

Growing Community Resilience from the Grassroots: Risk Awareness, Confidence in Institutions, and Civic Participation in a Natural Hazards Context

Hyunseok Hwang, Ph.D.¹; Arnold Vedlitz, Ph.D.²; and R. Patrick Bixler, Ph.D.³

Abstract: This article explores the factors that influence citizens' confidence in public and nonprofit sectors in the context of natural hazards. Utilizing a survey of residents in Austin, Texas, USA, we model the influence of residents' hazard risk awareness on the perceived confidence in formal institutions that are responsible for hazard preparedness and response. The empirical results of structural equation modeling show that perceived confidence in public and nonprofit sectors is differentially affected by residents' hazard risk awareness. Importantly, we also find the role of civic participation to positively mediate the effect of hazard risk awareness on the levels of confidence. Our findings contribute to the growing literature on coproduction of services for preparing urban residents for the impacts of climate change and emphasize the importance of community-driven development of community resilience. DOI: [10.1061/NHREFO.NHENG-1658](https://doi.org/10.1061/NHREFO.NHENG-1658). © 2023 American Society of Civil Engineers.

Author keywords: Natural hazard; Public service; Nonprofit; Community resilience; Public confidence; Coproduction.

Introduction

In the United States, hurricanes, tropical storms, tornados, floods, and fires threaten coastal and inland communities with loss of life and property and cause significant individual economic and psychological stress. Providing services during these natural hazard events often overwhelms response and recovery activities of government and nonprofit actors. Yet, individuals and communities must still rely on formal institutions, both governmental and nongovernmental, to provide prompt and effective assistance during the emergency and during recovery (Quarshie and Leuschner 2020; Koliba et al. 2011; Simo and Bies 2007). Prior to and after a hazard event, public and nonprofit effectiveness depends upon assessment of risk and impact on different communities as well as the coordination of information and resources across multiple, cross-sector organizations (Du et al. 2020; Gazley 2010; Koliba et al. 2011; Kapucu and Garayev 2016). Public trust and confidence across the spectrum of institutional actors are essential for effective service provision (Liu and Mehta 2021; Siegrist and Cvetkovich 2000; La Porte and Metlay 1996).

Past research has revealed that residents in hazard-prone areas are aware of natural hazard-related risks that they would face and that they expect planned responses from government and nonprofit

actors (Mileti et al. 1992). Earlier studies explored how governments, nonprofit organizations, and community residents collaboratively respond to natural disasters (for an overview, see Kapucu 2008; Gazley 2008). Without individual citizens' trust and confidence, governments and nonprofit organizations are less able to mobilize resources promptly and effectively in response to natural disasters. By focusing on individuals' perceptions and awareness, earlier research has indicated that personal experience with emergencies and response does, at a broad general level, affect confidence in government and nonprofit emergency service providers (O'Neill 2009; Basolo et al. 2009; Siegrist and Cvetkovich 2000).

However, how individual residents perceive and evaluate the performance of government and nonprofit service providers during and/or after a significant natural hazard is understudied (Dvir et al. 2022). Moreover, even less is known about how residents perceive the capacity and effectiveness of service providers to mitigate negative impacts of natural hazards such as excessive precipitation and flash flooding, extreme heat, wildfires, poor air quality, winter storms, etc. that can cause acute financial damage and threaten public health and safety. In this study, we empirically examine how individuals' perceived hazard risk awareness affects their confidence in formal institutions of government agencies and nonprofit organizations in the Austin area of Texas as an inland community. Community residents of Austin, Texas, have experienced inland fluvial and pluvial flooding as well as extreme heat (Bixler et al. 2021b). The city of Austin, Texas, is one of the fast-growing metropolitan cities in the United States in terms of population and economies (City of Austin 2022). Therefore, we believe that Austin is an appropriate study site among inland communities other than coastal communities.

The extant literature reveals that citizens' perceived confidence in government has largely decreased over time due to perceptions of incompetent preparedness and responsiveness to natural hazards (Bargain and Aminjonov 2020). As public confidence in nonprofits does not necessarily correlate with confidence in governments (O'Neill 2009; Ruddle et al. 2023), we seek to test empirically a more direct comparison between government and nonprofit agencies that provide services in response to natural hazards. In the

¹Assistant Professor, Dept. of Sociology, Univ. of Houston, Houston, TX 77004 (corresponding author). ORCID: <https://orcid.org/0000-0001-7285-3764>. Email: hhwang6@central.uh.edu

²Professor and Bob Bullock Chair in Government and Public Policy, Director and Distinguished Research Scholar in the Institute for Science, Technology and Public Policy Bush School of Government and Public Service, Texas A&M Univ., College Station, TX 77845. Email: avedlitz@tamu.edu

³Assistant Professor, LBJ School of Public Affairs, Univ. of Texas at Austin, Austin, TX 78712. ORCID: <https://orcid.org/0000-0003-0515-0967>. Email: rbixler@utexas.edu

Note. This manuscript was submitted on April 8, 2022; approved on January 26, 2023; published online on March 25, 2023. Discussion period open until August 25, 2023; separate discussions must be submitted for individual papers. This paper is part of the *Natural Hazards Review*, © ASCE, ISSN 1527-6988.

following section, we will review the relevant literature to establish the hypotheses for our study. Next, we describe the methods and data and use structural equation modeling to empirically test confidence in government and nonprofit service providers in response to natural hazards. The results demonstrate how civic participation plays an intervening role in transmitting the effect of individuals' hazard risk awareness on levels of confidence in government agencies and nonprofit organizations.

Literature Review

Role of Public Agencies and Nonprofit Organizations in Response to Natural Hazards

During and after natural hazard situations, governmental and nonprofit actors collaboratively provide indispensable physical and humanitarian services to community residents (Lester 2018; Kapucu and Boin 2017). Local and state governments share their responsibility with nonprofit organizations (Bajek et al. 2008), and empirical evidence suggests that these public-nonprofit networks can be effective (Nolte and Boenigk 2013). Of particular interest here are nonprofit social service organizations (NSSOs) that promote social welfare by providing social services to vulnerable and affected populations during and after natural hazard situations (Mathias et al. 2022).

Public-nonprofit networks address gaps when governmental assistance insufficiently provides the necessary services to affected individuals and communities (Domingue and Emrich 2019), even though government agencies typically are the primary source for essential assistance (Simo and Bies 2007). During extreme events, such as hurricanes Katrina, Rita, and Sandy, many government agencies were challenged to effectively coordinate across administrative levels, communicate with the public, and respond timely to community needs (Comfort and Haase 2006; Robinson et al. 2006). Therefore, government agencies seek to collaborate with available NSSOs (Yang and Lu 2022; Nowell et al. 2018), which play an important role as a partner of governmental agencies by providing indispensable assistance to community residents who received insufficient help from government agencies (Brudney and Gazley 2009; Curmin and O'Hara 2019; Gazley and Brudney 2007; Mathias et al. 2022).

Confidence in Formal Institutional Actors Responsible for Community Resilience to Natural Hazards

In the United States, all levels of government (federal, state, and local) are involved in hazard preparedness, response, and recovery stages. In response to extreme natural hazard events (e.g., large-sized hurricanes), community residents often assume that government agencies take the major responsibility to deal with major problems caused (Jackson 1981; Weng et al. 2015). However, research has found that the actual effectiveness of a government is largely overestimated by public perception compared with their actual capacity for responsiveness (Domingue and Emrich 2019; Russell et al. 1995).

Research on trust and confidence in formal institutions, specifically in the context of risks and hazards, dates back to the 1990s with the work on hazardous long-term systems (La Porte and Metlay 1996). Formal institutions are defined as agencies or institutional actors that provide solutions to social problems in society (Holmes et al. 2013). In this study, we consider government agencies and nonprofit organizations as formal institutional actors, given the roles they play in engaging with communities to mitigate, prepare, and respond to the impacts of natural hazards. Public trust and confidence,

it is argued, are needed to counter anxiety or fear of being vulnerable to natural disasters and the disruption that follows (Egan 2011). According to La Porte and Metlay (1996, p. 342), *trust* is the belief that individuals' interests will be taken into account, even when unaware of potentially negative outcomes; whereas *confidence* is when the party trusted is able to emphasize and know your interests, is competent to act on that knowledge, and will go to lengths to keep its word.

Factors affecting the levels of confidence in formal institutions are influenced by individuals' risk awareness of natural hazards, including their preparedness at community and household levels and their direct experience with natural hazards. Notably, when natural hazard events occur, government and nonprofits are supposed to provide timely and necessary services to affected individuals and communities. As previous research has explored public trust in government and nonprofits (Basolo et al. 2009; O'Neill 2009; Williams et al. 2018), this study focuses on how the levels of confidence in responsible institutional actors (i.e., governmental and nonprofit actors) can be influenced by individuals' hazard risk awareness, perceived preparedness at community and household levels, and their prior experiences of natural hazards.

We operationalize the term *confidence* based on citizens' perception and experience regarding performance (see, for example, Smith 2001; Basolo et al. 2009; Siegrist et al. 2003). We suggest that, if government relief programs are successful in distributing assistance equally and effectively, individuals' confidence in that government agency should increase because the agency demonstrated it knows and is competent to act in one's best interest. The levels of confidence in nonprofits should increase when their assistance is seen to be provided equitably, effectively, and in collaboration with government programs. In the following section, we review how factors related to individuals' perception and awareness of natural hazards influence the levels of confidence that community members have for government and nonprofit service services.

Perceived Preparedness at Community and Household Levels

Preparedness for a natural hazard event to occur can mitigate the immediate and long-term impact that residents and communities experience. The level of preparedness can vary with how individuals perceive hazard risks (Kruczkiewicz et al. 2021; Onuma et al. 2017; Kapucu 2008). Preparedness reflects individuals' motivations, limitations, and expectations from authorities and/or formal institutions (Howard et al. 2017) and is associated with the levels of confidence in the ability of a government to respond to natural disasters (Basolo et al. 2009). Residents in hazard-prone areas are more likely to be aware of hazard risks and take self-protective actions. On the other hand, community residents in areas less affected by natural hazards may believe that institutional actors' planning and public policies are sufficient to prepare for and respond to natural hazards. Hence, this study examines how individuals' perceived hazard preparedness affects their confidence in government and nonprofit actors.

Previous studies employ different measurements for preparedness based on stages: planning, mitigation, and survival activities (Russell et al. 1995; Sutton and Tierney 2006). In this study, we include perceived preparedness of planning and mitigation in two domains: community and household. Perceived preparedness at the community level refers to perceptions of risk-reduction activities prepared by collectivities such as neighborhood and/or local communities (Sutton and Tierney 2006; Castañeda et al. 2020). Notably in hazard-prone areas, the high frequency of natural hazards leads citizens to individually and collectively having protective behaviors.

