

Ready or Not? How Citizens and Public Officials Perceive Risk and Preparedness

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Abstract

The more prepared people are, the less harm they will suffer when disaster strikes. Yet anecdotal and empirical evidence shows that people overestimate their preparedness and are underprepared. While a robust literature has matured around hazards, risk, and vulnerability, and disaster policy, politics, and management, the literature about individual preparedness is much more limited and inconsistent. We know little about why people prepare (or why they do not), and what would make them prepare more. As a result, public managers are at a loss about how to design effective preparedness programs. In this paper, we survey the literature on preparedness to crystallize the gaps in our understanding of when and how citizens react to the threat of disaster. We then examine and compare the views of risk and preparedness held by individuals and government officials drawing on insights from a 4-year study that involved three national surveys and intensive studies in two communities. We use this analysis to address two questions: What do citizens think and do about risks and preparedness, and why? How do local government officials understand what citizens think and do about risks and preparedness?

Keywords

natural disasters, preparedness, risk perceptions

One of government's primary responsibilities is to ensure the safety and security of its citizens. This presents a policy challenge, since communities face multiple, complex hazards, illustrated by the present economic crisis, the continuing threat of terrorism, and the prevalence of major natural disasters. Likewise, citizens share responsibility for their own protection, by taking protective actions and avoiding the harms that may befall them. The more prepared people are, the less harm they will suffer when disaster strikes. Moreover, when citizen preparation and government efforts are in sync, then communities are more resilient to hazards. When citizens and governments are not aligned, dealing with the aftermath of hazards is slower and more expensive.

The scholarly literature and the anecdotal experience of public officials show that people do not understand the risks they face, are not prepared enough for major disasters, and often overestimate their preparedness. Yet we know little about why people prepare (or why they do not), and

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what would cause them to prepare more. While a robust literature has matured around hazard risk and vulnerability, and disaster policy, politics, and management, the literature about individual preparedness is more limited and inconsistent. As a result, public managers are at a loss about how to design effective preparedness programs.

In this paper, we survey the literature on preparedness to crystallize the gaps in our understanding of when and how citizens react to hazards. We then examine and compare the views of risk and preparedness held by individuals and public officials drawing on a 4-year study funded by the U.S. Department of Homeland Security. We use this analysis to address two questions: What do citizens think and do about risks and preparedness, and why? How do local government officials understand what citizens think and do about risks and preparedness? This discussion draws on three national surveys and intensive studies in two communities. The first survey was administered to a stratified national sample of 1,210 individual household decision-makers in fall 2009. A second was administered to a stratified national sample of 816 local public officials in summer 2010. The third survey was administered to a representative national sample of 2,000 individual household decision-makers in fall 2011. To further explore issues raised by the national surveys, in 2009 and 2010 we conducted in-depth examinations of two small communities that face different natural disaster risks. These intensive studies involved surveys of citizens and public officials similar to those we administered nationally, as well as experiments designed to measure risk perceptions and preferences.

Our purpose in this paper is not to present all of the analysis and results that arise from our multiyear project. Rather, we make three contributions: First, we reflect on the literature to help crystallize the state of knowledge about individual preparedness. Second, we use our study to probe gaps and inconsistencies in the literature. Together, our surveys and community studies present a broad picture of individual preparedness, and our project stands with only a few other national-level studies involving large random samples published in the academic literature. It is the only study that involves national surveys of households and local government officials, mirrored by localized cases. Third, we move toward a theory of individual preparedness by investigating an empirical model. Our goal is to support future research and help improve the design of programs to make them more effective at increasing individual preparedness.

The Literature on Individual Preparedness

Disasters have not been a core focus of mainstream public administration research despite their economic impact on the global economy and the devastating consequences disasters have for U.S. communities each year. Nonetheless, there is now a robust theoretical and applied empirical literature on disaster and emergency management that spans the disciplines of political science, sociology, geography, decision science, psychology, economics, environmental science, and others. Major aspects of this literature focus on the policy system and political context of disasters (e.g., Birkland, 1997; Comfort, 1988; May & Williams, 1986; Wamsley & Schroeder, 1996), the institutions responsible for disaster management (see Quarantelli, 1998; Schneider, 1995, 1992; Sylves, 1994), functional response roles and responsibilities, and the extent to which public agencies are capable of fulfilling them (see Perry & Lindell, 2003; Tierney, Lindell, & Perry, 2001; Waugh, 1988), the technical and information management challenges of hazard mitigation and management (e.g., Comfort, 2006; Godschalk, 2003), the challenges of social vulnerability (especially Cutter, 2003; Cutter, Boruff, & Shirley, 2003), and individual behavior post-disaster (Quarantelli & Dynes, 1972).

We focus on a dimension of this policy and management system where the literature is more sparse: individual-level preparedness. Preparedness is the state of readiness for some event or circumstance, and involves acquiring appropriate resources and being organized to use them. The emergency management discipline views preparedness as the set of activities undertaken in

advance of an incident that enable effective response and faster recovery. According to the Federal Emergency Management Agency (FEMA), “Preparedness involves establishing authorities and responsibilities for emergency actions and garnering the resources to support them” (FEMA, 2010: 4-1). Governments typically view individual-level preparedness responsibilities as involving activities like being informed about relevant hazards, developing an emergency communications plan, and maintaining a disaster supplies kit (FEMA, 2004).

How Prepared Are People Personally?

According to an estimate calculated by the Hazards and Vulnerability Research Institute at the University of South Carolina, 91% of Americans live in places at a moderate-to-high risk of a major natural disaster or terrorist attack (Ripley, 2006). Despite clear benefits to individual preparation, and substantial investments in public education and awareness campaigns, conventional wisdom among government agencies is that citizens are woefully underprepared and, at the same time, public programs seem unable to change this reality.

Recent studies repeatedly show that many to most U.S. residents are underprepared. In 2005, the University Consortium for Infrastructure Protection reported that 40% of people nationwide have no plan for communicating in the event of a disaster, and a majority of people “have not discussed nor made any plans at all for meeting or evacuating” (La Porte et al., 2005, p. ii). In 2006, a Council for Excellence in Government survey determined that only 8% of the U.S. population have done everything that is needed to fully prepare for a disaster, while 32% have taken no steps to prepare (CEG, 2007). Even when hazards regularly recur and are predictable, people’s preparedness has been found inadequate (King, 2000). For example, a 2007 study of 2,500 respondents by Harris Interactive for the American Red Cross found that 69% of Americans living in hurricane-prone states do not have a kit and 60% do not have an evacuation plan (ARC, 2007). While the Council for Excellence in Government has observed progress in certain areas (such as improved public awareness and better preparation among seniors), the overall preparedness level of the population has not improved appreciably in recent years. For example, a 2009 Citizen Corps study confirmed that Americans today are no more prepared for a natural disaster or terrorist attack than they were in 2003 (FEMA, 2009), even with intervening events like Hurricane Katrina highlighting the consequences of a major disaster.

