

1-8-2020

Trust in Emergency Management Authorities and Individual Emergency Preparedness for Tornadoes

Junghwa Choi

Follow this and additional works at: <https://digitalcommons.unomaha.edu/pubadfacpub>

Please take our feedback survey at: https://unomaha.az1.qualtrics.com/jfe/form/SV_8cchtFmpDyGfBLE

Recommended Citation

Choi, J. and Wehde, W. (2020), Trust in Emergency Management Authorities and Individual Emergency Preparedness for Tornadoes. *Risk, Hazards & Crisis in Public Policy*, 11: 12-34. <https://doi.org/10.1002/rhc3.12185>

This Article is brought to you for free and open access by the School of Public Administration at DigitalCommons@UNO. It has been accepted for inclusion in Public Administration Faculty Publications by an authorized administrator of DigitalCommons@UNO. For more information, please contact unodigitalcommons@unomaha.edu.

Trust in Emergency Management Authorities and Individual Emergency Preparedness for Tornadoes

Junghwa Choi and Wesley Wehde

The risks associated with disasters can be significantly reduced if individuals are well prepared according to the orders and recommendations of emergency management authorities such as the Federal Emergency Management Agency (FEMA) and local government. Despite this fact, there is evidence that individuals are not cooperative with these authorities and are therefore underprepared for an emergency. This article argues that individual trust in emergency management authorities may affect their cooperation with emergency preparedness recommendations. Using unique survey data, this study finds a nuanced relationship between individual emergency preparedness for tornadoes and trust in emergency management authorities. Although trust in FEMA in isolation does not explain variations in individual preparedness for tornadoes, increased preparation for a tornado is explained by trust in local government contingent upon a low baseline level of trust in FEMA. This article concludes with some practical and theoretical implications for emergency management authorities and scholars.

KEYWORDS: emergency management, trust in government, tornado preparedness, FEMA, local government

摘要

如果个人依照应急管理机构—例如联邦紧急事务管理局(FEMA)和地方政府—的指示和建议做好准备, 则能显著减少与灾害相关的风险。除此之外, 有证据表明, 那些不配合机构建议的个人因此在突发事件下会缺少准备。本文主张, 个人对应急管理机构的信任可能会影响其与应急预备建议的配合度。通过使用独特调查数据, 本文发现, 个人对龙卷风的应急预备和对应急管理机构的信任之间存在一个微妙的关系。尽管单独对FEMA的信任无法解释个人就龙卷风预备情况所存在的差异, 但当个人对FEMA的信任基准程度较低时, 对地方政府的信任则能解释预备力度的增加。本文结论为应急管理机构和学者提供了一些理论与实践意义。

关键词: 应急管理, 对政府的信任, 龙卷风预备, 联邦紧急事务管理局(FEMA), 地方政府

Resumen

Los riesgos asociados con los desastres pueden reducirse significativamente si las personas están bien preparadas de acuerdo con las órdenes y recomendaciones de las autoridades de gestión de emergencias, como el Agencia Federal de Manejo de Emergencias (FEMA) y gobierno local. A pesar de este hecho, hay es evidencia de que los individuos no cooperan con estas autoridades y, por lo tanto, están bajo preparado para una emergencia. Este artículo argumenta que la confianza individual en el manejo de emergencias Las autoridades pueden afectar su cooperación con las recomendaciones de preparación para emergencias. Utilizando datos únicos de la encuesta, este estudio encuentra una relación matizada entre la preparación individual para emergencias ante tornados y la confianza en las autoridades de gestión de emergencias. Mientras confía en FEMA en el aislamiento no explica las variaciones en la preparación individual para los tornados, la mayor preparación para un tornado se explica por la confianza en el gobierno local dependiente de un nivel bajo de confianza en FEMA. Este artículo concluye con algunas implicaciones prácticas y teóricas para las autoridades de gestión de emergencias y los académicos.

PALABRAS CLAVE: manejo de emergencias, confianza en el gobierno, preparación para tornados, FEMA, gobierno local

Disasters cause tremendous damage to individual human life and property. However, the risks associated with disasters can be significantly reduced if individuals at the household level are cooperative with government recommendations and orders before, during, and after emergencies. Previous disasters and their consequences, in fact, have shown that individual cooperation with government orders and recommendations in an emergency situation can lessen negative outcomes of disastrous events such as mortality and property damages (Diekman, Kearney, O'Neil, & Mack, 2007; Keim, 2008; Paton, 2008). Individual cooperation with emergency management authorities could mean several things depending on contexts: for instance, sometimes it may mean following evacuation orders during hurricanes or staying away from a certain area during a flash flood. Additionally, another form of cooperation is to follow emergency preparedness recommendations. Emergency management authorities such as FEMA and local emergency management offices provide individual guidelines for emergency preparedness to minimize the risks associated with disastrous events.¹

According to the emergency preparedness checklists disseminated by emergency management authorities, individuals are recommended to know the risks particular to their community and develop their own family emergency plan. Additionally, emergency management authorities also recommend individuals at the household level stockpile supplies such as food, water, prescription medications among other items for at least 72 hours. These recommendations are not compulsory: however, scholars and emergency managers expect a significant reduction in potential risk if individuals voluntarily cooperate with emergency management authorities and their recommendations.

It seems apparent that individuals will be better off and safer when they follow the recommendations of emergency preparedness officials. However, a recent survey conducted by FEMA indicates that a majority of Americans are under-prepared for various emergency situations.² Furthermore, previous studies have shown that people do not necessarily comply with instructions from emergency management authorities during an emergency (Ablah, Konda, & Kelley, 2009; Perry & Lindell, 1991; Redlener, Grant, Abramson, & Johnson, 2008). The lack of individual

cooperation with emergency management authorities and their recommendations at the household level leads to an important question: why are they not cooperative with emergency preparedness recommendations and not prepared for their own safety?

This article seeks to answer this question by drawing on theories from public administration. Public administration scholars have argued that individual trust in government may explain variations in their cooperation with government policies and recommendations (Chanley, Rudolph, & Rahn, 2000; Kim, 2005; Riccucci, Van Ryzin, & Li, 2016; Scholz & Lubell, 1998; Scholz & Pinney, 1995). These scholars have shown that individuals are more cooperative with the government when they perceive greater trust in government. In fact, there have been studies in the emergency management literature investigating the effect of trust in government in shaping individual emergency preparedness. Scholars have examined how individual trust in federal, state or local government is associated with their preparedness for various emergencies such as earthquakes, hurricanes and other health-related situations (Arlikatti, Lindell, & Prater, 2007; Basolo et al., 2009; Murphy, Cody, Frank, Glik, & Ang, 2009; Murphy, Greer, & Wu, 2018).

This current study contributes to this extensive literature by highlighting individual trust in an issue-specific agency, FEMA in addition to trust in local government in the context of emergency management. Previous literature has shown that individual trust varies at different levels of government and agencies (Han, Hu, & Nigg, 2011) particularly depending on the specific issues they are dealing with (Robinson, Stoutenborough, & Vedlitz, 2017). Furthermore, scholars have shown that individual trust in issue-specific agencies is in fact positively associated with their cooperation with the recommendations and policies of those agencies (Robinson et al., 2017). For instance, Tyler (2005) finds that individuals are more likely to be cooperative with the police, operationalized as reporting dangerous or suspicious activities in their community when they perceive greater trust in the police department.

Following the underlying theory, this article claims that trust in emergency management authorities, FEMA and local government in the context of emergency management, positively influence individual cooperation with them. Although the role of FEMA is somewhat limited to the distribution of funding to state and local

governments, both FEMA and local governments are the primary authoritative organizations in emergency management. Furthermore, they are the primary sources of information regarding emergency preparedness (Basolo et al., 2009; Sadiq, Tharp, & Graham, 2016). Therefore, this article claims that, in addition to local government as a major actor in emergency management (Basolo et al., 2009), it is important to investigate individual trust in FEMA and its effect in shaping individuals' levels of emergency preparedness. In this article, the level of individual emergency preparedness, as a form of cooperation with emergency management authorities, and how it is associated with trust in those emergency management authorities is investigated.