Sharing common interests and values to protect themselves from natural hazards can enhance the level of collective efficacy and develop the culture of hazard preparedness, which creates bonds among social actors such as confidence in former institutional actors (Appleby-Arnold et al. 2021). Hence, we posit that perceived preparedness at the community level can lead to high levels of confidence in responsible institutional actors (Basolo et al. 2009).

Hypothesis 1a: Perceived community preparedness for natural hazards is positively associated with confidence in responsible institutional actors.

Moreover, preparedness for natural hazards at the household level requires different activities or intention to act from community-level preparedness such as signing up to receive emergency alerts and self-learning about assistance programs for natural hazards. In this study, household preparedness refers to actual risk reduction and mitigation activities among family or household members rather than at the collective level (Castañeda et al. 2020). Household preparedness to mitigate negative impacts of natural hazards is a part of self-protective behavior implemented within limited resources or by individuals (Basolo et al. 2009). The risk perception of natural disasters mostly precedes protective behaviors and intention for protective behaviors (Cutter and Barnes 1982). Considering social psychological effects, increased household preparedness is beneficial to self-interest as well as to a collective purpose by mitigating adversarial impacts to individuals and communities, which might lead to high levels of confidence in government and nonprofits (Berrebi et al. 2021).

Hypothesis 1b: Perceived household preparedness for natural hazards is positively associated with confidence in responsible institutional actors.

Natural Hazard Experience

Direct natural hazard experiences might either weaken or strengthen community residents' levels of trust and confidence in responsible institutional actors (Nicholls and Picou 2013). Unlike perception or intention, direct experience with natural hazards traumatizes individuals and communities, which leads them to have less confidence, especially in government, which is primarily responsible for keeping individuals and communities safe during natural hazards (Basolo et al. 2009). The performance of government agencies and attitudes of public servants during and in the aftermath of natural hazards are evaluated by community residents based on their experiences. Based on the direct and physical impacts of natural hazards, community residents expect the authorities to control the situations (e.g., government, police, and National Guard in the United States), and their confidence is influenced by a government's action or inaction (Chamlee-Wright and Storr 2010). Perceived fairness and equality for aid distribution during a recovery phase leads community residents to have confidence in the effectiveness of government responses (Aldrich 2016). However, public assistance provided by governments is often unequally distributed because of bureaucratic procedures and a lack of federal agencies' understanding of local communities (Domingue and Emrich 2019), which lowers confidence in government agencies.

Since humanitarian aid provided by nonprofits fills the gap of government assistance, the public has less expectation of nonprofits than the government (Becker et al. 2020). Especially among NSSOs, community-based nonprofits better understand the needs and culture of local communities, which enhances the levels of perceived equities in distribution of indispensable humanitarian aid (Paarlberg et al. 2020). For a better understanding of local communities, the role of nonprofits is integral, specifically in the stages of response and immediate recovery while collaborating with government

agencies (Demiroz and Hu 2014; Curnin and O'Hara 2019). In hazard-prone communities, there are more NSSOs working on disaster-relief programs compared with nonhazard-prone communities (Lindell and Perry 2000). This geographic culture and density-based legitimacy may provide conformity and certain levels of confidence in nonprofits (Peters and McDonald 2011). Weakened or strengthened confidence in institutional actors affected by experiences with natural hazards may influence a communities' capacity to enhance resilience. In sum, we posit that the levels of confidence in public and nonprofit sectors vary by residents' direct experiences with natural hazards because of the role that public and nonprofit sectors is expected to perform in their communities.

Hypothesis 1c: Experience of natural hazard or climate impacts has a stronger association with confidence in nonprofits than government.

Mediating Role of Civic Participation

Civic participation in government is considered an integral part of hazard preparedness and response (Vallance and Carlton 2015); evidence suggests that civic participation enhances community capacity and increases levels of public trust in formal institutions (Lasker 2004). Community resilience and emergency management services that stem from programs that include citizen involvement or a participatory approach are typically more accessible (Rowel et al. 2012; D'Agostino and Kloby 2011). However, confidence in government can be easily damaged by ineffective emergency management and failure to address unmet resident needs before, during, or after a hazard event. In many cases, civic participation is often sparked by dissatisfaction and/or mistrust with how government agencies previously handled situations (Holum 2022). This has opened the role of government agencies from passive providers to facilitators or enablers by playing an active role in collaborating with citizens and NSSOs in all stages of emergency management (Markantoni et al. 2019). The active and facilitating role of government actors provides opportunities for citizens to coproduce resilience programs and services, which fosters a positive perception of government as an effective actor (Elvidge 2014). Therefore, greater civic participation in a government's resilience policies may reduce the levels of mistrust by empowering community residents to articulate their needs and suggest policy options (D'Agostino and Kloby 2011).

Hypothesis 2a: Civic participation in government positively transmits the effects of hazard risk awareness on the level of confidence in the public sector.

Relatedly, civic participation in nonprofits is also likely to mediate risk awareness on confidence. As the frequency and intensity of extreme weather and consequent hazards increase, more NSSO services will become necessary, in coordination with government response, to effectively respond in communities (D'Agostino and Kloby 2011). Often, NSSOs have more frequent touch points with residents in everyday interactions, thus providing the opportunity to raise public awareness and support mitigation behaviors. After a hazard event occurs, NSSOs have the ability to more quickly be on the ground in affected areas (Domingue and Emrich 2019; Hwang and Joo 2021). NSSOs recruit volunteers and solicit donations to prepare for upcoming natural disasters, which give residents' different ways to engage with nonprofits (Dollery et al. 2020; Brudney and Gazley 2009; Kapucu 2007). For example, in the postdisaster stage, NSSOs such as Habitat for Humanity and the United Methodist Committee on Relief address unmet needs by building and offering affordable housing. In doing so, volunteers participate in these community resilience activities through NSSOs rather than through government agencies (Meyer et al. 2022).

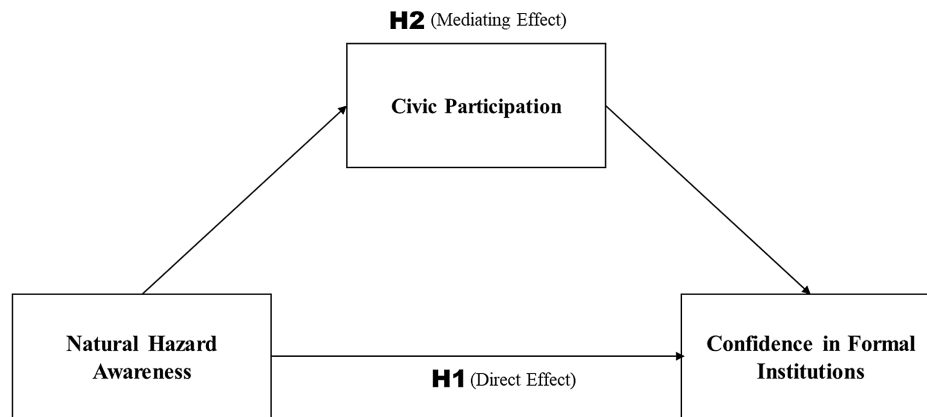


Fig. 1. Conceptual research model.

The levels of confidence in government and nonprofits are not always linearly correlated because NSSOs often fulfill the demands left unmet by government agencies and appear to address government failure or inaction (Meyer et al. 2022). When community residents' lack of confidence in government increases, they tend to rely more on relief programs provided by NSSOs (Ahmed 2011). In addition, civic participation in NSSOs is often considered prosocial behavior, influenced by collective efficacy of community members who have the high hazard-risk awareness because donations and volunteering represent civic participation in NSSOs (Berrebi et al. 2021; Hwang and Lee 2022). In line with this reasoning, civic participation in nonprofits may play a positive mediating role between the antecedents of hazard risk awareness and confidence in nonprofits. Fig. 1 visually summarizes our research model.

Hypothesis 2b: Civic participation in nonprofits positively transmits the effects of hazard risk awareness on the level of confidence in the nonprofit sector.

Study Site

Austin, Texas, experienced a 3% increase in population in 2021, making it the fastest-growing metro with at least 1 million residents in the United States (Chukwu 2021). The eleventh-largest US city at the edge of the Edwards plateau and Texas hill country, the city of Austin has an estimated population of 1,026,833 residents and a metropolitan statistical area population of 2.3 million residents (ranking twenty-ninth in the United States) (US Census 2021). This rapid population growth is compounded by climate projections that point to more variability and extremes in the future. Climate projections over central Texas show that average temperatures are increasing, the risks associated with extreme temperatures are more pronounced, and precipitation patterns are shifting, with an increased frequency in heavy precipitation and droughts. For example, the Austin area has seen an increase in the occurrence of 1% annual exceedance probability storms, experiencing three in a five-year window, including the 2013 Halloween Day Flood, 2015 Memorial Day Flood, and the 2018 Hill Country Flood (Gruca 2018). Relatedly, the metro area has seen an increasing number of total and consecutive extreme heat days throughout the summer seasons. Flooding and heat, combined with other extreme weather such as winter storms, wildfires, extreme wind, and tornados, expose the Austin area to natural hazards year-round. Perhaps of more concern, however, is that impacts are affecting people unevenly (Bixler et al. 2021b).

Historically underserved and economically marginalized communities are disproportionately impacted by extreme weather and

frequently most in need of government and nonprofit services to prepare and respond to natural hazards. City of Austin agencies have a multidimensional approach for addressing community resilience, including recently establishing a City Resilience Office, working to establish resilience hubs throughout the city, and working collaboratively with local community-based groups (City of Austin 2022). Over a decade during an increasing number of natural hazard events in the area, nonprofit organizations have been widely involved in emergency responses to flooding, and local news media and citizens recognize the valuable existence of nonprofit organizations for community capacity building (Roppe 2021). Given this context, the Austin area makes for an appropriate study site, given its combination of rapid population growth and development, hazard-prone location, and the spatial variation of hazard exposure and social vulnerability (Bixler et al. 2021b).