Despite these pessimistic findings, many studies find that people view themselves as prepared (see, for example, ARC, 2007; CCPR, 2006; La Porte et al., 2005; National Center for Disaster Preparedness [NCDP], 2007). Some show that people overestimate their preparedness. For example, a Citizen Corps report from a 2007 national survey notes,

even those who reported being prepared were lacking some critical elements of preparedness, e.g. just over a third who said they ‘have been prepared for at least the past six months’ did not have a household plan, nearly 80 percent had not conducted a home evacuation drill, and nearly 70 percent did not know their community’s evacuation routes. (FEMA, 2009, 18)

Likewise, Ablah, Konda, and Kelley (2009) find that while 78% of respondents report feeling prepared, only 45% actually were by objective measures. This disjuncture between citizen beliefs and objective truth is a challenge to preparedness programs.

Why Do People Prepare?

There has been substantial study of postdisaster behavior. For example, scholars have given a great deal of attention to debunking the popular myth that people react to catastrophe by panicking or “freezing,” and the social science literature has long shown that most people act rationally

within the limits of their information and resources (see, for example, James & Wenger, 1980; Johnson, Feinberg, & Johnston, 1994; Quarantelli & Dynes, 1972). But we do not yet have a satisfactory answer to the question of why people do what they do *ahead of* a disaster.

Some authors have tried to identify individual characteristics that predict whether people prepare, or factors that prompt them to prepare. Typically, this research focuses on a particular hazard class, event, or locale. For example, there are bodies of work around tornadoes (e.g., Mulilis & Duval, 1997; Mulilis, Duval, & Bovalino, 2000), volcanoes (e.g., Johnston, Bebbington, Lai, Houghton, & Paton, 1999; Paton, Smith, Daly, & Johnston, 2008; Paton, Smith, & Johnston, 2000), and floods (e.g., Miceli, Sotgiu, & Settanni, 2007). An especially robust literature carefully examines seismic risk and adoption of hazard adjustments. (See Lindell & Perry, 2000 for a comprehensive review.) Major events like Hurricanes Andrew and Katrina have motivated scores of studies, especially in the psychological literature. Regional studies have targeted a variety of geographical areas and communities. Despite this large literature, there are few broad national studies. Bourque and Mileti's 2007-2008 survey of 3,300 households about terrorism preparedness is a notable exception (Kano, Wood, Mileti, & Bourque, 2008).

Findings across these studies are inconsistent, but generally have shown that homeownership, family structure (being married and having children at home), age, education, and income are positively associated with preparedness (Ablah et al., 2009; Edwards, 1993; Miceli et al., 2007; Sattler, Kaiser, & Hittner, 2000), while results are mixed with regard to variation by gender and race. Though some studies find otherwise (e.g., Farley, Barlow, Finkelstein, & Riley, 1993), many have found that those who have experienced a disaster tend to be more prepared (CEG, 2007; Miceli et al., 2007; Mileti, 1999; Mileti & Darlington, 1997; Sattler et al., 2000, among others), and to have adapted and learned from prior experience, making them more effective (Tierney et al., 2001). Research also reveals that attitudes and beliefs are relevant. For example, personal threat (that affect an individual or their immediate family) appears to be more consequential to behavior than is national threat (Huddy, Feldman, Capelos, & Provost, 2002). For some scenarios, it has been shown that people who do not have a lot of trust in government are half as likely to cooperate with government instructions (Lasker, 2004). On the other hand, Basolo et al. (2009) show that high confidence in local government's ability to manage a disaster is positively associated with household preparedness. Lin, Shaw, and Ho (2007) use data from a survey of floods and landslides in Taiwan and find that hazard mitigation activities are positively associated with social trust, risk perception, socioeconomic status, and negatively associated with psychological vulnerability (powerlessness and helplessness). They also conclude that trust plays a critical role in the acceptance of risk mitigation policies.

Another stream of literature considers the role of risk perceptions in a variety of contexts, such as personal medical, public health, and insurance, as well as disaster settings. The logic of disaster preparedness is that risks and hazards can be obviated by appropriate mitigation or readiness actions. It seems sensible that if people perceive risks correctly, they can prepare better—a notion that has prompted many public education campaigns to inform people about the likelihood and potential damage associated with various events. Even if people's perceptions are inaccurate, one might expect their preparedness level to be correlated with the level of risk they perceive.

This has led researchers to ask whether risk perceptions determine preparedness, but the evidence is inconclusive—some studies find a relationship (e.g., Miceli et al., 2007; Sattler et al., 2000), while others find none. Mileti and Darlington (1997) find that objective risk is weakly related to information searching. Paton et al. (2000) cite cases where high levels of hazard awareness are not associated with concomitant preparedness. Looking at three New Zealand studies that compare risk perceptions and preparedness before and after volcanic activity, they find that direct experience shifts risk perception, but neither experience nor risk perception results in better preparedness. They suggest that risk perception is a trigger for the preparedness process, but that actions are a function of expectations, personal attributes (such as self-efficacy), community

norms, and past experience. Moreover, some authors note the dynamic, subjective nature of risk perceptions, which may explain this variation in findings (Hurnen & McClure, 1997; Lindell & Whitney, 2000; Sjoberg, 2000). In a 2008, looking again at volcanic hazard mitigation in New Zealand, Paton et al. find that neither experience of consequences nor public education may motivate people to manage their risk, and conclude that people's willingness to adopt hazard mitigation measures depends on the quality of the relationships between people, communities, and civic agencies.

In addition, risk perceptions about a given threat vary greatly across individuals and groups in the population. Previous experience with hazards appears to be relevant to risk perceptions. As one example, Brilly and Polic (2005) conducted two surveys about flood perception in a town in Slovenia in 1997 and 2003, and found that people's perceptions of threat varies by whether their place of residence had previously been inundated. In addition, considerable research documents cultural and regional differences in risk perception (Renn & Rohrman, 2000), as well as systematic individual differences. Many studies have shown the greater sensitivity to risk of women and members of minority groups, who are more likely to perceive a situation as risky (Flynn, Slovic, & Mertz, 1994). Experts, such as public officials, perceive risks differently from lay persons, but in many cases there is high variability even among experts (Kraus, Malmfors, & Slovic, 1992), calling into question the notion that experts' perceptions are more accurate. Furthermore, a natural disaster creates "lay experts," whose risk perceptions are close to those of "true" experts (e.g., Siegrist & Gutscher, 2006).

Do People Support Government Preparedness Efforts?

Even in the face of recognized disaster risk, government preparedness programs and capabilities are expensive and must compete for public resources with myriad seemingly more immediate priorities. While people's attitudes have been shown to predict support and willingness to pay for public safety services (Donahue & Miller, 2006; Donahue, Robbins, & Simonsen, 2007), Redlener, Grant, Berman, Johnson, and Abramson (2006) find that most adults are not confident in government's ability to oversee spending and set priorities for terrorism and disaster preparedness. Likewise, Harvey (2007) in a review of public opinion data, observes an expanding gap between the rising costs of homeland security and public confidence. He concludes that huge investments in security raise public expectations dramatically, and also exacerbate public frustration when things go wrong even after massive spending. Based on a 2005 survey of over 1,500 Americans, Light (2005) argues that despite the billions the United States has spent on preparedness, most Americans are "deeply confused about what to do in the event of an actual catastrophe" and "are not convinced the nation is well-prepared for actual attacks" (p. 2, 4). An important challenge to government investment in preparedness is that preparing in the absence of an obvious and imminent threat is much more challenging politically than responding once a disaster strikes. As Schneider (1995, p. 9) notes, "When a natural disaster occurs, few people stop to ask whether the government should intervene. Instead, citizens tend automatically to view the situation as a serious public problem requiring immediate governmental action." Waugh and Hy (1990) point out that disaster preparedness confronts several barriers, including the low salience of disasters as a policy issue, the tendency of governments to focus only on the most recent disaster, the difficulty of measuring risk, and a fundamental public distrust of government planning efforts—all set in an environment of fiscal constraints.

