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Perceived risk of homeland security incidents: The insignificance of actual risk factors

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PERCEIVED RISK OF HOMELAND SECURITY INCIDENTS: THE INSIGNIFICANCE OF ACTUAL RISK FACTORS

by

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Submitted in Partial Fulfillment of the Requirements for the
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Contingency theory, with regard to risk of homeland security incidents and homeland security preparedness, has received considerable empirical support. In past research, risk has been measured subjectively as agency executives' perceived risk of specific homeland security incidents occurring within their jurisdictions. This study examines actual risk, using the objective risk factors of experience with past natural hazards, social vulnerability, and urbanization. These risk factors, used in combination, have been significantly associated with terrorism-related homeland security incidents in the United States, and are used in risk assessment models of natural hazards. Contrary to expectations, the results of this study indicate that objective risk factors were not associated with either perceived risk or preparedness. Policy implications and directions for future research are discussed.

DEDICATION

I would like to dedicate this to my family. My husband deserves special thanks for taking care of the numerous little day-to-day things, which made the last four months much easier for me than they could have been. Particular recognition also goes my father for proof reading this (as well as nearly every paper I have written in the last two years), although criminal justice is well outside the realm of both his expertise and interest. I would also like to express my gratitude to my mother, sister, brothers, and grandmother for their encouragement. The unconditional support and never-ending patience of my family, not only during the process of completing my thesis, but throughout all my scholarly pursuits, have meant the world to me. I love you all.

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CHAPTER 1

INTRODUCTION

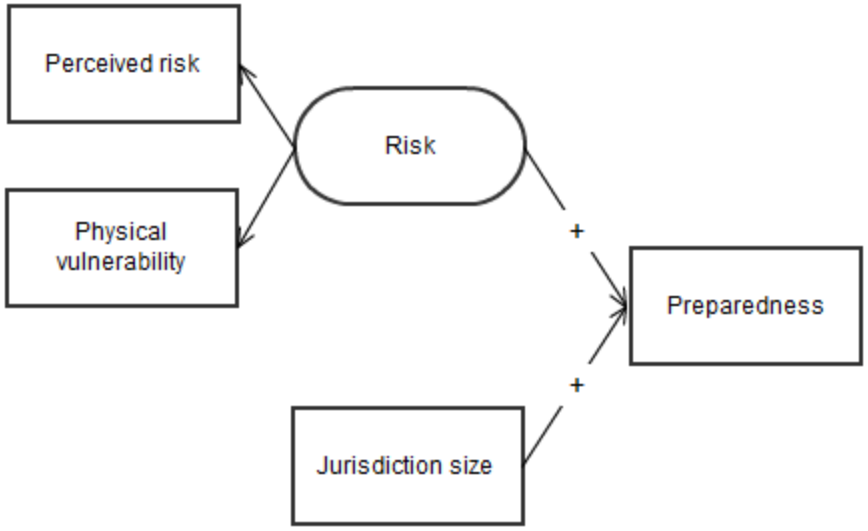
After the terrorist attacks of September 11th, 2001, the paradigm of policing expanded to include a homeland security function. Police departments are now expected to take an unprecedented role as the first line of defense for prevention, as first responders in the case of incidents, and as a main component of recovery operations (Homeland Security Council, 2007; Newman & Clarke, 2008; Oliver, 2006). Research has demonstrated that police agencies have taken a variety of steps to prepare for homeland security incidents, including updating mutual aid agreements, creating special units, and participating in homeland security training. One of the best theories to explain homeland security innovation is contingency theory, which posits that organizations respond rationally to contingencies in their external environment and innovate to meet their goals. Applied to homeland security preparedness, police agencies with higher levels of risk, a key contingency, are more likely to take steps to enhance their preparedness.

Perceived risk and its impact on behavior is one of the hallmarks of the American criminal justice system, but it is typically applied at the individual level. For example, as targeted police patrols or hot spots policing strategies are implemented, offenders are less likely to commit crimes because they perceive a higher risk of getting caught. When people are in high-risk situations (e.g., walking alone at night), they are more likely to take protective measures because they view their risk of victimization to be elevated. Some studies have applied this logic to organizational-level behavior. As criminal justice agency heads perceive an elevated risk of a homeland security incident,

