

# FEMA versus local governments: influence and reliance in disaster preparedness

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**Abstract** This study uses an experimental approach to examine whether disaster information sourced to the Federal Emergency Management Agency (FEMA) influences intentions to adopt hazard adjustments. Survey questions are also used to determine whether individuals rely more on FEMA or local governments when preparing for disasters. Using an online sample of 2008 US employees, the results indicate that information sourced to FEMA is no more influential than information sourced to local governments and that individuals rely less on FEMA than on local agencies during disaster preparedness. These results have significant implications for practice and future research on natural hazard preparedness.

**Keywords** Natural hazards · Disasters · FEMA · Preparedness · Local government · Experiment

## 1 Introduction

Organizations are expected to adopt preparedness measures, such as obtaining disaster information, in order to be ready for natural disasters (Huss et al. 2012). In this study, disaster information is any piece of hazard adjustment information that can help to reduce the impacts of natural disasters on organizations. Hazard adjustments are “... actions that intentionally or unintentionally reduce risk from extreme events in the natural environment” (Lindell and Perry 2000: 461–462). While there are many sources of disaster information—state and local agencies, news media, businesses, nonprofits, and educational

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and research institutions (Henstra 2010; Huss et al. 2012)—this study focuses on the Federal Emergency Management Agency (FEMA), a key source of disaster information and an important US federal agency for disaster preparedness.

Previous studies have established a positive relationship between disaster information and the adoption of hazard adjustments at the individual and organizational levels (Basolo et al. 2009; Huss et al. 2012; Perry and Nigg 1985). This study builds on this literature by using social influence theory (Asch 1955; Deutsch and Gerard 1955) to explore whether FEMA is an influential provider of disaster information. In this study, influence is the use of persuasive power to change the behavior of others (Carlson et al. 2000; Levi 2007). Social psychologists have examined the concept of social influence in great detail, but the topic of influence has not received much attention from natural hazards scholars despite its relevance to decision-making (Jensen 2007; Magee and Frasier 2014).

This study contributes to the body of the literature on public agency influence in the context of disaster preparedness by examining a first research question: Is FEMA an influential source of disaster information? A better understanding of whether FEMA is an influential source of disaster information could have broad implications for future inquiries into FEMA's role and performance in emergency management. If FEMA is not influential, steps may need to be taken to build public trust in the agency or rechannel FEMA's activities to the backstage where, instead of dealing directly with the public, they funnel authoritative disaster information through state and local agencies.

One of the FEMA's myriad goals is to help the USA prepare for natural disasters, serving as the lead agency in this arena. In order for FEMA to perform this preparedness function, the public must perceive FEMA as a specialty expert organization that they can rely on for disaster preparedness. No study to our knowledge has studied whether or not individuals rely on FEMA for disaster preparedness to a greater extent than county/city emergency management agencies. Hence, we examine a second research question: Do individuals rely more on FEMA or county/city emergency management agencies when preparing for natural disasters?

A key limitation of previous research on organizational preparedness has been how to obtain accurate information about an organization's readiness (Sadiq and Weible 2010). There have been dozens of employer-based surveys that purport to assess readiness, but their results are questionable because sample sizes are small, response rates are uneven, and it is difficult to establish standardization in who responds to the survey (executives, information technology professionals, human resources personnel, and so forth) (Han and Nigg 2011; Sadiq and Weible 2010). More importantly, such surveys are susceptible to a response bias, as employers may be reluctant to acknowledge that they are unprepared or are devoting insufficient resources to disaster preparedness or are not relying on the most authoritative sources of information about natural disasters (FEMA 2011; Fowler et al. 2007).

The following Sect. 2 discusses the origin of FEMA, and the subsequent section examines the literature on three related issues: the relationship between disaster information and hazard adjustments, how and where citizens seek disaster information, and the concept of public agency influence. The research design and methodology, including data collection and analysis, follows the literature review. A discussion of the results follows. The study concludes with a discussion of the implications of the research findings for practice and future scholarship in hazard research.

## 2 Background

### 2.1 Origins of FEMA

Emergency management agencies at the federal, state, and local levels of government are charged with the responsibility of protecting communities against disasters (Giuffrida 1985; McLoughlin 1985). At the federal level, FEMA is the lead agency for protecting and preserving the lives and properties of American citizens (Giuffrida 1985; May 1985; Sadiq 2009). Part of FEMA's role is to encourage state and local governments, private entities, and non-volunteer organizations to mitigate and prepare for disasters. FEMA also coordinates these parties during disaster response and recovery (Comfort et al. 2010). In short, FEMA plays a significant role in the four phases of emergency management cycle: mitigation, preparedness, response, and recovery. Mitigation is any action aimed at preventing disasters from occurring or reducing the consequences of disasters when they occur (Kapucu et al. 2010; McLoughlin 1985). Preparedness entails carrying out activities in readiness for disasters. Response consists of actions taken in the immediate aftermath of disasters to prevent further loss of life and property damage. Finally, recovery involves carrying out activities that can help to restore the functioning of a disaster-stricken community.

