

Risk Communication and Public Warning Response to the September 11th Attack on the World Trade Center

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Introduction

This research was conducted over a six-day period after the terrorist attacks on the United States on September 11, 2001. Research included conducting interviews with a wide variety of populations in assessing the impact of the event and risk communication. A model of risk communication was used in an attempt to understand some of the actions and behaviors of those affected by the attack. Risk communication proved useful in providing a basic behavioral model to this study, but the September 11th event was different from the usual context to which the model is applied (natural hazards) and needs further development and refinement for use in future events. These interviews were administered on an "as available" basis with interviewees with the City of New York still on emergency alert. Two additional days of interviewing were conducted two and one-half months later. Data collection is ongoing by the author and student assistants. This report represents the first phase of a larger project. The purpose of this phase was to better understand the immediate human dynamics of the event. Follow-up research in phase two will use quantitative methods to investigate the event.

The qualitative data presented here represent feelings, opinions, and activities in the immediate aftermath of the event. Subsequent research in phase two will apply rigorous social science research methods for greater generalizability. Structured interviews, structured focus groups, survey research using representative samples of the population, and an elaborate

detailing of events, actions, and warnings need to be undertaken to fully address critical public policy issues and future emergency planning.

A wide cross-section of the public and emergency personnel was interviewed for this project. One of the focus populations was the kindergarten through 12th grade (K-12) public school system. Many schools were affected by the event. The New York City school system is responsible for over one million children on a daily basis. The disaster had a profound impact on its administrators, staff, teachers, and pupils.

This paper includes the results of those initial interviews. Based on the interviews conducted, it is believed that considerable effort needs to be accomplished in the theoretical area of terrorist attacks to better explain the human actions. The long-term objective of this research is to better understand the risk communication model dynamics that occur in this new context. This understanding should enhance the ability of both the private and governmental sectors to deal with future events.

Description of Event

On the morning of September 11, 2001, two hijacked jetliners were flown into the World Trade Center Towers in lower Manhattan in New York City. The first impact occurred at 8:48 a.m., bringing a wide array of emergency personnel and vehicles to the aid of victims. At 9:07 a.m. the second tower was struck and emergency personnel were coming to the realization that this was not an accident.

At 9:50 a.m. the south tower of the World Trade Center collapsed, followed at 10:29 a.m. by the collapse of the north tower. At the time it was believed that upwards of 20,000 lives were lost. Presumed victims included those working, visiting, and running the towers and hundreds of emergency workers including police, fire, emergency medical, and Port Authority personnel. Since the initial projections the number of fatalities has been drastically reduced and now hovers at approximately 3000.

Sampling Frame

This investigation used a purposeful sample chosen on the basis of availability, willingness to be interviewed, and being in a position to have knowledge on the topic. There were three types of interviewees. The first was emergency personnel and included

- Police
- Fire department personnel
- Military personnel posted around the World Trade Center site
- Officials of the public school system.

The second set of interviewees were citizens in the area with more than a passing knowledge of the situation, but not having an official emergency function. They included

- K-12 teachers
- Business persons, e.g., restaurateurs, former World Trade Center employees
- Wall Street traders
- Support personnel of the World Trade Towers
- Religious leaders including priests and ministers.

The third sample category was conducted with people on the street, including

- Citizens in stores, restaurants, subway stations, and anywhere people congregated to discuss events.

The interviewees were 60% female and 40% male; 40% Anglo, 30% African-American, 15% Asian, and 15% Latino. Although the information they provided is anecdotal, the citizens of New York City gave their time in the hope that this research would aid future victims.

Risk Communication Theoretical Model

Risk communication informed the collection of data. Risk communication in hazards is a well-established model (Mileti, 1975; Mileti and Sorensen, 1990). The model has been used by both disaster researchers and practitioners in the field as a method of understanding the complex human behavior of hearing and responding to warning messages. Until this event, the risk communication model has been used extensively in the area of disaster research, primarily for natural disasters such as earthquakes, hurricanes, and tornados.

