Categories of Success: How Do We Make Who Listen?

Rachel Dowty Beech and William Wallace

Abstract Definitions of risk vary widely from person to person and from group to group. How then can disaster researchers prescribe effective actions and relevant information sources for all who seek to avert risk and disaster? Traditional strategies for matching particular "types of people" and/or "types of groups" to information they might find relevant to themselves have included, but are not limited to age, race, gender, and socioeconomic status. This chapter challenges the traditional group categories used to assess who will find what information relevant, the manner in which information is presented, and the places the information can be found by those seeking it. We propose that the four cultures presented by social anthropologist Mary Douglas can not only shed light on the failures to deliver salient information on averting risk and disaster to those who seek such information, but also help shape (1) which information is pertinent to whom, (2) how the information can be shaped to prompt action, and (3) where to post such information so that it reaches those who are interested. These four cultures are described as "Hierarchist," "Individualist," "Fatalist," and "Egalitarian."

Keywords Risk perception · Risk communication · Warning

Traditional Strategies

Models used by researchers to examine how people respond to disaster warnings vary widely, to the extent that generalizations and replicable tests of study conclusions remain elusive (Mileti and Peek 2000; Tierney et al. 2001; Tyshchuk 2014). Researchers frequently reinvent the wheel of warning response models because definitions of risk vary widely from person to person and from group to group. How

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then can disaster researchers prescribe effective actions and relevant warnings for all who seek to avert risk and disaster?

Sending out a warning, such as an evacuation warning, may at first glance seem direct: tell people to get out, or stay put, give them the reasons, and seek out the best possible ways to deliver the message so the most people will act upon it. However, each step of this process is fraught with complications. Through what channels should people be told? What reasons are the best to give? In what manner should the message be phrased, such that people will take it seriously and heed the warning? Each party, however, has his/her/their own definitions of risk through which the warning will be filtered once received.

Take, for example, the evacuation warnings sent out in the days preceding Superstorm Sandy in 2012 in New York City. Evacuation orders by Mayor Michael Bloomberg for the Lower East Side, which sustained some of the worst damage, were heard by nearly 90% of Lower East Side residents, yet only 36% of residents evacuated before the storm (LES Ready 2014). They had received the warning through fliers, New York City Housing Authority (NYCHA) staff going door to door, or police driving with loudspeakers up and down Avenue D. Reasons residents gave for not evacuating were varied, but many cited their efforts to evacuate for Hurricane Irene the previous year, during which the Lower East Side had received no impact. This jibes with a Harvard School of Public Health poll taken the year after Hurricane Katrina's impact: 68% of the 2,029 adults surveyed in eight states, who lived within 50 miles of hurricane-prone coastlines, said they would not evacuate or were unsure if they would evacuate if given an evacuation order. They cited confidence that they would be safe at home (Blendon et al. 2006). But why did they feel they would be safe at home? Is it because they were safe there the last time? If so, then how can the message send out the warning so that people take it seriously each and every time? Hassle and expense are certainly consistent factors, but what would get them to take action? The survey data from which these results were drawn, just as most other reports, group respondents into demographic categories: age, race, gender, and socioeconomic status. But these groupings can often give conflicting information when it comes to who heeds warnings and why.

Some results are almost always clear: if an evacuation warning goes out in a language not spoken by the target audience/receivers, then the message will not be received clearly. Culture, in this respect, is taken into account in the warning literature. But what about other aspects of culture? Are they relegated to the ranks of demographics? Will people who make a certain amount of money find one message more palatable than another? Will African-Americans really take one warning message to heart less than or more than Asians? Will a 59-year old take action more often than a 65-year-old? Research shows that the answers are more complicated than that, so why are these categories still so pervasive in the literature?

This chapter challenges the use of demographic categories used to assess who will find what information relevant, the manner in which information is presented, and the places the information can be found by those seeking it. We propose that the four cultures presented by social anthropologist Mary Douglas can not only shed light on the failures to deliver salient information on averting risk and disaster to

those who seek such information, but also help shape (1) which information is pertinent to whom, (2) how the information can be shaped to prompt action, and (3) where to post such information so that it reaches those who are interested. These four cultures are described as "Hierarchist," "Individualist," "Fatalist," and "Egalitarian." We discuss how the same message or the same information should be phrased differently to appeal to people who most closely identify with each of the four cultures.