Data & Methods

To test our hypothesis related to the influence of residents' perception and experience of natural hazards and the mediating role of civic participation included questions specifically for this study to the 2020 Austin Area Community survey (see Bixler et al. 2021a; Atshan et al. 2020), an institutional review board approved survey conducted October–November 2020. The 2020 survey was the seventh wave of survey data collected dating back to 2004 (other years include 2006, 2008, 2010, 2015, and 2018). The survey was conducted as part of the Austin Area Sustainability Indicators project (Austin Area Sustainability Indicators 2022). The 2020 wave of data collection has a sample size of 1,215 residents. The population frame was constructed through purchasing list samples of landline and cell-phone numbers from which a computer-generated random dial approach was employed. Our phone surveys were conducted in English and Spanish, and specific sample quotas were established for Hispanic and 18–24-year-old respondents. In addition to the telephone sample, approximately 25% of the total sample size were respondents from web-based panel procedures facilitated by Consumer Research International, the firm that collected the data. The survey adheres to methodological and ethical procedures and definitions from the American Association for Public Opinion Research (American Association for Public Opinion Research 2016). Table 1 offers a brief description of the sample. The reported results in this study are a subset of the total sample size because the number of respondents vary by the answers for respondents' confidence in government and nonprofits: 1,059 in Model 1 and 1,022 in Model 2. The following describes the operational definition of

Table 1. Socioeconomic and demographic overview of the sample population

Variable	<i>n</i> = 1,240	<i>N</i> (%)
Race		
White	775	62.5
Black	70	5.6
Hispanic or Latino	264	21.3
Asian	27	2.2
Others	104	8.4
Don't know	29	2.3
Education		
High school diploma or less	563	45.4
Associate degree	134	10.8
Bachelor's degree	328	26.5
Master's degree or higher	215	17.3
Don't know	22	1.8
Annual family income		
Under \$25,000	177	14.3
\$25,000–\$39,999	161	13.0
\$40,000–\$49,999	133	10.7
\$50,000–\$74,999	213	17.2
\$75,000–\$99,999	153	12.3
\$100,000–\$124,999	118	9.5
\$125,000–\$149,999	75	6.0
\$150,000–\$200,000	63	5.1
Over \$200,000	46	3.7
Don't know	101	8.1

dependent, independent, and control variables based on our conceptual frameworks using questionnaires on how we define each model and precede a series of analyses.

We developed a set of cross-sectional structural equation models (SEM) to test the listed hypotheses, adhering to Baron and Kenney's (1986) conditions for mediation analysis. Our study measured residents' perception and experience of risks and hazards, perception of civic participation, and levels of confidence in nonprofit and government service providers. These are latent variables constructed from multiple items of questionnaires. Using a series of SEM

analyses is advantageous in supporting the formulation of constructed latent variables through factor analysis and a series of mediation regression analyses to estimate path coefficients among predictors, mediators, and outcome variables (Atshan et al. 2020). Our SEM models were performed in STATA using version 16 and a maximum likelihood estimator.

Measures

A combination of yes/no, Likert scales, and computed factor scores from valid and reliable instruments was used to construct latent independent, mediating, and dependent variables. Construct sources for the conceptual framework, definition, and exact wording of questionnaires can be found in Tables 2 and 3.

Hazard Risk Awareness

Community-Level Preparedness (CPD)

Community-level preparedness is measured by combining seven survey items to produce a single score. The respondents were asked about their perceived community-level preparedness for natural hazards, which was different from their actual behaviors. This measure of perceived CPD consists for collective protective behaviors and perceived awareness and safety perception (Lam et al. 2017; Kellens et al. 2013; Wachinger et al. 2013; Bubeck et al. 2012). All responses for questionnaires range from 1 = disagree strongly to 4 = agree strongly. The Cronbach's alpha shows good internal consistency for a latent construct of perceived hazard preparedness ($\alpha = 0.85$).

Household-Level Preparedness (HPD)

This latent variable is measured by combining nine items asking what the respondent has done, or has the intention to take, to prepare to mitigate the impacts of natural hazards at the household level rather than the collective level (Brody et al. 2017). Responses to each question were recorded as 1 for No, 2 for Intention To, and 3 for Yes. The measurement for HPD was generated as the Cronbach's alpha, which shows good internal consistency ($\alpha = 0.93$).

Table 2. Conceptual framework of variables

Concepts	Variables	Description	Role of concepts in the study
Hazard risk awareness	Community-level preparedness	Perceived risk reduction activities to prepare for natural hazards and mitigate negative impacts at the collective and/or community level (Sutton and Tierney 2006).	Hazard risk awareness is conceptualized with three domains: perceived risk preparedness at the community and household levels and prior experiences with natural hazards in this study (Karimiziarani et al. 2022). Hazard risk awareness differs levels of civic participation in natural hazard preparation, which may ultimately affect public confidence in formal institutions (Babcicky and Seebauer 2017; Castañeda et al. 2020).
	Household-level preparedness	Perceived risk reduction activities to prepare for natural hazards and mitigate negative impacts at the individual and household levels (Howard et al. 2017).	
	Natural hazard experience	Individuals who have prior experience with natural hazards show more awareness or preparedness (Oral et al. 2015).	
Civic participation	Civic participation in government	Active civic participation in government agencies related to community resilience policies (Wachinger et al. 2013).	Civic participation varies with risk perception and across sectors (Yu et al. 2022). In this study, mediating roles of civic participation is posited to transmit the effects of hazard risk awareness on public confidence in each sector.
	Civic participation in nonprofits	Active civic participation in nonprofit organizations related to responses to or recovery from natural hazards (Brudeny and Gazley 2009).	
Confidence in formal institutions	Confidence in public sector	Public confidence in government authorities to deal with natural hazards during and in the aftermath of natural hazard events (Wachinger et al. 2013).	Beliefs or confidence in the role of formal institutions responsible for natural hazards are accumulated by individual perception, awareness, and behaviors (Siegrist et al. 2005). Strong confidence in government and/or nonprofits help implement collaborative community resilience policies to prepare for upcoming natural hazards.
	Confidence in nonprofit sector	Public confidence in the effectiveness of nonprofit social service organizations that respond to and recovery from natural hazards (Brudeny and Gazley 2009; O'Neill 2009).	

Table 3. Descriptive statistics of survey items

Items	β	α
Community-level preparedness (1 = strongly disagree; 2 = somewhat disagree; 3 = somewhat agree; 4 = strongly agree)		0.85
Let's talk about natural hazards and household preparedness for such events		
There is a safe place near our home to go for help or shelter during a natural hazard or emergency.	0.55	
My neighbors would help during emergency.	0.53	
My neighborhood actively prepares for future disasters.	0.73	
My neighborhood has services and programs to help people after a disaster.	0.72	
My neighborhood works with organizations and agencies outside the neighborhood to get things done.	0.80	
People in my neighborhood are aware of neighborhood issues that they might address together.	0.77	
People in my neighborhood communicate with leaders who can help improve the neighborhood.	0.73	
Natural hazard experience		0.68
1 = No; 2 = Yes		
Has your household or neighborhood experienced any of the following natural hazards in the last ten (10) years?		
Natural hazards: flooding, extreme heat, wildfire, poor air quality, drought, hail, heavy wind, and dust storm	—	
Household preparedness		0.93
1 = No; 2 = intend to; 3 = Yes		
Have you taken, or intend to take, any listed actions to mitigate the impact of (1) floods; and (2) extreme heat		
Purchase new air-conditioner for home	0.74	
Sign up to receive emergency alerts/warnings via text, email, or phone	0.78	
Contact nonprofits or community groups for information on extreme heat	0.81	
Contact governmental agencies for information on extreme heat	0.78	
Attend a meeting to learn about extreme heat hazards	0.74	
Talk to your neighbors about extreme heat	0.82	
Learn about energy assistance programs	0.71	
Learn the location of cooling centers near home	0.80	
Civic participation		
1 = not involved at all; 2 = not so involved; 3 = somewhat involved; 4 = very involved		
To what extent do you think the following should be actively involved in recommending or implementing policies for community resilience?		
<i>Nonprofit sector</i>		0.80
Nonprofit organizations	0.82	
Community-based groups	0.82	
<i>Public sector</i>		0.87
Local government	0.80	
State government	0.96	
Federal government	0.78	
Confidence in formal institutions		
1 = very little; 2 = some; 3 = quite a lot; 4 = a great deal		
Please tell me how much confidence you have in each one		
<i>Government and public service organizations</i>		0.85
Federal government	0.69	
State government	0.85	
Local government	0.59	
Federal Emergency Management Agency (FEMA)	0.65	
Texas state legislature	0.78	
Texas Division of Emergency Management	0.73	
<i>Nonprofit organizations</i>		Single item
Local charities and other nonprofits	—	

Natural Hazard Experience (NHE)

This latent variable is measured by combining questions asking whether the respondents have experienced the listed natural disasters in the last 10 years. Responses to each question were coded as a dichotomous variable: 1 = respondents experienced any of listed natural disasters; and 0 = respondents have not experienced any of the listed natural disasters. The measurement for this latent construct was generated as the Cronbach's alpha with good internal consistency ($\alpha = 0.68$).

Levels of Confidence

In this study, we focus primarily on respondents' levels of confidence in formal institutions measured in two distinct dimensions: government and nonprofits. Confidence in each formal institution was measured on a 4-point scale from 1 = very little to 4 = a great

deal by asking "please tell me how much confidence you have in each one." First, confidence in government was measured by asking about the levels of confidence in the listed government and public service organizations, as shown in Table 3, generated as the Cronbach's alpha with good internal consistency ($\alpha = 0.85$). Second, confidence in the nonprofit sector is generated as a single item variable by asking about the levels of confidence in local charities and other nonprofits from 1 to 4.

Mediators

To conduct path analyses for the dependent variables of confidence in nonprofit and government, we employed mediators to see how civic participation positively transmits hazard risk awareness on confidence in public and nonprofit sectors. Since civic participation is considered a key factor in building community capacity, we

employ a mediator of civic participation to see how it mediates the relationship between hazard risk awareness and public confidence. For the first model using the dependent variable of confidence in government, a latent construct for civic participation in government is used. This mediator was measured by asking “to what extent you think the following should be actively involved in recommending or implementing policies for community resilience?” for three levels of government: local; state; and government. Responses were recorded from 1 = not involved at all to 4 = very involved. Civic participation in government was generated as the Cronbach’s alpha, which shows good internal consistency ($\alpha = 0.87$). For the second model using the dependent variable of confidence in nonprofits, a latent variable was constructed. The survey asks the same question with civic participation in government, “to what extent you think the following should be actively involved in recommending or implementing policies for community resilience,” for nonprofit organizations and community-based groups. Civic participation in a nonprofit was generated as the Cronbach’s alpha, which shows a good internal consistency ($\alpha = 0.80$).