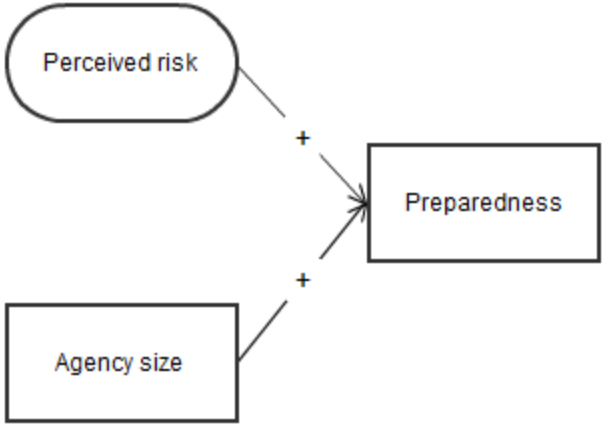
they are more likely to take steps to enhance their preparedness. The difference between the organizational and individual-level studies is the relationship between perceived risk and behavior. At the organizational level, perceived risk has only been included as a direct predictor of preparedness, while at the individual level, objective risk factors indirectly affect behavior through perceived risk.

To date, studies examining organizational-level behavior have not considered that the effects of external contingencies on preparedness may be indirect through perceptions of risk. When testing contingency theory, either explicitly or implicitly, past studies have either combined perceived risk and objective risk factors into a single variable (Davis et al, 2004), or only examined perceived risk and not considered objective risk factors (Burruss, Giblin, & Schafer, 2010) (see Figure 1). These tactics may obscure the intricacies of the associations between objective risk factors, perceived risk, and preparedness, as the relationships may be more complex and multifaceted.

The present study introduces a model of preparedness where objective risk factors indirectly affect preparedness through risk perceptions (see Figure 2). The objective risk factors in this study come from a variety of sources guided by different lines of research. Psychological literature indicates that experience with past hazards increases the perceived risk of, or rated probability of, future hazard events (Greening, Dollinger, & Pitz, 1996). Along the same lines, people who are more socially vulnerable perceive higher victimization risk than those who are less socially vulnerable (Reisig, Pratt, & Holtfreter, 2009). Additionally, in determining actual risk, researchers and government organizations use measures of physical vulnerability, or properties of the built environment that make the area more susceptible to harm (Department of



Source: Davis et al., 2006



Source: Burruss et al., 2010 and Giblin et al., in press

Figure 1.
Models used in extant literature to predict homeland security preparedness.

Homeland Security, 2009; Ezell, Bennett, von Winterfeldt, Sokolowski, & Collins, 2010). Objective risk factors include measures of past hazards, social vulnerability, and urbanization. Respondents from departments located in areas with higher incidence, prevalence, and magnitude of past natural hazards are expected to rate the probability of non-terrorism related homeland security incidents as higher when compared to those with less experience with past hazards. Additionally, departments located in counties that are more socially vulnerable and more urban should perceive higher risk of homeland security incidents.

Police chiefs or agency heads of small municipal police departments across the United States were surveyed and asked questions about their perceived risk of specific terrorism-related and non-terrorism related homeland security incidents occurring within the next five years in their jurisdictions. The survey also asked questions about their levels of preparedness for homeland security incidents. Data from past natural disasters from the last ten years is utilized, as well as a social vulnerability index and a rural to urban continuum code indicating the level of urbanization. The relationships between objective risk factors, perceived risk, and agency preparedness are explored.