The Four Cultures

Numerous studies have shown the difficulties inherent in communicating disaster warnings and information in languages not spoken by those meant to receive them (Wachtendorf et al. 2013; Mathew and Kelly 2008; Villagrán de León 2014). But there's more to understanding an evacuation warning and information about a forecast disaster event: it has to speak to the target audience in a way that makes it important to them, in a way that prompts the action that the message intends. This art of persuasion encompasses complicated nuances of communication. This applies across languages and cultures. "Culture," in this traditional sense, usually refers to ways people know and do things in different world regions. However, we adopt Mary Douglas's approach to culture (Douglas 1978, 1999; Douglas and Wildavsky 1982; Thompson et al. 1990) because it transcends the cultures of world regions and taps into the ways humans know and do things across regions. Thus, we believe that it may enable practitioners and researchers to "speak" those different "languages" to send out more persuasive evacuation and other disaster warnings. In a world where international borders are crossed back and forth every second with messages through the Internet and other technological means, this redefinition of culture becomes increasingly important.

In Mary Douglas's model, there are four cultures (hierarchist, individualist, egalitarian, fatalist), based on two mutually exclusive dimensions (grid and group). The "grid" dimension refers to rule rigidity, and the "group" dimension refers to the social ties that bind people together in terms of their ideas set in motion. So a culture with "high grid" will prioritize actions that follow rigid rule structures, and a "high group" culture will prioritize community well-being and defend against outsiders threatening their ties that bind them together. Each of the four cultures has a low or high level of "grid," and each of the four cultures has a low or high level of "group."

An example of a traditional hierarchist ("high grid, high group") culture is that of the military: people live in close quarters with one another, defend their group boundaries ("high group") and live by highly rigid rule structures ("high grid"). Those who live in close quarters with each other and defend themselves as a group, but do not require a highly rigid rule structure to sustain the group are egalitarians ("low grid, high group"). Many closely-knit neighborhood activist groups could be considered egalitarian groups. Individualists ("low grid, low group") depend less on rules and more on making themselves stand out to get ahead ("low grid"), and see

themselves as self-reliant ("low group"), such as financiers or others who consider themselves "self-made." Fatalists ("high grid, low group") live by rigid rule structures with few close bonds to others, thereby mostly relying on fate to deal them luck or doom.

These are the extremes. The four cultures exist as a continuum of "grid" and "group," and it is on this continuum where we all live and continuously construct our world. There are, therefore, plenty of "shades of grey" that lie between these extremes. However, when it comes to disasters, extremes are where we need to look. Disasters are, by their very nature, extreme. Research shows that, accordingly, people exhibit more extreme tendencies of the four cultures in times of disaster. The anthropological research on famine by William Torry shows how "normative principles of exclusion from privilege or security – whether by birth, or office, or sex, or age, or by definition of deviancy and criminality … point to who will get less as resources diminish and who will finally be turned out or left to starve" (Douglas 1986, page 123). Torry was surprised to see that these "preordained victims" accepted their fate, with no anger or resentment showed by survivors, who recognized "the doom of their families as fitting and as a normal part of crisis conditions" (Douglas 1986, page 123) Those who were left to starve understood that the elite would not starve, and resumed their normal positions once the crisis had ended. In other words, they were fatalists, and became more so during the famine. However, this did not dissuade them from being fatalists after the famine: Torry describes them as grateful for having a return to normalcy. This, as Douglas points out, is an affirmation of social order through disaster, not its destruction. Such profound decisions as who will eat and who will starve "are not made by individuals as such, but by individuals thinking within and on behalf of institutions" (Douglas 1986, page 124).

Institutions are at the heart of decision-making regarding risk and the four cultures. Dowty et al. (2011) show how organizations exhibited more extreme "grid" and "group" characteristics during the federal response to Hurricane Katrina. The White House exhibited an individualistic tendency prior to the storm, but representatives during the response increased that individualistic tendency to create new rules and blur group boundaries in their actions and statements. The Federal Emergency Management Agency (FEMA) was drowning in rules (increased "grid") while having less and less of a group bond on a national level (decreased "group"), thereby becoming even more fatalistic than the agency had been after being absorbed into the Department of Homeland Security after 9/11. The Coast Guard relied on tightening its hierarchy as much as possible, increasing both "grid" and "group" to resolve tasks (such as rescue operations) as quickly and efficiently as possible while taking care of their own. Not only did existing neighborhood groups increase their "group" and decrease dependence on rules ("grid"), but new neighborhood groups formed in the wake of the storm (Dowty et al. 2011).