Control Variables

We employed several measurements to control individual socioeconomic and demographic characteristics: age; educational attainment; race; and income. These control variables are coded and measured in different ways. First, a variable measuring a respondent’s age was included as a raw number ranging from 18 to 98, and the mean age of the respondents is 48.99. Second, a variable for educational attainment is transformed to a dichotomous variable to identify whether a respondent holds a bachelor’s degree or above or not: 1 = holding a bachelor’s degree or above and 0 = otherwise. Third, a control variable for race is transformed to a dichotomous

variable asking for a respondent’s minority status. If a respondent identifies oneself as a racial minority, coded to 1; otherwise (i.e., non-Hispanic white), coded to 0. Fourth, a variable for a respondent’s income level is controlled. The income level is categorized into 10 levels for their family income from \$25,000 = 1 to over \$200,000 = 9, as shown in Table 1.

Analytic Strategies and Model Fit Criteria

We ran a series of structural equation modeling (SEM) analyses to find the effects of mediators on two dependent variables, i.e., confidence in public and nonprofits sectors. Since we used two mediators (i.e., civic participation in government and civic participation in nonprofits), we employed two sets of SEM models based on two mediators, respectively. The summary of descriptive statistics is shown in Table 4. Before running a series of SEM analyses, we conducted the confirmatory factor analysis (CFA) on each of three models. The results for two models, as shown in Table 6, indicate that the measurement model, including all confirmatory factory analyses, was found to be an acceptable fit for all three models with the data.

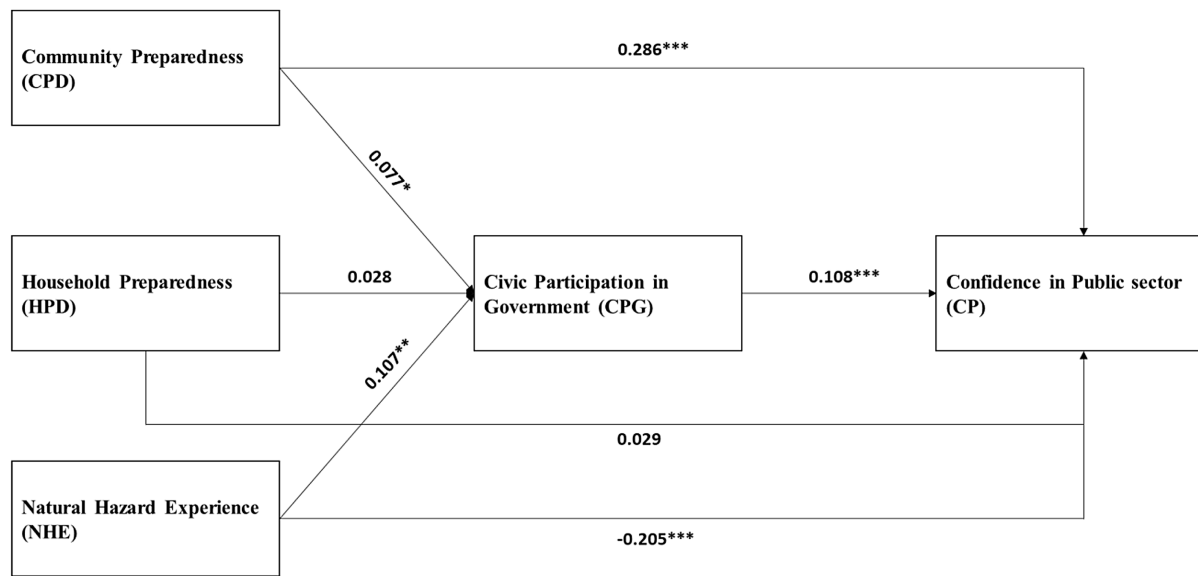
As shown in Table 3, the Cronbach’s alpha of all constructs shows good internal consistency since α above 0.60 is considered acceptable, which accounts for the reliability of our empirical analyses (Garson 2010). In Table 3, the factor loading items for each construct indicate convergent validity. Further, the Cronbach’s alpha values on factor loadings ranged from 0.68 to 0.92 for all constructs showing that the indicator items for each construct correlate with each other to an acceptable degree, which establishes convergent validity for all constructs (Fornell and Larcker 1981). As summarized in the correlation matrix for eight constructs in Table 5, all correlation coefficients are below 0.85. Thus, we considered that discriminant validity for all constructs is established (Kline 2015).

Table 4. Descriptive statistics of variables

No.	Variable	N	Mean	Standard deviation	Minimum	Maximum
1	Confidence in public	1,059	2.08	0.69	1.00	4.00
2	Confidence in nonprofit	1,015	2.70	0.94	1.00	4.00
3	Civic participation in government	1,059	3.12	0.84	1.00	4.00
4	Civic participation in nonprofit	1,015	3.14	0.80	1.00	4.00
5	Community preparedness	1,059	2.71	0.75	1.00	4.00
6	Household preparedness	1,059	0.13	0.37	0.00	2.00
7	Natural hazard experience	1,059	0.49	0.25	0.00	1.00
8	Age	1,059	48.57	17.72	18.00	93.00
9	Educational attainment	1,059	0.45	0.50	0.00	1.00
10	Race	1,059	0.33	0.47	0.00	1.00
11	Income	1,059	4.18	2.25	1.00	9.00

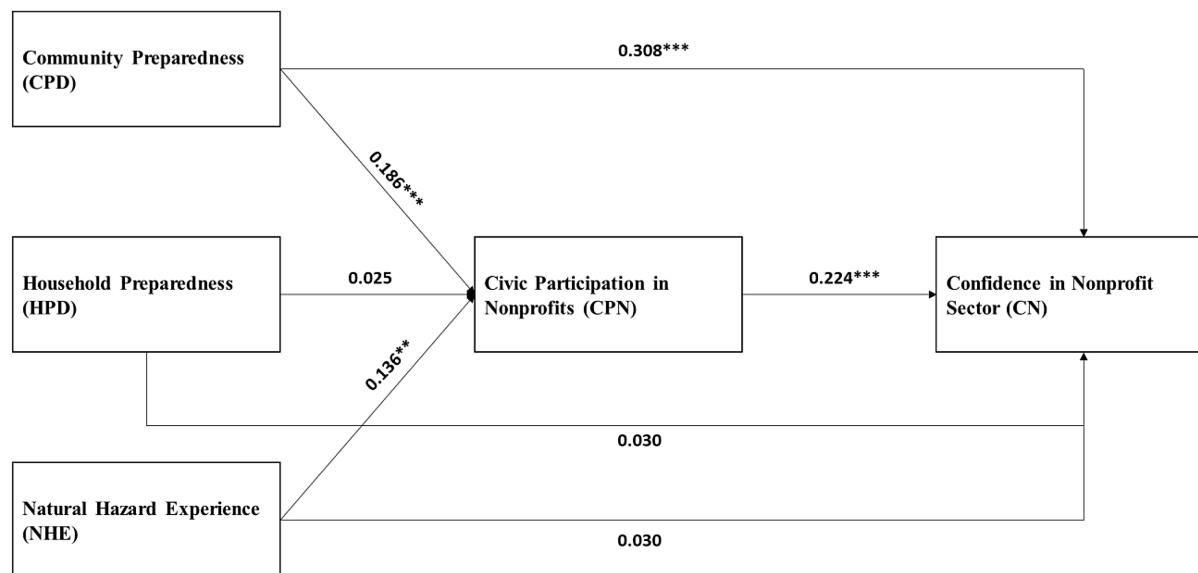
Table 5. Correlation

No.	Variable	1	2	3	4	5	6	7	8	9	10	11
1	Confidence in public	1.00	—	—	—	—	—	—	—	—	—	—
2	Confidence in nonprofit	0.37	1.00	—	—	—	—	—	—	—	—	—
3	Civic participation in government	0.13	0.17	1.00	—	—	—	—	—	—	—	—
4	Civic participation in nonprofit	0.06	0.27	0.57	1.00	—	—	—	—	—	—	—
5	Community preparedness	0.35	0.26	0.07	0.15	1.00	—	—	—	—	—	—
6	Household preparedness	0.09	0.07	0.04	0.05	0.09	1.00	—	—	—	—	—
7	Natural hazard experience	−0.21	0.04	0.11	0.12	−0.06	0.14	1.00	—	—	—	—
8	Age	0.00	−0.05	0.14	0.04	0.07	−0.17	0.10	1.00	—	—	—
9	Educational attainment	0.07	0.14	0.14	0.17	0.11	0.03	0.08	0.10	1.00	—	—
10	Race	−0.04	−0.09	−0.11	−0.11	−0.06	0.04	−0.15	−0.28	−0.15	1.00	—
11	Income	0.04	0.06	0.11	0.09	0.15	0.00	0.01	0.04	0.28	−0.13	1.00



Note: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Fig. 2. Structural model on confidence in government (i.e., public sector).



Note: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Fig. 3. Structural model on confidence in nonprofit sector through civic participation in nonprofit.

Results

We tested our hypotheses through two models based on mediators: civic participation in government and civic participation in nonprofits. Each model tests the structural equation relationship between five constructs, as depicted in Figs. 2 and 3; further, the overall fit for each model was found to be in the acceptable range, as shown in Table 6. CFI are above the 0.9 cutoff, while the RMSEAs and SRMR are below 0.6 for all three models. In addition, a structural model needs to be assessed using the variance inflation factor (VIF) to alleviate issues of multicollinearity (Hair et al. 2019). VIFs should

Table 6. Model fit statistics

Goodness of fit	Model 1	Model 2
χ^2 (df, p -value)	234.34 (15, 0.000)	219.18 (15, 0.000)
CFI	0.999	0.999
TLI	0.999	0.999
RMSEA	0.000	0.001
SRMR	0.000	0.000

Note: chi-square statistics (χ^2); comparative fit index (CFI); Tucker–Lewis index (TLI); root mean square error of approximation (RMSEA); and standardized root mean square residual (SRMR).

Table 7. Results of direct effects

Model	Path	Direct effect	p-value
Model 1	Community preparedness -> Civic participation in government	0.077	0.039
	Household preparedness -> Civic participation in government	0.028	0.411
	Natural hazard experience -> Civic participation in government	0.107	0.010
	Community preparedness -> Confidence in public sector	0.286	0.000
	Household preparedness -> confidence in public sector	0.029	0.264
	Natural hazard experience -> Confidence in public sector	-0.205	0.000
	Civic participation in government -> Confidence in public sector	0.108	0.000
Model 2	Community preparedness -> Civic participation in nonprofits	0.186	0.000
	Household preparedness -> Civic participation in nonprofits	0.025	0.486
	Natural hazard preparedness -> Civic participation in nonprofits	0.136	0.002
	Community preparedness -> Confidence in nonprofit sector	0.308	0.000
	Household preparedness -> Confidence in nonprofit sector	0.030	0.393
	Natural hazard experience -> Confidence in nonprofit sector	0.030	0.493
	Civic participation in nonprofits -> Confidence in nonprofit sector	0.224	0.000

be less than 2.5 to rule out the possibility of multicollinearity. VIFs for our models range from 1.21 to 1.22, which confirms that multicollinearity is not a concern for our models.