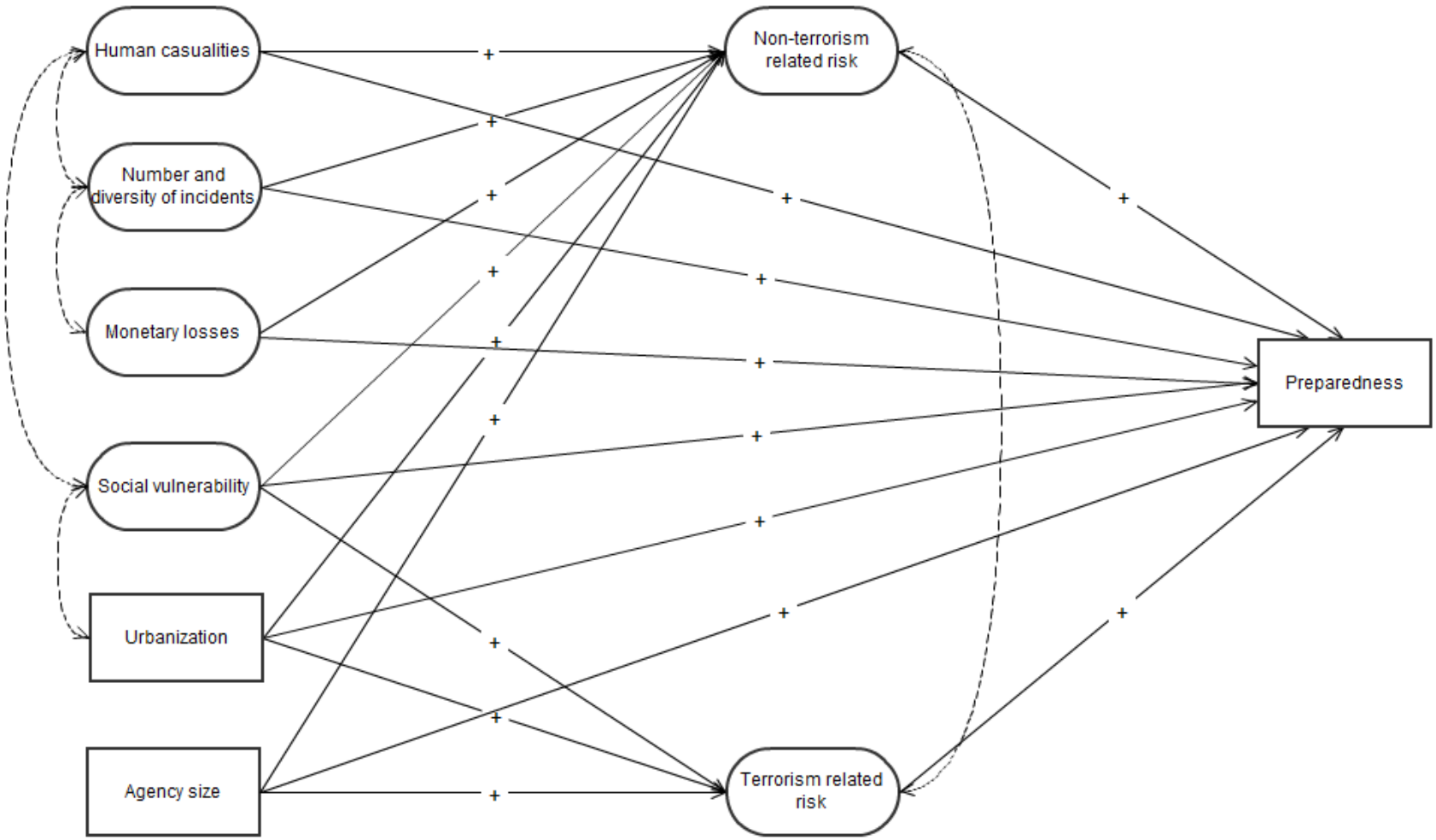


Figure 2.
Proposed structural model predicting risk and preparedness with direct and indirect paths

CHAPTER 2

LITERATURE REVIEW

Several studies have analyzed the role of police in homeland security efforts. Results show that police chiefs feel homeland security is the primary mission of the institution of policing (Stewart & Morris, 2009), and have taken a number of steps to prepare for homeland security incidents. Departments have written emergency response plans and trained personnel for homeland security response (Burruss et al., 2010; Pelfrey, 2007), and have created divisions or units to handle homeland security threats or incidents (DeLone, 2007; Grillo, 2011). In addition, local police departments are increasingly relying on state police agencies for training and specialized services related to homeland security (The Council of State Governments & Eastern Kentucky University, 2006). These past studies, by examining the steps law enforcement agencies have taken to prepare for or prevent homeland security events, demonstrate that homeland security policing tactics are practiced by departments across the nation. They also revealed that not all departments are equally prepared, and some researchers have tried to understand what affects levels of preparedness by applying contingency theory.

Contingency Theory

Linking the idea that risk influences behavior to organizations, contingency theory maintains that organizations are dynamic, and rationally adapt to contingencies to achieve “fit” with their environment. By fitting an organization to contingencies, they attain effectiveness (Donaldson, 2001). Donaldson’s (2001) structural adaptation to regain fit (SARFIT) model proposes that when organizations shift out of fit with their

environment, they change their structure to regain fit. This has been applied to law enforcement organizations; the structures and activities of an agency are influenced by contingencies in the external environment (Burruss et al., 2010; Maguire, 2003). In this case, contingencies would be the objective risk of a homeland security incident. In policing, it would follow that police departments have rationally responded to an increased risk of homeland security incidents by taking steps to enhance their homeland security preparedness.