Furthermore, to the best of our knowledge, there have not been sufficient studies investigating individual emergency preparedness for tornadoes in multiple states including those in the area described as "Tornado Alley." It is important to have a geographically broader sample because this allows for the production of more generalizable knowledge regarding this subject matter. Additionally, it is meaningful to examine how trust in government works in the context of tornadoes when previous studies have heavily focused on seismic hazards (Basolo et al., 2009; Murphy et al., 2018). This is important because different types of disasters may affect individual perceived trust in government and how this perception influence individual emergency preparedness in different ways (DeYoung & Peters, 2016). For instance, while most seismic disasters are considered geophysical natural disasters, a majority of recent earthquakes in Oklahoma are triggered by the activities of the oil and gas industries (Choi & Wehde, 2019; Murphy et al., 2018). Under this circumstance, residents in Oklahoma may not be well prepared for earthquakes if they believe the state of Oklahoma will address the potential emergencies related to earthquakes. The potential risks associated with human-induced earthquakes may be reduced by state regulation of the oil and gas industry activities to reduce the frequencies of earthquakes instead of through individual preparedness. In this case, residents may not necessarily think that they have to prepare for potential earthquakes. However, this is not always the case especially when individuals face natural disasters such as tornadoes. Tornadoes and their causes are not as easily regulated; therefore,

understanding individual emergency preparedness may be more important in preventing property damage and saving lives in this case.

Thus, this article asks how does trust in emergency management authorities, in conjunction with individual characteristics, help explain individual cooperation with government emergency preparedness recommendations for tornadoes? In the following section, this article first reviews previous studies of trust in government and individual cooperative behaviors. This article then utilizes data from the 2013 Severe Weather and Society survey. Using this unique survey data, this article finds a nuanced relationship between individual emergency preparedness for tornadoes and trust in emergency management authorities. Although trust in FEMA does not solely explain variations in individual preparedness for tornadoes, increased preparation for a tornado is driven by trust in local government when a low baseline of trust in FEMA is met. Finally, this article ends with a discussion of the implications and contributions of our research.

Literature Review

Trust in Government and Individual Cooperative Behaviors

Scholars in public administration argue that trust in government plays an important role for increasing the compliance and cooperation of individuals with government policies and recommendations (Kim, 2005; Levi, 1998; Makkai & Braithwaite, 1994). Some scholars argue that individuals may be compliant simply because they are afraid of getting punished if they do not follow laws and regulations (Whitaker, 1980). However, others claim that trust in government increases the likelihood that individuals will voluntarily accept most decisions made by the government (Kim, 2005). In other words, individuals are more cooperative with government decisions, which are not mandated by-laws without any coercion if they have greater trust in government (Chanley et al., 2000; Levi & Stoker, 2000; Ruscio, 1997; Scholz & Lubell, 1998; Scholz & Pinney, 1995; Thomas, 1998).

Understanding the determinants and effects of public trust is an important and evolving strand of research for scholars of risk, natural hazards, crises, and emergencies. Although scholars have heavily focused on how disastrous events may

affect political trust and satisfaction of individuals (Albrecht, 2017; Brändström, Kuipers, & Daléus, 2008; Han, Lu, Hörhager, & Yan, 2017), they have also investigated the role of public trust in managing emergencies and crises. For instance, a study of the refugee crises in Turkey found that refugee trust in government leads to greater cooperation and compliance of refugees with government policies of hosting country (Demiroz & Unlu, 2018). Furthermore, scholars have examined how individual trust in federal, state, or local government is associated with individual cooperation with government, particularly emergency preparedness recommendations for various emergencies such as earthquakes, hurricanes, terrorist attacks, and other health-related situations (Arlkatti et al., 2007; Basolo et al., 2009; Murphy et al., 2009; Murphy et al., 2018; Perry & Lindell, 1991; Terpstra, 2011). Most scholars have provided evidence that there is a positive association between trust in government and individual cooperation with the government. These scholars have found that individuals are more likely to adopt emergency preparedness measures when they perceive higher trust in government (Ablah et al., 2009; Longstaff & Yang, 2008; Murphy et al., 2009; Murphy et al., 2018; Paton, 2008).

However, there are also mixed findings regarding the effect of trust in government in the context of emergencies. For instance, Terpstra (2011) finds that individuals who have a higher level of trust in government are more likely to have a higher level of flood preparedness intentions. One potential explanation of this association is that individuals may not see the necessity of adopting preparedness measures if they believe that the government will take care of the potential emergency situations for them (Murphy et al., 2018; Scolobig, De Marchi, & Borga, 2012). In other words, individuals may pass on the full responsibility of preparing and responding to emergency situations to the government when they perceive higher trust in government.

However, most evidence suggests that a higher trust in government is positively associated with individual emergency preparedness across many other hazards; therefore, this relationship may also be present when examining preparedness for tornadoes. As stated, local government and other emergency management authorities have promoted emergency preparedness at the household level to minimize potential risks associated with disasters. If individuals trust the local government and other

emergency management authorities more, they will consider the risk estimates and risk mitigation policies of emergency management authorities more credible (Johnston, Bebbington Chin-Diew Lai, Houghton, & Paton, 1999). Therefore, it is reasonable to expect that individuals may be more prepared for emergencies if they trust the government and their recommendations and policies more. Furthermore, other previous studies have shown no dampening effect of trust in government on individual preparedness behaviors (Basolo et al., 2009; DeYoung & Peters, 2016).

Trust in Issue-Specific Agency

In public administration and political science more broadly, scholars have highlighted trust in general political institutions such as the President, Congress, federal, state, or local government to understand individual behaviors and attitudes toward government orders and recommendations (Cooper, Knotts, & Brennan, 2008; Hetherington & Rudolph, 2008; Rahn & Rudolph, 2005). However, a body of scholarship in public administration has recently highlighted the need to investigate individual trust in issue-specific government agencies for several reasons (Robinson et al., 2017; Robinson, Liu, Stoutenborough, & Vedlitz, 2012). First, previous studies have found that context-specific variables matter in the formation of individual trust in government. According to existing studies, individuals evaluate the level of trust in government based on their specific policy expectations and/or preferences (Bouckaert & Van de Walle, 2003; Christensen & Lægreid, 2005; Job, 2005; Ryzin, 2004; Yang & Holzer, 2006). Furthermore, previous polls and studies have shown that individuals are capable of evaluating different government agencies differently (Kettl, 2019; Robinson et al., 2012, 2017). Additionally, it follows intuitively to look at trust in a specific agency to understand individual cooperative behaviors or perceptions toward specific policies. This is because, for example, individual trust in the Department of Health and Human service most likely matters more than their trust in general political institutions when it comes to decisions regarding vaccination.

Following these arguments, instead of highlighting individual trust in general political institutions, this article seeks to investigate individual trust in issue-specific agencies and its effects on their cooperation. This article considers FEMA and local

government as issue-specific agencies in the context of emergency management. This is because, though the role of FEMA is somewhat limited to the distribution of funding to state and local governments, both FEMA and local governments are the primary authoritative organizations in emergency management. Furthermore, they are the major sources for information regarding emergency preparedness (Basolo et al., 2009; Sadiq et al., 2016).

Trust in Emergency Management Authorities as a Mediator

Though this article argues that trust in emergency management authorities is an important factor in shaping individual emergency preparedness, individual behaviors are complex with many potential explanatory factors. Previous studies have found that several major predisposition characteristics primarily affect individual behaviors for emergency preparedness.

The first set of variables is individual demographic characteristics. Research in emergency management has documented the important contingent effect of a large variety of demographic variables that are related to individual emergency preparedness. Previous studies have shown that age (Ablah et al., 2009; Heller, Alexander, Gatz, Knight, & Rose, 2005; Lindell & Perry, 2000), gender (Blessman et al., 2007; Eisenman et al., 2006; Murphy et al., 2009; Robinson, Pudlo, & Wehde, 2019), education (Fothergill & Peek, 2004; Russell, Goltz, & Bourque, 1995), income (Ablah et al., 2009; Edwards, 1993), location (Wehde, Pudlo, & Robinson, 2019), and race/ethnicity (Brodie, Weltzien, Altman, Blendon, & Benson, 2006; Eisenman et al., 2006; Peacock, Morrow, & Gladwin, 1997; Redlener et al., 2008; Torabi & Seo, 2004) capture important individual differences that structure individual emergency preparedness and response. Additionally, individuals who have children at their residences tend to be more prepared for disasters (Baker & Cormier, 2013; Edwards, 1993; Russell et al., 1995).