Risk communication has been used for both short- and long-term warnings. It can be broken down into three broad categories of variables: pre-event factors, warning information, and demographic variables.

Pre-event Factors

There are three sub-categories of pre-event factors. A person's pre-warning perceptions or biases can determine, in part, how a particular person responds or fails to respond to a given targeted warning message. These pre-warning perceptions can thus influence the subsequent decision-making behavior in which a person engages (Mileti et al., 1981). The pre-event factors are described below.

Pre-event Salience

This category measures the degree to which a hazard resides in the conscious awareness of the public. Those living in coastal areas may have a high level of awareness of hurricanes but perhaps little for tornadoes. People in California have a high degree of awareness of earthquakes but little for hurricanes. This variable has been shown to be important because the more salient a disaster type is for a public, the more likely that public is to respond to warnings regarding that particular hazard (Turner et al., 1981).

Pre-event Knowledge

This category measures what people know about disasters. This knowledge can be general and/or specific. It is important to know this in fashioning a clear warning message. If the public is told that a carload of radon gas has just escaped, what does this message truly convey? If few know what radon gas is, the warned public will not understand the message and no response will be forthcoming. In such a circumstance it is important that knowledge of what the threat means also be explained for any significant public response to occur. Only then can the public be expected to respond to a warning in a meaningful way (Perry and Lindell, 1986).

Pre-event Experience

Prior experience with a particular disaster type ties in directly with how the public will respond to a given warning. Those people with prior experience will respond more readily to warnings than will those without the experience. This concept is important in deciding how to inform such a public in the event of a disaster (Perry and Lindell, 1986).

Warning Information

The second set of variables includes information factors. This is the warning message itself that must be evaluated to see if the message was a coherent one. Research has shown that the following variables are important.

Consistency

Consistency is an important characteristic of the warning message. Although it is good to have multiple sources, it is critical that they be consistent with one another, i.e., that the messages are conveying the same warning (Quarantelli, 1984).

Specificity

Specificity is how detailed the message is. The more specific the message is about the type of danger and what to do about it, the greater the personal response on the part of the public (Nigg, 1987).

Source Credibility

Source credibility is an essential characteristic of any good warning message. The warning must come from a source that is deemed credible by the public. Different members of the public have different perceptions of who is a credible source. Given this diversity, it is best to have a mix of sources. This could include spokespersons from the government, scientists, or local officials all giving a similar warning to deny the public the ability of claiming that the message itself is not believable (Mileti et al., 1981).

Frequency

Frequency refers to the number of times that a warning message is given. Research has shown a correlation between the number of warnings and the public's response to act on those warnings. Frequency of the warning must also be addressed in understanding the public's response to it. How many times a message is disseminated to the public will affect their hearing, understanding, and belief of the message. The public will respond more readily to a message that is heard numerous times (Mileti and O'Brien, 1992). Frequency of message has several effects on the warned public. Some of these include the reduced potential for such public misperceptions as the spread of rumor and not focusing on the official warnings. Hearing a message over and over helps to reinforce to people that protective actions need to be taken.

Channel

The channel is the vehicle by which the message is conveyed, such as television, radio, newspapers, and the internet. Research has shown that warnings transmitted over multiple channels yield the best results (Turner et al., 1981).

Demographic Variables

The final set of variables in the model deals with the demographic make-up of the population hearing the warnings. Relevant demographic variables include sex, age, socioeconomic status, and ethnicity. Research has demonstrated that the background of the people hearing the warning affects their hearing and responding to the warning. For example, older people, women, and persons with a higher socioeconomic status are more likely to respond to warnings.

Field Questions

Along with the risk communication model, a series of questions guided this research. They focused on

- What warning messages were heard
- Sources of warning information

- Content of messages
- Procedures for dissemination of information to children and parents
- Protective actions taken for school populations
- Warning messages heard by both parents and children
- Languages used in warning messages
- Public responses to warnings.