While contingency theory did not receive much empirical support when applied to community policing innovations (Zhao, Ren, & Lovrich, 2010) or the creation of gang units (Katz, Maguire, & Roncek, 2002), it has received considerable support in explaining homeland security preparedness (Burruss et al., 2010; Davis et al., 2004; Davis, Mariano, Pace, Cotton, & Steinberg, 2006; Gerber, Cohen, Cannon, Patterson, & Stewart, 2005; Schafer, Burruss, & Giblin, 2009). These past studies have operationalized risk and preparedness slightly differently, but there are many similarities. While some did not explicitly use contingency theory in framing the relationship, perceived risk has been a significant predictor of homeland security preparedness.

RAND conducted three national waves of a survey on the state of terrorism preparedness among local law enforcement agencies in the U.S. (Davis et al., 2004; Davis et al., 2006). Focusing on the second wave, as this measured variables of interest to the present study, the researchers dichotomized overall risk into two components – perceived risk and physical vulnerability. Perceived risk was measured as the perceived likelihood of a terrorist event occurring within their jurisdiction in the

next five years. The levels of risk reported by metropolitan agencies were no different than the perceived risk reported by non-metropolitan agencies. Census region was a significant variable; Southern and Western agencies perceived lower risk than the Northeastern and Midwestern agencies, which perceived risk as higher. Additionally, law enforcement agencies with less than 30 officers rated their perceived risk levels as significantly lower than those agencies with more officers.

In the same study, physical vulnerability was measured by quantifying the number of different types of structures that were considered potential targets within the jurisdiction. This group of survey questions asked whether there were particular types of facilities in the respondent's jurisdiction (e.g. nuclear power plants, agricultural facilities, water treatment plants, airports, etc.). This was summed for a scale of 0- 7 of different types of facilities. Based on responses to the perceived risk and vulnerability questions, the departments were classified as high, medium, or low-risk. The researchers determined that higher overall risk was associated with higher levels of preparedness. Interestingly, vulnerability was the driving factor of overall risk, not perceived risk (Davis et al., 2004). RAND did a third wave of this survey, but did not include vulnerability measures. However, researchers found that law enforcement agency respondents who perceived the risk of a terrorist attack to be higher had participated in more preparedness activities, and perceived the level of adequacy of training to be higher (Davis et al., 2006).

Gerber and colleagues (2005) conducted a survey of municipal government officials, primarily first responders (police, fire, or emergency services department heads), and examined homeland security preparedness. Preparedness was measured

using two variables – perceived preparedness and preparedness commitment. Perceived preparedness was measured by asking the officials to rate their ability to respond to a terrorist attack, and preparedness commitment was measured by asking officials to rate their cities' overall commitment to homeland security preparedness. While perceived preparedness and preparedness commitment were subjective measures, the researchers also assessed two objective aspects of preparedness. This was measured by whether the department had created mutual aid agreements specifically related to homeland security, and had tested homeland security emergency response plans (Gerber et al., 2005). Perceived risk was positively and significantly associated with perceived preparedness and preparedness commitment. Additionally, large city respondents were more likely to report higher perceptions of preparedness, preparedness commitment, and preparedness activities. However, perceived risk was not associated with preparedness activities. This could indicate a direct effect of large cities on preparedness activities, or this could be due to the study only measuring two types of preparedness activities (Gerber et al., 2005).

Examining homeland security practices in small agencies across Illinois, Schafer and colleagues (2009) measured perceived risk as the rated likelihood of a specific terrorism-related homeland security incident occurring within the jurisdiction within the next five years. Burruss and colleagues (2010) used the same measure when studying agencies of all sizes across Illinois. In both these studies, preparedness was the sum of dichotomous measures of several specified measures to enhance their homeland security preparedness since the September 11th attacks (Schafer et al., 2009; Burruss et al., 2010). The results from both studies indicated that an increase in perceived risk

was positively and significantly associated with preparedness. Agency size was also an important predictor of preparedness, and the authors ascertained that because larger agencies are typically found in more urban/metropolitan areas, they may have more vulnerability than smaller, more rural agencies, in addition to more intergovernmental complexity, cooperation, and networks (Burruss et al., 2010). While agencies located in metropolitan areas reported significantly lower risk, there was a direct positive relationship between metropolitan agencies and preparedness (Schafer et al., 2009). By examining vulnerability as a separate objective risk measure, this may help explain the relationship between size and preparedness.