Healy and Malhorta (2009) and Gasper and Reeves (2011) provide evidence that politicians underinvest in mitigation because the electoral payoffs are higher for bringing in disaster funding through postdisaster declarations to provide help. Abney and Hill (1966) and Chen (2013) show that there are clear short-term electoral gains for providing relief post-disaster, and Bechtel and Hainmueller (2011) provide evidence from the 2002 Elbe River flood in Germany that electoral

benefits to incumbents persist through several elections. These findings suggest citizens hold their elected officials accountable for disaster response more than for readiness. Consistent with this, Birkland and Waterman (2008, 2009) paint a damning picture of changes in federal policy toward disaster preparedness, as the Department of Homeland Security has shifted the incentives for local governments from mitigation to reliance on postdisaster funding.

In the end, neither scholars nor public officials really understand what drives people to prepare. As Lindell and Perry (2000, 462) point out in their review of 23 studies of people's responses to earthquake hazards:

Many studies in the past 25 years have related respondents' adoption of seismic hazard adjustments to risk perception, demographic characteristics, personal experience, social influence, and other variables. The theoretical constructs, measured variables, and research designs of those studies have varied considerably. The profusion of approaches has yielded a wealth of new and useful ideas, but the idiosyncratic nature of many studies has impeded summarization of this work.

The same could be said of the preparedness literature more generally. In the context of disasters, scholars have studied public institutions and government agencies, the politics of disasters and blame, disaster management and decision-making processes and procedures, social vulnerability, risk and risk perception, and the hazards themselves, and we have a robust literature around these topics . . . , but we still know relatively little about who prepares, why they prepare or why they do not, and what would make them prepare better. This lack of understanding motivates the analysis that follows.

Data

Our discussion draws on two national surveys of individual household decision-makers and one national survey of local government officials. We also conducted intensive studies of two small communities for which we have more specific information about their threats and natural disaster experiences. These two studies also give us insight into the perspectives of a more diverse set of public officials and emergency responders who are charged with planning for natural disasters. This section briefly describes the methods used for the surveys and community studies. All instruments are available from the authors. Further details about the project scope and methodology, the national surveys, and descriptive results are available in project reports (Donahue, 2010, 2011, 2012).

National Surveys

The first survey was a 25-min telephone questionnaire administered to a national sample of 1,210 individual household decision-makers during October 10-16, 2009. The sample was randomly drawn using a stratification structure that included eight geographic regions: four coastal and four interior (corresponding to the U.S. Census regions). The interior strata were sampled in proportion to census population counts. The coastal strata were sampled equally (150 respondents from each) to assure large enough samples. The sample was generated by random digit dialing (RDD) limited to private households with telephones. Computer-assisted telephone interviewing (CATI) procedures were used to administer the questionnaire in English, and no incentive to participate was used. The cooperation rate for the citizen sample was 42%.¹

The survey asked respondents about their personal orientation toward risk, what threats they think their communities face, the likelihood that disaster will strike their communities, and how prepared they think they are for a disaster. To help ground their perceptions, respondents were presented with a variety of disaster scenarios and asked a variety of questions for each, including

what specific actions they had taken to prepare. Those who said they had taken no actions to prepare were asked why. They were also asked who they expect to rely on for help after a disaster, how informed they are about what to do, and how well they can recover.²

A second survey was designed to assess public managers' perceptions of risk and their beliefs about citizen attitudes and behavior, and was administered to a national stratified sample of 816 local public officials between June 1 and October 16, 2010. The strata were the same as for the 2009 household survey. To identify the local public officials, a frame of all municipalities was identified for each stratum. These were sorted by county and place name, and municipalities were selected systematically using a fixed sampling interval to generate an available sample of 2,500 jurisdictions for each. Seventeen-minute computer-assisted interviews were then completed with local officials from at least 100 municipalities in each stratum. To assure consistency, appropriate expertise, and relevant budgetary and policy decision-making authority for the jurisdiction as a whole, we identified our target respondents as each jurisdiction's chief executive officer, whether elected or appointed, or their immediate deputy. The cooperation rate was 43%. The interviews were offered in English, and no incentive to participate was used, except that officials were offered the opportunity to receive a copy of the survey results. This survey asked public officials many of the same questions that were asked of individuals, as described above. In addition, local officials were asked how well prepared their residents are, why their residents do not prepare, who they think their residents are likely to rely on after a disaster, and how well they think their residents can recover from a disaster.

The third survey was a 21-min telephone interview of a representative national sample of 2,000 individual household decision-makers conducted in November and December 2011. A national database of residential telephone listings was randomly sampled in proportion to U.S. census population counts for each state. The location of each respondent with respect to the regional strata used in 2009 was also identified. CATI procedures were used to administer the questionnaire in English, and no incentive to participate was used. The cooperation rate was 11%. Several questions from the 2009 survey were replicated in this survey.

Community Studies

To help us explore our research questions in a more nuanced way, we also conducted two intensive community studies. The communities were chosen to reflect similar contexts but different natural disaster risks: One was on the Gulf Coast, had been struck by a Category 1 hurricane within the past decade, and had experienced numerous mandatory evacuations for hurricanes. The other community was in the same state, and therefore subject to the same policies and regulations, but located more than 200 miles inland. That community had experienced periodic minor flooding and rare tornadoes, but no other natural disasters. Both communities were small (population < 20,000).

In each community, a sample of individual citizens and a sample of local officials were recruited to participate. Residents in the two communities were selected from neighborhoods matched according to demographic characteristics (income, employment status, and age) using census data. Recruiters thoroughly canvassed the neighborhoods, contacted participants at their homes, and asked them to participate in a study that included a decision-making component and a questionnaire similar to the national surveys described above. Public officials in the two communities were recruited from among elected officials (mayors, county judges or commissioners, and city council members) and appointed civil servants (city managers, emergency managers, first responders, and others involved in city planning). The study consisted of two components: a survey that included many of the questions on the national survey, and a set of incentivized decisions designed to assess risk tolerance, future orientation, and cooperation with other community members. All participants were paid \$20 for completing the survey, and could earn

additional money for the incentivized decision-making tasks. (Average earnings were \$80 for the 2.5-hr study.) The study was carried out in two waves: The first occurred between July 12 and October 5, 2009, and the second between April 14 and June 14, 2010. A total of 253 individuals and 44 officials participated.