Findings

Findings from this investigation must be seen as preliminary. Whereas every effort was made to interview a representative sample of all populations, i.e., victims, emergency personnel, and the general public, it nevertheless was not possible to use the widely accepted social science research methods that would allow for greater generalizability. Nevertheless, much was learned from this initial data collection phase, and will be detailed in this section.

Warning Background

Cellular phones, beepers, the internet, and 24-hour news coverage are changing how humans interact and receive information. In addition, much of the country's news industry is based in New York City. There was no shortage of networks, reporters, or media infrastructure to report and analyze events as they unfolded on and after September 11th. Many respondents spoke repeatedly about information overload and the difficulty of making sense of all the information.

Typical was a 28-year-old schoolteacher whose class saw the planes hit the towers and the subsequent collapse from the classroom across the Hudson River. As her students watched out the window, she received instructions via the classroom phone, while some kids were already on the internet getting additional information. She stated, "We were inundated with advice and directives on what to do." Another teacher from Leadership High School in lower downtown explained, "Our concern was to get the students out of the building and area immediately, and we didn't have time to watch television—we just knew something was terribly wrong." Where people were located in relation to the unfolding events had an impact on whether they heard warnings. One could categorize people as "spectators" or "participants" with regard to hearing messages, with the former hearing and remembering warnings issued and the latter reacting like others in their immediate surroundings. One respondent expressed it perfectly: "I ran like everyone else."

Respondents reported an eerie silence immediately after the attack, as people tried to understand what had happened. After the second plane impact,

however, warnings began to be issued by a host of government agencies. Initial warnings related to possible building collapse and concern about structural integrity of remaining buildings in the immediate area of the World Trade Center. National news reporting agencies were focused on the collapse of the buildings and the grounding of all commercial aircraft nation-wide. Local warnings were targeted on the safety of children in the school system (see discussion, below), crowd control, what areas were cordoned off (a typical message was not to travel south of Canal Street in lower Manhattan). The third wave of messages evolved over the afternoon of September 11th to become more informational and less specific warnings, i.e., where to go to locate family members, where to go for help, hospital hotlines, messages from Mayor Rudolf Giuliani, and public transit and bridge/tunnel warnings.

Pre-event Variables

The pre-event variables did not have applicability in this situation. The airplanes struck the World Trade Center without any warning. Given the nature of the event no prior experience could be called upon by the public to help form their perceptions in preparing them to undertake protective actions. Although the World Trade Center was the target of a terrorist attack in 1993 that resulted in the evacuation of the towers, none of the people interviewed made reference to the 1993 attack as being similar in any way.

The first question asked of all respondents was where they were when the planes struck the towers. The question served to allow the respondents to collect their thoughts for further questions. All the respondents could state exactly where they were and what they were doing when they received the news. Many respondents spoke of the surreal nature of the event. A typical comment was, "We were out in the street calmly drinking our coffee, watching smoke come out of the building, wondering what had happened." Those in lower downtown thought it was all a terrible accident until the second plane hit. Thus pre-event variables were irrelevant in explaining whether people heard warnings or not.

Warning Information

The second set of informational variables included source, consistency, and frequency of warning messages. As noted above, in the immediate aftermath of the event emergency personnel and the public were inundated with warnings. Many warnings were to take protective actions (such as leaving the area) or to watch for falling debris. These warnings came from emergency personnel in the affected area. The magnitude of this event made it impossible to escape both official and unofficial warnings that were being disseminated by federal, state, and local officials.