What all of these studies show is that perceived risk is positively associated with preparedness activities. All of these studies support contingency theory in that perceived risk (the contingency) is positively associated with preparedness activities (organizational behavior). However, contingency theory has only been examined using perceived risk as a proxy measure of actual risk. These two measures of risk, subjective perception and objective reality, are discrete. While perceived risk is important, objective risk factors may indirectly affect preparedness through their effect on perceived risk.

Objective Risk

Calculating objective risk for terrorism-related homeland security incidents involves the use of the threat vulnerability consequences (TVC) model. This is the product of threat (the probability of an attack), vulnerability (if it occurs, the probability of the attack's success), and consequences (if the attack occurs, the losses that would be incurred through fatalities, injuries, and economic losses) (Ezell et al., 2007). In this

model, threat is the most difficult to calculate; it takes into account the goals, motives, and capabilities of terrorists, as well as factors about possible targets. As opposed to the actual probability of an event, threat is typically reported as relative likelihood in comparison to other terrorist events, and is calculated by experts in the intelligence community (Ezell et al., 2010).

There has been criticism in applying this model to threats posed by intelligent adversaries – terrorists can adapt to and circumvent protective measures, and use risk assessment results to plan attacks. Additionally, some scholars argue that this model only examines individual infrastructure targets but does not consider the interconnectedness of systems (e.g., electric power grids) (Brown, & Cox, Jr., 2011). Scholars have recommended that multiple models be used, not TVC exclusively, to estimate the risk of terrorism attacks (Ezell et al., 2010). In spite of this criticism, the TVC model is used by the Department of Homeland Security (DHS) to assess the risk of homeland security incidents, both terrorism-related and non-terrorism related, on infrastructure (Department of Homeland Security, 2009).

Within the natural hazards literature, objective risk is calculated using both target-specific and hazard-specific information. Risk is defined as the combination of the probability of a hazard occurring, the intensity or impact of the hazard, and the exposure and vulnerability of the targets (Hollenstein, 2005). The history of hazards in a place is a salient factor in calculating the probability of reoccurrence (Hufschmidt, Crozier & Glade, 2005). While the terms may be the same, their meanings differ from the TVC model. In psychological risk perception, vulnerability describes the potential for harm, which is equivalent to the consequences variable in the TVC model. Risk, in the

psychological perspective, would be the probability of something occurring, equivalent to threat in the TVC model.

How individuals perceive risk is somewhat different than the analytical risk assessments performed by experts. The perception of risk can be defined as, "the judgments people make when they are asked to characterize and evaluate" hazards (Slovic, 1987, p. 280). While risk was once thought to be completely objective, it is now accepted that risk is actually a subjective judgment and can be influenced by a wide array of factors, including emotional and affective processes (Slovic, 2000).

A recent article applying this psychometric paradigm to risk perception and terrorism assessed the relevant literature (Jenkin, 2006). This revealed that while there are nineteen identified qualitative factors used in the psychometric paradigm, they are typically reduced to four factors using factor analysis. Dread, unknown risk, the number of people exposed, and the severity of the consequences are the four factors identified. Most often, the dread risk factor is the driving force behind overall perceived risk (Jenkin, 2006). The present study examines the relationship between agency heads' opinions of probabilities of homeland security events occurring within their jurisdiction and the objective risk factors of social vulnerability, urbanization, and experience with past hazards. These objective risk factors correspond with a number of the elements of the psychometric paradigm identified above.

Hazards.

In the risk assessment field, it has been established that an experience with a past hazard increases the perceptions of probability of that hazard occurring in the future. This is due to both availability and affect heuristics. The availability heuristic

posits that when people experience an event, it is more easily recalled (available), which increases their future risk perception. The affect heuristic suggests that how people feel about an event (positive or negative) will impact their risk perceptions. Positive feelings decrease risk perceptions, and negative feelings increase risk perceptions. The affect and availability heuristics are closely related, as remembered events are linked with affect (Keller, Siegrist, & Gutscher, 2006). This is supported in the criminal justice literature, as people who have been victims of crime rate their perceived risk of future victimizations as higher than those who have not been victimized (LaGrange, Ferraro, Supancic, 1992). Experience with past hazards would correspond with both dread and severity of the consequences in the psychometric paradigm (Jenkin, 2006).