The second set of variables is issue-specific characteristics. These variables generally include individuals' perceived risk, previous experience, and knowledge regarding specific disasters of individuals to name a few (Robinson et al., 2017). Individual perceived risks of specific disasters is a significant predictor affecting

individual emergency preparedness and other risk-mitigating behaviors (Funk, Salathé, & Jansen, 2010; Lai, Chib, & Ling, 2018; Miceli, Sotgiu, & Settanni, 2008; Miceli et al., 2008; Murphy et al., 2009; Palm, Hodgson, Blanchard, & Lyons, 1990; Paton, 2008). These studies have shown that when people perceive higher risks associated with potentially disastrous events, they tend to prepare for these events more. However, other studies in this area have found that risk perception is not significantly associated with individual risk-mitigating behaviors (Jackson, 1981; Mileti & Darlington, 1997; Russell et al., 1995). Some scholars argue that the mixed results are derived from different measurement strategies across these various studies (Miceli et al., 2008). Previous studies have also found that people tend to take action for risk mitigation and emergency preparedness more when they are knowledgeable about risks, they face (Bord, Fisher, & O'Connor, 1998; Jaeger, Dürrenberger, Kastenholz, & Truffer, 1993; Leiserowitz, 2006). For instance, O'Connor, Bord, and Fisher (1999), find that people take greater efforts to reduce the burning of fossil fuels when they are more knowledgeable about global warming issues. Furthermore, it has been observed that those who have previously experienced disasters tend to prepare for emergency situations more (Mullis, Duval, & Rogers, 2003; Norris, Smith, & Kaniasty, 1999).

Additionally, political dispositions are often investigated to explain individuals' cooperative behaviors with government authorities to prepare for, respond to and recover from emergencies. Political dispositions are generally measured as a political ideology, party identification or attitudes toward government. These serve as underlying predispositions and filters through which individuals process their decisions related to policy (Rudolph & Evans, 2005; Taber & Lodge, 2006). Despite numerous studies looking at various political disposition variables such as political ideology and party identification as predictors of individual mitigation attitude or support for risk mitigation policies (Mumpower, Liu, & Vedlitz, 2016; Mumpower, Shi, Stoutenborough, & Vedlitz, 2013; Reckhow, Grossmann, & Evans, 2015; Stoutenborough, Sturgess, & Vedlitz, 2013), there have been insufficient studies looking at these variables of political dispositions in order to understand the actual behavior of emergency preparedness of individuals, except a few (Ablah et al., 2009; Arlikatti et al., 2007; Basolo et al., 2009; Perry & Lindell, 1991; Murphy et al., 2018; van der Weerd,

Timmermans, Beaujean, Oudhoff, & van Steenbergen, 2011).

Instead of treating trust in emergency management authorities as another explanatory variable in addition to these sets of variables, this article argues that trust in emergency management authorities plays a role as a mediator between three sets of individual predisposition variables and individual emergency preparedness. This is because trust in an issue-specific agency is also a function of these same categories of explanatory factors (Liu, Robinson, & Vedlitz, 2017; Robinson et al., 2017). In a recent study, Robinson et al. (2017) review a broad range of existing studies and conclude that individual trust in an issue-specific agency is primarily constructed by these sets of explanatory factors including demographic characteristics, political dispositions, and issue-specific variables. Therefore, this article reasonably expects that trust in emergency management authorities is structured by demographic characteristics, political predispositions, and issue-specific characteristics while trust in emergency management authorities itself is also a determinant or explanatory factor of individual emergency preparedness. Following these arguments previously described, this article arrives at two research expectations as follows:

Expectation 1: Trust in emergency management authorities is structured by demographic characteristics, political predispositions, and issue-specific factors.

Expectation 2: Trust in emergency management authorities, both local governments and FEMA, will be positively associated with individual levels of emergency preparedness.

Data and Methods

To test these expectations, this study draws on data from the 2013 Severe Weather and Society survey. This survey measures the perceptions, opinions, and preferences of Americans concerning severe weather and public policy. A total of 3,976 people in the United States participated in this online survey which was fielded in eight weekly waves between May 8th and June 27th with each wave consisting of approximately 500 randomly selected members of the same SurveySpot Internet panel.³ This article relies on 3,696 full observations for the purpose of

analysis. The average completion time was approximately 29 minutes. Respondents were recruited from tornado-prone states including Alabama, Arkansas, Georgia, Illinois, Indiana, Kansas, Kentucky, Louisiana, Michigan, Mississippi, Missouri, North Carolina, Ohio, Oklahoma, South Carolina, Tennessee, and Texas. These states are commonly known as “Tornado Alley” because they consistently experience a high frequency of tornadoes each year. Members of the panel qualified as living in a tornado-prone region if the address they registered with SSI is located in one of the high-vulnerability regions listed by Ashley (2007) in his seminal study of tornado climatology. The study included an oversample of individuals from rural areas so as to avoid the urban clustering commonly associated with internet-based surveys. The survey includes a set of questions regarding natural disaster issues, perceived risk, trust in various levels of government and agencies, respondents’ knowledge about tornadoes and basic demographic characteristics

The dependent variable in this study is individual cooperation with emergency preparedness recommendations. To measure individual cooperation with FEMA’s recommendations, this paper operationalizes this concept as *Individual Emergency Preparedness for Tornadoes*. The respondents were asked to select items they currently have available at their residence in case of emergency situations. These items recommended by FEMA include (i) a disaster response plan for them and their family, (ii) an emergency preparedness kit containing first-aid supplies, flashlights, batteries, etc., (iii) supplies of water and food, (iv) generators to provide electricity, (v) designated place to provide the most shelter from tornadoes within their house, and (vi) specially constructed room or other facility on your property designed to provide shelter from tornadoes. Using this survey question, this article creates a measure of individual emergency preparedness (0 = “not prepared at all” to 6 = “fully prepared”).

This article includes *Individual Trust in FEMA and Local Governments* as dependent variables as well as mediating variables. As previously mentioned, this article focuses on individual confidence in FEMA and local governments to measure their trust. The respondents were asked to rate the following statement to report their

trust in FEMA: On a scale from zero to ten, where zero means not at all confident and ten means completely confident, how confident are you that FEMA will provide effective assistance to you and your community if you experience a natural disaster? Furthermore, to measure individual trust in local governments, the respondents were asked to rate the statement of “how much of the time do you trust your county and local governments to do what is right for you and your fellow residents in your local area?”. This scale ranges from zero which represents none of the time to ten which represents all of the time.⁴

This study considers six important demographic variables. This article includes *Gender* (0 = “female”, 1 = “male”), *Age* (respondent’s actual age), *Education* (dummy variables for high school education or less, some college or a bachelor’s degree, and graduate education), *Race* (dummy variables for White, Black, and Other Races), *Hispanic* (0 = “non-Hispanic”, 1 = “Hispanic”), and *income* (variable ranging from 1 to 21, with each point representing a \$10,000 range of income, where 1 represents less than \$10,000 and 21 represents greater than \$200,000).

This article considers *Individual Confidence in Federal Government* as a political disposition variable. The respondents were asked to rate how much of the time they trust the federal government to do what is right for the American people (0 = “none of the time” to 10 = “all of the time”). Additionally, respondents were asked to report their *Political Ideology* (1 = “strongly liberal” to 7 = “strongly conservative”). Finally, they were also asked to self-identify their *Party Affiliation* (Republican, Independent, or Democrats). On the basis of this, this study created dummy variables for Republican and Other Party and Independents.

This article includes some items in order to measure issue-specific variables such as perceived risk and previous tornado experience. First, this study includes the *Perceived Risk of Tornadoes*. The respondents were asked to rate how much risk they think tornadoes impose to them and their family (From 0 = “no risk” to 10 = “extreme risk”). *Individual Knowledge regarding Tornadoes* is also included. The respondents were asked to answer six questions regarding common myths about tornadoes. These statements were either true or false; each question was recoded where 1 = correct and 0 = incorrect. On the basis of these recoded questions, this

article creates a scale of individual knowledge (0 = “not knowledgeable at all” to 6 = “fully knowledgeable”).⁵ Finally, this article includes *Individual Experience of Tornadoes*. The respondents were asked to answer if they have personally experienced tornadoes and related damages (1 = “experienced” 0 = “no experience”). Data from the National Centers for Environmental Information (NCEI) Storm Events database were used to calculate measures of tornado frequency and total property damage. These measures were calculated for the year prior to survey administration, from May 2012 through May 2013, for each respondent’s county. Counties that experience no tornadoes were assigned a value of 0 for both numbers of tornadoes and property damage. Some counties experienced a tornado, but no property damage occurred or was measured. These respondents’ counties were assigned a zero for the total property damage variable. Summary statistics are in Table 1 below. Using these measures and variables, this article specifies a series of ordinary least squares regression models. The article first assesses the effect of predisposition variables on individual trust in FEMA and local governments in the context of emergency management. This study then examines if trust in FEMA and trust in local governments influence individual levels of emergency preparedness for tornadoes.