FEMA was created through the Reorganization Plan No. 3 of 1978 (Federal Register n.d.), and President Jimmy Carter's Executive Order 12127 on April 1, 1979, puts the reorganization plan into effect (Fugate 2014). The creation of FEMA was in response to a widespread belief that the management of disasters pre-FEMA was unorganized (May 1985). During its infancy, FEMA was neglected with respect to funding and official attention and was often staffed with political appointees devoid of emergency management experience (Comfort et al. 2012). These problems, among others, led to poor responses to disasters, such as Hurricane Hugo and the Loma Prieta earthquake in 1989 and Hurricane Andrew in 1992 (Comfort et al. 2012). Against this backdrop of poor FEMA responses, Congress contemplated disassembling FEMA during a reauthorization hearing in 1992 (Comfort et al. 2012). In 1993, President Bill Clinton brought in an experienced emergency manager, James Lee Witt, to head FEMA (Comfort et al. 2012). The reign of James Lee Witt became known as the *Golden Age of FEMA*, as Witt instilled a culture of transparency and openness at the agency and established close ties with state and local governments through FEMA's ten regional offices (Comfort et al. 2012).

After the 9/11 terrorist attacks, the Homeland Security Act was passed in 2002 (Comfort et al. 2010), establishing the new cabinet-level Department of Homeland Security (DHS), under which FEMA and 21 other agencies were subsumed (Col 2007). Instead of reporting directly to the President of the USA, as was previously the case, the FEMA Director started reporting to the Secretary of the Department of Homeland Security. After FEMA became part of DHS, the agency began to suffer from diminished funding and capacity to respond to natural disasters (Adamski et al. 2006; Gerber 2007; Waugh 2007). In 2005, Hurricane Katrina devastated the Gulf Coast and exposed the weaknesses in the new post 9/11 emergency management structure. In order to improve the emergency management system, Congress passed the Post-Katrina Emergency Management Reform Act (PKEMRA) in 2006 (Comfort et al. 2010). Among other changes, this act retained FEMA in DHS, but assigned greater independence to FEMA (e.g., the DHS secretary cannot reorganize FEMA) and made preparedness, response, and recovery a larger part of what FEMA does (Comfort et al. 2010).

## 2.2 The relationship between disaster information and hazard adjustments

Hazard adjustments apply to all four phases of emergency management, but our focus is on the preparedness phase, where adjustments are implemented before a disaster occurs (e.g., issuing warnings prior to an imminent disaster, Lindell and Perry 2000). The importance of hazard adjustments in any community cannot be overemphasized because hazard adjustments can help to enhance community resilience to disasters (Sadiq 2011).

Hazard adjustment intention in this study means the perceived willingness of an organization to adopt hazard adjustments. This can be contrasted with actual hazard adjustments, which are adjustments that have been adopted. Although previous studies have focused on hazard adjustment intentions at the household level (e.g., in the context of earthquake hazard) (Davis 1989), we are aware of no study that has examined the relationship between disaster information and the hazard adjustment intentions of organizations in multiple disaster contexts.

Previous research has established a positive relationship between the provision of disaster information and the adoption of hazard adjustments at the individual and organizational levels (Basolo et al. 2009; Huss et al. 2012; Perry and Nigg 1985; Sadiq and Weible 2010). We are particularly interested in studies that examined this relationship at the organizational level. Huss et al. (2012) studied trust, information, and preparedness using information from 227 organizations in Memphis, Tennessee. They found, among other results, a significant and positive relationship between disaster information received from Memphis City government and preparedness. Sadiq and Weible (2010) examined the relationship between organizational obstacles and disaster risk reduction among Memphis, Tennessee organizations. One of their results was that a lack of disaster information is a significant obstacle to risk reduction in organizations.