These examples show how individual representatives of organizations think within and on behalf of institutions, and how the dimensions of "grid" and "group" characterize tendencies of people to adopt even more extreme cultural tendencies during disasters to ensure their institutions weather the storm.

Risk and Warning in the Four Cultures

If we assume, as we have shown above, that people tend to exhibit more extreme versions of the four cultures during disasters to better uphold their institutional systems, when do they start? Is it when the warning is issued? Or is it when they see and feel the event upon them? As William Torry's research on famine showed, people do not change which institutions they uphold during disaster, rather, their efforts to uphold their culture's "grid" and "group" simply intensifies. Therefore, to appeal to all four cultures when issuing a warning, each of the four cultures must be addressed accordingly.

For example, people who are highly Hierarchist can be expected to identify most strongly with information that identifies particular resources and is ranked in terms of group priority (e.g., 'to properly be prepared, consider water, food, and shelter for your family first'). Individualists will best respond to information that emphasizes a single person's dependence upon his/her own abilities to avert risk, especially concerning financial matters (e.g., 'make sure you have enough money to pay for water, food, and shelter'). A fatalist in search of averting risk ultimately views risk as an inevitable disaster, with the question only being when and what form it will take. Therefore, prompting a fatalist to action requires accepting doom as a certainty (e.g., in the face of certain disaster, your feelings of helplessness and powerlessness must take a backseat to thoughts about where I am, who am I with, and what will we

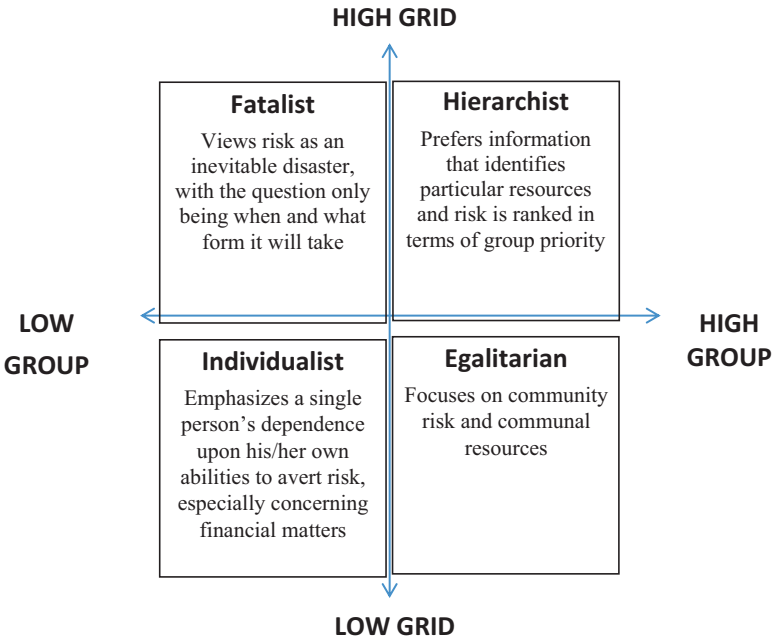

Fig. 1 The four cultures of warning response

have there'). Egalitarians overwhelmingly focus on community and communal resources, so they will find information with such foci most relevant to their needs (e.g., 'make sure you, your family, and your friends collectively know where to meet and what resources each should possess to ensure everyone has enough'). Figure 1 summarizes these approaches to risk and warnings according to "grid," "group" and the four cultures.

An important aspect of risk communication involves the message's source (i.e. who sends the warning message), not just the receivers (i.e. the audience to whom the warning is sent) (Laswell 1948). In this case, the cultural inclination of the message's source will determine the cultural tone that pervades the message sent. For example, warning messages sent out by a hierarchist agency or individual will be phrased in such a way as to appeal to other hierarchists. Although most governmental organizations from which warnings originate operate with a clear hierarchical structure, it's important not to confuse traditional hierarchy with the hierarchist culture. For example, while many hierarchically-structured organizations do exhibit a predominantly hierarchist culture, some may function more as fatalists if the "group" begins to lower while upholding a plethora of rules and regulations. So "official" warnings sent out from an organization/agency may potentially be from the perspective of any of the four cultures, even if it operates using the traditional notion of hierarchy. And every message, be it a warning or otherwise, is uttered from a cultural perspective seeking to uphold institutions. This phrasing of warning message content is what we will focus upon in the rest of this chapter, as well as how the medium used to deliver the warning can affect the dynamic interplay between warning content and evoking the target audience's actions.