Vulnerability.

Another objective risk factor is vulnerability. Broadly defined, vulnerability is the, "susceptibility to damage or harm" (Eakin & Luers, 2006, p. 366). While vulnerability is a term used in multiple scientific disciplines (e.g., geography, economics, earth sciences, engineering, etc.), it typically has two main themes: the environment and the people that live there. It is generally agreed upon that vulnerability is made up of three components: exposure, sensitivity, and response (Cutter & Finch, 2008, Hogan & Marandola, 2005). However, vulnerability is conceptualized differently across different disciplines. Depending on the discipline, other components to vulnerability could include politics, natural resource use and distribution, ecological resilience, and the absence of entitlements (Adger, 2006; Eakin & Luers, 2006). The vulnerability of interest in this project is the vulnerability to hazards, whether natural or manmade.

Cutter (2003) describes vulnerability as, “those circumstances that put people and places at risk and those conditions that reduce the ability of people and places to respond to environmental threats” (p. 6).

Social vulnerability measures the potential for harm to a population. While quantifying social vulnerability is challenging, researchers at the University of South Carolina have created a social vulnerability index (SoVI) (Hazards & Vulnerability Research Institute, 2010b). Based on thirty-two variables and seven components (see Table 1), this index provides a value for each county in the United States. Higher values are associated with higher levels of social vulnerability. The value itself is unitless, as it is only for comparison to other counties.

Myriad variables are included in the index based on empirical studies measuring the influence of the variables on social vulnerability. For example, females have been shown to have a harder time recovering from disasters. This can be due to women making less money than their male counterparts, and the typical role of childcare. The very young, very old, and disabled are more vulnerable because they may be unable to remove themselves from disasters without assistance. The burden of childcare or elderly care when facilities are impacted increases vulnerability as well. Ethnicity can increase social vulnerability to the extent that cultural and language barriers decrease receipt of post-disaster funding. Socioeconomic variables, such as poverty and unemployment, indicate the ability to absorb the consequences of disasters and to bounce back (see Cutter, Boruff, & Shirley, 2003 for an extensive description and list of sources for each concept).

Table 1.
Social vulnerability index components

Component	Increases or decreases social vulnerability	Name	Percent variance explained	Variables
1	+	Race (Black), Class (Poverty)	17.025	Percent female headed households Percent poverty Percent Black Percent civilian unemployment Percent of housing units with no car Percent with less than twelfth grade education Percent of population with a disability Percent of children living in married couple families
2	-	Wealth	15.742	Median house value Median gross rent Percent of households earning greater than $200,000 annually Per capita income Percent Asian Percent urban population (county, tract levels only) Population per square mile (block group level only)
3	+	Age	12.805	Median age Percent of households receiving social security Percent of population under age 5 or over age 65 Percent of population with a disability Percent urban population (county, tract levels only) Percent renters People per unit
4	+	Ethnicity (Hispanic)	7.988	Percent Hispanic Percent of population without health insurance Percent employment in extractive industries Percent female participation in labor force
5	+	Gender, Care Dependence	6.282	Hospitals per capita (county, tract levels only) Percent of population under age 5 or over age 65 Percent of population 65 and over living in group quarters Percent female Percent civilian unemployment Percent mobile homes
6	+	Ethnicity (Native American)	4.837	Percent Native American
7	+	Service Employment	4.432	Percent employment in service industry
		Total	69.102	

Source: Hazards & Vulnerability Research Institute, 2011a

While the social vulnerability index in this study is place-based, it is interesting to note that past studies have indicated that individuals who were more socially vulnerable (measured as socioeconomic and minority status) perceived a higher risk of victimization (Reisig, et al., 2009). This has been supported in other studies as well; people who are more socially vulnerable generally report higher risk perceptions than those who are less socially vulnerable (Kanan & Pruitt, 2002; LaGrange, Ferraro, Supancic, 1992). This is possibly due to the decreased ability of the socially vulnerable to recover economically from victimization. According to Reisig and colleagues (2009), "This dimension weighs heavily on the minds of low-income residents and racial/ethnic minorities who may be less able to absorb effectively the costs associated with such losses" (p. 371). While the indirect relationship between social vulnerability and protective measures has been observed, there may be a direct relationship as well. Gender and age, variables included in SoVI, have been shown to have direct effects on some protective measures (Ferraro, 1995). Social vulnerability would correspond with both dread and severity of consequences in the psychometric paradigm (Jenkin, 2006).