## 2.3 How and where citizens seek disaster information

The provision of timely and accurate disaster information can help ameliorate the consequences of disasters (Huss et al. 2012). This is one reason why public agencies at the federal, state, and local levels provide disaster information to citizens and organizations in all four phases of the emergency management cycle (McLoughlin 1985). For example, in the preparedness phase, FEMA can issue warnings to communities about an impending disaster such as a hurricane that is about to make landfall. Traditionally, the public has relied on emergency management officials and news media to provide them with disaster information (Hughes and Palen 2012). More recently, communities and the citizenry have begun to seek disaster information from web sites managed by federal agencies, such as FEMA and the National Weather Service, and those maintained by state and local emergency management agencies (Hwang et al. 2001). FEMA alone provides over 100 links on its website on disaster preparation for citizens and organizations (Kahan 2015).

In recent years, social media are becoming a major medium for disseminating disaster information due to the ease of accessibility, depth of information provided, and the speed at which information can be distributed and retrieved (Hughes and Palen 2012). As a result, FEMA has begun to use social media to disseminate disaster information and increase disaster awareness among the public (Kahan 2015). In addition to social media and the Internet, FEMA's Office of Public Affairs supplies information to the public through print and electronic media. As information flows from FEMA to state and local governments and

the public, FEMA must be seen as credible in order for the target audiences to receive and share the information with others (Egnoto et al. 2013). In other words, the degree of information diffusion is contingent on the credibility of the source.

## 2.4 The concept of agency influence

Among all of the social sciences, social psychologists may have examined social influence in the greatest detail (Asch 1955; Deutsch and Gerard 1955). Social influence can be defined as the “attempts to affect or change other people” (Levi 2007: 127). Asch’s (1955) series of experiments on conformity provides a foundation for understanding group influence on individuals. Deutsch and Gerard (1955) studied the relationship between two types of social influence—normative and informational—on individual judgment. Normative influence is when individuals change their behavior in order to meet the expectations set by others and are in turn welcomed by others, while information influence has to do with the acceptance of information from others in a well-defined situation (Levi 2007). Using an experimental approach, Deutsch and Gerard (1955) found that, in the absence of normative social influence, subjects made more errors when they were part of an experimental group than when they were alone. This result suggests that a group can exert influence on the behaviors of individuals.

The concept of social influence provides a conceptual basis for the three hypotheses below. Whereas social influence is often applied to understand the behavior of an individual, here we posit the influence occurring within an organizational context. The assumption is that FEMA, a federal agency, will use information influence to affect the behavioral intentions of organizations to adopt hazard adjustments (Gladwin et al. 2001; Levi 2007).

**H1** There will be a negative relationship between the warning based on information from FEMA and the adoption of *fewer than the recommended measures*.

**H2** There will be a positive relationship between the warning based on information from FEMA and the adoption of *all the recommended measures*.

**H3** There will be a positive relationship between the warning based on information from FEMA and the adoption of *more than the recommended measures*.

Among the three levels of government in the USA, local governments are the closest to citizens and the most trusted (Pew 2013). The result of a public opinion survey conducted in 2013 by the Pew Research Center indicates that 63 % of the public have a favorable view of local governments compared to just 28 % for the federal government (Pew 2013). Local emergency management agencies, in particular, have been found to be trusted sources of disaster information for citizens (Schmalzried et al. 2011). The propinquity of local governments to their citizens allows citizens to mount pressure on local agencies to be accountable for emergency management decisions (French 2011). Indeed, when citizens perceive local emergency management agencies to be trusted sources of disaster information, they are more likely to search their web sites for disaster information (Schmalzried et al. 2011). Based on the above literature, we offer Hypothesis 4.

**H4** Citizens will rely more on their county/city emergency management agencies than on FEMA when preparing for natural disasters.

### 3 Data collection

We considered three modes for subject recruitment and survey administration: the random-digit dial (RDD), the home-interview method, and the online survey. Selection criteria were cost, representativeness of the sample, response time, response quality, and measurement error. Previous research has demonstrated that the online survey, if executed properly, is equivalent or superior to the other methods on each criterion (Chang and Krosnick 2009; Yeager et al. 2011). Moreover, the American Association for Public Opinion Research (AAPOR) has determined that, where online panels of respondents have been compared to external benchmarks such as the Census, representative national samples of respondents have been accomplished (Baker et al. 2010). Thus, we chose the online survey for administration, but included a RDD component in subject recruitment to avoid the selection problems that can result when subject recruitment occurs only through online methods.

The authors designed the survey instrument and administered it through GfK (<http://www.gfk.com/us/About-us/Pages/default.aspx>), a survey design company. GfK is one of the largest global survey research organizations and has approval from the National Institute of Health to conduct survey research. The instrument collected information about employees' perceptions of their employers' hazard adoption intentions, respondents' individual risk perceptions of hazards, respondents' demographics, and organizational characteristics (e.g., age). The authors pretested the survey instrument with 17 individuals. The test group consisted of staff and alumni of a university in the Midwestern US. The pretest, which was from December 12, 2013, to December 20, 2013, revealed some minor issues, which were corrected.