Findings

Determinants of Trust in Emergency Management Authorities

In this section, this article examines the determinants of trust in government using agency and domain-specific measures of trust. This study examines how these types of individual trust, in particular, trust in FEMA and local governments, are structured by characteristics including demographics, political dispositions, and issue-specific variables. The measures individual trust in FEMA and local governments in this study are 10-point scales; therefore, this study uses the ordinary least squares (OLS) regression models to assess the determinants of trust in FEMA and local governments. These models are presented in Table 2, which includes two columns. The first column investigates the determinants of individual trust in FEMA while the second column includes variables to test the determinants of individual trust in local

governments.⁶

Table 1. Summary Statistics, *N* = 3,696

Statistic	Mean	SD	Min	Max
Dependent variables				
Emergency Preparedness Scale	1.721	1.454	0	6
Generator	0.169	0.375	0	1
Supplies	0.286	0.452	0	1
Kit	0.348	0.476	0	1
Designated place	0.587	0.493	0	1
Plan	0.265	0.442	0	1
Shelter	0.066	0.248	0	1
Trust in FEMA	5.854	2.948	0	10
Trust in local government	4.880	2.469	0	10
Demographics				
Male	0.472	0.499	0	1
Age	45.348	16.46	18	99
Income	5.351	3.850	1	21
High school or less	0.262	0.440	0	1
Some college or bachelor's degree	0.611	0.488	0	1
Graduate school	0.126	0.332	0	1
Hispanic	0.085	0.279	0	1
White	0.793	0.405	0	1
Black	0.161	0.367	0	1
Other race	0.046	0.210	0	1
Political dispositions				
Trust in Federal Government	3.434	2.568	0	10
Republican	0.279	0.448	0	1
Democrat	0.365	0.481	0	1
Other party and independents	0.357	0.479	0	1
Ideology (Conservative)	4.169	1.588	1	7
Tornado specific characteristics				
Knowledge	3.642	1.246	0	6
Tall buildings	0.875	0.331	0	1
Geographic features	0.723	0.447	0	1
Southwest corner	0.416	0.493	0	1
Bridge	0.568	0.495	0	1
Open windows	0.693	0.461	0	1
Shape and size	0.367	0.482	0	1
Risk perceptions of tornadoes	5.339	2.251	0	10
Experienced damage from tornado	0.116	0.321	0	1
Number of tornadoes	0.57	1.21	0	8
Total property damage (in millions)	5.10	98.7	0	2,000

SD, standard deviation.

First, the results indicate that several predisposition variables are associated with individual trust in FEMA. Gender and education variables show significant effects on trust in FEMA: while females tend to have higher trust in FEMA, less educated people are more likely to trust that FEMA will provide effective assistance to people and their community if they experience a natural disaster. Furthermore, politically conservative people also tend not to trust FEMA for emergency management.

However, people tend to trust FEMA more when they have higher trust in the federal government more generally. Examining tornado specific characteristics, this study finds that both risk perception and knowledge regarding tornadoes affect trust in FEMA while previous experience with a tornado does not. Specifically, this article finds that people tend to trust FEMA less in the context of emergency management when they are more knowledgeable regarding tornadoes. As previous studies have shown, this article also finds that risk perception of tornadoes is strongly and positively associated with trust in FEMA.

Table 2. Ordinary Least Squares (OLS) Regression Coefficients for Determinants of Trust in Emergency Management Authorities

	Trust in FEMA (1)	Trust in Local Govt. (2)
Demographics		
Male	-0.28 (0.09)***	0.23 (0.07)***
Age	0.01 (0.003)*	0.01 (0.002)**
Income	-0.002 (0.01)	0.04 (0.01)***
High school or less	0.26 (0.11)**	-0.26 (0.09)***
Graduate school	-0.08 (0.14)	-0.04 (0.11)
Hispanic	-0.06 (0.16)	0.03 (0.12)
Black	0.15 (0.13)	-0.26 (0.10)**
Other race	-0.06 (0.22)	-0.28 (0.15)*
Political dispositions		
Trust in federal government	0.42 (0.02)***	0.49 (0.02)***
Republican	0.01 (0.14)	0.45 (0.11)***
Other party and independents	-0.29 (0.11)***	0.11 (0.09)
Ideology (conservative)	-0.09 (0.03)**	0.11 (0.03)***
Tornado specific characteristics		
Tornado experience	-0.01 (0.14)	-0.11 (0.11)
Tornado risk perception	0.09 (0.02)***	0.01 (0.02)
Knowledge of tornadoes	-0.11 (0.04)***	-0.01 (0.03)
Number of tornadoes total	0.05 (0.04)	0.05 (0.03)*
Total property damage (in millions)	0.0004 (0.0004)	0.0002 (0.0004)
Constant	4.59 (0.28)***	2.05 (0.22)***
N	3,696	3,696
R ²	0.17	0.24
Adjusted R ²	0.17	0.24
Residual SE (df = 3,678)	2.69	2.16
F Statistic (df = 17; 3,678)	45.52***	68.15***

Reference categories are female, not Hispanic, bachelor's degree, White, and Democrat.
* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. Robust standard errors in parentheses. SE, standard error.

Many of the individual demographic and disposition variables which help explain trust in FEMA also help explain trust in local governments in the context of emergency management. However, many of these characteristics actually show the opposite patterns. Being male is associated with more trust in local governments while having only a high school education or less, relative to some college or a bachelor's degree,

is associated with less trust. Both of these patterns are in direct contrast to our findings for trust in FEMA. Similarly, this article finds complete opposite patterns for ideology; the more conservative an individual is the more they trust local government while the less they trust FEMA. Some relationships are remarkably similar too, however. Age has a modest positive relationship with both trust variables. Trust in the federal government also has a strong positive relationship with both specific measures of trust. Trust in local governments also has a few unique relationships such as the association between higher income and higher trust in local governments. Republicans are also more likely to perceive higher trust in local governments in the context of emergency management than their Democrat counterparts. The race also has strong negative effects on trust in local governments for both black and other race respondents. Interestingly this article finds no relationships between tornado specific characteristics and trust in local governments, other than the variables which represent the number of tornadoes a respondents' county experienced the previous year. Those respondents who experienced, or were near, more tornadoes have slightly higher levels of trust in local government.

Trust in Emergency Management Authorities and Individual Emergency Preparedness

As previously mentioned, this article claims that trust in FEMA and local governments in the context of emergency management shapes the individual level of emergency preparedness. To test this argument, this article measured the individual level of emergency preparedness as a continuous variable. Therefore, this article used ordinary least squares regression models to assess the effect of trust in FEMA and local governments on individual emergency preparedness.

Table 3 includes four models: the first column shows the effect of trust in FEMA on individual emergency preparedness, while the second column shows the effect of trust in local governments in emergency management on individual emergency preparedness. The third column then models emergency preparedness including both types of trust. Finally, this article models the same relationship and include an interaction term.⁷ The visualization of the marginal effects of domain-specific trust on emergency preparedness, when modeled with an interaction, is in Figure 1. Across all.

Table 3. Ordinary Least Squares (OLS) Regression Coefficients for Determinants of Emergency Preparedness

	Emergency Preparedness Scale			
	(1)	(2)	(3)	(4)
Domain-specific trust				
Trust in FEMA	0.02* (0.01)		0.01 (0.01)	-0.02 (0.02)
Trust in Local Govt.		0.05*** (0.01)	0.05*** (0.01)	0.02 (0.02)
Trust in FEMA:Trust in Local Govt.				0.01* (0.003)
Demographics				
Male	0.003 (0.05)	-0.01 (0.05)	-0.01 (0.05)	-0.01 (0.05)
Age	0.004*** (0.001)	0.004*** (0.001)	0.004*** (0.001)	0.004*** (0.001)
Income	0.05*** (0.01)	0.05*** (0.01)	0.05*** (0.01)	0.05*** (0.01)
High school or less	-0.33*** (0.05)	-0.31*** (0.05)	-0.31*** (0.05)	-0.32*** (0.05)
Graduate school	-0.06 (0.08)	-0.06 (0.08)	-0.06 (0.08)	-0.06 (0.08)
Hispanic	0.11 (0.09)	0.11 (0.09)	0.11 (0.09)	0.11 (0.09)
Black	-0.08 (0.07)	-0.06 (0.07)	-0.06 (0.07)	-0.07 (0.07)
Other race	-0.18 (0.11)	-0.17 (0.11)	-0.17 (0.11)	-0.17 (0.11)
Political dispositions				
Trust in Federal Government	-0.03** (0.01)	-0.04*** (0.01)	-0.05*** (0.01)	-0.05*** (0.01)
Republican	-0.05 (0.07)	-0.07 (0.07)	-0.07 (0.07)	-0.07 (0.07)
Other party and independents	0.04 (0.06)	0.03 (0.06)	0.03 (0.06)	0.03 (0.06)
Ideology (conservative)	0.02 (0.02)	0.01 (0.02)	0.01 (0.02)	0.01 (0.02)
Tornado specific characteristics				
Tornado experience	0.61*** (0.08)	0.62*** (0.08)	0.62*** (0.08)	0.62*** (0.08)
Tornado risk perception	0.05*** (0.01)	0.05*** (0.01)	0.05*** (0.01)	0.05*** (0.01)
Knowledge of tornadoes	0.001 (0.02)	-0.002 (0.02)	0.001 (0.02)	0.002 (0.02)
Number of tornadoes total	-0.02 (0.02)	-0.03 (0.02)	-0.03 (0.02)	-0.03 (0.02)
Total property damage (in millions)	-0.0001 (0.0003)	-0.0001 (0.0003)	-0.0001 (0.0003)	-0.0001 (0.0003)
Constant	0.94*** (0.15)	0.91*** (0.14)	0.87*** (0.15)	1.01*** (0.17)
N	3,696	3,696	3,696	3,696
R ²	0.08	0.08	0.08	0.08
Adjusted R ²	0.07	0.08	0.08	0.08
Residual SE	1.40 (df = 3,677)	1.40 (df = 3,677)	1.40 (df = 3,676)	1.40 (df = 3,675)
F-Statistic	16.74*** (df = 18; 3,677)	17.82*** (df = 18; 3,677)	16.96*** (df = 19; 3,676)	16.32*** (df = 20; 3,675)

