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IHAZ



On the cover: Tornados, earthquakes, hurricanes and floods—these threats put millions of Americans at risk each year. The Multihazard Mitigation Council (MMC) is working to reduce the total costs associated with these disasters and other related hazards to buildings by fostering and promoting consistent and improved multihazard risk mitigation strategies, guidelines, practices and related efforts.

Motivating Public Mitigation and Preparedness for Earthquakes and Other Hazards

By Dennis S. Mileti; Linda B. Bourque; Michele M. Wood; and Megumi Kano

MANY SOCIAL SCIENCE RESEARCH PUBLICATIONS report on findings from research about what correlates with public preparedness and mitigation actions across a range of different hazards in different places and locations (cf. Lindell and Perry 2000). By far, most of these report on the results of studies conducted in California on the earthquake hazard. **FIGURE 1**, adapted from Wood et al., 2009, lists the categories of public actions that people can take to get ready.

Even more publications report on other societal earthquake-related topics studied in California, for example, the public response to actual earthquake disasters, household and organizational responses by public and private organizations to earthquake predictions and forecasts, and much more. The references provided in this document refer to some of these publications but not to all of them.¹

THE RESEARCH RECORD

Earthquake research in California

Social science research on the correlates of public responses to "actual" earthquakes in California began in 1971 (Bourque et al., 1973). While many of these studies did not focus on public preparedness and mitigation for future earthquakes, most were cross-sectional surveys that enabled researchers to generalize findings to larger populations. Some of these did report on a few factors that were found to correlate with a few public preparedness and mitigation actions.

For example, some studies examined how actual exposure to shaking, damage and injury in a recent earthquake (cf. Dooley et al., 1992; Russell et al., 1995; Nguyen et al., 2006) impacted respondents' estimates of the probability of a future earthquake and how subsequent expectations of damage and injury (DeMan and Simpson-Houseley 1987; Palm et



Figure 1.

al., 1990; Mileti and O'Brien 1992) influenced some preparedness and mitigation action-taking.

Earthquake information research in California

The first social science research to clearly focus on the correlates of public preparedness and mitigation actions in response to "information" about possible future earthquakes in California, and the need to prepare for them, began in 1976 (Mileti, Hutton, and Sorensen 1981; Turner, Nigg, and Heller-Paz 1986). The studies that were performed covered a range of different contexts in which the dissemination of public earthquake and earthquake preparedness information occurred. These include immediately after an earthquake (Mileti and O'Brien 1992); after the prediction/ forecast of a particular earthquake (Mileti and Darlington 1997); and during more "general times" when no specific event had just occurred or had been forecasted/predicted (Bourque et al., 2009).

These California-based studies include the study of populations in small rural communities such as Paso Robles, Coalinga and Taft (Mileti and Fitzpatrick 1992), large urban populations in southern California, such as Los Angeles (Turner, Nigg and Heller-Paz 1986) and large urban populations in northern California, including different populations in the greater Bay Area (Mileti and Darlington 1997; Mileti and O'Brien 1992).

Research in other places and on other hazards

Social science research on this topic, however, has not been limited to studies performed just on Californians or just on the earthquake hazard. The effect of information to encourage public preparedness and mitigation actions has also been studied in other places and for other hazards. Some of these include terrorism (Bourque et al., 2010), an earthquake prediction in the central United States (Farley et al., 1993), tsunamis (Haas and Trainer, 1974), floods (Waterstone 1978) and hurricanes (Ruch and Christenson 1980).

Perhaps, the most elaborate study ever performed on the correlates of public response to information in education programs, in order to motivate the public to take preparedness and mitigation actions, has only recently been completed. It examined the effect of distributed educational information and many other factors on encouraging personal readiness for terrorism as well as for "any reason."

This research was conducted on the population of the 48 contiguous states in the United States, the populations of three different major cities in the nation, including Los Angeles, New York City and Washington, D.C., and on different U.S. racial and ethnic groups (Bourque and Mileti 2008) (TABLE 1).

A thorough reading of the results leads to many conclusions. The most general conclusion is what motivates the public to prepare is relatively the same regardless of differences in the geo-political location of the people being examined or the type of hazard being investigated. Perhaps this is because each study examined the same phenomenon: What motivates people to get ready for future hazardous events?