Demographics Versus the Four Cultures

Here, contradictory conclusions abound. In some studies, women/females respond to warnings more frequently than men/males (Flynn 1979; Fothergill 1996; Drabek 1994; Dooley et al. 2006), in others, there is no difference in response to warnings between men/males and women/females (Mileti et al. 1993; Duval and Mulilis 1999; Bourque and Russell 1994; Arklikatti et al. 2006). In some studies, older persons understand and respond to warnings more frequently than younger persons (Cutter and Barnes 1982; Blanchard-Boehm 1998; Aguirre et al. 1998), in others, older persons respond less frequently (Flynn 1979; Dynes 1979; Gruntfest 1997; Baker 1987; Dooley et al. 2006), and in some age makes no difference (Baker 1979; Bateman and Edwards 2002; Bourque and Russell 1994). In some studies, race has been found to be a determining factor in response to disaster warnings in that minority populations (usually African-Americans or "non-Anglos") respond more frequently to disaster warnings (Aguirre 1991; Dooley et al. 2006), but in others, they respond less frequently (Edwards 1993; Mileti and O'Brian 1991), and some find no difference (Bateman and Edwards 2002; Arklikatti et al. 2006). The same problem applies to socioeconomic categories: in most studies, low-income populations hear

and/or respond to warnings less frequently than others (Flynn 1979; Edwards 1993; Fothergill and Peek 2004), but even so, there exist data to contradict that finding (Aguirre 1991), especially in that there is no difference in low-income populations and response to disaster warnings (Bateman and Edwards 2002; Arklikatti et al. 2006; Bourque and Russell 1994; Mileti et al. 1993).

These contradictory conclusions were found in studies that mostly examined warnings broadcast via traditional media outlets such as newspapers, radio and television, along with neighborhood and local community broadcasting via word of mouth and/or pamphlets. What about warnings disseminated through less traditional social media outlets such as Facebook and Twitter? Categories that are unique to social media users such as "blog followers" and "non-blog followers" (Jin et al. 2010) are starting to enter the literature. Despite the entry of these new social media outlets on the disaster warning scene, studies so far suggest that people still rely on the more traditional outlets to gain and confirm information, then disseminate that information via social media (Schultz et al. 2011). For example, a person at work might overhear talk about a hurricane headed their way. S/he is likely use the computer and/or cell phone with Internet to access a television news outlet or newspaper to confirm the warning, then turn to Facebook and/or Twitter to spread the news and seek confirmation from others in their online social networks.

Given that social media use does not come at the expense of more traditional media outlet use, but rather adds to it, disaster warnings need to be phrased and sent with this in mind. Add to this the well-documented tendency of people to seek confirmation of warnings before taking action (Cutter and Barnes 1982; Berry 1999; Aguirre et al. 1998), message formulation and dissemination channels must balance redundancy with personal and familial relevance for those in the warning area. How should we best determine personal and familial relevance?

Using demographics to determine such relevance and appropriate dissemination channels has the advantages of convenience and comparability. For example, if an organization deems it necessary to send out a warning to all flood-prone households in a given area, they can identify the area with flood-prone housing, but what about determining the personal and familial relevance of the warning? Are all people who live in low-income housing going to have the same preferences when deciding what to do about a warning message? Demographics are used so frequently in many research fields to determine so many things that information can be readily found about these groups for the purposes of making comparisons. The same cannot be said about cultural biases, because there are not as many studies out there that utilize them. But what is the use of comparability if the comparisons yield inconsistent conclusions?