While social vulnerability refers to a population, physical vulnerabilities are the physical properties of the built environment that make an area more susceptible to harm. In quantifying the vulnerability of the built environment, researchers have considered variables assessing residential property, commercial and industrial development, lifelines, transportation, infrastructure, and monuments/icons (Borden, Schmidtlein, Emrich, Piegorsch, & Cutter, 2007). Past studies have either created an index for only particular, predominately large cities (Borden, et al., 2007; Piegorsch, Cutter, & Hardisty, 2007), examined these factors in a case study for one area of

interest (Armas, 2008), or asked survey respondents to identify the number of different types of specific potentially vulnerable targets in their jurisdiction (Davis et al., 2004). Studies of vulnerability to natural hazards (e.g., flooding due to climate change) measure exposure as physical vulnerability, or the number of people who could be impacted (see Brooks, 2003).

Arguably, urban areas have higher property density, more complex infrastructure, more venues of transportation, and more commercial/industrial development. Urban cities have disproportionately been targets of terrorism due to "their role as nerve-centres of an international economy that puts them at higher risk" (Savitch & Ardashev, 2001, p.2517). Terrorism incidents in urban settings are more frequent, and in turn have more fatalities, injuries, and physical damages. Researchers contend that terrorists choose to target urban cities because of their vulnerability (Savitch, & Ardashev, 2001). Additionally, counties with higher populations will have more people exposed to potential hazards. In the psychometric paradigm, the physical vulnerability of an area would correspond to the number of people exposed, dread, and severity of consequences (Jenkin, 2006). Therefore, an increase in urbanization should be associated with an increase in perceived risk.

Past criminal justice research has indicated the type of area (rural to urban) has an impact on protective measures, but only constrained behavior (not defensive behavior) (Ferraro, 1995). Similar findings have been echoed with regard to law enforcement agencies. In a study examining small municipal agencies across Illinois, Schafer and colleagues (2009) determined that rural and urban agencies generally did not have significant differences in their perceived risk of several different terrorist

attacks, while agencies located in metropolitan areas generally had lower perceived risk. However, agencies in metropolitan and urban areas had taken more steps to prepare for a homeland security incident than agencies in rural areas (Schafer et al., 2009). Therefore, the relationship between urbanization, perceived risk, and preparedness is assessed. It is expected that urbanization will indirectly affect preparedness through its relationship with perceived risk, but it may have a direct effect as well.

Physical vulnerability and social vulnerability have been studied together in past research. Borden and colleagues examined the vulnerability of 132 cities in the United States to environmental hazards. They created indices for socio-economical vulnerability, built environment vulnerability, and hazard exposure/experience. Adding all three vulnerability index scores together revealed the vulnerability of the cities in relation to one another, and indicated that New Orleans was the most vulnerable city in the United States (Borden et al., 2007).

Piegorsch and colleagues (2007) combined the three indices used by Borden and colleagues (2007) (social, built environment, and hazard vulnerability) into one place-based vulnerability index for 132 cities in the United States. Using this information, and past data on terrorist incidents in the United States, they determined that the place-based vulnerability index was able to significantly predict both whether a terrorist incident occurred and whether there were casualties in past terrorist events (Piegorsch et al., 2007).

Within the hazards literature, social and physical vulnerability has also been linked to perceived risk. For example, in a study in Romania, people's awareness of the

degree of vulnerability of the building in which they lived was positively and significantly associated with seismic risk perceptions. Additionally, higher levels of social vulnerability were associated with higher levels of risk perception, but due to study limitations, they were not able to rule out extraneous factors in the link between social vulnerability and risk (Armas, 2008).

The Effect of Risk Perceptions on Behavior

At the individual level, studies in criminology have examined the relationship between perceptions of risk and behavior. In a model introduced by Ferraro (1995), perceived risk is a predecessor to protective measures. This model has received empirical support (Reisig et al., 2009). At the organizational level, as previously discussed, agency respondents' perceptions of risk are positively associated with department preparedness.