The revised survey instrument was given to GfK for an initial pilot of 100 individuals in their KnowledgePanel<sup>®</sup> (<http://www.gfk.com/us/Solutions/consumer-panels/Pages/GfK-KnowledgePanel.aspx>). The KnowledgePanel<sup>®</sup> is based on a representative random sample of the US population. Members of the KnowledgePanel<sup>®</sup> are recruited using random-digit dialing and address-based sampling methods that include both households with and without Internet access. If the sampling selects households that have neither an Internet connection nor a computer, GfK provides both to them at no charge. As a result, the KnowledgePanel<sup>®</sup> provides a nearly complete coverage of the US population.

The pilot results indicated minor refinements were needed to improve clarity. After the refinements, GfK fielded the online survey in May 2014 to a nationally representative sample of 10,559 US adults, 18 years of age or older from their KnowledgePanel<sup>®</sup>. GfK sent one reminder to encourage participation. Of the 10,559 sample members invited to participate, 5079 responded. These 5079 responders were then screened based on two eligibility criteria: (1) currently working as a paid employee for an employer other than themselves, and (2) not currently telecommuting for the majority of their work time. We focus on these two eligibility criteria because employees that work for an employer and report to work on a day-to-day basis are in the best position to provide information about the preparedness activities at the facility where they report for work. A total of 2026 respondents passed the eligibility screening and completed the survey.

Eighteen respondents were removed from the sample due to short survey completion times (<5 min). Using survey completion time to identify speeders who may have completed the survey without reading and carefully answering the items is a common technique in survey research (Olson and Parkhurst 2013). A review of these cases showed that 17 respondents either failed to answer the items after the initial selection on demographic

questions or exhibited “straight-lining” (answering several sequential items with the same response). Another case was removed when a review of the open comments indicated that the respondent was a full-time telecommuter and therefore ineligible for the survey. With these exclusions, the final sample size is 2008. The response rate for this survey is 48 %, using the guidelines established by AAPOR ([www.aapor.org/Standard\\_Definitions2.htm#U9fLRvldU1c](http://www.aapor.org/Standard_Definitions2.htm#U9fLRvldU1c)).<sup>1</sup> GfK weighted the data to account for unequal probabilities of selection as well as to ensure that the data are as close as possible to Current Population Survey estimates for the US population vis-à-vis demographic characteristics (e.g., gender, age, marital status, race/ethnicity, household size, household income).

To the best of our knowledge, the data used for this study come from a survey that is unique in two respects. First, it is the largest survey of natural disaster preparedness among public, private, and nonprofit organizations conducted to date. Second, it is one of only a few surveys to gather information anonymously from a national sample of employees about their employer’s level of preparedness for natural disasters.<sup>2</sup> Our approach is novel in that we surveyed employees instead of the leaders of organizations, as is typically the case in previous studies. For example, Sadiq and Weible (2010) surveyed owners and risk managers of organizations in Memphis/Shelby County, Tennessee, while Han and Nigg (2011) surveyed business owners in Santa Cruz County, California.

### 3.1 Research design

An experimental design was used to test the validity of the above hypotheses (Maxfield and Babbie 2014). In this study, the dependent variable is employee perception of his/her employer’s intention to adopt hazard adjustments and the independent variable is FEMA’s influence as a disaster information source. We presented the scenario below to the 2008 respondents in the sample.

Now think about a scenario that might happen in the future. Suppose that the local government in your area issues a warning that natural disasters are more likely than previously known to impact the area where you report to work.

[This warning is based on information from the Federal Emergency Management Agency (FEMA)].

Your employer has been urged to take a variety of measures to reduce the impact of the disaster on your organization. These measures will be costly to your organization. Please indicate how your employer would respond using the three-point scale below.

1. My employer is likely to do *fewer than all* of the recommended measures.
2. My employer is likely to do *all* of the recommended measures.
3. My employer is likely to do *more than all* of the recommended measures.

The computer randomly assigned the respondents into two groups: the treatment (with FEMA) group and the control (without FEMA) group. The treatment group was given the

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<sup>1</sup> AAPOR’s Response Rate 3, or RR3, was used and calculated by dividing the 2008 interviews by the sum of 2026 known eligible cases plus 2192 estimated eligible cases among the 5480 who did not respond to the survey invitations (assuming an estimated eligibility rate of 40 %, based on the eligibility rate of the 5079 responders).