Cultural biases are based upon institutional beliefs and the actions that serve to uphold those institutions. They are very difficult to change. Although one may act according to a different cultural bias in different contexts, such as a hierarchist at the workplace and an egalitarian at home, the biases tend to stay the same for the same institutions (in the case of this example, work and home). And, although the intensity with which an individual or group displays characteristics of one or another cultural bias may vary, that bias tends to stay the same and become more intense in

times of crisis. Therefore, using cultural biases to determine personal and familial relevance introduces consistency to formulating effective warnings. There are four different types of phrasings with which to send out the warning, one to address each of the four cultural biases.

A disadvantage of demographic categories is that they can be added upon and redefined in different studies: one study, for example, may include four different racial groups but another may include ten. Also, even if the warning formulated by racial stereotyping is effective, formulating a warning message to appeal to one or another racial stereotype may not appeal to people who are of mixed races.

Cultural biases, on the other hand, are mutually exclusive and jointly exhaustive. If a person or group exhibits a cultural bias to support a particular institution, the person/group cannot exhibit another cultural bias for that institution at the same time. In other words, unlike demographics where an individual may belong to more than one (racial, gender, etc.) category simultaneously (regardless of context), an individual can only belong to one cultural bias category for each institutional context. Cultural biases are also jointly exhaustive: there are no other categories missing, all belief is encapsulated in these four ways of life.

The remainder of this chapter will outline the ramifications of these assertions when formulating and disseminating warning messages to appeal to each of the four cultures.

Which Warning Information Is Pertinent to Whom?

Superstorm Sandy challenged the way storm warnings are issued. Although it began as typical hurricanes begin, its characteristics changed as it trekked up the eastern U.S. coast. It could no longer be categorized as a hurricane, or even as a tropical storm, because it no longer drew its heat from the ocean, along with a loss of other defining characteristics. It became a nor'easter wrapped in a post-tropical cyclone (NOAA 2013).

These meteorological categories affect the way warnings are issued and by whom. The National Hurricane Center (NHC) is part of the National Oceanic and Atmospheric Administration's (NOAA's) National Weather Service (NWS). Once Sandy could no longer be classified as a hurricane, the NHC could no longer issue hurricane warnings according to NOAA rules, even hours before the colossal storm came ashore. NHC warnings are strictly formatted and delivered through private companies such as The Weather Channel, AccuWeather, and local meteorologists. This streamlined delivery of computerized warnings through the entire system run on deeply institutionalized rules and definitions. Despite deep concerns by NHC officials, the rules forced them to remove hurricane warnings at a crucial time, leaving warnings to be disseminated by local meteorologists (Lubick 2013). While the local organizations certainly made grave warnings about the storm, there was no unified message coming from NOAA and locals. People heard different terms such as "hurricane," "nor'easter" or "big storm" and prepared for more wind than flood (Baker et al. 2012).

In the aftermath of Sandy, NOAA changed the rules to allow hurricane warnings to be issued for a wider variety of storms. In 2013, the U.S. Congress passed the Sandy Supplemental Appropriations Act, giving NOAA an additional $48 million to "strengthen the National Weather Service" (NOAA 2013). The assessment found problems in communicating the impact of the forecast storm surge for Sandy, and NOAA aims to improve communication of warnings with local organizations.

This case highlights how the birth of warnings can be complicated, and are not simply disseminated from an authoritative source to the public – the message content and path to the public can be much more convoluted. Therefore, the formulation and dissemination of warning messages must consider the institutional forms through which warnings travel, in addition to the targeted receivers (public).

The first step must therefore address the source. What is the dominant cultural bias of the organization issuing the warning? That is not to say, however, that egalitarians, fatalists, and individualists would not act upon a warning from hierarchists, merely that they may interpret the warning and act to best uphold their own institutional forms (cultural bias), which may or may not help prompt actions desired by the organization issuing the warning.

Once the cultural bias of the source is identified, the cultural biases of agencies with which the source communicates must also be identified, for they act as additional filters. If they simply pipe the same computerized message (as is typical with the hurricane warning system), one may assume no change in cultural bias has occurred. But once the warning message gets translated into calls for specific actions/behaviors, the language of each bias can better reach the intended audiences/publics.

How Information Can Be Shaped to Prompt Action

Hierarchists

Prefer information that identifies particular resources and risk is ranked in terms of group priority.

> To be properly prepared, consider water, food, and shelter for your family first.