Findings

We ask two questions: What do citizens think and do about preparedness, and why? How do local officials understand what citizens think and do about preparedness? We address these questions in three steps. First, we use the literature to identify and operationalize characteristics that have commonly been used to influence preparedness, create an empirical model, and use the survey data from our large national random samples to explore what factors matter to individual preparedness to help address some of the inconsistencies in the literature. Next, we use the survey data to compare citizen perspectives on preparedness with those of local officials. This allows us to see whether citizens and public officials share common beliefs about preparation, and in particular to look at why people do not prepare. If there is a mismatch between individual perceptions and the beliefs that public officials hold about them, then the preparedness programs public officials design may not fit citizen preferences. Our third step examines this possibility by using an incentivized decision-making experiment to compare the choices officials make for citizens with the choices citizens make for themselves.

Measures and Descriptive Findings

From studies that attempt to predict the likelihood that someone will prepare, it is clear that people vary in their level of preparation, and those variations are correlated with observable characteristics like gender, race, and education. The question is why—it is probably not that people's preparation is caused by their demographic characteristics. As Paton et al. (2000) propose, "while the perception of a threat triggers the process, risk reduction behaviour is a function of outcome expectancies, self-efficacy, coping style, past experience and community norms." Thus, we expect that people's preferences and perceptions drive them to prepare (or not), and we therefore examine three broad categories of explanatory variables for preparedness: environmental and personal characteristics, preferences, and perceptions. We discuss these here, and descriptive statistics are given in Table 1. To conduct our analysis, we pool the data across the 2009 and 2011 citizen surveys.

Preparedness. We use three measures of individual preparedness as dependent variables. Our primary measure (*Prepared*) is the response to a question that simply asked respondents how well prepared they are for a natural disaster, to which they replied on a four-point categorical scale from very prepared to not prepared at all. On average respondents believe themselves to be somewhat prepared. Fewer than 26% in the 2009 survey and 20% in the 2011 survey feel they are not very prepared or not at all prepared. Our second measure (*Capacity*) is the response to a question that asked respondents how well they would bounce back from a natural disaster, which is an indirect measure of preparedness in the sense that the more prepared someone is, the greater their capacity to recover. Capacity is measured on a scale from 0 (not able to recover at all) to 10 (able to recover completely) and the average response is 7.1, indicating respondents feel very able to recover after a disaster. The third measure (*Behavior*) is assayed by the actions by respondents. In the 2009 survey, respondents were asked to tell us, in their own words, what specific actions they had taken to prepare their household for a major natural disaster. Their responses were coded into seven categories (e.g., made a family emergency plan, stockpiled food and water, etc.). Those who had taken one or more actions were coded as prepared (*Behavior* = 1) and those who

Table 1. Descriptive Statistics for Pooled Data From the 2009 and 2011 Surveys of Individual Household Decision-Makers.

Variable	Definition	<i>n</i>	<i>M</i>	<i>SD</i>	Minimum	Maximum
Prepared	How well prepared a respondent thinks they are for a natural disaster (1 = not; 4 = very)	3,188	2.94	0.79	1	4
Capacity	How well a respondent thinks they would recover from a disaster (0 = not able; 10 = completely)	3,052	7.07	2.31	0	10
Behavior ^a	Whether a respondent has taken specific actions to prepare (1 = has taken actions)	1,205	0.76	0.43	0	1
Male	Whether the respondent is male (1 = male)	3,208	0.46	0.5	0	1
Age	The respondent's age	3,063	56.81	15.04	17	96
Education	A respondent's education level (1 = less than grade 12; 5 = graduate degree)	3,164	3.44	1.16	1	5
White	Whether the respondent is White (1 = white)	3,063	0.82	0.38	0	1
Married	Whether the respondent is married (1 = married)	3,144	0.62	0.49	0	1
Average Loss	The natural log of the average dollar cost per disasters over the past 5 years	3,196	12.58	2.14	6.91	19.3
Risk Tolerance	Whether respondent sees themselves as a person takes risks (0 = avoids risks; 10 = enjoys risks)	3,186	5	2.92	0	10
Self-Reliance	How much respondent would rely on themselves versus govt. after a disaster (-10 = govt.; 10 = self)	3,175	1.36	2.99	-10	10
Future Orientation	Whether respondents see themselves as focused on the future (0 = present only; 10 = future only)	3,168	5.58	2.74	0	10
Compliance	How likely respondent is to follow directions by govt officials after a disaster (3 = not; 12 = very)	3,154	8.37	3.34	3	12
Homeowner	Whether the respondent owns their home (1 = homeowner)	3,141	0.81	0.39	0	1
Disaster Experience	Whether a respondent has personally experienced a disaster (1 = has experienced a disaster)	3,182	0.5	0.5	0	1
Likelihood	How likely a respondent thinks a major disaster in their community is (0 = not; 10 = extremely)	3,120	3.82	2.91	0	10
Consequence	How much a respondent has thought about the consequences of a disaster (1 = not; 5 = a great deal)	3,178	3.52	1.25	1	5
Informed	how informed a respondent feels about what to do in the event of a major disaster (1 = not; 4 = very)	3,183	3.15	0.76	1	4

^aBehavior was only measured in the 2009 survey.

had done nothing were coded as unprepared (*Behavior* = 0). On average 76% had taken some specific action. Not surprisingly, these three preparedness measures are significantly correlated, ranging from a low of $r = .22$ for *Behavior* and *Capacity*, to a high of $r = .51$ for *Behavior* and *Prepared*.

Environmental and personal characteristics. As noted above, considerable research has sought to identify common individual characteristics that lead people to prepare. Following the literature, we use a number of standard demographic variables in our analysis, including gender, age, education level, race, and marital status.³ An additional environmental variable measures the extent to which the county in which a respondent lives has been affected by recent disasters. Here, we rely on data from the Spatial Hazard Events and Losses Database for the United States (SHELDUS),⁴ a county-level hazard data set made available by the Hazards and Vulnerability Research Institute at the University of South Carolina that records all disaster events, including the costs of each, for 18 different natural hazard categories (e.g., hurricanes, floods, wildfires, etc.) from 1960 to 2011. To create our variable (*Average Loss*), we divided the total (agricultural and non-agricultural) dollar costs of disasters by the number of events over the past 5 years, then converted this average to a natural log. This gives us an objective measure of the disaster experience in each county, where higher average values indicate more severe impacts.

Individual preferences. A second set of independent variables reflects underlying individual preferences that are considered important determinants of behavior in a variety of settings. For example, some people are risk takers and others are not. Some people think about the future and others do not. These preferences may affect whether and to what extent a person chooses to prepare. For example, we might expect that a risk taker who does not think much about the future would not bother preparing. Our first variable, *Risk Tolerance*, is based on a question that asked respondents whether they see themselves as a person who takes risks, ranging from 0 (avoids risks) to 10 (enjoys risks). On average, respondents are in the center of the scale. We also asked a question about respondents' *Future Orientation*, where 0 indicated they see themselves as focused only on the present and 10 indicated they focused only on the future. Again, respondents are about at the middle of the scale on average. Two items, also on a 0 to 10 scale, asked respondents the extent to which they would rely on themselves and on their local government in the event of a natural disaster. We took the difference between the responses to these items to generate a measure of *Self-Reliance*, where positive values indicate a respondent is relatively self-reliant and negative values indicate a relatively strong reliance on local emergency responders. On average, respondents see themselves as self-reliant. Finally, we created a measure of *Compliance* using three items that asked respondents whether they are likely to follow directions by local government officials, state officials, and federal officials after a disaster, ranging from 1 (not at all likely) to 4 (very likely). These items scale together (Cronbach's $\alpha = .76$), and we add the responses. Respondents average 8.4 on this 12-point scale.