Direct Effect

The direct effects of three independent variables (i.e., community-level preparedness, household-level preparedness, and natural hazard experience) and two mediators (i.e., civic participation in government and civic participation in nonprofits) on two dependent variables (i.e., confidence in the public sector and nonprofit sector) were empirically analyzed. Mediation analyses requires three necessary conditions: (1) association between an independent variable (X) and a dependent variable (Y); (2) association between an independent variable (X) and a mediator (M); and (3) an association between a mediator (M) and a dependent variable (Y) (Baron and Kenny 1986). The first three hypotheses (H1a, H1b, and H1c) were tested for Baron and Kenny's first condition.

In Table 7, the direct effects are summarized with statistical significance and the magnitude of coefficients. Community preparedness (CPD) is directly and positively associated with the levels of confidence in the public sector ($\beta = 0.286$, $p < 0.001$ in Model 1) and nonprofit sector ($\beta = 0.308$, $p < 0.001$ in Model 2), which supports Hypothesis 1a. On the contrary, our results reveal the non-significant direct effects of household preparedness (HPD) on the levels of confidence in the public sector ($\beta = 0.029$, $p > 0.05$ in Model 1) and the nonprofit sector ($\beta = 0.030$, $p > 0.05$ in Model 2), which does not support Hypothesis 1b. A variable for natural hazard experience shows the different direct effects on confidence in each institution. The direct effect of experience of a natural hazard experience (NHE) is negatively associated with confidence in the public sector ($\beta = -0.205$, $p < 0.001$ in Model 1). Moreover, the direct effect of NHE does not show significant effects on confidence in the nonprofit sector ($\beta = 0.030$, $p > 0.05$ in Model 2). The results partially support Hypothesis 1c. Our findings reveal that a variable for community-level preparedness as collective protective behaviors in response to natural hazards is associated with the greater levels of confidence in both institutional actors. However, interestingly, natural hazard experience is negatively associated with confidence in the government.

Indirect Effect

To establish an indirect relationship between mediators to meet Baron and Kenny's second condition, the relationship between independent variables and mediators was examined, as shown in

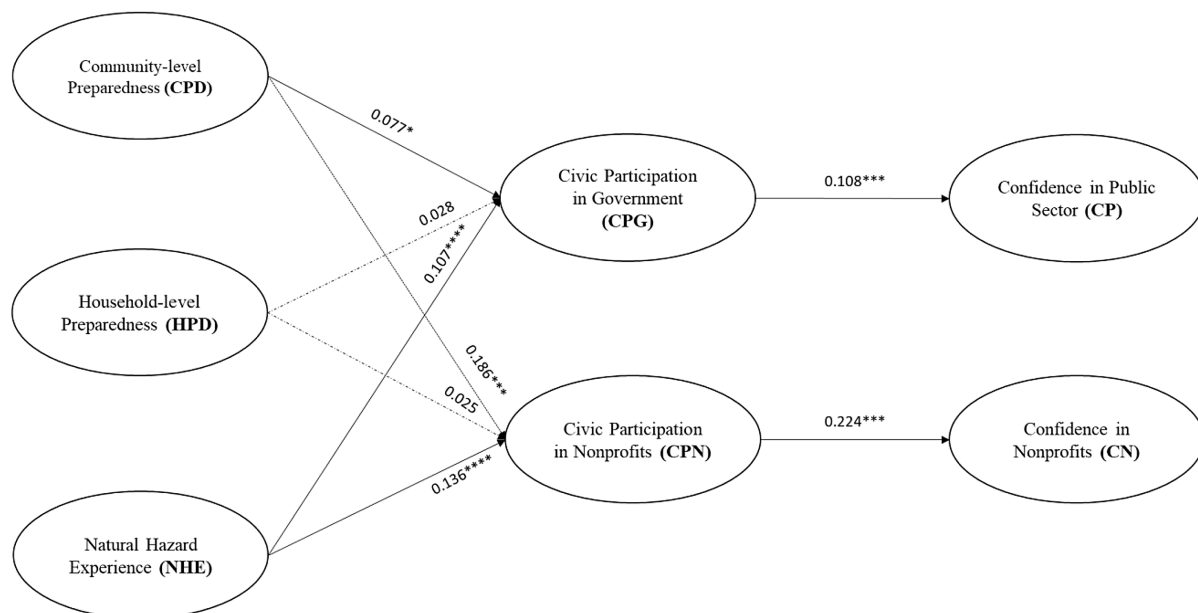
Table 7. CPD ($\beta = 0.077$, $p < 0.05$ in Model 1) and NHE ($\beta = 0.107$, $p < 0.01$ in Model 1) are positively associated civic participation in government (CPG), but HPD not significantly associated ($\beta = 0.028$, $p > 0.05$ in Model 1). CPD ($\beta = 0.186$, $p < 0.001$ in Model 2) and NHE ($\beta = 0.136$, $p < 0.01$ in Model 2) are also positively associated with civic participation in nonprofits; however, HPD does not have significant effects on CPN ($\beta = 0.025$, $p > 0.05$ in Model 2). Then, the influences of two mediating variables on the two dependent variables were scrutinized to meet Baron and Kenny's third condition. CPG is positively associated with the levels of confidence in the public sector ($\beta = 0.108$, $p < 0.001$ in Model 1), and CPN is positively associate with the levels of confidence in the nonprofit sector ($\beta = 0.224$, $p < 0.001$ in Model 2) as well. Since our analyses meet all three conditions for mediation, we tested the indirect effects through three mediators, as shown in Table 8.

Although the CPG positively transmits the effects of CPD ($\beta = 0.008$, $p < 0.001$ in Model 1) and NHE ($\beta = 0.012$, $p < 0.001$ in Model 1) on the levels of confidence in the public sector, but the effect of active action is not transmitted by a mediator ($\beta = 0.003$, $p > 0.05$ in Model 1), as shown in Table 8. The results in Model 1 partially support Hypothesis 2a. A mediator for CPG positively transmits the effects of CPD ($\beta = 0.042$, $p < 0.001$ in Model 2) and NHE ($\beta = 0.030$, $p < 0.001$ in Model 2) on the levels of confidence in the nonprofit sector, but not the effect of HPD either ($\beta = 0.006$, $p > 0.05$ in Model 1). Hypothesis 2b is partially supported as well. Our findings imply that natural hazard experience positively leads to confidence in government through civic participation. In addition, the levels of confidence in formal institutions can be enhanced through civic participation when community residents experience natural hazards and collectively prepared for natural disasters rather. The overall mediation analyses are visually described in Fig. 4.

Table 8. Results of indirect effects

Model	Path	Indirect effect
Model 1	CPD -> CPG -> CP	0.008***
	HPD -> CPG -> CP	0.003
	NHE -> CPG -> CP	0.012***
Model 2	CPD -> CPN -> CN	0.042***
	HPD -> CPN -> CN	0.006
	NHE -> CPN -> CN	0.030***

Note: *** $p < 0.001$.



Note: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Fig. 4. Structural model of serial mediations.

Table 9. Coefficients of control variables on the dependent variables

Variables	Model 1 (government)		Model 2 (nonprofits)	
	Civic participation	Confidence	Civic participation	Confidence
Age	0.005** (0.001)	−0.001 (0.001)	−0.001 (0.002)	−0.004** (0.002)
Education	0.176** (0.056)	0.004 (0.042)	0.220*** (0.059)	0.135* (0.059)
Race	−0.022 (0.060)	−0.050 (0.044)	−0.101 (0.063)	−0.120 (0.063)
Income	0.022 (0.012)	−0.008 (0.009)	0.010 (0.013)	−0.006 (0.013)

Note: * $p < 0.05$; ** $p < 0.01$; and *** $p < 0.001$.

In addition, the effects of control variables on mediators and the dependent variables reveal interesting findings in Table 9. On a variable for civic participation in government, control variables for age and educational attainment have positive effects. On variables for civic participation and confidence in nonprofits, a variable for educational attainment has positive effects as well. However, on confidence in the nonprofit sector, a variable for age has negative effects. Overall, educational attainment is positively associated with civic participation across sectors. Kahn and Zimbalist (2022) revealed that highly educated individuals perceive that less corruption occurs in government agencies when public investment is high. Our findings on control variables affirm that educational attainment of individuals is positively associated with public confidence in government as well as nonprofits.

Discussion and Conclusion

Although the relationship between confidence in government and risk perception has been studied, much less is known about how citizens view the services provided by nonprofits in these situations. In addition, the important role of civic participation in preparing for and recovering from natural hazards has been overlooked in the community resilience literature. To fill this important gap in the research, this study examined the direct relationship between citizens'

risk awareness of natural hazards and confidence in formal institutions, both public and nonprofit, as well as the role of civic participation as mediators. The results mostly support our hypotheses of direct relationships for three independent variables associate residents' confidence in public and nonprofit sectors. In addition, the results also reveal that civic participation can positively transmit the effects of the antecedents of hazard risk awareness on the levels of confidence in public and nonprofit sectors.

Our analyses of direct effects offer mixed results for our hypotheses on two dependent variables, i.e., confidence in public and nonprofit sector service providers. Hypothesis 1a received strong support in all three models. As reviewed in the extant literature, the protective behaviors in preparedness for natural hazards at the community-level are affected by collective efficacy, which leads to trust in government communication and other existing formal institutions responsible for responding to natural hazards and climate impacts (Basolo et al. 2009; Babicky and Seebauer 2017; Chen 2015). Regarding the effects of perceived community-level preparedness on the dependent variables, the direction and magnitude of the effects are consistent in both public and nonprofit sectors. On the other hand, Hypothesis 1b is not supported because the effects of household-level preparedness on the dependent variables indicate no significant effect. The results indicate different effects of community- and household-level preparedness, although they seem similar; however, there is a gap between perception and actual

action (Basolo et al. 2009). In addition, as described in Table 3, the relationships between community-level preparedness and dependent variables are more about collective efforts of communities and neighbors; however, the relationships between household-level preparedness and dependent variables are more about individual's action. In addition to the differences between community and household preparedness, the gap between collectivities and individual activities can lead to the difference results (Ibarra et al. 2005; Mancini and Bowen 2009).