<sup>2</sup> The other known studies that took the employee approach are Fowler et al. (2007) and Larson and Fowler (2009).

above scenario in its entirety, and the control group received the same scenario without the FEMA mention in square brackets.

With regard to the second research question, we are interested in knowing whether employees rely on FEMA as opposed to county/city emergency management agencies when preparing for an imminent natural disaster. Specifically, the following hypothetical scenario was posed to *all* respondents:

Suppose a major natural disaster was predicted to impact the area where you live. To what extent would you rely on each of the following organizations or groups to help you prepare for the natural disaster?

The respondents were presented with this list of organizations and groups: American Red Cross, county/city emergency management agency, federal emergency management agency (FEMA), friends and family, fire departments, Local Religious Organizations (e.g., churches, synagogues, and mosques), State Emergency Management Agency, police departments, and colleges and universities. The response options were on a five-point Likert scale: 1 (wouldn't rely on at all) to 5 (will rely on a great deal).

We carried out difference of proportion tests to assess whether there is a difference between the treatment group proportion and the control group proportion for each of the three response categories—employers were likely to do *fewer*, *all*, or *more* than all the recommended measures. The Rao–Scott Chi-square test was used to ascertain whether there are statistically significant differences between the treatment and control groups with respect to the three response categories. Although the Rao–Scott Chi-square test is like the Pearson Chi-square, the former has a design correction mechanism that accounts for the increase in variance as a result of weighting. The use of weights results in a penalty in the cell, making it harder to detect differences compared to unweighted data. Nonetheless, the Rao–Scott Chi-square test is more appropriate for our data than the Pearson Chi-square test. Finally, we carried out a series of *t* tests to ascertain whether there is a statistically significant difference between reliance on FEMA and other organizations or groups, including county/city emergency management agencies.

## 4 Results

According to Table 1, the average age of respondents in the sample is approximately 42 years, and 69 % of the respondents are white (non-Hispanic). In addition, 22 % have a bachelor's degree, 53 % are men, and 80 % are household heads. The average household size is about three people, 67 % of the respondents live in detached one-family houses, and 14 % has a household income between \$1,00,000 and \$1,24,999. Finally, 52 % of the respondents are married, 85 % live in Metro areas, 35 % are from the southern part of the USA, 72 % own their living quarters or their living quarters are being bought by someone in their households, and 86 % have Internet access. With regard to organizational sector, 15 % belong to the health sector, 12 % belong to the educational sector, another 12 % comprise of organizations from the wholesale/retail sector, and 7 % belong to the finance/insurance/real estate sector.<sup>3</sup> A comparison test between the demographic variables for the two randomized groups did not reveal a significant difference at the 5 % level of significance, suggesting that the randomization to the experimental groups was effective.

<sup>3</sup> We presented information on the major organizational sectors only.



**Table 1** Sample demographic statistics (weighted sample)

Variable description	Obs.	Mean	SD	Min	Max
Age	2008	41.81	13.853	18	86
Race/ethnicity: white, non-Hispanic	2008	.69	.463	0	1
Education: bachelor’s degree	2008	.22	.418	0	1
Gender: male	2008	.53	.499	0	1
Household head: yes	2008	.80	.397	0	1
Household size	2008	2.73	1.404	1	10
Housing type: a one-family house detached	2008	.67	.469	0	1
Household income: \$1,00,000 to \$1,24,999	2008	.14	.352	0	1
Marital status: married	2008	.52	.500	0	1
MSA status: metro	2008	.85	.356	0	1
Region: south	2008	.35	.477	0	1
Ownership status of living quarters: owned or being bought by someone in household	2008	.72	.450	0	1
HH Internet access: yes	2008	.86	.345	0	1
Health sector	1831	.15	.010	0	1
Education sector	1831	.12	.010	0	1
Wholesale/retail trade	1831	.12	.010	0	1
Finance/insurance/real estate sector	1831	.07	.010	0	1

### 4.1 Reaction to disaster information sourced to FEMA

The goal of the experiment is to determine whether a disaster warning that is sourced to FEMA is influential to organizations, at least in the eyes of employees of the organization. In a sense, this is an experimental test of whether FEMA is an influential public agency relative to local governments. In Table 2, responses for the two groups are categorized by whether respondents said their employers were likely to do *fewer than all*, *all*, or *more than all* of the recommended measures.