In attempting to investigate the consistency of warnings disseminated, the model assumes that there are protective steps that can be taken. In the natural hazards example, one is warned to seek higher ground with heavy rain or not to run outside the building in an earthquake. What, however, is one to do in a terrorist attack? For days and weeks after the event the media showed pictures of the towers being hit by airplanes, people running down streets, and the collapse of the towers. Many of those interviewed spoke of an intense need for a structured (thought-out) response to the events. Said one respondent, "I was scared but what could I do—my child was missing." Specific guidance and help was needed with less dramatic media frenzy. Questions such as what to do immediately after such an event and what protective actions families, businesses, and governments should take need to be addressed so that future warnings are not only targeted to those needing to receive them, but also focused on actions that are feasible and practical.

It is premature at this stage to attempt to have a specific emergency plan in place for future possible terrorist attacks. One sees, for example, that in natural disasters, emergency managers explicitly state what the public should do. Emergency practitioners sorely need this for future terrorist threats and deeds. The emergency community now has the Oklahoma City bombing, and the World Trade Center attacks of 1993 and 2001 as baseline events. A critical question at this juncture is what specific protective actions can be gleaned from these events. Research needs time to discover the best protective actions to take, and then have that information work its way through the emergency community. This will require multiple methods by a variety of disciplines to come to a consensus on the most productive course of actions.

Based on this preliminary research, it appears that a new variable of magnitude must be added to the model for similar events. This event was perceived as so extraordinary that trying to get the public to take protective actions (as, for example, with earthquake aftershocks) was not necessary. At times the public's perceptions and response was in front of official warning messages. This event was of such a magnitude that it created a new reality. Events were unfolding that have not been experienced by this society.

The fact that this event was not only a human disaster but also a crime scene made for some special dynamics. Local, state, and federal law enforcement agencies were involved. Instead of the usual crowd control concerns of keeping on-lookers at a distance (Quarantelli, 1984), these agencies were charged with the arrest of anyone who did not follow specific instructions. This raised the level of urgency and seriousness to a much higher level than in many natural disasters. This higher level of urgency made the warnings to evacuate and take protective actions impossible to discount.

Situational Variables

Prior research has shown that situational variables such as environmental cues, social setting, and social ties have an impact on whether people take protective action (Drabek, 1969; Mileti and O'Brien, 1992). Given the nature of this event, situational variables had an acute salience. The entire region and country were affected by the events. It was impossible to deny their gravity, magnitude, seriousness, and reality. All of these variables coalesced to create a public that was simultaneously scared, angry, sad, and grieving. In addition, the entire country and world was witnessing the event live on television. Environmental cues and social setting were conducive to taking protective actions. One stark example of an environmental cue in the days after the event was the posting of World Trade Center victims' pictures in the subway. Many stations were filled with thousands of pictures of lost and/or missing people. The scope of loss and its real life consequences were unavoidable in the entire region. Social ties also played a pivotal role in getting the public to take protective actions. Not only were many people tied directly to the event—as emergency responder or victim—but their family and friends across the country felt an indirect connection to the disaster as well.

Demographic Variables

The severity of the event brought all types of people together regardless of their demographic characteristics (sex, age, socioeconomic status, or ethnicity). New York's history is that of a "melting pot." That tradition continues today with a highly diverse population along all the variables in this category. The event cut across all of the traditional factions that divide a society. All populations had friends, acquaintances, and family members involved in the subsequent response. The public behaved very similarly to what would be expected after a natural disaster where one sees the emergence of a "therapeutic community" (Barton, 1969).

Warning Information Discussion

The World Trade Center attack was extraordinary in this country, based on the magnitude of loss of life. This investigation aimed to identify lessons that could aid in minimizing and/or responding to future possible events, regardless of the low probability of their occurrence. The following discussion is based on interviews and impressions of being in New York City after the September 11th disaster.

As noted throughout this paper, the model of risk communication was adapted for use to understand the on-going emergency. The theoretical model needs to be modified to include extreme events such as the World Trade Center attack. Among the core components of the model are the pre-event

variables, which were not applicable in this event. Little prior experience could be called upon to guide behavior in this event.