Table 1: Sample Description of the2008 National Survey

Geographic Areas	(N :	= 3,3	300):	
Death of 10 shales		N 1	2 200	

N = 2	2,298	(09.0%)
N =	390	(11.8%)
N =	200	(6.1%)
N =	412	(12.5%)
	N = 2 N = N = N =	N = 2,298 N = 390 N = 200 N = 412

Racial/Ethnic Groups (N = 3,300):

– White	N = 2	(70.1%)	
– Hispanic	N =	416	(12.6%)
 African American 	N =	314	(10.4%)
 Asian/Pacific Islander 	N =	109	(3.3%)
– Other	N =	119	(3.6%)

Table 1.

WHAT IS KNOWN ABOUT MOTIVATING PUBLIC PREPAREDNESS AND MITIGATION?

Where we are today, based on the conclusions from the cumulative social science research record, is that relatively strong, conclusive and replicated science-based evidence exists regarding what it takes to teach members of the public what they need to know and how to motivate them to take actions to better ready them for possible future hazardous events (cf. Mileti and Bourque 2010). This empirical record of social science research evidence may provide a more effective basis for increasing public knowledge and motivating public preparedness and mitigation than alternative popular approaches (for example, those based on good intentions, intuition and limited personal experience).

A synthesis of what is known based on the social science research evidence accumulated to date is presented in this section. The key question is behavioral: How do you help people to stop, listen, learn and get ready for future disasters that most of them think won't really happen, and, if they do, will happen to other people and not them? Most people think this way because they think they are not at risk to high consequence, low probability events. This perception of being safe is reinforced every day that a disaster does not occur.

The strongest motivator is experiencing a disaster

Perceptions of "being safe", however, change to perceptions of "being at risk" immediately **after** a disaster. In fact, experiencing an actual disaster has the strongest effect among all factors to motivate people to prepare for future disaster events. Research on what has been popularized as "the window of opportunity" has found that the strong effect of experiencing an actual disaster on motivating victim preparedness and mitigation declines as time from the event passes. This is because perceptions of safety re-emerge and rise to pre-disaster levels, typically within an approximate two-year period after the event (Burton et al., 1993; Weinstein 1989; Sims and Bauman 1983).

Three strong information motivators also exist

In the absence of an actual disaster, the social science research record identifies three other factors (TABLE 2) as the strongest motivators, by far, of household preparedness and mitigation action-taking. The first of these is "information observed" (Mileti and Fitzpatrick 1992; Bourque and Mileti 2008). The impact of seeing what other people have done to prepare and mitigate is a stronger motivator for taking action than receiving information about the need to take actions.

The second and third factors both have to do with preparedness and mitigation information received from, for example, governments and non-governmental organizations (NGOs). Second, "dense information" works better to motivate than less dense information. Information is dense when it comes from multiple sources (Mileti and Fitzpatrick 1992; Bourque and Mileti 2008) and is communicated over multiple diverse channels of communication (Mileti, Fitzpatrick, and Farhar 1992; Bourque and Mileti 2008).

Third, the "content" of the information received works to motivate when it is clearly focused on what actions to

Table 2: Key Factors that Influence Public Action-taking

Information <u>OBSERVED</u>:

- Cues: seeing the actions others have taken

Information <u>DENSITY</u>:

- From: multiple sources
- Over: multiple communication channels
- Information <u>CONTENT</u>:
 - About: what preparedness actions to take
 - Explains: how actions cut losses
 - That is: *consistent across messages*

take (Mileti and Darlington 1997; Bourque and Mileti 2008), explains how those actions cut future losses (Dynes et al., 1979; Bourque and Mileti 2008) and is consistent (says the same thing) across the messages received from different sources (Turner et al., 1981; Mileti, Fitzpatrick and Fahar 1992).