Our analyses of the direct effects of natural hazard experience on confidence offer mixed results. The direct effects of natural hazard experience do not lead to greater levels of confidence in the public sector aligned with the extant literature. As seen in the case of Hurricane Katrina, traumatic collective memories of community residents lead residents to believe that the public agencies are incompetent and have the low levels of capabilities to effectively handle emergency management (Akbar and Aldrich 2018). The direct effects of natural hazard experience on confidence in nonprofits were not significant. However, the effects of experience become stronger and significant through the mediating variable of civic participation in nonprofits. On the other hand, the findings of a mediator of civic participation in government are interesting primarily because this mediator moves the relationship for confidence in government from negative to positive.

As hypothesized, civic participation in government and nonprofits plays an important role in transmitting the effect of hazard risk awareness on the levels of confidence in both institutions, except for household-level preparedness. Building adaptive capacity and trustful institutions in response to natural hazards requires collaborative processes not limited in across sectors (Gazley 2010, 2013; Kapucu et al. 2010) but embracing the public opinion of community residents (i.e., citizens) as a means of co-production. Although the existing emergency management adopts collaborative decision-making processes, it is largely about interorganizational management, still considered as a top-down policy implementation (Nolte and Boenigk 2013). However, having community residents involved in implementing community resilience policies through government and nonprofit actors may lead to building reciprocal trust between responsible institutions and residents.

The results also suggest policy implications for public agencies responsible for community resilience. Public image and reputation on emergency management of public agencies have been damaged over time, which decreases trust and confidence in the government. Implementing civic engagement for community resilience policies at the stage of preparedness will help public agencies restore public confidence. Organizational efforts alone cannot provide timely and effective public services; however, involving community residents in policymaking processes as legitimate partners can create a greater policy platform in which to embrace diverse ideas (Patterson et al. 2010).

Nonprofit organizations recruit volunteer and fundraise donations, and, through these volunteering and fundraising events, nonprofit organizations interact with community residents. That is why the perception and experiences are consistently associated with the positive levels of confidence in nonprofits. Likewise, positive relationships can be facilitated further by active civic participation in nonprofit organizations than passive participation, which offers a clear direction for nonprofit leaders in which to earn public confidence. Nonprofit effectiveness is largely determined by nonprofit participants and beneficiaries termed as "effective altruism" (Bixler and Springer 2018). In line with this reasoning, community-embedded or large-sized nonprofits have more resources to utilize and cover the sheer number of beneficiaries, which increases the level of nonprofit confidence (Hutton et al. 2021). Therefore, by being embedded in

local contexts or mobilizing resources for nonprofit missions and goals, nonprofit leaders can help community members involve in philanthropic activities, which ultimately increases the public confidence in the nonprofit sector.

Although our study provides interesting findings, there are some limitations for generalization. First, our survey used a cell/telephone sampling method for the major portion of respondents. Although the survey was conducted in the English and Spanish languages, it has limitations in reaching marginalized populations. Second, due to the nature of the survey-based analysis, the sample was collected in a limited geographic area. To generalize the findings, samples for the future research from more hazard-prone areas (e.g., coastal areas) and less hazard-prone areas are needed for comparison studies. For instance, future research could be conducted on the behavioral and perception differences on confidence in government based on small and large disasters, hazards, and climate impacts, which will cover multiple geographic areas rather than limited areas in the United States. Third, due to the nature of public opinion and perception-based survey, the study is limited to observations of the actual behaviors of community residents. For further generalization, the future research could adopt mixed-method studies that include interviews and surveys for community residents.

Despite the limitations, the results provide implications and contributions as to how the findings can be beneficial to policymakers, nonprofit leaders, and scholars. Natural hazards negatively affect the physical, social, and human capital of communities. At the stage of preparation and recovery, responsible institutions, government agencies, and nonprofits typically adopt flexible and effective community resilience policies by having citizens involved in co-creating community resilience plans (Osborne et al. 2016). As revealed in our study, civic participation for community resilience policies is beneficial to all stakeholders. Government agencies would understand specific community contexts and needs, which increases the level of public confidence in the government. For nonprofits, expanding participatory philanthropy allows nonprofit managers for capacity-building to mobilize collective resources and build public confidence in their organizations. Our findings emphasize the importance of civic participation for community resilience policies across multiple responsible institutions to reduce damage and build reciprocal trust among all stakeholders. We hope that our studies encourage the institutions that provide indispensable services in response to natural disasters to adopt the new governance to more diverse and inclusive civic participation models.

Data Availability Statement

All data that support the findings of this study are available from the corresponding author (Hyunseok Hwang) upon reasonable request.

Acknowledgments

This work was financially supported by (1) the RGK Center for Philanthropy and Community Service through funding to the Austin Area Sustainability Indicators program; (2) Planet Texas 2050, a research grand challenge at the University of Texas at Austin; (3) The Institute for Science, Technology, and Public Policy at Texas A&M University; (4) The St. David's Foundation; (5) The Michael and Susan Dell Foundation; and (6) Center for Nonprofits and Philanthropy in the Bush School of Government & Public Service at Texas A&M University.

References

- Ahmed, Z. 2011. "Electricity crisis of Bangladesh: Result of organizational inefficiency?" *Energy Environ. Res.* 1 (1): 12. <https://doi.org/10.5539/eeer.v1n1p12>.
- Akbar, M. S., and D. P. Aldrich. 2018. "Social capital's role in recovery: Evidence from communities affected by the 2010 Pakistan floods." *Disasters* 42 (3): 475–497. <https://doi.org/10.1111/disa.12259>.
- Aldrich, D. P. 2016. "It's who you know: Factors driving recovery from Japan's 11 March 2011 disaster." *Public Administration* 94 (2): 399–413. <https://doi.org/10.1111/padm.12191>.
- American Association for Public Opinion Research. 2016. "Standard definitions: Final dispositions of case codes and outcome rates for survey." Accessed June 21, 2021. <https://aapor.org/wp-content/uploads/2022/11/Standard-Definitions20169theditionfinal.pdf>.
- Appleby-Arnold, S., N. Brockdorff, and C. Callus. 2021. "Developing a 'culture of disaster preparedness': The citizens' view." *Int. J. Disaster Risk Reduct.* 56 (Apr): 102133. <https://doi.org/10.1016/j.ijdrr.2021.102133>.
- Atshan, S., R. P. Bixler, V. Rai, and D. W. Springer. 2020. "Pathways to urban sustainability through individual behaviors: The role of social capital." *Environ. Sci. Policy* 112 (Oct): 330–339. <https://doi.org/10.1016/j.envsci.2020.07.005>.
- Austin Area Sustainability Indicators. 2022. "Explore the indicators." Accessed March 20, 2022. <https://www.austinindicators.org/>.
- Babcicky, P., and S. Seebauer. 2017. "The two faces of social capital in private flood mitigation: Opposing effects on risk perception, self-efficacy and coping capacity." *J. Risk Res.* 20 (8): 1017–1037. <https://doi.org/10.1080/13669877.2016.1147489>.
- Bajek, R., Y. Matsuda, and N. Okada. 2008. "Japan's Jishu-bosai-soshiki community activities: Analysis of its role in participatory community disaster risk management." *Nat. Hazards* 44 (2): 281–292. <https://doi.org/10.1007/s11069-007-9107-4>.
- Bargain, O., and U. Aminjonov. 2020. "Trust and compliance to public health policies in times of COVID-19." *J. Public Econ.* 192 (Dec): 104316. <https://doi.org/10.1016/j.jpubeco.2020.104316>.
- Baron, R. M., and D. A. Kenny. 1986. "The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations." *J. Personality Social Psychol.* 51 (6): 1173. <https://doi.org/10.1037/0022-3514.51.6.1173>.
- Basolo, V., L. J. Steinberg, R. J. Burby, J. Levine, A. M. Cruz, and C. Huang. 2009. "The effects of confidence in government and information on perceived and actual preparedness for disasters." *Environ. Behav.* 41 (3): 338–364. <https://doi.org/10.1177/0013916508317222>.
- Becker, A., S. Boenigk, and J. Willems. 2020. "In nonprofits we trust? A large-scale study on the public's trust in nonprofit organizations." *J. Nonprofit Public Sector Mark.* 32 (2): 189–216. <https://doi.org/10.1080/10495142.2019.1707744>.
- Berrebi, C., A. Karlinsky, and H. Yonah. 2021. "Individual and community behavioral responses to natural disasters." *Nat. Hazards* 105 (2): 1541–1569. <https://doi.org/10.1007/s11069-020-04365-2>.
- Bixler, R. P., S. Paul, J. Jones, M. Preisser, and P. Passalacqua. 2021a. "Unpacking adaptive capacity to flooding in urban environments: Social capital, social vulnerability, and risk perception." *Front. Water* 3 (Aug): 728730. <https://doi.org/10.3389/frwa.2021.728730>.
- Bixler, R. P., and D. W. Springer. 2018. "Nonprofit social capital as an indicator of a healthy nonprofit sector." *Nonprofit Policy Forum* 9 (3): 1–8. <https://doi.org/10.1515/npf-2018-0017>.
- Bixler, R. P., E. Yang, S. M. Richter, and M. Coudert. 2021b. "Boundary crossing for urban community resilience: A social vulnerability and multi-hazard approach in Austin, Texas, USA." *Int. J. Disaster Risk Reduct.* 66 (Dec): 102613. <https://doi.org/10.1016/j.ijdrr.2021.102613>.
- Brody, S. D., Y. Lee, and W. E. Highfield. 2017. "Household adjustment to flood risk: A survey of coastal residents in Texas and Florida, United States." *Disasters* 41 (3): 566–586. <https://doi.org/10.1111/disa.12216>.
- Brudney, J. L., and B. Gazley. 2009. "Planning to be prepared: An empirical examination of the role of voluntary organizations in county government emergency planning." *Public Perform. Manage. Rev.* 32 (3): 372–399. <https://doi.org/10.2753/PMR1530-9576320302>.
- Bubeck, P., W. J. W. Botzen, and J. C. J. H. Aerts. 2012. "A review of risk perceptions and other factors that influence flood mitigation behavior." *Risk Anal.* 32 (9): 1481–1495. <https://doi.org/10.1111/j.1539-6924.2011.01783.x>.
- Castañeda, J. V., N. C. Bronfman, P. C. Cisternas, and P. B. Repetto. 2020. "Understanding the culture of natural disaster preparedness: Exploring the effect of experience and sociodemographic predictors." *Nat. Hazards* 103 (2): 1881–1904. <https://doi.org/10.1007/s11069-020-04060-2>.
- Chamlee-Wright, E., and V. H. Storr. 2010. "Expectations of government's response to disaster." *Public Choice* 144 (1–2): 253–274. <https://doi.org/10.1007/s11127-009-9516-x>.
- Chen, M.-F. 2015. "Self-efficacy or collective efficacy within the cognitive theory of stress model: Which more effectively explains people's self-reported proenvironmental behavior?" *J. Environ. Psychol.* 42 (Jun): 66–75. <https://doi.org/10.1016/j.jenvp.2015.02.002>.
- Chukwu, D. 2021. "Austin named fastest growing major metro in the US." *KVUE, ABC*. Accessed April 20, 2022. <https://www.kvue.com/article/money/economy/boomtown-2040/austin-population-growth-census-data/269-c1e8725e-3489-4445-9bb5-fc340887cc43>.
- City of Austin. 2022. "City launches a new dashboard with 2020 population estimates for the City and Austin-Metro Area." *AustinTexas.Gov*. Accessed December 30, 2022. <https://www.austintexas.gov/news/city-launches-new-dashboard-2020-population-estimates-city-and-austin-metro-area>.
- Comfort, L. K., and T. W. Haase. 2006. "Communication, coherence, and collective action: The impact of Hurricane Katrina on communications infrastructure." *Public Works Manage. Policy* 10 (4): 328–343. <https://doi.org/10.1177/1087724X06289052>.
- Curnin, S., and D. O'Hara. 2019. "Nonprofit and public sector interorganizational collaboration in disaster recovery: Lessons from the field." *Nonprofit Manage. Leadersh.* 30 (2): 277–297. <https://doi.org/10.1002/nml.21389>.
- Cutter, S., and K. Barnes. 1982. "Evacuation behavior and three mile island." *Disasters* 6 (2): 116–124. <https://doi.org/10.1111/j.1467-7717.1982.tb00765.x>.
- D'Agostino, M. J., and K. Kloby. 2011. "Building community capacity to engage government: Reflections of nonprofit leaders on post-Katrina New Orleans." *Administration Soc.* 43 (7): 749–769. <https://doi.org/10.1177/0095399711413733>.
- Demiroz, F., and Q. Hu. 2014. "The role of nonprofits and civil society in post-disaster recovery and development." In *Disaster and development: Examining global issues and cases*, 317–330. Cham, Switzerland: Springer.
- Dollery, B., Y. Kinoshita, and K. Yamazaki. 2020. "Humanitarian co-production in local government: The case of natural disaster volunteering in Japan." *Local Gov. Stud.* 46 (6): 959–978. <https://doi.org/10.1080/03003930.2019.1702531>.
- Domingue, S. J., and C. T. Emrich. 2019. "Social vulnerability and procedural equity: Exploring the distribution of disaster aid across counties in the United States." *Am. Rev. Public Administration* 49 (8): 897–913. <https://doi.org/10.1177/0275074019856122>.
- Du, L., Y. Feng, L. Y. Tang, W. Kang, and W. Lu. 2020. "Networks in disaster emergency management: A systematic review." *Nat. Hazards* 103 (1): 1–27. <https://doi.org/10.1007/s11069-020-04009-5>.
- Dvir, R., A. Vedlitz, and A. Mostafavi. 2022. "Far from home: Infrastructure, access to essential services, and risk perceptions about hazard weather events." *Int. J. Disaster Risk Reduct.* 80 (Oct): 103185. <https://doi.org/10.1016/j.ijdrr.2022.103185>.
- Egan, M. J. 2011. "The normative dimensions of institutional stewardship: High reliability, institutional constancy, public trust and confidence." *J. Contingencies Crisis Manage.* 19 (1): 51–58. <https://doi.org/10.1111/j.1468-5973.2010.00632.x>.
- Elvidge, J. 2014. *A route map to an enabling state*. Dunfermline, Scotland: Carnegie UK Trust.
- Fomell, C., and D. F. Larcker. 1981. "Structural equation models with unobservable variables and measurement error: Algebra and statistics." *J. Mark. Res.* 18 (3): 382–388. <https://doi.org/10.1177/002224378101800313>.