One question raised by the September 11th disaster in New York City is that of the historical role of fire fighters and others. The first responder community may need to re-evaluate the risks of entering buildings to rescue people and make a judgment based not only on the emergency response needed (as in the past) but also on a new set of criteria of additional dangers unforeseen by earlier generations of emergency personnel. Over 300 fire fighters and emergency personnel lost their lives in the collapse of the World Trade Towers. A public outpouring of emotion illustrated the nationwide mourning of the loss of so many (Figure 1).

Warnings targeted at the emergency responders themselves also may need to be evaluated. Instead of the historical perspective of protecting the public, emergency warnings might need to be disseminated to all people in the area regardless of their role in the activities. This will make the function of warnings much more complex and difficult.

The traditional perspective of measuring source, consistency, and frequency of warning messages in a simple linear model needs to be rethought. Emergency personnel and the public were bombarded with information 24 hours a day, seven days a week. Information technology has changed dramatically since the days of the 1950s when sirens warned of impending dangers. In those earlier times, the concern was how to get warning messages out to all those who could be affected; the concern was for greater dissemination of the warnings. From interviews conducted for this investigation, the opposite appeared to be the case. Many interviewees complained of information overload as opposed to an information void. The numerous warnings and the subsequent media coverage were so intense that what was a warning and what was media coverage was intermixed. The City of New York, the state, and the Federal Emergency Management Agency all used, for example, internet web sites to provide the public with a lot of information, ranging from what schools were closed to how to request a death certificate. The level of technology in a given society must be included in the risk communication model because it will have an impact on warning messages heard and the public's response. It will be necessary to measure or account for the level of internet use, 24-hour news coverage, personal beepers, and cellular phones. Warning messages can no longer be seen as a simple linear model of "issue warning, public hears warning, and response to warning."

The model's situational variables of environmental cues, social setting, and social ties were the most relevant to understanding public perceptions and warnings heard. First, the physical environment had changed dramatically with the collapse of the towers and portions of the city being off-limits to the

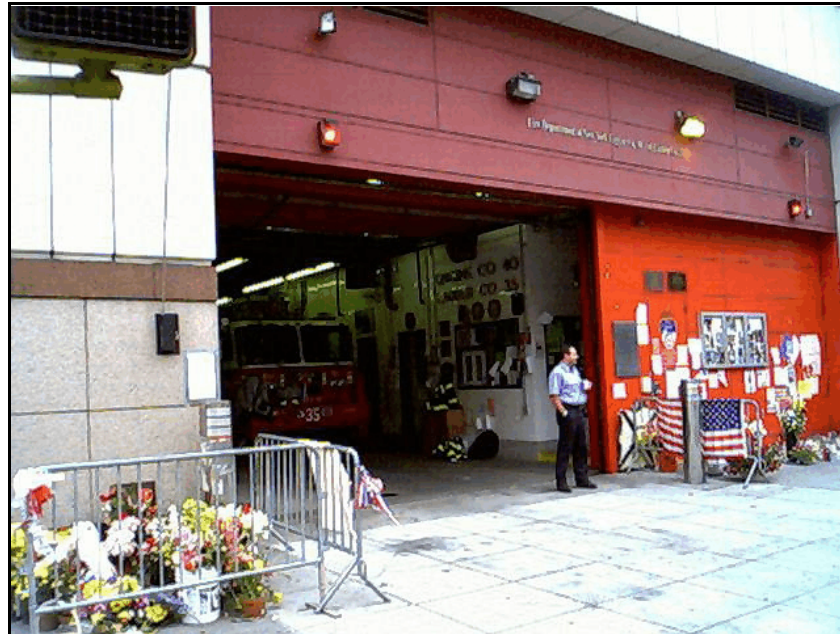


Figure 1. A typical scene at a fire station in New York City after the September 11th disaster.

public (Figure 2). Priority was given to the restoration of public infrastructure (Figure 3). Much of the financial district's infrastructure was either damaged, destroyed, or needed to be redirected. Major portions of the subway system coming into the financial district from New Jersey (the PATH system) were no longer functioning. All traffic that passed through the tunnels into the city was searched. Hundreds of photographs of victims were displayed in the subway stations (Figure 4). These all were stark environmental cues that something catastrophic had occurred and people could not simply dismiss them and disregard warnings. Denial of what happened was impossible.