Reference categories are female, not Hispanic, bachelor's degree, White, and Democrat.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. Robust standard errors in parentheses. [Correction added on January 31, 2020: after first online publication: "Residual SE" row has been updated with "df" new values under the sub columns "(3)" and "(4)" and in the "F-Statistic" row the new values are added under the sub columns "(1)", "(2)", "(3)" and "(4)" to prevent ambiguity in data presented for Emergency Preparedness Scale.]

models, this article finds significant relationships for age, education, and income with individual emergency preparedness. This article finds that older and wealthier people tend to prepare for emergency situations, particularly tornadoes, more. This article also finds that having a high school education or less is associated with fewer emergency preparation actions, relative to having some college or a bachelor's degree, for tornadoes. However, party identification and political ideology do not show significant relationships with individual emergency preparedness. Several issue-specific variables

are also significantly associated with emergency preparedness for tornadoes across all models. When people perceive higher risks associated with tornadoes and have previously experienced tornadoes, they tend to prepare for tornadoes more than those who do not perceive high risks or have not experienced damage from tornadoes. Knowledge of tornadoes, on the contrary, does not help explain preparedness actions for tornadoes

Finally, the analyses of this study show that trust in FEMA and trust in local governments in the context of emergency situations helps to explain emergency preparedness in nuanced ways. When modeled alone, this article finds that when people trust that FEMA will address emergency situations, they tend to be more cooperative with emergency preparedness recommendations. Furthermore, when they trust local governments in the context of emergency situations, they are also more likely to follow emergency preparedness recommendations. Both of the trust variables are positively significant and present slight relationships with emergency preparedness when modeled separately, with trust in local government having a slightly stronger relationship with emergency preparedness. This study, therefore, argues that public trust in local governments may matter more than trust in FEMA in the context of emergency management and preparedness. This is further evidenced when this article models emergency preparedness as a function of trust in FEMA and local governments simultaneously in column 3. This model suggests that the effect of trust on emergency preparedness is only driven by trust in local governments; trust in FEMA is no longer statistically significant and the coefficient shrinks by 50 percent. Finally, this article models emergency preparedness as a function of both types of trust and the interaction between them. This allows us to examine if there is a conditional or conjoint effect of both types of trust. When this article examines fit statistics, multiple pieces of evidence suggest this may be the best approach. First, the adjusted R^2 improves modestly as adding variables and complexity at each stage from column 1 to column 4. This article also conducted nested F -tests to see if the models improve as making them more complex. Comparing the model in column 3 to column 1, this article finds a significant improvement in model fit (F -statistic = 19.34, $p < 0.01$). When this study compares the models in column 3 and column 2, this

article does not see an improvement in fit, given the added complexity (F -statistic = 1.32, $p = 0.25$). However, when comparing the model in column 3, both trust measures, with the fully specified model including the interaction term, this article finds an improvement in model fit with an F -statistic of 3.91 and a $p = 0.0488$.⁸ Given this evidence, this article prefers the fully specified model in column 4 and presents the results of the interaction term in Figure 1 below.⁹

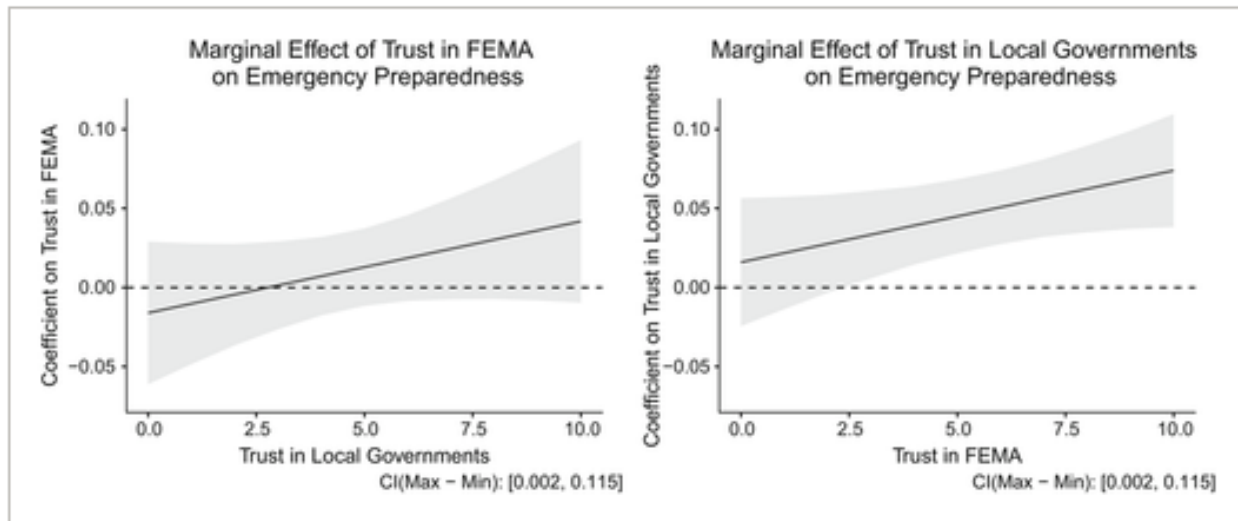


Figure 1. Interaction Plots for Trust in Federal Emergency Management Agency (FEMA) and Local Governments on Emergency Preparedness.

Given the nature of interaction terms, this article cannot interpret the coefficients or their significance directly. The figure follows the advice of Brambor, Clark, and Golder (2006) in displaying the marginal effect of each variable of interest in the interaction over the range of the conditional variable. Doing so, this article sees in the first panel of Figure 1 that the effect of trust in FEMA on emergency preparedness is null across the range of trust in local governments. However, when flipping this, it is observed that the marginal effect of trust in local government is statistically significant and positive when trust in FEMA is above 2.5. These findings suggest that the positive effect of trust in local government on emergency preparedness is contingent on having a base, though relatively low, trust in FEMA¹⁰ These results suggest a nuanced relationship between trust and emergency preparedness. First, this article finds that trust in domain-specific agencies and relevant bodies of government, such as FEMA and local governments, are

related to emergency preparedness even when accounting for general trust in government. This article then further finds that there is a conditional relationship between these trust in these domain-specific entities. Specifically, this study finds that trust in local government is only associated with increased emergency preparedness for tornadoes when a base rate of trust in FEMA is met.¹¹ Trust in FEMA, interestingly, does not have a significant effect on emergency preparedness when conditioned on trust in local government, for all levels of that trust.

Conclusions

Research on disasters and natural hazards has often followed one of two paths. Either scholars are interested in the institutional governance of disasters or how individuals behave regarding disaster, including response and preparation. Recent reviews of the research in leading journals on crisis and risk have found that the issue of crisis and risk governance, in particular, is examined extensively (Kuipers, Kantorowicz, & Mostert, 2019; Kuipers, van Grieken, & van Asselt, 2018). Furthermore, Kuipers and Welsh (2017) find that much of the literature of the past three decades focuses on citizen behaviors in the process of crisis and disaster management. Specifically, scholars have investigated under which circumstances individuals cooperate with emergency management authorities and the effects of this cooperation on emergency and disaster management. This article attempts to combine these two streams of scholarship by focusing on the role of trust in institutions, a result of their governance, and individual preparedness behaviors. Specifically, we contribute to these scholarly endeavors by drawing on theories of public institutional trust from public administration scholarship and their potential to help explain individuals' emergency preparedness.