The high GRID, high GROUP characteristics of hierarchists dictate that they guard the group and they guard the rules, so during times of crisis, those group boundaries and rules will be tightened. This arrangement, so characteristic of military organizations in which people not only work together but also live and sleep in the same quarters, is the mark of many disaster response organizations. However, as noted previously, just because an organization is structured as a hierarchy (high GRID), does not mean it functions under a hierarchist cultural bias (both high GRID and high GROUP). It may sport a rigid rule structure but lack a functional, tightly knit brother- and/or sisterhood-type group (see "Fatalists").

Considering that hierarchists will be most interested in resources and people according to rank ("rank" defined by the particular institution the person or group is upholding), warning messages should also use a ranking system to address which resources and which people should be where and why. Starting with the meteorological definitions of risk allows a clear path into other ranked areas of concern. Therefore, important elements of a hierarchist warning message include:

1. Definition of risk (i.e. category of storm).
2. Which geographic locations are at a certain percentage of which risk (e.g. wind, storm surge, etc.).
3. Direct or indirect suggestion of taking leadership role in household.
4. Ranked listing of material supplies needed and how long they should last and/or ranked listing of evacuation priorities (e.g. take this route, identify hotel, shelter, or friends'/relatives' house at which family will stay that is outside the risky geographic boundary).

Egalitarians

Focus on community risk and communal resources

> Make sure you, your family, and your friends collectively know where to meet and what resources each should possess to ensure everyone has enough.

Egalitarians share the high GROUP of hierarchists, but lack the desire for strict ranking and rule structures (low GRID). Context for group membership is of the utmost importance for egalitarians, who may be members of neighborhood organizations (either official or unofficial) or who may volunteer to help others. Transparent lines of communication are also important for upholding an egalitarian cultural bias, as a lack of transparency signals questionable rule structures that may introduce inequality or untrustworthy authority.

As such, warning messages directed toward egalitarians should lack rankings and suggestions of leadership, and focus more on group cohesion and preservation. References to community groups and/or volunteer organizations may help prompt action, but must be used cautiously in case people have had bad experiences with particular organizations. Equitable distribution of resources and equitable consideration of different group needs will also appeal to most egalitarians. Thus, a warning message to prompt egalitarians into action would include:

1. Definition of risk (i.e. flooding, wind, tremors, etc.)
2. Neighborhoods at risk (neighborhoods grouped according to local language used)
3. Non-profit and local volunteer groups who offer services that can help neighborhoods named prepare and mitigate the risk in a timely manner.
4. Which services people in those neighborhoods are most likely to need (e.g. evacuation assistance, shelter, food, etc.)

Fatalists

View risk as an inevitable disaster, with the question only being when and what form it will take.

> In the face of certain disaster, your feelings of helplessness and powerlessness must take a backseat to thoughts about where I am, who am I with, and what will we have there.

Fatalists are a difficult bunch to spur into action. Since they accept doom, why should they do anything to avert risk? Their low GROUP is trampled by oppressive high GRID rule structures. This cultural bias dominated FEMA during the early days of the Hurricane Katrina response in New Orleans (Dowty et al. 2011). Leaders thought someone else was doing one job or another and, when that didn't pan out, blame was placed on the Fates dealing folks a bad day. Uncertainty rules the fatalist cultural bias, and what happens under the rule structures defined and maintained by others is largely out of their control.

Accepting (as fatalists do) that any action or inaction taken as a result of receiving a warning message may lead to doom or luck, uncertainty becomes important in warning messages directed toward fatalists. Emotional affect, in all its uncertainty, also becomes important to evoke. This is because, like many other things, emotions are out of a fatalist's control but likely to be affected upon receipt of a warning message. Metaphors suggesting loss of control and its consequences may help reach fatalists, as may images of poorly defined circumstances during and after the disaster. Considering these challenges, a warning message to fatalists should reference:

1. Uncertainty of risk (e.g. percent likelihood of devastation and in which geographic locations)
2. Range of conditions expected, highlighting specific examples of possibilities (e.g. flooding higher than a standard bed height, waves higher than a one-story house, winds strong enough to have specific effect on specific structures, etc.)
3. Proposed action (e.g., evacuation, shelter in place, resources necessary, etc.)
4. People/places available for assistance considering likely emotional upheaval (e.g., consider who you will be with, what you will have, what it takes to stay safe in prescribed location).

Individualists

Emphasize a single person's dependence upon his- or her own abilities to avert risk, especially concerning financial matters

> Make sure you have enough money to pay for water, food and shelter.