The results in Table 2 indicate that there are no significant differences in proportions between the control group and the treatment group for the three response categories (5 % level). The results of the Rao–Scott Chi-square test in Table 3 support those in Table 2 and indicate that there are no significant differences between the treatment and control groups for all three response categories (5 % level). In short, neither the differences in proportion tests nor the Rao–Scott Chi-square tests provide evidence in support of hypotheses 1, 2, or 3.

### 4.2 Organizations or groups relied upon for natural disaster preparedness

Table 4 indicates that 20.7 % of the respondents said they would not rely on FEMA at all to prepare for an impending disaster. Only local religious organizations (32.7 %) and colleges and universities (50.7 %) recorded higher percentages of no reliance. In addition, 10.9 % of respondents said they would rely on FEMA a great deal. This percentage is relatively small compared to those of friends and families (39.2 %), fire departments (24.1 %), police departments (20.2 %), American Red Cross (17.5 %), and county/city

**Table 2** Results of the difference in proportion tests for the three response categories (weighted sample)

	<i>N</i>	Mean	Robust SE	<i>z</i>	<i>p</i> value	95 % CI
<i>My employer is likely to do fewer than all of the recommended measures</i>						
Treatment group	312	.312	.018			.277–.346
Control group	266	.279	.018			.243–.314
Difference		.033	.025	1.60	.110	–.016–.0782
<i>My employer is likely to do all of the recommended measures</i>						
Treatment group	498	.498	.019			.461–.536
Control group	524	.550	.020			.511–.590
Difference		–.044	.023	–1.89	.059	–.090–.002
<i>My employer is likely to do more than all of the recommended measures</i>						
Treatment group	190	.190	.012			.166–.214
Control group	163	.171	.012			.147–.195
Difference		.022	.025	.89	.373	–.027–.071
Treatment group	1000					
Control group	953					
Total respondents	1953					

**Table 3** Results of the Rao–Scott Chi-square for the three response categories (weighted sample)

Groups	Weighted frequency	Percent distribution	
0 (Control group)	Employer likely to do <i>fewer than all</i> recommended measures	266	27.9
	Employer likely to do <i>all</i> recommended measures	524	55.0
	Employer likely to do <i>more than all</i> recommended measures	163	17.1
	Total	953	100
1 (Treatment group)	Employer likely to do <i>fewer than all</i> recommended measures	312	31.2
	Employer likely to do <i>all</i> recommended measures	498	49.8
	Employer likely to do <i>more than all</i> recommended measures	190	19.0
	Total	1000	100
Total	Employer likely to do <i>fewer than all</i> recommended measures	578	29.6
	Employer likely to do <i>all</i> recommended measures	1022	52.3
	Employer likely to do <i>more than all</i> recommended measures	353	18.1
	Total	1953	100
Rao–Scott Chi-square test			
Pearson Chi-square			5.3743
Design correction			1.5228
Rao–Scott Chi-square			3.5291
DF			2
Pr > Chi-sq			.1713
Sample size = 1969			

**Table 4** Reliance on organizations or groups for disaster preparedness (weighted sample) ( $N = 1966$ )

Agency/organization	Would not rely on at all				Would rely on a great deal 5 (%)	Mean reliance
	1 (%)	2 (%)	3 (%)	4 (%)		
Federal Emergency Management Agency (FEMA)	20.7	19.0	30.8	18.5	10.9	2.8
County/City Emergency Management Agency	14.5	13.7	32.8	22.4	16.6	3.1
Friends and Family	4.5	7.5	21.7	27.1	39.2	3.9
Fire Departments	11.0	10.2	27.0	27.6	24.1	3.4
Police Departments	13.1	12.9	29.0	24.8	20.2	3.3
American Red Cross	14.4	15.4	29.6	23.1	17.5	3.1
State Emergency Management Agency	15.3	15.7	32.7	22.0	14.2	3.0
Local Religious Organizations (e.g., churches, synagogues, and mosques)	32.7	17.8	26.1	13.4	10.1	2.5
Colleges and Universities	50.7	20.9	21.3	4.5	2.7	1.9

emergency management agencies (16.6 %), and only higher than those of local religious organizations (10.1 %) and colleges and universities (2.7 %). In addition, Table 4 shows that respondents' mean reliance on county/city emergency management agencies (3.13) is higher than that for FEMA (2.80). In fact, FEMA ranks lower than all the groups except local religious organizations (2.50) and colleges and universities (1.88).

In Table 5, the results from several  $t$  tests show that respondents are more likely to rely on their county/city emergency management agencies than on FEMA. In addition, the results indicate that FEMA ranks lower than fire departments, police departments, and state emergency management agencies and higher than local religious organizations and colleges and universities. In sum, the  $t$  test results corroborate those of the descriptive statistics.