This study demonstrates that individual predisposition variables including demographic characteristics, political dispositions and issue-specific variables help in explaining domain-specific measures of trust. Using survey data from states prone to tornadoes, this study also finds that individual levels of emergency preparedness can be explained, at least partially, by how much people trust emergency management authorities. Using OLS regression models with interaction terms, this study finds that these relationships are nuanced and require careful conceptualization and

operationalization of the measures of trust.

The analyses in this study suggests that trust in FEMA and local governments in the context of emergency management is first structured by individual predisposition characteristics. This result supports previous research claiming that trust in an agency is a function of demographic characteristics, political dispositions and issue-specific variables (Liu et al., 2017; Robinson et al., 2017). In addition, the findings show that how individuals perceive trust in FEMA and local governments plays a significant role in their preparedness for emergency situations. In other words, when people believe that FEMA and local government will provide effective assistance to people and their community in the case of a natural disaster, they tend to prepare for emergency situations more. However, once accounting for trust in local government, the analysis shows that trust in FEMA has a null relationship with emergency preparedness. Nevertheless, this study argues that trust in FEMA is an important factor along with trust in local government because the increased preparation for tornado emergencies is driven by trust in local governments when a baseline of trust in FEMA is met. These results show that emergency management authorities may need to manage their reputations among their constituents in order to promote individual cooperation with them in the context of emergencies.

Although this article provides some intriguing evidence regarding individuals' emergency preparedness behaviors and trust in domain-specific agencies and governments, these findings should be understood within the limitations of a singular study. In this article, this article created a scale to measure individual levels of emergency preparedness. As previously mentioned, those who prepare more items as recommended by FEMA had higher scores on this emergency preparedness scale. However, this measurement does not consider the fact that preparing each item takes different levels of effort, time, and resources. For example, stockpiling water for three days is much easier than preparing a shelter for disasters. For future research, measuring individual preparedness for disaster should consider ways of measuring effort. One solution may be to weight these different items according to their relative difficulties. Another way may be to directly ask people how much effort they have put into being prepared for emergencies, as opposed to specific actions.

In addition, while this article argues that trust in emergency management authorities helps explain preparedness, it is difficult to know if that is the case because individuals are considering those agencies' or governments' recommendations. To examine if individuals are actually processing FEMA and local government recommendations for emergency preparedness, more in-depth research regarding this subject is required. Research that relies on interviews or survey questions that directly ask if individuals read and follow recommendations from FEMA and local governments may be able to better investigate potential causal effects of trust in emergency management authorities on emergency preparedness.

Despite these limitations, this study provides a practical implication to emergency management authorities: emergency management authorities as a whole should improve their reputation among their constituents for better emergency management. Furthermore, this study contributes to theories about the role of trust in government in community member cooperation with government policies and recommendations more generally. There have been insufficient efforts to test these theories of trust in emergency management as a specific area of cooperation. In particular, past research has ignored the potentially important role trust in FEMA may play in cooperation with government recommendations in emergency management and preparedness. The findings in this article suggest that trust in local governments, however, may be more important for understanding cooperation with government recommendations in emergency preparedness once a base level of trust in FEMA is established. This article finds that general trust in government, trust in local government, and its interaction with trust in FEMA together best help us understand community member cooperation in the context of emergency preparedness. This study argues then that scholars of trust in government consider the effects of agency and domain-specific measures not only separately but in conjunction with each other, as both covariates and conditioning variables in interaction.

Notes

1. See <https://www.fema.gov/media-library/assets/documents/90354> for supply

recommendations from FEMA.

2. Results from a FEMA survey, in 2017, suggest only 42 percent of individuals feel they have been prepared for a disaster for more than a year. See [https://community.fema.gov/AP Survey Story PDF](https://community.fema.gov/AP_Survey_Story_PDF).
3. At the time, the SurveySpot panel consisted of approximately two million households with about five million household members. In addition to this large panel, SSI maintains a subpanel of approximately 400,000 members whose demographics (e.g., race, gender, and education) are roughly proportionate to the national census characteristics. The sample was randomly drawn from the 400,000-member census-balanced subpanel.
4. Although this question is asked in a more general sense, given the nature and context of the survey, this article confidently argues that this measure captures individuals' confidence in local government during disasters.
5. Question wordings for knowledge questions and correct answers are in the Appendix. For the development of this scale, see Allan, Ripberger, Ybarra, & Cokely (2017).
6. Both models presented heteroskedasticity in the residual term, therefore this article reports robust standard errors. Additionally, this study checked for multicollinearity using the VIF statistic; all were below 2.
7. All four models presented heteroskedasticity in the residual term, therefore this article reports robust standard errors. Additionally, this article checked for multicollinearity using the VIF statistic; all were below 2 except in column four. However, this is to be expected given the inclusion of an interaction term, see Brambor, Clark, and Golder (2006) for a clear description of why this is the case and not a "problem".
8. Given the lack of improvement between columns 2 and 3, this article also compares the model in column 4 to that in columns 2. This article finds an *F*-statistic of 2.61 and a $p = 0.073$ which provides further statistical evidence, if weak, of the preferability of the fully specified model in column 4.
9. These plots use the technique suggested by Esarey & Sumner (2018) for calculating the confidence intervals and these are plotted using the adj CI

argument and the interplot package in R (Solt, Hu & Kenke, 2015).

10. For the fully specified analysis, models using two different measures of basic preparedness were also considered. The first included having supplies, a kit, a plan, and a back-up generator. The second basic preparedness measure included the first three actions but instead counted having a designated sheltering place as a basic measure of preparedness as opposed to having a generator. Results from these models were very similar to those presented below and are available from the authors upon request.
11. Various count models were also run as a robustness check, given the nature of the dependent variable. The study found similar results across all estimations. In the zero-inflated models, the interaction term is no longer statistically significant; however, plots of the interaction suggest a similar interpretation to our main results with a higher threshold level of trust in FEMA of about five required for significance. The range of trust in local government is associated with an increase of approximately one-half an action on the six-action index. Results available from the authors on request.

References

- Ablah, Elizabeth, Jurt Konda, and Crystal L. Kelley. 2009. "Factors Predicting Individual Emergency Preparedness: A Multi-State Analysis of 2006 brfss Data." *Biosecurity and Bioterrorism: Biodefense Strategy, Practice, and Science* 7 (3): 317–30.
- Albrecht, Frederike. 2017. "Government Accountability and Natural Disasters: The Impact of Natural Hazard Events on Political Trust and Satisfaction With Governments in Europe." *Risk, Hazards & Crisis in Public Policy* 8 (4): 381–410.
- Allan, Jinan N., Ripberger, Joseph T., Ybarra, Vincent T., and Cokely, Edward T. 2017. "Tornado Risk Literacy: Beliefs, Biases, and Vulnerability." In *Naturalistic Decision Making and Uncertainty*, 284–90.
- Arlikatti, Sudha, Michael K. Lindell, and Carla S. Prater. 2007. "Perceived Stakeholder Role Relationships and Adoption of Seismic Hazard Adjustments." *International Journal of Mass Emergencies and Disasters* 25 (3): 218–88.

- Ashley, Walker S. 2007. "Spatial and Temporal Analysis of Tornado Fatalities in the United States: 1880–2005." *Weather and Forecasting* 22 (6): 1214–28.
- Baker, Lisa R., and Loretta A. Cormier. 2013. "Disaster Preparedness and Families of Children With Special Needs: A Geographic Comparison." *Journal of Community Health* 38 (1): 106–12.
- Basolo, Victoria, Laura J. Steinberg, Raymond J. Burby, Joyce Levine, Ana Maria Cruz, and Chihyen Huang. 2009. "The Effects of Confidence in Government and Information on Perceived and Actual Preparedness for Disasters." *Environment and Behavior* 41 (3): 338–64.
- Blessman, James, James Skupski, Mada Jamil, Hikmet Jamil, David Bassett, Roger Wabeke, and Bengt Arnetz. 2007. "Barriers to At-Home-Preparedness in Public Health Employees: Implications for Disaster Preparedness Training." *Journal of Occupational and Environmental Medicine* 49 (3): 318–26.
- Bord, Richard J., Ann Fisher, and Robert E. O'Connor. 1998. "Public Perceptions of Global Warming: United States and International Perspectives." *Climate Research* 11 (1): 75–84.
- Bouckaert, Geert, and Steven Van de Walle. 2003. "Comparing Measures of Citizen Trust and User Satisfaction as Indicators of 'Good Governance': Difficulties in Linking Trust and Satisfaction Indicators." *International Review of Administrative Sciences* 69 (3): 329–43.
- Brambor, Thomas, William Roberts Clark, and Matt Golder. 2006. "Understanding Interaction Models: Improving Empirical Analyses." *Political Analysis* 14 (1): 63–82.
- Brändström, Annika, Sanneke Kuipers, and Pär Daléus. 2008. "The Politics of Blame Management in Scandinavia After the Tsunami Disaster." In *Governing After Crisis: The Politics of Investigation, Accountability and Learning*, Boin, A., 't Hart, P., and McConnell, A. Cambridge: Cambridge University Press, 114–47.
- Brodie, Mollyann, Erin Weltzien, Drew Altman, Robert J. Blendon, and John M. Benson. 2006. "Experiences of Hurricane Katrina Evacuees in Houston Shelters: Implications for Future Planning." *American Journal of Public Health* 96 (8): 1402–08.