Social ties were pivotal in getting the public to take protective actions. Respondents spoke of wide use of their cellular phones to connect to significant others. One respondent reported, "I called my mom in California and she told me what was going on." Although communication technology has developed dramatically in the past two decades, calling spouses, parents, friends, and family members appears to be as important as it was 40 years ago in earlier disaster research (Drabek, 1969).



Figure 2. *Portions of lower downtown New York City were blocked off both to protect the public and to protect the crime scene.*

Warning Information and the Public School Impact

One focus of this investigation was warning information dissemination in the New York City school system. The system is responsible for over one million children daily, with 79,924 teachers in 1,198 schools (New York Board of Education, 2001). Numerous interviews were completed with administrators and teachers. One of the “fortunate” aspects of this event was that it occurred in a city with tremendous resilience and infrastructure. The New York Board of Education accomplished its responsibility of warning and caring for the region’s school-age children. In addition, it used its resources and its intellectual capital in the event. Curricular changes helping children cope with the situation were instituted immediately. An already strong diversity curriculum was reworked and offered to teachers within days of the attack for classroom use in helping students work through the aftermath.

The Board of Education had an elaborate emergency response plan in place. This was located on a compact disk in each and every school. The CD



Figure 3. Work to restore public infrastructure was much in evidence.

allowed administrators to use a cascading scenario approach to select the best course of action, be it a bombing, shooting, or hostage situation. One of the major problems that occurred was the wide area impacted. All of lower downtown's schools were affected. Schools evacuated included PS 234, PS 150 and P/I 89. Evacuated high schools included High School for Leadership and Public Service, Economics and Finance, Stuyvesant High School, and Murray Bergtraum High School. The emergency plan, for example, foresaw many school populations evacuating to Stuyvesant High School which, in this event, was also being evacuated. Specific warnings on school closings were done via telephone and in some cases in person by school safety officers physically going to schools. Thus, pictures on national television showed children and their teachers running through the financial district, fleeing the area. The teachers' primary concern was for their pupils and getting them to safety. Many of the children were transported by ferries to New Jersey taking them out of harm's way. This led to desperate parents' seeking their children at several locations. This suggests the importance of having an all-hazards plan in place that plans for a larger impact area.



Figure 4. Pictures of those lost and/or missing were displayed in public places.

The few interviews with teachers made note of the potential long-term psychological damage of the event and the information overload that occurred. Emergency procedures and warning messages were followed as closely as possible for the given situation. Teachers spoke more definitively of the aftermath of the event on their students rather than specific warning messages heard.

The information overload problem was addressed in part by a New York City school publication. It offered many suggestions on how to help children with the aftermath of the event. Of note is item J, which stated:

One thing to avoid: Don't show videos of the attack or keep a television on for live coverage of the latest developments. The kids have seen enough. The most important thing for schools to do is to help them come to terms with what they have experienced already

(Roderick, 2001).

Discussion of Study

As noted throughout this document, additional research needs to be conducted. A formalized investigation needs to be undertaken from which generalizations can be drawn for the region and nation. Whereas the model of risk communication proved useful in attempting to understand this event, the model needs to be refined for a better fit with the reality of similar disasters.

The pre-event variables were not applicable to this situation, because this was the first major event of its kind in the United States. The American public now has experienced the attack on the World Trade Center and has the requisite “experience” to be better prepared for future events. Just as in natural hazard events, however, this prior experience will slowly dissipate as time passes. Parallels likely exist with natural hazards in keeping the public’s attention on the lessons learned.