Individual perceptions. Finally, we develop a set of variables that measure how people perceive the benefits and costs of preparing. These include a dummy variable for whether a respondent owns a house (*Homeowner*), since this is a major asset that respondents are likely to want to protect. Eighty-one percent of respondents are homeowners.⁵ We also asked whether respondents had personally experienced a major natural disaster (*Disaster Experience*). Experience provides a respondent with a sense of how a disaster could affect them, and may make the costs and benefits of preparing more evident. Almost half of respondents indicated they had experienced a disaster. We also include three attitudinal items. One item asked the likelihood that a major disaster will happen in their community (*Likelihood*), a subjective assessment with values ranging between 0 (not likely at all) and 10 (extremely likely), with an average response of 3.82. A second item

Table 2. Ordered Logit Regression Models Predicting Preparedness Self-Assessment.

	Model 1	Model 2	Model 3
Male	0.223** (0.0736)	0.144 [^] (0.0760)	0.104 (0.0799)
Age	0.00470 [^] (0.00241)	0.00509* (0.00248)	0.00189 (0.00261)
Education	0.131*** (0.0323)	0.0811* (0.0335)	0.0297 (0.0356)
White	0.214* (0.0972)	0.273** (0.100)	0.221* (0.106)
Married	0.232** (0.0769)	0.255** (0.0790)	0.0711 (0.0852)
Average loss	-0.0144 (0.0191)	-0.0111 (0.0196)	-0.0152 (0.0203)
Risk tolerance		0.0781*** (0.0135)	0.0665*** (0.0142)
Self-reliance		0.0749*** (0.0133)	0.0671*** (0.0139)
Future orientation		-0.0244 [^] (0.0141)	-0.0174 (0.0147)
Compliance		0.0603*** (0.0119)	0.0819*** (0.0128)
Homeowner			0.279** (0.107)
Disaster experience			0.333*** (0.0805)
Likelihood			-0.00728 (0.0145)
Consequence			0.378*** (0.0352)
Informed			0.966*** (0.0587)
Cut 1 Constant	-1.740*** (0.328)	-0.935** (0.359)	2.816*** (0.408)
Cut 2 Constant	-0.267 (0.323)	0.569 (0.356)	4.541*** (0.410)
Cut 3Constant	2.351*** (0.326)	3.252*** (0.362)	7.694*** (0.431)
Observations	2,885	2,782	2,678
Pseudo R ²	.018	.033	.129
LI	-3,172.1	-3,017.1	-2,619.8

Note. Standard errors in parentheses. Fixed effects for region not shown.

[^] $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

asked how informed a respondent feels about what to do in the event of a major disaster (*Informed*), which was measured on a 4-point scale from “not at all” to “very,” with an average of 3.15. The final item asked how much a respondent has thought about the specific consequences for their household of a major disaster (*Consequence*), measured on a 5-point scale from “not at all” to “a great deal,” with an average of 3.52. We argue that all of these elements will enter into a person’s calculation about whether and how much to prepare. For example, we might expect that a renter who has never experienced a disaster, thinks it unlikely, and rarely considers the impact would have little reason to invest in preparation.

Who Prepares?

To help understand why people prepare, we estimate a variety of models of individual preparedness, as shown in Table 2. To begin, we use our primary measure of preparedness as the dependent variable and compare a set of models that first account for demographic characteristics only, then also include environmental and personal characteristics, and finally add perceptions. This strategy allows us to systematically examine different classes of explanations for why people prepare: demographic, preferential, and perceptual, as described above. We then check the robustness of our findings by comparing models that use each of our three alternative dependent variables and the full set of independent variables.

Table 2 presents three models that use the dependent variable *Prepared*. The models were estimated using ordered logit and include fixed effects for region. The first model includes only demographic variables. In line with previous findings, being an educated, married, White male is associated with being better prepared. (Age is also positively associated with preparedness, but

only at the $p < .10$ level.) Race and education may indicate wherewithal—White people are more likely to have access to resources and educated people are more equipped to understand what to do. This is consistent with the literature on social vulnerability, which is higher among members of minority groups. As some literature suggests, marital status and gender may indicate responsibility for family members. Surprisingly, the average loss from disasters that has actually occurred in a respondent's county is not significantly related to preparedness. We examined alternative specifications and interactions of these variables, and found this model to be robust, but the demographic variables explain little of the variance in the dependent variable.

The second model in Table 2 adds the variables that characterize individual preferences. Notably, people who are more risk tolerant and more self-reliant report being more prepared. Risk-tolerant people may be more aware of risks and have a better sense of what confronting those risks requires. Self-reliant people have an inclination to be ready to take care of themselves, perhaps because they do not expect help to be readily available—Indeed, governments routinely warn communities that it will take time before aid arrives in a disaster zone. Surprisingly, people who focus more on the future are less likely to be prepared, though this effect is only marginally significant. It may be that because they pay attention to the magnitude of what could happen, they feel inadequately prepared. Finally, those who are most likely to comply with government instructions in the wake of a disaster also are more likely to be prepared. People who expect to listen to public officials after a disaster may also heed government advice to prepare ahead of time. Adding these preference variables begins to dampen the size and significance of the coefficients on several of the demographic variables. Being White and married retains its independent effect, but the effects for education and being male are cut in half. Thus, preferences provide additional explanation for preparedness beyond the demographic effects. While there is a significant improvement in model fit between Models 1 and 2, however, the proportion of the variance that is captured is only 3.3%.

The third model in Table 2 includes perceptions of the cost and benefits of preparing. Four of these five variables are significantly related to individual preparedness. A person's assessment of the likelihood of a disaster is not significantly related to their preparedness. On the other hand, homeownership has a strong, positive relationship. Homeowners face an obvious loss if disaster strikes their property, and may also have more incentive to prepare to reduce insurance premiums or avoid uncovered costs, while renters have less at stake. If a respondent has experienced a natural disaster, this also has a strong, positive coefficient. Those who have thought about the consequences of a natural disaster, and those who feel informed about what to do, are much more likely to be prepared. Experience, information, and forethought may operate in similar ways: Experience makes people more aware of the reality of their circumstances, and they respond accordingly (and appropriately), while people who lack experience have little knowledge of how bad it can be. Likewise, people who have thought about consequences—even if they have never experienced a disaster—have imagined the conditions they may face. And people who have collected information about what to do when they do face the consequences of a disaster use it to prepare better. Model 3 is a significant improvement in fit, and coefficients on individual preferences such as risk tolerance, self-reliance, and willingness to comply all retain significance and magnitude. Among demographic measures, however, only being White remains significantly correlated with preparation; the remaining effects disappear.