- Chanley, Virginia A., Thomas J. Rudolph, and Wendy M. Rahn. 2000. "The Origins and Consequences of Public Trust in Government: A Time Series Analysis." *Public Opinion Quarterly* 64 (3): 239–56.
- Choi, Junghwa, and Wesley Wehde. 2019. "Venue Preference and Earthquake Mitigation Policy: Expanding the Micro-Model of Policy Choice." *Review of Policy Research* 36 (5): 683–701.
- Christensen, Tom, and Per Lægrend. 2005. "Trust in Government: The Relative Importance of Service Satisfaction, Political Factors, and Demography." *Public Performance & Management Review* 28 (4): 487–511.
- Cooper, Christopher A., H. Gibbs Knotts, and Kathleen M. Brennan. 2008. "The Importance of Trust in Government for Public Administration: The Case of Zoning." *Public Administration Review* 68 (3): 459–68.
- Demiroz, Fatih, and Ali Unlu. 2018. "The Role of Government Legitimacy and Trust in Managing Refugee Crises: The Case of Kobani." *Risk, Hazards & Crisis in Public Policy* 9 (3): 332–56.
- DeYoung, Sarah E., and Melissa Peters. 2016. "My Community, My Preparedness: The Role of Sense of Place, Community, and Confidence in Government in Disaster Readiness." *International Journal of Mass Emergencies & Disasters* 34 (2): 250–82.
- Diekman, Shane T., Sean P. Kearney, Mary E. O'Neil, and Karin A. Mack. 2007. "Qualitative Study of Homeowners' Emergency Preparedness: Experiences, Perceptions, and Practices." *Prehospital and Disaster Medicine* 22 (6): 494–501.
- Edwards, Margie L. 1993. "Social Location and Self-Protective Behavior: Implications for Earthquake Preparedness." *International Journal of Mass Emergencies and Disasters* 11 (3): 293–303.
- Eisenman, David P., Cheryl Wold, Jonathan Fielding, Anna Long, Claude Setodji, Scot Hickey, and Lillian Gelberg. 2006. "Differences in Individual-Level Terrorism Preparedness in Los Angeles County." *American Journal of Preventive Medicine* 30 (1): 1–6.
- Esarey, Justin, and Jane Lawrence Sumner. 2018. "Marginal Effects in Interaction Models: Determining and Controlling the False Positive Rate." *Comparative*

- Political Studies* 51 (9): 1144–76.
- Fothergill, Alice, and Lori A. Peek. 2004. "Poverty and Disasters in the United States: A Review of Recent Sociological Findings." *Natural Hazards* 32 (1): 89–110.
- Funk, Sebastian, Marcel Salathé, and Vincent A. A. Jansen. 2010. "Modelling the Influence of Human Behavior on the Spread of Infectious Diseases: A Review." *Journal of the Royal Society Interface* 7 (50): 1247–56.
- Han, Ziqiang, Xiaojiang Hu, and Joanne Nigg. 2011. "How Does Disaster Relief Works Affect the Trust in Local Government? A Study of the Wenchuan Earthquake." *Risk, Hazards & Crisis in Public Policy* 2 (4): 1–20.
- Han, Ziqiang, Xiaoli Lu, Elisa I. Hörhager, and Jubo Yan. 2017. "The Effects of Trust in Government on Earthquake Survivors' Risk Perception and Preparedness in China." *Natural Hazards* 86 (1): 437–52.
- Heller, Kenneth, Douglas B. Alexander, Margaret Gatz, Bob G. Knight, and Tara Rose. 2005. "Social and Personal Factors as Predictors of Earthquake Preparation: The Role of Support Provision, Network Discussion, Negative Affect, Age, and Education." *Journal of Applied Social Psychology* 35 (2): 399–422.
- Hetherington, Marc J., and Thomas J. Rudolph. 2008. "Priming, Performance, and the Dynamics of Political Trust." *The Journal of Politics* 70 (2): 498–512.
- Jackson, Edgar L. 1981. "Response to Earthquake Hazard: The West Coast of North America." *Environment and Behavior* 13 (4): 387–416.
- Jaeger, Carlo, Gregor Dürrenberger, Hans Kastenholtz, and Bernhard Truffer. 1993. "Determinants of Environmental Action With Regard to Climatic Change." *Climatic Change* 23 (3): 193–211.
- Job, Jenny. 2005. "How is Trust in Government Created? It Begins at Home But Ends in the Parliament." *Australian Review of Public Affairs* 6 (1): 1–23.
- Johnston, David M., Mark S. Bebbington, Chin-Diew Lai, Bruce F. Houghton, and Douglas Paton. 1999. "Volcanic Hazard Perceptions: Comparative Shifts in Knowledge and Risk." *Disaster Prevention and Management: An International Journal* 8 (2): 118–26.
- Keim, Mark E. 2008. "Building Human Resilience: The Role of Public Health Preparedness and Response as an Adaptation to Climate Change." *American*

- Journal of Preventive Medicine* 35 (5): 508–16.
- Kettl, Donald F. 2019. "From Policy to Practice: From Ideas to Results, From Results to Trust." *Public Administration Review* 79: 763–7.
- Kim, Seok-Eun. 2005. "The Role of Trust in the Modern Administrative State: An Integrative Model." *Administration & Society* 37 (5): 611–35.
- Kuipers, Sanneke, Jaroslaw Kantorowicz, and Jan Mostert. 2019. "Manual or Machine? A Review of the Crisis and Disaster Literature, Risk Hazards and Crisis in Public Policy." *Risk, Hazards & Crisis in Public Policy* 10 (4): 388–402.
- Kuipers, Sanneke, Bob J. van Grieken, and Marjolein B. A. van Asselt. 2018. "Risk, Hazards, and Crises in Research: What Risks Get Researched, Where, and How?" *Risk, Hazards & Crisis in Public Policy* 9 (4): 384–96.
- Kuipers, Sanneke, and Nicholas H. Welsh. 2017. "Taxonomy of the Crisis and Disaster Literature: Themes and Types in 34 Years of Research." *Risk, Hazards & Crisis in Public Policy* 8 (4): 272–83.
- Lai, Chih-Hui, Arul Chib, and Rich Ling. 2018. "Digital Disparities and Vulnerability: Mobile Phone Use, Information Behavior, and Disaster Preparedness in Southeast Asia." *Disasters* 42: 734–60.
- Leiserowitz, Anthony. 2006. "Climate Change Risk Perception and Policy Preferences: The Role of Affect, Imagery, and Values." *Climatic Change* 77 (1–2): 45–72.
- Levi, Margaret. 1998. "A State of Trust." *Trust and Governance* 1: 77–101.
- Levi, Margaret, and Laura Stoker. 2000. "Political Trust and Trustworthiness." *Annual Review of Political Science* 3 (1): 475–507.
- Lindell, Michael K., and Ronald W. Perry. 2000. "Household Adjustment to Earthquake Hazard: A Review of Research." *Environment and Behavior* 32 (4): 461–501.
- Liu, Xinsheng, Scott E. Robinson, and Arnold Vedlitz. 2017. "A Micro Model of Problem Definition and Policy Choice: Issue Image, Issue Association, and Policy Support of Power Plants." *Policy Studies Journal*, early view version:
<http://onlinelibrary.wiley.com/doi/10.1111/psj.12233/full>
- Longstaff, Patricia H., and Sung-Un Yang. 2008. "Communication Management and Trust: Their Role in Building Resilience to "Surprises" Such as Natural Disasters, Pandemic Flu, and Terrorism." *Ecology and Society* 13 (1): art3.

