sources; the messages should tell people specifically what to do and assist them with seeking additional information (Glik, 2005).

Risk/Crisis-Source Match

Another important issue is what we call the risk/crisis-source match (O'Hair, 2004). Do we have the right person communicating for the right crisis and the right risk? We found through research that the public has very definitive ideas about who ought to be delivering these risk and crisis messages. For example, when the event is national federal spokespersons are preferred. When the event is more localized they want someone that they know, someone from their community. We also know whenever the risk or crisis is medical they want to hear from medical personnel, and if the medical crisis is perceived as national they want to hear from a spokesperson representing the CDC. At this point, we do know that the public does not accept messages at face value. They continuously make judgments about all facets of the message, its source, and the context in which it is delivered. This leads to the preeminent issue in risk communication—trust.

Trust

Trust is an all important goal of risk communication strategies. Earlier this year the World Health Organization (2005) issued its long awaited "guidelines for outbreak communication." Trust building is the first communication principle highlighted in their document. Research (Petts, 1998) has demonstrated that different governmental organizations elicit different expectations about 'trustworthy' activities, and accordingly require different 'trust enhancing' strategies. Different investigations have identified specific variables that influence trust: perceived openness; competence; objectivity; fairness; consistency; independence and care/altruism (e.g. Johnson, 1999; Petts, 1998; Renn & Levine, 1991). Trust is diminished when experts disagree, lack of coordination among risk management organizations, lack of sensitivity to the communication needs of the audience, lack of information access or disclosure, and lack of public participation in risk management plans (Covello, Peters, Wojtecki, & Hyde, 2001). There is a need to build a preparation mindset among the public through calculated, evolving, and cooperative activities using such venues as school programs, public education, public participation in planning processes, educating and training citizen's groups, and small personalized learning environments (Covello, et al., 2001; O'Hair & Averso, in press; O'Hair, Heath, & Becker, 2005).

What are the top remaining research questions in this area?

Building a Community-Based Communication Infrastructure

Risk and crisis communication programs must be designed, tailored, and executed at the community level (O'Hair, 2004; Rodriguez, Diaz, & Aguirre, 2004). The aim is to build upon innovative activities and programs of risk management by determining and verifying community-specific requirements and expectations. Through these processes community-specific communication infrastructures can be built to facilitate risk and crisis communication plans. Communities can vary considerably in terms of their desires and needs for risk communication. Take for example the research finding that urban communities possess less social capital than rural areas which are more socially connected. Rural households have more children, more traditional

family systems, and stronger kinship relationships. According to Putnam, urban citizens belong to 10-15% fewer clubs and attend 10-15% fewer club meetings than other groups (Beaudoin & Thorson, 2004). Therefore a goal of community research should be determining if communication strategies vary among these community types. Geospatial analysis should be employed to provide visual representations of how communication infrastructure features can be represented within diverse communities. The most prudent approach would be to benchmark existing risk communication strategies and programs involving natural disasters or homeland security and test their utility under varying conditions and audience (community) characteristics. Recent advances in communication sciences should be incorporated into these models for testing. In addition, this project should include a program of research and development of communication strategies for educating schools, business and community leaders, first responders, policy makers, and the media on risk perception and assessment. Studies should be designed that take existing and proposed systems and protocols and test their viability under experimental conditions.

Media

Research questions focused squarely on the media and their processes before, during, and after disasters must continue especially with regards to narrowcasting, specialized news content, and increasing reliance on interactive information sources (alerting services, blogs, IM, reverse 911, etc.). Media use is often thought of as a moving target with new services and tools rolled out on a continuous basis. Which media are most recognized as trustworthy sources of information and advice during disaster conditions? What combinations of media are utilized in various conditions? How prepared are various media organizations and their members for dealing with a variety of disasters?

Literacy and Intercultural Issues

An increasingly diverse citizenry will not respond to the same risk/crisis message in consistent ways. The United States is becoming an increasingly diverse culture or network of cultures. Most telephonic instructions from self-help desks now offer service for both Spanish and English speakers. Language diversity is an obvious issue for communication scientists, but literacy and cultural issues must also be recognized beyond the simple linguistic properties of messages. How can risk messages be designed for low literacy receivers? What intercultural variables are most prominent in communicating risk?

Inter-Organizational Communication

Much research has determined that serious shortcomings are evident at the community level in terms of constituent organizations failing to communicate effectively with one another. Future research should focus on the coordination of community response units. How do we manage adhocracies, jurisdictional conflict, and territoriality? The key is determining how to make sense of this complex system given the multiple players involved, all with their own politics, mindsets, perspectives, goals, fears, entrenched behavior, stakeholders, and obligations. There is a need for better metrics for understanding the patterns of communication among agencies, communities, and individuals. Research should study the structure of organizations responsible for managing risks/crises, optimal patterns of information management, and focus on the most effective methods for coordinating actions (both planned and self-correcting). Both structural and operational strategies should be developed and tested that lead to strategic communication models with the goal of improving inter-organizational and inter-agency cooperation and collaboration. Inherent in these processes is assessing community and organizational risk and crisis communication programs and strategies and developing standardized assessment tools (e.g., report cards, scorecards, communication audits) that determine areas of organizational communication vulnerability. These programs could start with (a) the National Data Base of Incident Reports (National Incident Management System, 2004), and (b) the reported experiences of those who have first hand

knowledge of preventing and responding to terrorists attacks (OKC; NYC). Possible outcomes include interactive, web-based tools developed for use at different levels--individuals/families, communities, organizations, and governmental agencies.