It may be that the way we have measured preparation is an aberration and our analysis would fail to hold up using other measures of preparedness. To examine this, we estimate Model 3 using our other two dependent variables, *Capacity* and *Behavior*, described above. Figure 1 reports the point estimates using Model 3 for each of these dependent variables. For each variable, the figure indicates the coefficient and its 95% confidence interval. The magnitude of the coefficient is along the horizontal axis. The dotted vertical line indicates a coefficient of zero. The estimates

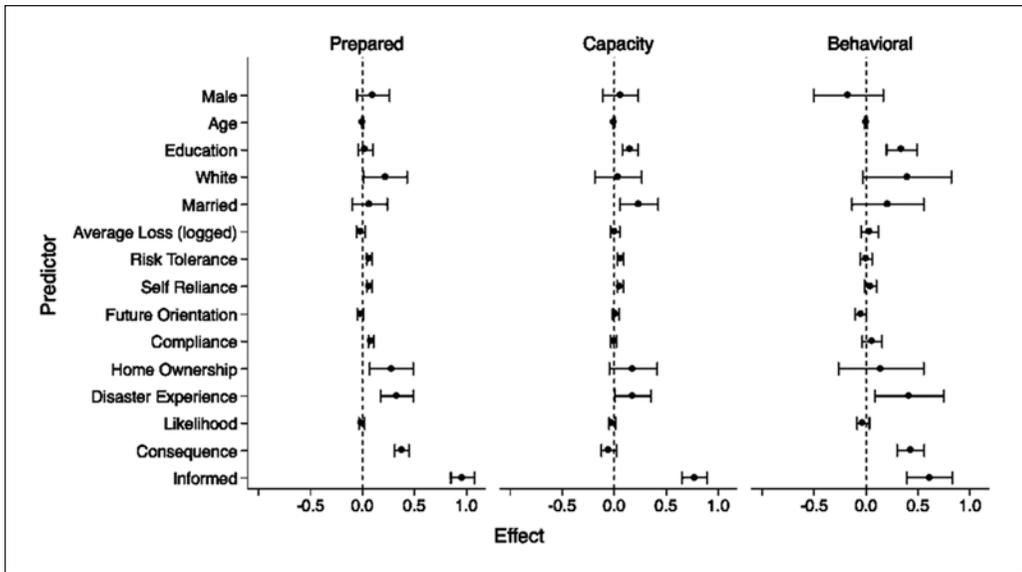


Figure 1. Comparison of alternative measures of preparedness as dependent variables. Note. Dependent variables: “Prepared” is estimated using ordered logit. “Capacity” is estimated using OLS. “Behavior” (2009 data only) is estimated using logit. All models include fixed effects for region.

discussed above (Table 2) hold up across the different measures of preparedness, which gives us confidence in our general model.

In sum, our analysis shows that people who are White, male, educated, married, risk-tolerant, self-reliant, compliant with government direction, and homeowners, and those who have experienced a disaster, thought about the consequences, and feel informed about what to do, are more prepared. Those who are minorities, female, poorly educated, unmarried, risk-averse, dependent on others, but unlikely to comply with government directions, and who are renters, have not experienced a disaster or thought about the consequences, and who do not feel informed about what to do, tend to be less prepared. Our unique access to large national random samples lends confidence in these findings, and helps address some of the inconsistencies in the literature. Moreover, while we confirm that people vary in their level of preparation in ways that are correlated with observable characteristics like gender and race, when we control for individual perceptions and preferences directly, we get a better sense of who prepared people are. People’s level of preparation is correlated with their demographic characteristics, but the reason for those correlations has to do with their preferences and perceptions, which happen to be correlated with their demographic characteristics.

Comparing Public Officials and Individuals

We now turn to the question of whether citizens and public officials share common beliefs about individual-level preparation. We explore the question of how individuals’ perceptions compare with those of government officials using data from our three national surveys and the similar questions asked in our two small community studies. Table 3 shows how each group of respondents assesses how well-prepared individuals are. The first and second columns of the table show how well-prepared the national samples of individuals feel. Roughly 75% to 80% claim to be somewhat or very prepared. Very few admit they are not prepared. When public officials are asked how well prepared their citizens are, however, a different picture emerges (third column).

Table 3. Difference in Citizen and Local Official Assessments of Citizen Preparedness.

How prepared are you [your citizens] for a major disaster?	Citizen self-reported preparedness (2009)	Citizen self-reported preparedness (2011)	Public Official Assessment of Citizens (2010)
Very prepared	23.4	21.2	29.5
Somewhat prepared	50.8	59.3	24.3
Not very prepared	17.9	14.2	26.6
Not prepared at all	8.0	5.3	19.7
	<i>n</i> = 1,207	<i>n</i> = 1,981	<i>n</i> = 815

Table 4. Why People Do Not Prepare.

	National sample		Small community sample	
	How people assess themselves	How local officials assess citizens	How people assess themselves	How local officials assess people
They know they should, but have not gotten around to it	24.3	20.4	41.98	31.82
They think that getting ready will not make a difference	5.3	3.0	2.47	0.00
They think that it is not their responsibility	1.2	7.9	1.23	13.64
They would rather not think about bad things happening	14.2	4.3	11.11	4.55
They do not think it is going to happen to them	23.5	35.1	2.47	31.82
They just do not feel like it	4.9	2.5	3.70	0.00
They do not know what to do	16.6	9.0	27.16	9.09
They think that it takes too much time, effort, or money	8.1	17.8	7.41	9.09
Other	2.02	0.0	2.47	0.00
	<i>n</i> = 247	<i>n</i> = 796	<i>n</i> = 81	<i>n</i> = 22

Note. Results here are for citizens in 2009, and include only the subsample of 247 who reported that they had done nothing to prepare. The responses are different between citizens and public officials ($\chi^2 = 93.75, df = 8, p < .001$). The two small community groups are different (using top five categories across both groups, $\chi^2 = 26.25, df = 4, p < .001$).

Interestingly, public officials are more likely to view their citizens as very well prepared than citizens are themselves. At the same time, they are more likely to classify a substantial portion of citizens as unprepared, and generally public officials are more skeptical about how prepared people are than individuals are on average.

To understand why a substantial portion of people are not very or not at all prepared, we asked the individuals in 2009, who said they had not taken any action to prepare to indicate why they had not, using a predefined set of response options. Using the same question structure, we asked local officials in 2010 why citizens do not prepare. The proportions of respondents by reason are shown in Table 4. The top reasons individuals give are that they procrastinate (24% say “they know they should, but they haven’t gotten around to it”), they are in denial (24% “don’t think it will happen to me” and 14% “would rather not think about bad things happening”), or they do not know what to do (17%). Public officials agree that people procrastinate (20%), but are much more likely to believe they are in denial (35% think people do not think it will happen to them). Officials also believe that people think “it takes too much time, effort, or money” to prepare (18%). The differences between the perceptions of individuals and officials are statistically significant.