Just because individualists are not necessarily moved by rules (low GRID) or group boundaries (low GROUP) does not mean they are senseless of their need for others. They trust others to do what they think is best for themselves. This applies to family

members, friends, meteorologists, local television and radio station announcers, grocery store employees, or anyone else. According to the individualist, individuals are born as individuals, and their affect is borne from their individuality. Thus, resources are defined in terms of individual holdings and rationality stems from individuals' decision-making.

Warning messages aimed toward individualists should therefore emphasize an "every man for himself" type approach to prescribed actions. Value should be placed on the ability of each person to give him- or herself the best chance of not only surviving but thriving through a forecast disaster. Knowledge held by the individual should also be highlighted, as such knowledge can lead to better chances of getting ahead and staying ahead of the rest. In sum, the elements of a warning to appeal to individualists include:

1. Definition and geographic range of risk (e.g. category of storm and forecast impact areas)
2. Associated probabilities of damages (e.g. property damage, financial risks associated with the storm, etc.)
3. Proposed action (evacuation, shelter-in-place, etc.)
4. Comparison of forecast disaster with a past disaster likely known to those in warning area (e.g., a hurricane like Katrina, an earthquake like Loma Prieta, etc.)

These are generalizations for recommended content to direct warning messages toward each of the four cultural biases. A trickier question is how to issue this information to target audiences, that is, get the fatalist's message to the fatalists without making him/her trudge through warnings geared toward the other cultural biases.

Where Should Information Be Posted?

Simon et al. (2015) refer to a "traditional disaster management model" in which information flows from emergency management organizations to the public. They challenge that one-way directional flow based on the rising use of social media. Mitchell et al. (2012) found that most people still rely on newspapers, news sites or apps (71% of Facebook users and 76% of Twitter users) to receive news. They note that users on Facebook get news mostly through family and friends, but interact with a broader range of associated users on Twitter. Accordingly, a Princeton-led survey found that Twitter users considered news they received more unique than news they received through Facebook (Mitchell et al. 2012). Prior to and during Sandy, New York City and FEMA utilized Facebook, Twitter, and Tumblr to disseminate timely information and respond to questions from users directly. New York City's Mayor's office made it possible for residents to sign up for text alerts through Twitter as an alternative means of information once electricity and Internet services were lost (Cohen 2013). Crowdsourcing is another new consideration with the rise of social media, where Tweets and Facebook posts from people on site and people monitoring the situation remotely can generate maps. During the warning period,

the impact and effect of the disaster is frequently still unknown, so thus far crowdsourcing has been used more for post-impact evacuation orders (Simon et al. 2015).

Regarding cultural biases and warning messages, the implications for using social media versus the traditional warning model involve (1) how many individuals and organizations through which warning messages are filtered and (2) wording and language requirements for posted warnings that differ across media types. Word of mouth takes on a whole new dimension when considering how social media interaction transcends face-to-face interactions. It also transcends some of the usual hierarchical boundaries. For example, how many people can readily get an answer to a question directly from the NYC's Mayor's office without the use of social media? With fewer filters, messages can be more readily formulated and delivered according to the suggestions in this chapter. However, limitations and changes must be made to accommodate different requirements on social media sites. For example, Twitter posts ("tweets") cannot exceed 140 characters, and the use of hashtags (denoted by the # symbol before a word) categorizes tweets such that people searching for or posting specific warning information can more readily achieve their goals. Communicating the nuances associated with each cultural bias-focused warning message in 140 characters would take particular skill at tweeting.

Despite a host of confounding social media factors, communicating warnings according to cultural biases may not be much more complicated on social media sites than it is through traditional channels. Hierarchists will gravitate toward other hierarchists, egalitarians will gravitate toward other egalitarians, fatalists will gravitate toward other fatalists, and individualists will gravitate toward other individualists. How each person or organization uses the language and limitations of Twitter, Facebook, blogs, or other interactive online opportunities may not be so different from whatever limitations are posed by face-to-face, newspaper, radio, or television warning dissemination. Such postulations, however, require exploration and research, to help initiate a basis for comparison and a literature on using cultural biases for disaster warning formulation and dissemination.