Developing Appropriate Metrics

A set of integrated metrics must be developed and used as a standard to assess risk and develop plans for disaster management and response. Key objectives in this project include:

- A set of integrated metrics for community disaster preparation, deterrence and response.
- Tying metrics to strategic and tactical goals. Metrics serve as benchmarks.
- Create community goals and objectives (that allow community based action planning based upon standardized metrics while incorporating the needs of communities).

One means of pursuing this strategy would be to leverage the *The Community Terrorism Preparation, Deterrence and Response Model* (Ledlow, 2004) that structures a systematic approach to anti-terrorist planning and decision support. Its essential components include: Risk Assessment; Screening and Identification; Prevention; Training and Application; Activation and Response; and Leadership, Authority, and Communication. The information, systems, tools, and improvement plans of this project allows municipalities to assess their own preparedness plans, scenarios, and drills while maintaining a standard set of metrics, and thus expectations based on preparedness priorities. Inherent to the system is a scorecard that allows a community to evaluate each domain and dimension of the model based on various threat scenarios and engage training opportunities to improve performance.

Leveraging Technology

One issue looming large on the horizon is advances in science and technology and the promise they offer for disentangling the complexity of warning systems through **smart agents** (Bostrom, 2003). Smart agents are presumed to have the capacity for interacting with warning systems and other information sources including the media, while incorporating global positioning information, then making decisions for an individual in a certain location. Based on stored personal preferences data and the threat severity of the impending disaster, the smart agent would provide “intelligent” options for the individual including precise paths to safety. These smart agents will be small enough to wear or eventually they may be implanted making them seamless. A whole host of issues will require sorting before smart agents become common place, not the least of which is the ethics of consent and a further widening of the digital divide. A larger implication is that public agencies and officials may be removed from the warning system as we know it today. Social science research is a necessary partner in this research enterprise.

Conclusion

I am gratified that one of the organizations that this subcommittee oversees, the National Science Foundation, has identified risk communication as an essential ingredient in a complex array of processes necessary for disaster preparation, response, and management. Early this year, the director of NSF, Dr. Bement, testified before the Senate Committee on Commerce, Science, and Transportation for the need to include risk communication in the research programs that it funds. A recent NSF report argues for greater interdisciplinary cooperation among basic natural sciences, human decision processes, economists, engineers, and communication scholars (NSF, 2002). The Government Accounting Office reported to Congress last year that risk communication theory and protocol must assume a greater role in threat mitigation plans (GAO-04-682, 2004). In a PCAST report referred to in testimony earlier this year before this subcommittee on combating terrorism, the authors highlight the important role of communication in mitigating, preventing, and responding to terrorist acts. Just about every GAO report on public response organizations and agencies places communication at the top of the list. I echo this sense of priority.

Chess et al. (1995) asked a number of meaningful questions: Is successful risk communication persuasion, transfer of information, public participation, or empowerment of citizens to make decisions? Should it produce an informed citizenry, a compliant citizenry, an alert citizenry, or an empowered citizenry? Should the goal be better decisions, fairer decisions, more consistent decisions, or, in the throes of environmental gridlock, any decisions at all? Or are there “different motivating forces” and therefore different risk communication goals, for every “group, person, agency administrator, and middle manager”? These questions, in turn, have raised additional ones about the ethics and evaluation of risk communication. (p. 115)” (Heath & O’Hair, in press). These questions also suggest that we are far from drawing conclusions about risk communication during emergencies and disasters. However, and mostly importantly, in the last ten years we have made substantial inroads into how people perceive and respond to risk messages. Supporting the risk communication scientific community would help to narrow the gap between technological advances in warning systems and policy initiatives and our citizenry’s ability to take advantage of those good faith efforts.

My colleagues and I from the social sciences welcome the challenge and opportunity to play an important role in building a communication infrastructure that addresses the essential components of communicating effectively with our citizenry before, during, and after disasters.

This completes my prepared statement. I would be happy to answer any questions you may have.