When we look at the community-level samples (columns 3 and 4), the distribution of responses demonstrates that, even when they are in the same setting, officials and their own citizens hold different views about why individuals are not better prepared. Here citizens are much more likely to procrastinate and public officials agree, although not to as great an extent (42% vs. 32%, respectively). The next most likely explanation offered by citizens is that they lack information (27%), while 32% of public officials think their citizens are in denial. These samples are small, but the differences are statistically significant.

To this point, we have modeled citizen preparedness and shown that a subset of predictors characterize who is likely to prepare. We have also shown that the views of public officials do not match those of citizens, which suggests there is a disconnect between what government thinks should be done and what citizens want to do prior to a disaster. This leaves public officials in a quandary, since the literature shows that public officials are seldom rewarded for devoting resources to predisaster mitigation and preparation, yet are penalized after the fact if the response turns out to be insufficient. We now turn to the question of whether this disconnect might lead public officials to make policy choices that do not reflect what their citizens want.

What Officials Choose for Citizens

As we have shown, public officials often believe that citizens are insufficiently prepared for natural disasters. This could be because officials believe citizens are uninformed about the relevant risks, or officials could believe citizens make the wrong choices about how much risk to bear. Using data from our two community studies, we examine whether public officials are correct in their beliefs about citizen choices. In effect, we look for the presence of stereotypes held by officials that may bias their assessment of citizen behavior toward risks.

Our vehicle for this element of the study is a simple, incentivized game designed to assess an individual's risk tolerance: that is, their willingness to accept additional variance in payoffs to obtain a higher expected payoff.⁶ In this game, an individual faces a choice among six different gambles, as illustrated in Figure 2. Each oval represents a gamble with equal odds of a high or low payoff, indicated by the dollar bills in the ovals. Each participant was required to choose one of the gambles, his most preferred, which would be played out at the end of the study. Any earnings would be paid in cash, and his to keep. Losses would be deducted from his show-up fee. (Note that the individual could guarantee himself \$40 by selecting the safe, upper right gamble.) Moving clockwise around the page, the gambles increase in variance and expected payoff except for the final gamble: It has a higher variance, but no higher payoff, and should be selected only by those who are risk-seeking. In the first wave of the community studies, citizens and public officials in both of our communities participated in this experiment.

In the second wave of the community studies, we selected 32 representative citizens, including men and women, older and younger, with different levels of income, and who lived in each of the respective communities. Each public official was given information about four randomly selected citizens from their own town, including each person's gender, age, income, and the street intersection near where they lived, and then asked first to *guess* which gamble that person chose, and second to make a *choice* for that person. The payoffs were structured to give the official an incentive to guess accurately, and the officials were told that the person would actually receive the payoff from the chosen gamble. The *guess* provides a measure of the public official's beliefs about the citizen's choices for himself, and the *choice* provides a measure of the officials' assessment of the right decision to make.

In Table 5, we analyze the guesses and choices, controlling for the public official's own risk choice (for herself). In the analysis that follows, the choices are coded as Gamble 1 (\$40 for sure) through Gamble 6, and this gamble number is used as the dependent variable. Thus, a positive coefficient indicates greater risk tolerance. The first column examines the officials' beliefs about

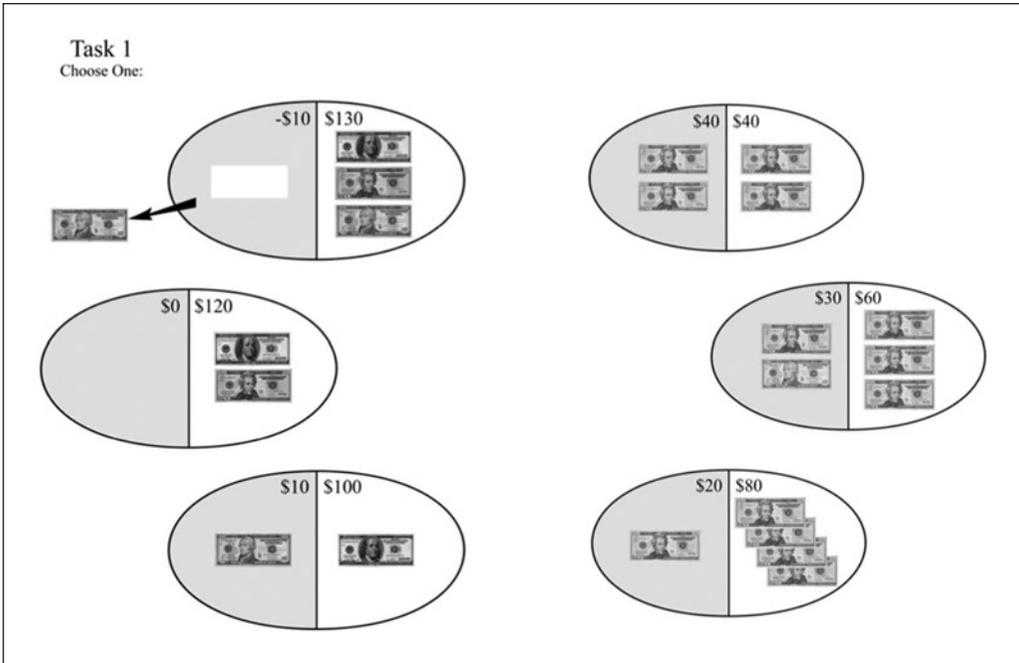


Figure 2. Risk game choices.

Table 5. Public Official Beliefs and Choices for Citizens (Random Effects OLS).

	Official beliefs about citizen choice	Official choice for citizen	Bias in decision (official choice minus citizen choice)
Citizen gender (1 = female)	-0.531**	-0.191	-0.335
Age of citizen	-0.024***	-0.013*	-0.005
Income of citizen	0.092	0.113	0.068
Official gender (1 = female)	-0.250	-0.710	-0.846
Official income	0.089	-0.115	-0.136
Official own choice	0.087	0.309*	0.363*
Constant	2.995**	2.982**	0.320
Observations	128	128	128
R ²	.14	.12	.08

*p < .05. **p < .01. ***p < .001.

citizens. The negative significant coefficient on gender indicates that officials believe women to be less risk-tolerant than men. Similarly, they believe older subjects are less risk-tolerant, choosing lower-risk, lower-return alternatives. There is no significant effect of the official's characteristics (gender, income, or own gamble choice), indicating that male and female officials have these expectations.⁷ The second column examines the official's decision for the citizen. Here the official's own choice has a clear effect on their choices for others, indicating that their beliefs about the right decisions for others is affected by their own preferences. The demographics of the citizens are less important, with only age showing significance. That is, while officials' beliefs about citizens are biased by their stereotypes about others (women, older people), in their choices for citizens those biases are largely absent, replaced by a strong influence of their own risk tolerance. This suggests a paternalistic approach to choices for others.

Finally, in the third column the dependent variable is a measure of bias, and consists of the difference between the official's choice for the citizen and the citizen's choice for himself. A significant coefficient would indicate a bias in choices for others. The only bias seen is the official's own choice for herself. One way to interpret this is to note that a lower, more risk-averse choice by the official for herself means that she chooses more risk-averse alternatives for her citizens than they would choose for themselves.