The second set of information variables helped with the understanding of the public’s actions. The public was in the midst of on-going emergency and formed a “therapeutic community” of helping each other very similar that noted in natural disasters. This sense of “oneness” with other members of the community lasted for several weeks. *Newsweek’s* cover page of November 12, 2001, was entitled “Generation 911—Terror, War, and Recession Hit Home on Campus.” One of the problems with the model’s information variables was attempting to observe and note the emergency messages disseminated by public officials. Without prior incidents as a guide, there were no clearly formulated steps of protective actions except for simply leaving the area. Future research needs to address not only information dissemination, but also potential filtering mechanisms for a meaningful digestion of information. Any discussion of filtering in the American culture may be criticized as being undemocratic, but, if future terrorists acts do occur, the public might be willing to give up some of those traditional freedoms.

Another unusual aspect of the September 11th disaster was the dynamic of patriotism. To this author’s knowledge, this has not been recorded or written about in earlier hazards research. American flags began to appear everywhere. A strong sense of patriotism was prevalent from lower Manhattan to ethnic restaurants in mid-town. Citizens had a sense of pride and purpose in the enterprise of responding and reacting. A possible parallel could be the immediate aftermath of the attack on Pearl Harbor in 1941, when the country was of one mind. This phenomenon had a palpable impact on warnings that were issued. They were not disregarded or dismissed. Everyone was paying attention to government officials and the media. This can be seen in the almost cult-like figure Mayor Guiliani became in the aftermath of the disaster. For a short period the city and state of New York, along with the rest of the country, became Barton’s “therapeutic community.”

One of the issues arising out of this investigation is dealing with low probability events. How is a society to deal with events that might never happen again? As in the case of the New York City school system, how many personnel and resources should be devoted to updating an excellent emergency plan to include another event on the scale of the World Trade Center attack? If no additional planning is completed with the modification of current plans, and another low probability does occur, who receives the blame? On the other hand, if personnel and resources are diverted in creating an enhanced plan that is never used, who bears the political costs of such a decision? This conundrum speaks loudly for the need for all-hazards planning to cover an entire range of possible events.

Theoretical development in the area of terrorist attacks should be given high priority in future research. This project attempted to “test” the risk communication model. Research targeting low probability events is also called for and has the potential to help in other areas of warnings, such as earthquakes, where the state-of-the-art prediction is still limited to 30-year probability time lines. Another area that might be focused on is bio-hazards. Can risk communication be modified or evolve to help explain behavior in that context?

The use of technology in warning research needs further investigation as well. As noted in this piece, local, state, and federal agencies all used the internet for information dissemination. Many respondents reporting getting much if not most of their information from the internet, as opposed to radio and television as in the past. One of the exciting aspects to this technology for emergency managers is its interactive nature. Information can be both disseminated and collected through one medium. It is widely known in earthquake-prone areas, for example, that it makes sense to use local populations to help dig out victims because they are ready, willing, and able. Is government ready to use the public as information gatherers? Where are water mains broken, where are trees down, are there looters in the area, who is buried and where? To not engage the public in information gathering may well be a lost opportunity.

Finally a deeper understanding of “social ties” needs to be reached. America continues to be a melting pot of different races, ethnic backgrounds, and religions. Some excellent research has focused on this aspect (e.g., Enarson and Morrow, 1998 or Bolin and Bolton, 1986), but issues of diversity need to remain at the forefront of the research agenda, if viable and believable warnings are to be acted upon by a diverse public.

Careful design of future research is needed to address the issues raised by this project and by other investigations undertaken immediately after the disaster. It will take considerable time to fully understand all the events and dynamics of September 11, 2001. That work needs to begin now.

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Acknowledgments

This paper is a result of research conducted in the aftermath of terrorist attack on the World Trade Center on September 11, 2001. It is a product of the Quick Response Research Program funded by the National Science Foundation, and administered by the Natural Hazards Research and Applications Information Center housed at the University of Colorado–Boulder. Their support is gratefully acknowledged.

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