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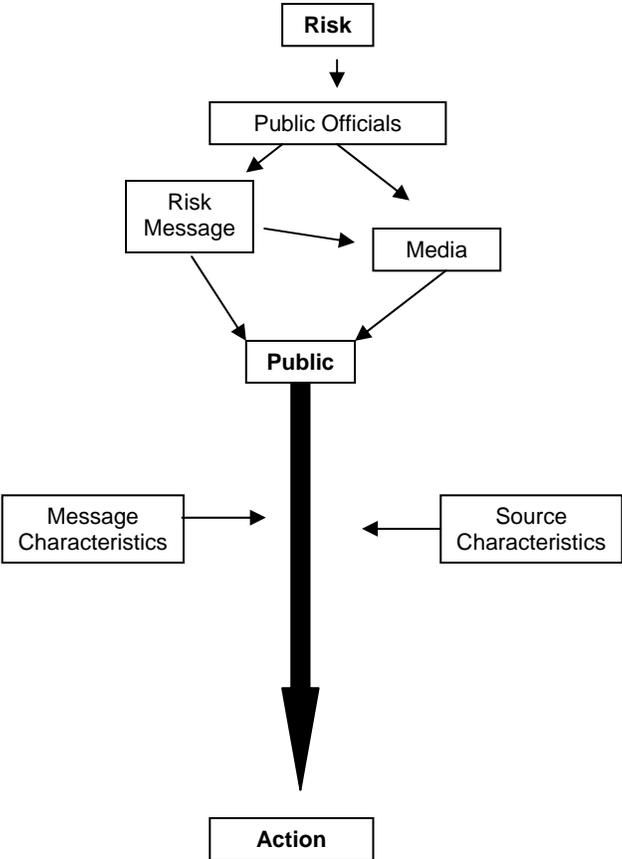


Figure 1

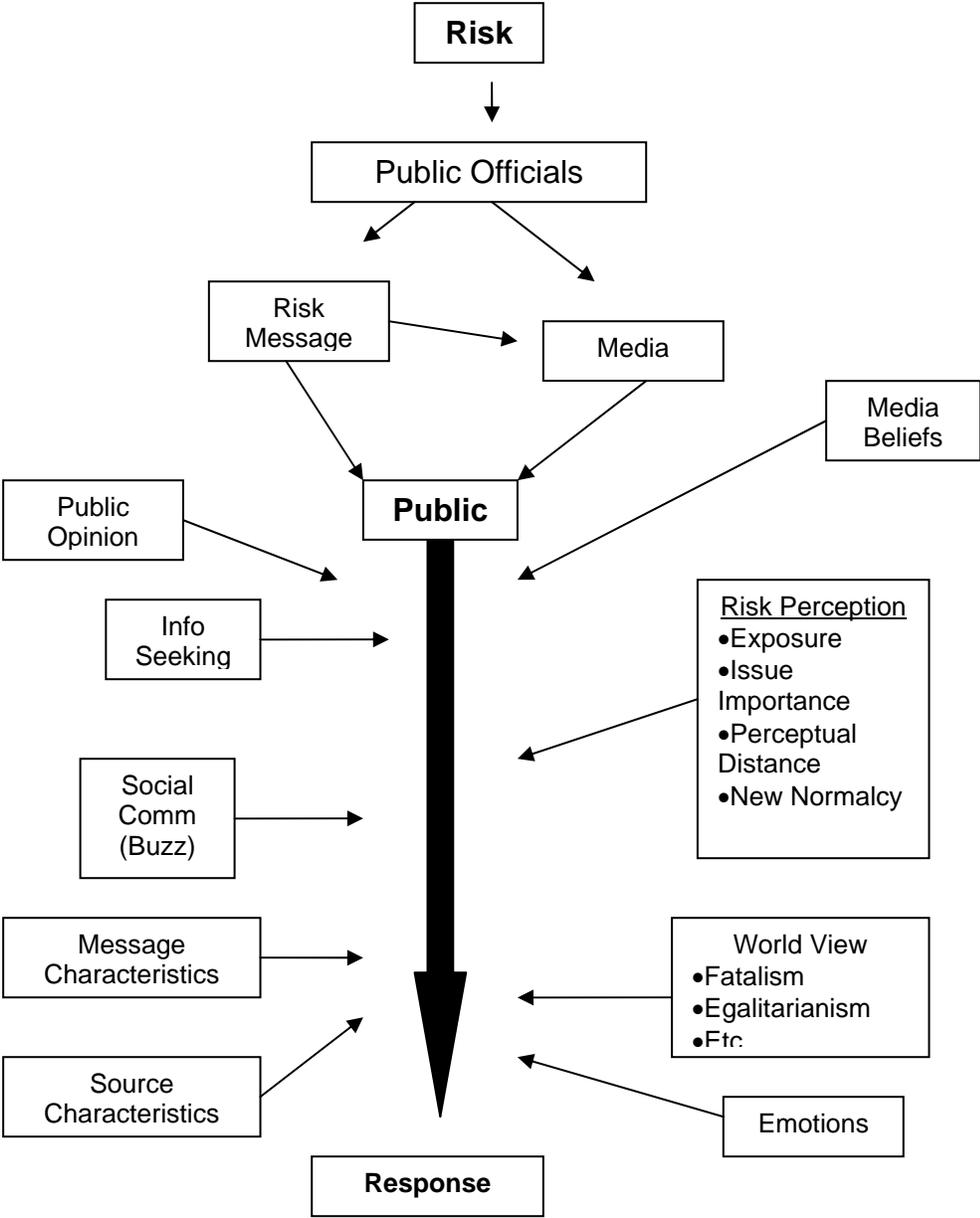


Figure 2