How people convert information received into actions

The recently completed national study of motivating public action-taking (Bourque and Mileti 2008) provided two major contributions to social science knowledge. First, the study sample was representative of all households in the country and the findings confirmed those of previous studies that were performed on much smaller sub-populations in unique parts of the country. This lends increased validity to the conclusions of those other studies. Second, it clearly identified the general social processes (FIGURE 2) that people experience to convert received preparedness information into actual household preparedness actions.

This process can be described as follows. The factors of information observed, information density and information content are the key factors that motivate the pubic to prepare and mitigate. Each of these factors has direct effects on increasing household action-taking. The more people hear, read and see, the more they do to get ready.

These factors also indirectly affect household preparedness. They do this by increasing people's knowledge and their perceived effectiveness or efficacy of recommended actions and by increasing discussions (sometimes called milling) with others about preparedness and mitigation. These factors, knowledge, perceived effectiveness and milling, in turn, also increase household preparedness and mitigation.

THE IMPORTANCE OF PROVIDING INFORMATION

These findings are very good news. In the absence of an actual disaster (which is the strongest way to get people's attention and motivate preparedness actions), the three major determinants of household preparedness are pliable. Policies and programs can be developed that increase information dissemination in ways that increase people's preparedness and mitigation behavior.

Moreover, the pathway from information to action-taking is such that the more information that is disseminated to households, the more they will prepare and mitigate; the less information, the less preparedness and mitigation.

In comparison to information received and observed, most other factors do not matter much (Bourque and Mileti 2008; Bourque et al., 2010). These other factors include the increased probability of a future event (which is certainly useful to know about for other reasons), risk perception and demographic characteristics (which can constrain what people can afford but has little effect on readiness motivation).

They are either not related to household preparedness and mitigation or their effects remain but are reduced to insignificant levels when the information factors just described are taken into account (for example, included and controlled in multivariate statistical models).





IMPLICATIONS FOR PRACTICE

For practitioners, the current state of social science knowledge suggests several clear and low-cost pathways forward on how to better present information to motivate public prepared ness and mitigation for future disaster losses (FIGURE 3).

There certainly is no shortage of public information being presented in our nation by a multitude of federal, state and local government agencies and NGOs. Each of these organizations largely provides the public with unique information that has been invented and is disseminated independent of each other.

The social science research record suggests, however, that regardless of what agency is providing public preparedness and mitigation information, no single agency can do so very effectively. Partnerships between information-providing organizations are critical to maximize effectiveness, and leadership (much like an orchestra leader) is needed to weave the actions of partners together.

Here is what such an approach might seek to accomplish if it were based on the current state of knowledge in the social sciences about how to maximize public preparedness and mitigation:

- 1. Deliver messages to the public from multiple and different information sources and through many different channels of communication;
- 2. Improve coordination among the many different message providers to craft and then deliver consistent messages rather than multiple unique messages;

- Coordinate message distribution across organizations so that there is an ongoing flow of information across time rather than delivery in discontinuous "lumps and bumps";
- 4. Focus the message on the actions people might take (rather than on the horrors of disasters and their probabilities) and how taking actions might cut actual future losses;
- Invent innovative ways to motivate those who have already prepared and mitigated to share what they have done with other people in their lives who have done less or nothing; and
- 6. Evaluate and revise programs to motivate public preparedness and mitigation not in terms of the number of products or processes an agency delivered or engaged in but rather in terms of actual preparedness and mitigations outcomes. Over the past several decades, the social science research

literature has amassed on how to increase the likelihood that members of the public will take action in response to preparedness and mitigation information. This literature provides clear guidance about how such messages can best be composed and delivered. If helping members of the public become better prepared for disasters is truly a national priority, then designing public education campaigns, not in a vacuum but rather based on the accumulated research literature, must be a priority as well.

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Figure 3.

Terrorism and Responses to Terrorism (START) at the University of Maryland at College Park, grant number N00140510629 to the University of California at Los Angeles (UCLA); grant number SES-0647736 from the U.S. National Science Foundation to UCLA; and grant number 1543106 from the U.S. National Science Foundation to UCLA through the University of Colorado at Boulder.

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1. Eighteen data sets from California-based social science earthquake research conducted between 1971 and 1994 are available at: www.sscnet.ucla.edu/issr/da/earthquake/erthqstudies2.index.htm

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