## 5 Discussion

This study on FEMA's influence is closely related to the literature on the credibility of public agencies. As a result, we use previous work on credibility to explain the finding of no FEMA effect for the *fewer than all*, *all*, and *less than all* categories. The lack of credibility of public agencies might constrain collaboration between public agencies, stakeholders, and the public (Scholz et al. 2008) and could have a significant impact on public agencies' performance with regard to managing disasters (Egnoto et al. 2013; French 2011). Stated simply, a public emergency management agency lacking credibility may find it hard to persuade the public to heed its disaster warnings or otherwise utilize its disaster information.

In the aftermath of Katrina, FEMA's credibility was tarnished because of its poor response (Comfort et al. 2010; Kahan 2015; Kapucu and Van Wart 2006; Vogel 2012). Images of people stranded on rooftops, deplorable conditions in the New Orleans Superdome and the Convention Center, as well as reports of looting and police officers abandoning their posts, may have undermined FEMA's reputation for responsiveness and

**Table 5** Reliance *t* test results: FEMA versus other organizations or groups (weighted sample)

	Other organizations or groups	<i>N</i>	Mean difference	SE	<i>t</i> stat
FEMA versus	County/City Emergency Management Agency	1957	−.34	.02	−14.2***
	Friends and Family	1961	−1.09	.03	−32.4***
	Fire Departments	1956	−.65	.03	−24.7***
	Police Departments	1965	−.47	.03	−18.0***
	American Red Cross	1961	−.35	.02	−14.2***
	Colleges and Universities	1949	.92	.03	31.0***
	Local Religious Organizations	1963	.29	.03	8.5***
	State Emergency Management Agency	1961	−.24	.02	−11.9***

\*\*\*  $p < .001$  (two-tailed tests)

competence (Adamski et al. 2006). As a result, it is possible that the public may not view FEMA as a credible agency and any piece of disaster information from FEMA will have little or no impact on an organization's intention to adopt hazard adjustments. According to a public opinion survey conducted by Gallup in 2009—in between Hurricane Katrina and Superstorm Sandy—regarding the overall customer experience with federal agencies ( $N = 41,876$ ), 40–50 % of the public said they were satisfied with FEMA (the 40–50 % represents the bottom quartile of federal agencies) (Gallup 2009). To put this result in perspective, 90 % of respondents were satisfied with the National Park Service (Gallup 2009). Based on this perspective, FEMA may not be viewed as an influential source of disaster information.

On the contrary, FEMA's role immediately before, during, and after Superstorm Sandy is widely regarded as commendable. Indeed, in the aftermath of Superstorm Sandy, academics, Senators, governors, and the public believed that FEMA's performance was good (Kahan 2015; Naylor 2012; Vogel 2012). For example, Joseph E. Trainor, an assistant professor with the Disaster Research Center at the University of Delaware, noted in the Washington Post, “My impression is that this is a different agency [FEMA] than we've seen over the last decades, one that post-Katrina had lost a lot of credibility” (Vogel 2012). In addition, Perry and Nigg (1985) argue that the visibility of an agency is a prerequisite for credibility. FEMA's visibility during Superstorm Sandy through appearances on TV, radio, print media, website, and social media (Facebook, Twitter, etc.) may have contributed to FEMA being viewed as a credible agency by the public. This conclusion is supported by two Gallup polls about Americans' satisfaction with what the federal government is doing in response to natural disasters (Jones and Steve 2013). The results of these Gallup polls, which were conducted in 2005 (after Hurricane Katrina) and 2013 (after Superstorm Sandy), indicate that 33 and 75 % of Americans, respectively, are satisfied with what the federal government is doing to respond to natural disasters (Jones and Steve 2013). It is important to note that the latter survey did not mention “FEMA” specifically.

The result of our experiment is consistent with the result of the reliance analysis, which indicates that respondents rely more on their county/city emergency management agency than on FEMA. In other words, the result of the experiment could be explained by the fact that respondents tend to rely on county/city information rather than information sourced to FEMA. Schmalzried et al. (2011) raise an important point: Is FEMA channeling disaster information through trusted sources like the local emergency management agencies

because the public trusts such agencies? FEMA participates in a weekly *Social Media in Emergency Management* to connect, collaborate, and contribute ideas to help increase disaster awareness among citizens and organizations, including local governments (Kahan 2015). An interesting extension of our FEMA experiment would assess the intended responses of managers in county and city agencies.