In sum, this part of our investigation shows that public officials have stereotypes (biases based on demographic characteristics) about citizens; specifically that women and older citizens are less risk tolerant. Their guesses about what other people will do are biased by these stereotypes. But when officials make choices for others, their actions are not biased in the same way, suggesting that officials think there is a "right choice" that does not vary by the nature of the individuals. Notably, public officials believe they are making decisions for people that are different from what those people would make for themselves, but they are not in fact: The decisions they make are approximately what people would do for themselves. Then, paternalism seems to "work," in that officials make the choices people prefer even when their guesses about citizen preferences are wrong. The exception is that officials' own preferences do induce bias in a different way by producing variance in the decisions they make for others—In other words, officials have their own innate bias toward or away from risk, and this shapes their views of the choices of others.

If this experimental finding generalizes to the domain of natural disaster decision-making, this could mean that public officials' perceptions of people's risky behavior (i.e., failing to prepare) are also wrong. Citizens do not appear to be unhappy with their levels of preparation, and perhaps they are correct in making these choices for themselves. Indeed, it may be that officials misperceive the preparedness levels of citizens, and that what citizens are in fact doing for themselves is closer to what officials believe they should do than the officials realize.

Conclusion

From a public perspective, the more people prepare, the better. But people are underprepared and less prepared than they think they are. This led us to ask why people do not prepare more, a puzzle to which answers have long been unsatisfying—55 years ago Fritz and Williams (1957) opened their article on humans and disasters by asserting, "Many groups and agencies have a vital need of accurate information on how people behave during disasters" (p. 42). Since that call, we have learned a lot about how people behave *after* disasters, but we still do not understand what they do ahead of them. This frustrates policymakers and public managers trying to design programs to improve preparedness.

Our approach has been to review the literature to understand how others have predicted preparedness, develop a model that synthesizes core insights from prior studies, and examine it using data from large national samples. We find that individual preparation is correlated with demographic characteristics, confirming the results of prior studies. We show, however, that it is not these characteristics per se, but rather people's underlying preferences and perceptions, that drive preparation. That is, people prepare because they see it as in their interest to do so. Those with higher incentives to prepare and for whom the potential consequences are more salient are more likely to prepare. This confirms what other narrower studies have hinted at.

Another interesting factor is that those who prepare are informed—that is, they take risk seriously enough to find out what they need to know to prepare. Yet while those who are informed are prepared, those who are not prepared claim not to know what to do. This suggests the information provided by governments either does not reach citizens, or is not the information citizens want—either way, just adding more of it will not help. Moreover, the conventional logic of disaster preparedness turns on convincing people to react appropriately to the objective risks posed by various hazards. We have seen, however, that the actual disaster experience of a

jurisdiction does not affect whether citizens prepare, which suggests that simply educating people about objective risk will not be very effective.

Moreover, we now have more detailed insights about the unprepared—those whom preparedness information needs to reach—and policymakers need to think creatively about how to reach them. Present policy at a national-level treats all individuals the same, but individuals are not uniform, but rather differ in their incentives and preferences for preparation. Our research suggests that policymakers may be more successful in reaching their goals for a prepared citizenry with a more flexible preparation approach tailored to different types in the population that treats different people differently.

Furthermore, we confirm that public officials see citizens differently from how citizens see themselves. Public officials think people are less well prepared than people think they are. Public officials also tend to attribute lack of preparedness to procrastination, denial, or stinginess, while citizens also feel like they do not have the information they need and are uncomfortable focusing on the possibility of disaster. Even in instances where individual and public officials have similar views, they may have different foundations. For example, a top reason people give for not preparing is people do not think it will happen to them. Public officials also believe this is why citizens do not prepare, but view this as a state of denial on the part of citizens, rather than a rational assessment. In truth, citizens' lack of preparedness—and lack of inclination to prepare—may be rational, given that disasters are relatively rare events in any particular jurisdiction.

Conventionally, preparedness programs have a “just in case” orientation, exhorting people to prepare now even when there is no obviously impending threat. It may be that citizens are more inclined toward “just in time” preparedness strategies. As many citizens (rightfully) assess that disaster is not that likely to strike them personally, they are less inclined to invest time, energy, and money in getting ready and staying ready. Given that big disasters are unpredictable with respect to time, place, and effect, it would be more efficient to enable people to prepare just in time, rather than expecting them to continuously maintain a level of readiness that is rarely used.

Finally, it does seem that public officials might be off-base in their assessment of the actions and preferences of their citizens. Their predictions of the decisions of others are paternalistic and based on stereotypes. That said, when they make decisions for others these judgment-based decisions are *not* based on stereotypes. At the same time, the public officials' own choices for themselves bias their choices for others. This means public officials need to take care not to impose their own wishes on others, and to take into account that others may have different opinions about the right thing to do, which suggests programs that accommodate flexibility about the “right” level of preparation might be more effective.

It is not surprising that public officials have a different view of disaster preparedness from citizens. Public officials have more information about risks and resources, and it is their responsibility to think broadly about how to apply response capabilities to mitigate risks. Moreover, the fact that public officials are incorrect about what citizens think does not mean that they are incorrect about citizens. The literature does show that people tend to overestimate how prepared they are. Public officials, who are less sanguine about how prepared citizens are, may also have a better sense of the reality of public preparedness. At the same time, this disconnect could help explain why preparedness programs seem to have been ineffective at improving preparedness. In short, people act based on their perceptions, and so public policies must account for what people think and feel if they are to influence behavior.

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Authors' Note

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Notes

1. This represents the proportion of respondents that participated in the survey (i.e., the number of completed surveys divided by the sum of completed surveys, refusals, and terminations).
2. Not reported here, the survey also involved a substantial component using contingent valuation to gauge respondents' willingness to pay for preparedness and willingness to accept risk.
3. We asked respondents about income, monthly expenditures, and savings, but the response rates on these questions were too low to include these in our final analysis, though we see a positive, significant correlation of each of these variables with preparedness. Education and income are also correlated ($r = .50$), and education is included in our analysis to capture variability in income.
4. A detailed explanation of SHELDUS is available at <http://webra.cas.sc.edu/hvri/products/sheldus.aspx>, where the data may also be downloaded.
5. This is somewhat higher than the 2009 national average, when 67.4% of units were occupied by the owner.
6. Games like this present subjects with alternatives that carry real financial consequences. Evidence suggests that these "real" decisions are a better gauge of an individual's preferences than hypothetical decisions or self-reported surveys. Similar games have been used in many settings to assess risk tolerance, beginning with Binswanger's (1980, 1981) study of agricultural investment in India. The present version was adapted from Eckel and Grossman (2008). For this study, we developed a simple, intuitive interface, using graphic representation of the gambles. This representation proved effective, as subjects found the decision easy to understand. Note that the full protocol included a series of five incentivized "tasks," of which this was the first.
7. Examining the actual decisions of citizens (not shown), we see that there is no significant difference by gender or income, and age carries a positive, significant sign, opposite that of the official's beliefs.

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