- Garson, G. D. 2010. "Reliability analysis. Statnotes: Topics in Multivariate Analysis." Accessed June 13, 2021. <https://faculty.chass.ncsu.edu/garson/PA765/reliab.htm#rater>.
- Gazley, B. 2008. "Beyond the contract: The scope and nature of informal government–nonprofit partnerships." *Public Administration Rev.* 68 (1): 141–154. <https://doi.org/10.1111/j.1540-6210.2007.00844.x>.
- Gazley, B. 2010. "Linking collaborative capacity to performance measurement in government—Nonprofit partnerships." *Nonprofit Voluntary Sector Q.* 39 (4): 653–673. <https://doi.org/10.1177/0899764009360823>.
- Gazley, B. 2013. "Predicting a volunteer's future intentions in professional associations: A test of the Penner Model." *Nonprofit Voluntary Sector Q.* 42 (6): 1245–1267. <https://doi.org/10.1177/0899764012453207>.
- Gazley, B., and J. L. Brudney. 2007. "The purpose (and perils) of government–nonprofit partnership." *Nonprofit Voluntary Sector Q.* 36 (3): 389–415. <https://doi.org/10.1177/0899764006295997>.
- Gruca, T. 2018. "Central Texas has seen three 100-year floods in 5 years. Now thousands are destined to flood." *KVUE, ABC*. Accessed April 20, 2022. <https://www.kvue.com/article/news/defenders-destined-to-flood/269-615925368>.
- Hair, J. F., J. J. Risher, M. Sarstedt, and C. M. Ringle. 2019. "When to use and how to report the results of PLS-SEM." *Eur. Bus. Rev.* 31 (1): 2–24. <https://doi.org/10.1108/EBR-11-2018-0203>.
- Holmes, R., Jr., T. M. Michael, M. A. Hitt, and M. P. Salmador. 2013. "The interrelationships among informal institutions, formal institutions, and inward foreign direct investment." *J. Manage.* 39 (2): 531–566. <https://doi.org/10.1177/0149206310393503>.
- Holum, M. 2022. "Citizen participation: Linking government efforts, actual participation, and trust in local politicians." *Int. J. Public Administration* (Mar): 1–16. <https://doi.org/10.1080/01900692.2022.2048667>.
- Howard, A., K. Agllias, M. Bevis, and T. Blakemore. 2017. "'They'll tell us when to evacuate': The experiences and expectations of disaster-related communication in vulnerable groups." *Int. J. Disaster Risk Reduct.* 22 (Jun): 139–146. <https://doi.org/10.1016/j.ijdr.2017.03.002>.
- Hutton, N. S., S. W. Mumford, M. Saitgalina, J. Yusuf, J. G. Behr, R. Diaz, and J. J. Kiefer. 2021. "Nonprofit capacity to manage hurricane–pandemic threat: Local and national perspectives on resilience during COVID-19." *Int. J. Public Administration* 44 (11–12): 984–993. <https://doi.org/10.1080/01900692.2021.1922439>.
- Hwang, H., and D. Joo. 2021. "How to be resilient? Local philanthropy as a collective response to natural disasters." *VOLUNTAS: Int. J. Voluntary Nonprofit Organ.* 32 (Apr): 430–447. <https://doi.org/10.1007/s11266-020-00239-0>.
- Hwang, H., and Y. Lee. 2022. "Community social capital, racial diversity, and philanthropic resource mobilization in the time of a pandemic." *City Community* 22 (1): 22–47. <https://doi.org/10.1177/1535684122119181>.
- Ibarra, H., M. Kilduff, and W. Tsai. 2005. "Zooming in and out: Connecting individuals and collectivities at the frontiers of organizational network research." *Organ. Sci.* 16 (4): 359–371. <https://doi.org/10.1287/orsc.1050.0129>.
- Jackson, E. L. 1981. "Response to earthquake hazard: The west coast of North America." *Environ. Behav.* 13 (4): 387–416. <https://doi.org/10.1177/0013916581134001>.
- Kahn, T., and Z. Zimbalist. 2022. "How do local public spending decisions shape corruption perceptions? Evidence from Mexico." *Lat. Am. Polit. Soc.* 64 (3): 67–92. <https://doi.org/10.1017/lap.2022.12>.
- Kapucu, N. 2007. "Non-profit response to catastrophic disasters." *Disaster Prev. Manage.* 16 (4): 551–561. <https://doi.org/10.1108/09653560710817039>.
- Kapucu, N. 2008. "Collaborative emergency management: Better community organising, better public preparedness and response." *Disasters* 32 (2): 239–262. <https://doi.org/10.1111/j.1467-7717.2008.01037.x>.
- Kapucu, N., T. Arslan, and M. L. Collins. 2010. "Examining intergovernmental and interorganizational response to catastrophic disasters: Toward a network-centered approach." *Administration Soc.* 42 (2): 222–247. <https://doi.org/10.1108/09653561011070376>.
- Kapucu, N., and A. Boin. 2017. *Disaster and crisis management: Public management perspectives*. London: Routledge.
- Kapucu, N., and V. Garayev. 2016. "Structure and network performance: Horizontal and vertical networks in emergency management." *Administration Soc.* 48 (8): 931–961. <https://doi.org/10.1177/0095399714541270>.
- Karimziorani, M., K. Jafarzadegan, P. Abbaszadeh, W. Shao, and H. Moradkhani. 2022. "Hazard risk awareness and disaster management: Extracting the information content of twitter data." *Sustainable Cities Soc.* 77 (Feb): 103577. <https://doi.org/10.1016/j.scs.2021.103577>.
- Kellens, W., T. Terpstra, and P. De Maeyer. 2013. "Perception and communication of flood risks: A systematic review of empirical research." *Risk Anal.* 33 (1): 24–49. <https://doi.org/10.1111/j.1539-6924.2012.01844.x>.
- Kline, R. B. 2015. *Principles and practice of structural equation modeling*. New York: Guilford Publications.
- Koliba, C. J., R. M. Mills, and A. Zia. 2011. "Accountability in governance networks: An assessment of public, private, and nonprofit emergency management practices following Hurricane Katrina." *Public Administration Rev.* 71 (2): 210–220. <https://doi.org/10.1111/j.1540-6210.2011.02332.x>.
- Kruczkiewicz, A., J. Klopp, J. Fisher, S. Mason, S. McClain, N. M. Sheekh, R. Moss, R. M. Parks, and C. Braneon. 2021. "Opinion: Compound risks and complex emergencies require new approaches to preparedness." *Proc. Natl. Acad. Sci.* 118 (19): e2106795118. <https://doi.org/10.1073/pnas.2106795118>.
- Lam, R. P. K., L. P. Leung, S. Balsari, K. Hsiao, E. Newnham, K. Patrick, P. Pham, and J. Leaning. 2017. "Urban disaster preparedness of Hong Kong residents: A territory-wide survey." *Int. J. Disaster Risk Reduct.* 23 (Aug): 62–69. <https://doi.org/10.1016/j.ijdr.2017.04.008>.
- La Porte, T. R., and D. S. Metlay. 1996. "Hazards and institutional trustworthiness: Facing a deficit of trust." *Public Administration Rev.* 56 (4): 341–347. <https://doi.org/10.2307/976375>.
- Lasker, R. D. 2004. *Redefining readiness: Terrorism planning through the eyes of the public*. New York: Academy of Medicine.
- Lester, W. 2018. *Transforming disaster response: Federalism and leadership*. London: Routledge.
- Lindell, M. K., and R. W. Perry. 2000. "Household adjustment to earthquake hazard: A review of research." *Environ. Behav.* 32 (4): 461–501. <https://doi.org/10.1177/00139160021972621>.
- Liu, B. F., and A. M. Mehta. 2021. "From the periphery and toward a centralized model for trust in government risk and disaster communication." *J. Risk Res.* 24 (7): 853–869. <https://doi.org/10.1080/13669877.2020.1773516>.
- Mancini, J. A., and G. L. Bowen. 2009. "Community resilience: A social organization theory of action and change." In *Pathways of human development: Explorations of change*, 245–265. Lanham, MD: Rowman & Littlefield.
- Markantoni, M., A. A. Steiner, and J. E. Meador. 2019. "Can community interventions change resilience? Fostering perceptions of individual and community resilience in rural places." *Community Dev.* 50 (2): 238–255. <https://doi.org/10.1080/15575330.2018.1563555>.
- Mathias, J., D. D. Burns, E. Pekalkiewicz, J. Choi, and G. Feliciano. 2022. "Roles of nonprofits in disaster response and recovery: Adaptations to shifting disaster patterns in the context of climate change." *Nat. Hazard. Rev.* 23 (3): 04022011. [https://doi.org/10.1061/\(ASCE\)NH.1527-6996.0000559](https://doi.org/10.1061/(ASCE)NH.1527-6996.0000559).
- Meyer, M. A., M. Alexander-Hawk, J. C. Purdum, H. Yelle, J. Vick, A. Rodriguez, S. Romero, and K. A. Taylor. 2022. "Resilience in recovery? Understanding the extent, structure, and operations of nonprofits meant to address disaster survivors' unmet needs." *Nonprofit Voluntary Sector Q.* 08997640221138265. <https://doi.org/10.1177/08997640221138265>.
- Mileti, D. S., C. Fitzpatrick, and B. C. Farhar. 1992. "Fostering public preparations for natural hazards: Lessons from the Parkfield earthquake prediction." *Environ.: Sci. Policy Sustainable Dev.* 34 (3): 16–39. <https://doi.org/10.1080/00139157.1992.9931434>.
- Nicholls, K., and J. S. Picou. 2013. "The impact of Hurricane Katrina on trust in government." *Social Sci. Q.* 94 (2): 344–361. <https://doi.org/10.1111/j.1540-6237.2012.00932.x>.
- Nolte, I. M., and S. Boenigk. 2013. "A study of ad hoc network performance in disaster response." *Nonprofit Voluntary Sector Q.* 42 (1): 148–173. <https://doi.org/10.1177/0899764011434557>.
- Nowell, B., T. Steelman, A.-L. K. Velez, and Z. Yang. 2018. "The structure of effective governance of disaster response networks: Insights from the