Furthermore, one could argue that what matters is not the perceptions of rank-and-file employees of an organization, but the perceptions of the leaders/managers in the organization that have the responsibility for preparedness. Since we have not surveyed those individuals, it is possible that they might rely more on FEMA (compared to other entities) and would be more responsive to a disaster warning that is sourced to FEMA. Future research is needed to examine, anonymously, the perceptions of leaders/managers in charge of organizational preparedness.

The results of the reliance analysis also reveal that respondents rely more on friends and families, fire departments, police departments, and American Red Cross than on FEMA. The greater reliance on American Red Cross is consistent with results of dozens of focus groups around the country that have been reported in the literature (Wray et al. 2006). Similarly, Huss et al. (2012) found that organizational representatives are more likely to rely on police and fire departments than on FEMA.

## 6 Conclusions

FEMA represents an important arsenal in the US ability to prepare communities for disasters. This public agency has an extensive array of resources: web sites, access to international, national and regional experts, ten regional offices, leaders experienced in emergency management (e.g., the current FEMA Director, Craig Fugate), and relatively more independence since the passage of PKEMRA. Despite the aforementioned and other resources at FEMA's disposal, our results do not provide evidence that FEMA is a more influential source of disaster information in comparison with local governments. Our results indicate respondents rely more on their county/city emergency management agency than on FEMA when it comes to preparing for natural disasters. In addition, respondents rely more on friends and families, fire departments, police departments, and American Red Cross than on FEMA. Unless FEMA is effectively funneling information through these other information sources, our results are not optimistic regarding FEMA's effectiveness as an information provider in the preparedness phase. The "funneling" strategy to city/county governments may work fine for FEMA with small- and medium-scale disasters. When a Katrina-scale disaster strikes and the capabilities of local and state governments are overwhelmed, the public will look toward the federal government for resources, expertise, and leadership. In that situation, FEMA would have to deal directly with the public. Hence, it is vital that FEMA be seen as an influential agency that people can rely on. On a final note, we suggest that future research should examine FEMA's strategy for disseminating disaster information in the preparedness phase.

Another plausible explanation of our results is that perhaps, the issue is not about credibility; rather it is about familiarity with an agency or other entities. Some might argue that the reason why FEMA is not viewed as reliable as others such as friends and families, local governments is because there is less interaction between FEMA and the public than between friends and families, and local governments and the public. Unless there is a disaster, an average citizen will be less likely to interact with FEMA than with local

governments, and friends and families on a regularly basis. Our study cannot confirm or disprove this explanation. Hence, we suggest that future studies examine the credibility versus familiarity hypothesis further.

This study offers methodological and practical insights that scholars and practitioners in the natural hazards community—both nationally and internationally—might find useful. Methodologically, we demonstrated the feasibility of a different way to measure organizational preparedness—one based on the perceptions of employees rather than the perceptions of organizational leaders. In addition, the use of an experimental approach helps to solve the endogeneity problems that have plagued many survey-based studies. Practically, our results suggest that warning information meant for a general, non-specialist audience such as employees should be delivered by FEMA through trusted local governments. More generally, our study suggests that a public agency needs to pay careful attention to how it is perceived by the public, since adverse perceptions can have a significant deleterious impact on an agency's ability to be successful in accomplishing its mission.

Before our experimental result about FEMA is accepted by practitioners, we recommend that the result be replicated in a variety of contexts such as in other countries and with regard to a variety of specific natural hazards. Replication with leaders of organizations as well as employees would also be valuable. Future studies should examine, via controlled experiments, whether other sources of disaster warnings (e.g., the National Weather Service) are more or less influential than FEMA and the reasons why the public does not rely on FEMA as much as they rely on other entities. In addition, we urge future research to consider looking at the impacts of demographic and ideological characteristics on public agencies' influence and reliance. Investigating these questions will be crucial in helping policymakers design policies aimed at increasing public reliance on FEMA for natural disaster preparedness as well as increasing FEMA's influence as a disaster information source.

In conclusion, this study provides insight into the influence of FEMA as source of disaster information in comparison with local governments and underscores the importance of understanding the influence of public agencies in charge of disaster preparedness in the USA and other countries, as natural disasters continue to pose a major challenge for communities across the globe. Natural hazards scholars in the USA and abroad should extend this study by examining the reasons why citizens rely on particular sources of disaster information. Only then will natural hazards researchers begin to have a comprehensive understanding of reliance for disaster preparedness and provide a solid basis for practitioners to develop appropriate policies that can increase the level of disaster preparedness in specific communities in the USA and abroad.

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