- Makkai, Toni, and John Braithwaite. 1994. "Reintegrative Shaming and Compliance With Regulatory Standards." *Criminology* 32 (3): 361–85.
- Miceli, Renato, Igor Sotgiu, and Michele Settanni. 2008. "Disaster Preparedness and Perception of Flood Risk: A Study in an Alpine Valley in Italy." *Journal of Environmental Psychology* 28 (2): 164–73.
- Mileti, Dennis S., and Joanne Derouen Darlington. 1997. "The Role of Searching in Shaping Reactions to Earthquake Risk Information." *Social Problems* 44 (1): 89–103.
- Mulilis, John-Paul, T. Shelley Duval, and Randy Rogers. 2003. "The Effect of a Swarm of Local Tornadoes on Tornado Preparedness: A Quasi-Comparable Cohort Investigation 1." *Journal of Applied Social Psychology* 33 (8): 1716–25.
- Mumpower, Jeryl L., Xinsheng Liu, and Arnold Vedlitz. 2016. "Predictors of the Perceived Risk of Climate Change and Preferred Resource Levels for Climate Change Management Programs." *Journal of Risk Research* 19 (6): 798–809.
- Mumpower, Jeryl L., Liu Shi, James W. Stoutenborough, and Arnold Vedlitz. 2013. "Psychometric and Demographic Predictors of the Perceived Risk of Terrorist Threats and the Willingness to Pay for Terrorism Risk Management Programs." *Risk Analysis* 33 (10): 1802–11.
- Murphy, Haley, Alex Greer, and Hao-Che Wu. 2018. "Trusting Government to Mitigate a New Hazard: The Case of Oklahoma Earthquakes." *Risk, Hazards & Crisis in Public Policy* 9: 357–80.
- Murphy, Sheila T., Michael Cody, Lauren B. Frank, Deborah Glik, and Alfonso Ang. 2009. "Predictors of Emergency Preparedness and Compliance." *Disaster Medicine and Public Health Preparedness* 7: S1–8.
- Norris, Fran H., Tenbroeck Smith, and Krzysztof Kaniasty. 1999. "Revisiting the Experience–Behavior Hypothesis: The Effects of Hurricane Hugo on Hazard Preparedness and Other Self-Protective Acts." *Basic and Applied Social Psychology* 21 (1): 37–47.
- O'Connor, Robert E., Richard J. Bord, and Ann Fisher. 1999. "Risk Perceptions, General Environmental Beliefs, and Willingness to Address Climate Change." *Risk Analysis* 19 (3): 461–71.

- Palm, Risa I., Michael E. Hodgson, R. Denise Blanchard, and Donald I. Lyons. 1990. *Earthquake Insurance in California: Environmental Policy and Individual Decision-Making*. Boulder, CO: Westview Press.
- Paton, Douglas. 2008. "Risk Communication and Natural Hazard Mitigation: How Trust Influences Its Effectiveness." *International Journal of Global Environmental Issues* 8 (1–2): 2–16.
- Peacock, Walter Gillis, Betty Hearn Morrow, and Hugh Gladwin. 1997. *Hurricane Andrew: Ethnicity*. Routledge: Gender and the Sociology of Disaster London.
- Perry, Ronald W., and Michael K. Lindell. 1991. "The Effects of Ethnicity on Evacuation Decision- Making." *International Journal of Mass Emergencies and Disasters* 9 (1): 47–68.
- Rahn, Wendy M., and Thomas J. Rudolph. 2005. "A Tale of Political Trust in American Cities." *Public Opinion Quarterly* 69 (4): 530–60.
- Reckhow, Sarah, Matt Grossmann, and Benjamin C. Evans. 2015. "Policy Cues and Ideology in Attitudes Toward Charter Schools." *Policy Studies Journal* 43 (2): 207–27, <https://doi.org/10.1111/psj.12093>, Retrieved from <https://onlinelibrary.wiley.com/doi/abs/10.1111/psj.12093>
- Redlener, Irwin E., Roy F. Grant, David M. Abramson, and Dennis G. Johnson. 2008. *The 2008 American Preparedness Project: Why Parents May Not Heed Evacuation Orders and What Emergency Planners, Families and Schools Need to Know*. New York, NY: Columbia University.
- Riccucci, Norma M., Gregg G. Van Ryzin, and Huafang Li. 2016. "Representative Bureaucracy and the Willingness to Coproduce: An Experimental Study." *Public Administration Review* 76 (1): 121–30.
- Robinson, Scott E., Xinsheng Liu, James W. Stoutenborough, and Arnold Vedlitz. 2012. "Explaining Popular Trust in the Department of Homeland Security." *Journal of Public Administration Research and Theory* 23 (3): 713–33.
- Robinson, Scott E., Jason M. Pudlo, and Wesley Wehde. 2019. "The New Ecology of Tornado Warning Information: A Natural Experiment Assessing Threat Intensity and Citizen-to-Citizen Information Sharing." *Public Administration Review* 79 (6): 905–16, <https://doi.org/10.1111/puar.13030>

- Robinson, Scott E., James W. Stoutenborough, and Arnold Vedlitz. 2017. *Understanding Trust in Government: Environmental Sustainability, Fracking, and Public Opinion in American Politics*. Routledge: Taylor & Francis.
- Rudolph, Thomas J., and Jillian Evans. 2005. "Political Trust, Ideology, and Public Support for Government Spending." *American Journal of Political Science* 49 (3): 660–71.
- Ruscio, Kenneth P. 1997. "Trust in the Administrative State." *Public Administration Review* 57 (5): 454. Russell, Lisa A., James D. Goltz, and Linda B. Bourque. 1995. "Preparedness and Hazard Mitigation Actions Before and after Two Earthquakes." *Environment and Behavior* 27 (6): 744–70.
- Van Ryzin, Gregg G. 2004. "The Measurement of Overall Citizen Satisfaction." *Public Performance & Management Review* 27 (3): 9–28.
- Sadiq, Abdul-Akeem, Kevin Tharp, and John D. Graham. 2016. "Fema Versus Local Governments: Influence and Reliance in Disaster Preparedness." *Natural Hazards* 82 (1): 123–38.
- Scholz, John T., and Mark Lubell. 1998. "Trust and Taxpaying: Testing the Heuristic Approach to Collective Action." *American Journal of Political Science* 42: 398–417.
- Scholz, John T., and Neil Pinney. 1995. "Duty, Fear, and Tax Compliance: The Heuristic Basis of Citizenship Behavior." *American Journal of Political Science* 39: 490–512.
- Scolobig, Anna, Bruna De Marchi, and Marco Borga. 2012. "The Missing Link Between Flood Risk Awareness and Preparedness: Findings From Case Studies in an Alpine Region." *Natural Hazards* 63(2): 499–520.
- Solt, Frederick, Hu, Yue, and Kenke, B. 2015. "interplot: Plot the Effects of Variables in Interaction Terms." Available at the Comprehensive R Archive Network (CRAN) [Online]. [http:// CRAN.R-project.org/package=interplot](http://CRAN.R-project.org/package=interplot)
- Stoutenborough, James W., Shelbi G. Sturgess, and Arnold Vedlitz. 2013. "Knowledge, Risk, and Policy Support: Public Perceptions of Nuclear Power." *Energy Policy* 62: 176–84.
- Taber, Charles S., and Milton Lodge. 2006. "Motivated Skepticism in the Evaluation of

- Political Beliefs." *American Journal of Political Science* 50 (3): 755–69.
- Terpstra, Teun. 2011. "Emotions, Trust, and Perceived Risk: Affective and Cognitive Routes to Flood Preparedness Behavior." *Risk Analysis: An International Journal* 31 (10): 1658–75.
- Thomas, Craig W. 1998. "Maintaining and Restoring Public Trust in Government Agencies and Their Employees." *Administration & Society* 30 (2): 166–93.
- Torabi, Mohammad R., and Dong-Chul Seo. 2004. "National Study of Behavioral and Life Changes Since September 11." *Health Education & Behavior* 31 (2): 179–92.
- Tyler, Tom R. 2005. "Policing in Black and White: Ethnic Group Differences in Trust and Confidence in the Police." *Police Quarterly* 8 (3): 322–42.
- van der Weerd, Willemien, Daniëlle R. M. Timmermans, Desirée J. M. A. Beaujean, Jurriaan Oudhoff, and Jim E. van Steenbergen. 2011. "Monitoring the Level of Government Trust, Risk Perception and Intention of the General Public to Adopt Protective Measures During the Influenza A (H1N1) Pandemic in the Netherlands." *BMC Public Health* 11 (1): 575.
- Wehde, Wesley, Jason M. Pudlo, and Scott E. Robinson. 2019. "Is There Anybody Out There?": Communication of Natural Hazard Warnings at Home and Away." *Social Science Quarterly* 100: 2607–24.
- Whitaker, Gordon P. 1980. "Coproduction: Citizen Participation in Service Delivery." *Public Administration Review* 40 (3): 240–246, <https://doi.org/10.2307/975377>
- Yang, Kaifeng, and Marc Holzer. 2006. "The Performance–Trust Link: Implications for Performance Measurement." *Public Administration Review* 66 (1): 114–26.