Conclusions and Future Directions

The pervasiveness of demographic categories frequently hides the assumptions implicit in their use. When considering the connections between warnings, decision-making, and behavior, we ask "Do demographic categories capture the beliefs that drive response to disaster warnings?" Our answer is no, they do not. We therefore propose an alternative set of categories, based on beliefs about the way the world works, to better communicate warnings to target audiences. Cultural biases, as described by Mary Douglas and those who further developed her theory of cultural biases, use categories based on how people use their beliefs and actions to uphold the institutions they depend on to make sense of their world. Cultural biases are defined by two dimensions: GRID (rigidity of rule structures) and GROUP (rigidity of group inclusiveness). These two dimensions give rise to four mutually exclusive

and jointly exhaustive cultural biases: hierarchist, egalitarian, fatalist, and individualist. We believe these cultural biases, unlike demographic categories, do indeed capture the beliefs that drive response to disaster warnings.

We have shown how these cultural biases can be used to formulate disaster warning content that specifically appeals to each way of looking at the world. Because cultural biases exist across internationally-defined cultures, we postulate that these strategies could be effectively used to formulate disaster warnings worldwide. Language barriers are always challenging in formulating and disseminating disaster warnings, and they remain challenging when translating the nuances of cultural biases. Language barriers exist not only across nations but also across social media sites, where messages are limited to a certain number of characters and are sorted into categories using hashtags. But these challenges are surmountable, so long as the interest and motivation to improve warning messages remains a priority in research and in practice.

Improving warning messages as addressed in this chapter has three implications for ensuring more people reach safety faster: (1) enhancing effective communication readiness for organizations that issue warnings, (2) eliciting prompt attention to a warning message with less post-message confirmation time before action is taken, and (3) taking appropriate actions that reflect accurate understanding of actions prescribed in a warning message. First, organizations that issue warnings must be ready to communicate to each of the individual cultural biases increase the probability of people paying closer attention to the warnings they send. Such warnings would also elicit a prompter response on behalf of the target audience(s) because the message would be sympathetic to the institutional scaffolding that each person individually and collectively uphold(s). Last but not least, closer attention and a fuller understanding of the warning message and impending threat would prompt appropriate responses and thus ensure more people reach safety and more people effectively protect property to weather the disaster.

Thus, a methodology would have to be formed to categorize tweets and other social media posts to sort the posters into the four cultural bias types. Dehghani et al. (2016) found that tweets can be successfully sorted according to homophily (love of same) such that a social network can be predicted on Twitter based on perceived moral difference and similarity. Such a method could be adopted to sort tweets according to cultural biases, because cultural biases are defined through perceived moral differences. To make this moral difference specific to differences in risk perception for the purpose of identifying social networks that can be targeted for warning messages, a scale of risk would be used.

Gardoni and Murphy (2014) proposed a scale of risk based on (1) perceived consequences (2) perceived probability and (3) perceived source of a given risk. We propose applying Gardoni and Murphy's scale of risk, such that a risk will rank higher on the scale for each cultural bias the larger that people holding that cultural bias perceive the consequences to be, the greater the perceived probability of those consequences occurring, and the more morally culpable the source of the warning is deemed to be by each particular cultural bias. Therefore using this scale and Twitter and/or Facebook posts, people may be sorted using their posted content to determine risk perceptions

that can be scaled and sorted according to cultural biases. Then, a social network of those tweeters can be identified that would enable warnings to be targeted to a social network of hierarchists, or a social network of egalitarians, or a social network of fatalists, or a social network of individualists. Once a warning, tailored to suit each of the cultural biases, is disseminated in its appropriate social network, responses can be tracked and also sorted accordingly to track warning effectiveness.

The greatest challenge is perhaps that of comparability: demographics have been used for so long in so many different research areas that a new set of categories must be tested repeatedly to gain ground. Future studies need to delineate ways of sifting through social media sites to identify characteristics of each cultural bias, so that we might identify particular phrasing strategies to prompt individuals and groups upholding each of the four cultural biases into action. Additional research needs to be done to test the efficacy of what is proposed here: how does formulating warning messages according to cultural bias improve evacuation rates? Is there a significant difference in how the target audience takes action when cultural biases are used to formulate the warnings? In a more connected world of increasing environmental risks, different ways of looking at that world become increasingly important. Cultural biases can provide a lens through which to view the institutions that create our world.

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