- field." *Am. Rev. Public Administration* 48 (7): 699–715. <https://doi.org/10.1177/0275074017724225>.
- O'Neill, M. 2009. "Public confidence in charitable nonprofits." *Non-profit Voluntary Sector Q.* 38 (2): 237–269. <https://doi.org/10.1177/0899764008326895>.
- Onuma, H., K. J. Shin, and S. Managi. 2017. "Household preparedness for natural disasters: Impact of disaster experience and implications for future disaster risks in Japan." *Int. J. Disaster Risk Reduct.* 21 (Mar): 148–158. <https://doi.org/10.1016/j.ijdr.2016.11.004>.
- Oral, M., A. Yenel, E. Oral, N. Aydin, and T. Tuncay. 2015. "Earthquake experience and preparedness in Turkey." *Disaster Prev. Manage.* 24 (1): 21–37. <https://doi.org/10.1108/DPM-01-2013-0008>.
- Osborne, S. P., Z. Radnor, and K. Strokosch. 2016. "Co-production and the co-creation of value in public services: A suitable case for treatment?" *Public Manage. Rev.* 18 (5): 639–653. <https://doi.org/10.1080/14719037.2015.1111927>.
- Paarlberg, L. E., M. LePere-Schloop, M. Walk, J. Ai, and Y. Ming. 2020. "Activating community resilience: The emergence of COVID-19 funds across the United States." *Nonprofit Voluntary Sector Q.* 49 (6): 1119–1128. <https://doi.org/10.1177/0899764020968155>.
- Patterson, O., F. Weil, and K. Patel. 2010. "The role of community in disaster response: Conceptual models." *Popul. Res. Policy Rev.* 29 (2): 127–141. <https://doi.org/10.1007/s11113-009-9133-x>.
- Peters, E. J., and C. McDonald. 2011. "The contributions and performances of Grenadian main NGOs after a natural disaster." *Int. NGO J.* 6 (3): 62–70. <https://doi.org/10.5897/NGOJ10.038>.
- Quarshie, A. M., and R. Leuschner. 2020. "Interorganizational interaction in disaster response networks: A government perspective." *J. Supply Chain Manage.* 56 (3): 3–25. <https://doi.org/10.1111/jscm.12225>.
- Robinson, S. E., B. Berrett, and K. Stone. 2006. "The development of collaboration of response to Hurricane Katrina in the Dallas area." *Public Works Manage. Policy* 10 (4): 315–327. <https://doi.org/10.1177/1087724X06289053>.
- Roppe, S. 2021. "Local nonprofits provide necessary response to natural disasters." *Daily Trojan*. Accessed October 10, 2022. <https://dailytrojan.com/2021/03/08/local-nonprofits-provide-necessary-response-to-natural-disasters/>.
- Rowel, R., P. Sheikhattari, T. M. Barber, and M. Evans-Holland. 2012. "Introduction of a guide to enhance risk communication among low-income and minority populations: A grassroots community engagement approach." *Health Promot. Pract.* 13 (1): 124–132. <https://doi.org/10.1177/1524839910390312>.
- Ruddle, T. B., S. E. Robinson, and A. Fister. 2023. "Fragile halos: Comparing organisational reputation across sectors." *J. Contingencies Crisis Manage.* 13 (1): 13–25. <https://doi.org/10.1111/1468-5973.12400>.
- Russell, L. A., J. D. Goltz, and L. B. Bourque. 1995. "Preparedness and hazard mitigation actions before and after two earthquakes." *Environ. Behav.* 27 (6): 744–770. <https://doi.org/10.1177/0013916595276002>.
- Siegrist, M., and G. Cvetkovich. 2000. "Perception of hazards: The role of social trust and knowledge." *Risk Anal.* 20 (5): 713–720. <https://doi.org/10.1111/0272-4332.205064>.
- Siegrist, M., T. C. Earle, and H. Gutscher. 2003. "Test of a trust and confidence model in the applied context of electromagnetic field (EMF) risks." *Risk Anal. Int. J.* 23 (4): 705–716. <https://doi.org/10.1111/1539-6924.00349>.
- Siegrist, M., H. Gutscher, and T. C. Earle. 2005. "Perception of risk: The influence of general trust, and general confidence." *J. Risk Res.* 8 (2): 145–156. <https://doi.org/10.1080/1366987032000105315>.
- Simo, G., and A. L. Bies. 2007. "The role of nonprofits in disaster response: An expanded model of cross-sector collaboration." Supplement, *Public Administration Rev.* 67 (S1): 125–142. <https://doi.org/10.1111/j.1540-6210.2007.00821.x>.
- Smith, C. 2001. "Trust and confidence: Possibilities for social work in 'high modernity'." *Br. J. Social Work* 31 (2): 287–305. <https://doi.org/10.1093/bjsw/31.2.287>.
- Sutton, J., and K. Tierney. 2006. Vol. 3 of *Disaster preparedness: Concepts, guidance, and research*, 1–41. Boulder, CO: Univ. of Colorado.
- US Census. 2021. "Quick fact: Austin City, Texas." Accessed October 30, 2022. <https://www.census.gov/quickfacts/fact/table/austincitytexas/PST045221>.
- Vallance, S., and S. Carlton. 2015. "First to respond, last to leave: Communities' roles and resilience across the '4Rs.'" *Int. J. Disaster Risk Reduct.* 14 (Dec): 27–36. <https://doi.org/10.1016/j.ijdr.2014.10.010>.
- Wachinger, G., O. Renn, C. Begg, and C. Kuhlicke. 2013. "The risk perception paradox—Implications for governance and communication of natural hazards." *Risk Anal.* 33 (6): 1049–1065. <https://doi.org/10.1111/j.1539-6924.2012.01942.x>.
- Weng, W. W., C. K. Woo, Y. S. Cheng, T. Ho, and I. Horowitz. 2015. "Public trust and corruption perception: Disaster relief." *Appl. Econ.* 47 (46): 4967–4981. <https://doi.org/10.1080/00036846.2015.1039703>.
- Williams, B. D., J. N. Valero, and K. Kim. 2018. "Social media, trust, and disaster: Does trust in public and nonprofit organizations explain social media use during a disaster?" *Qual. Quant.* 52 (2): 537–550. <https://doi.org/10.1007/s11135-017-0594-4>.
- Yang, Z., and Y. Lu. 2022. "Exploring network mechanisms to organizations' influence reputation: A case of collaborative disaster response." *Public Manage. Rev.* 24 (12): 2004–2032. <https://doi.org/10.1080/14719037.2021.1955952>.
- Yu, J., T. Sim, and W. Qi. 2022. "Informal social support and disaster preparedness: Mediating roles of perceived collective efficacy and self-efficacy." *Int. J. Disaster Risk Reduct.* 68 (Jan): 102734. <https://doi.org/10.1016/j.ijdr.2021.102734>.