Most individual-level studies examine the link between past experiences and protective behaviors through perceived risk. That is, the relationship between experiences and behavior is indirect. However, experience with past hazards has been found to have a direct effect on protective behaviors, in addition to an indirect effect through perceived risk. In a study examining adoption of household hazard adjustments, researchers determined that past experiences with hazards increased perceived risk of future hazards, which mitigation adjustments and the purchase of insurance. Overall, the relationship between past hazards and protective behaviors was not completely mediated by perceived personal risk of experiencing future hazards, as experience with past hazards, independent of risk, affected protective measures (Lindell & Hwang, 2008). Additionally, Ferraro (1995) determined that, independent of

perceived risk, past victimization was significantly associated with avoidance behaviors (e.g., avoiding unsafe areas), but not defensive behaviors (e.g., keeping a weapon in the home). This illustrates that while objective risk factors affect behavior through perceived risk, there is still a direct effect.

Present Study

Past research has found support for the effect of homeland security risk perceptions on preparedness. Increased perceived risk of homeland security incidents is significantly associated with higher levels of preparedness in several studies (Burruss et al., 2010; Davis et al., 2004, 2006; Gerber, 2005; Schafer et al., 2009). However, this past research has failed to consider, or has inadequately considered, objective risk factors. By simply measuring the perceived risk of an incident without considering the actual risk factors, or contingencies, present in the environment, this may provide an incomplete picture of the relationship. Individual-level studies have established that risk perception is an indirect variable between objective risk factors and protective measures, but objective risk factors also directly impact behaviors. To address the gap in the organizational-level literature, I propose that objective risk factors will affect homeland security preparedness both indirectly through perceived risk, as well as directly (see Figure 2). By using survey data of small municipal agencies, and combining this with several sources of data outside of the traditional realm of criminal justice, this study should provide a more thorough understanding of the relationship between risk and organizational behavior.

CHAPTER 3

METHODOLOGY

Sample

The sample for this project included small municipal law enforcement agencies, as they are largely understudied in criminal justice research, but represent a majority of police agencies across the United States. Using the 2004 *Census of Law Enforcement Agencies*, agencies with between one and twenty-five full-time officers were selected, and the overall sampling frame included 9,708 police departments. Because urban agencies have been shown to be different than rural agencies even after controlling for size (see Schafer et al., 2009), the sampling frame was stratified along the U.S. Department of Agriculture's rural-urban continuum. This is a classification scheme that uses population size, population density, and spatial relationship to other metropolitan areas. There are nine classifications, ranging from metropolitan counties in metropolitan areas with a population of one million or more, to completely rural or less than 2,500 urban population, and not adjacent to a metropolitan area (Economic Research Service, 2010).

Ninety agencies were randomly selected from each stratification level, for a total of 810 agencies. Three waves of the survey were mailed out, using the agency address from the *Census of Law Enforcement Agencies*. Surveys were addressed to the head of the agency. This information predominantly came from the *National Directory of Law Enforcement Administrators* (National Public Safety Information Bureau, 2011). If the name of the agency head was not available through this directory, an attempt was made to find this information online from agencies' websites (if available), or various other web

sources. The surveys were sent with a cover letter describing the project, as well as a pre-paid pre-addressed envelope for the respondent to use to return the completed survey. Twenty-four surveys were returned as undeliverable with notations from city personnel or sheriffs' office personnel reporting that the sampled agency was no longer in existence. As a result of this, the final sample size was reduced to 786 agencies (see Table 2). After the survey mailings, the response rate was approximately 38 percent.

An attempt was made to contact each of the non-responding agencies by phone. As the chief was usually not available, messages were left either on voicemail, with agency personnel, with city personnel, or others, to remind the chief to complete and return the survey. An additional copy of the survey was sent to agencies as requested. At the end of data collection, 350 completed surveys had been returned, for an overall response rate of 44.5 percent (see Table 2 for descriptive statistics of the sample). To consider non-response bias, agencies, respondents and non-respondents will be compared using data from the Census for Law Enforcement Agencies as well as data from the objective risk factors. Data from this survey was merged with data about past hazards and the social vulnerability index as described below.

Endogenous Variables

In this study, the final outcome variable is preparedness (see Figure 3). Preparedness was measured in the law enforcement survey, and agency heads were asked to indicate whether they had engaged in thirteen specific activities, including mutual aid agreements, training activities, and risk assessments, among others (see Table 3). The preparedness variable was summed to create a scale of 0 to 13 (Cronbach's alpha = 0.815).

Table 2.
Size and region of the country of responding agencies

	Number of agencies	%
Agency size, 2004		
1-5 officers	182	52.0
6-10 officers	89	25.4
11-15 officers	39	11.1
16-20 officers	21	6.0
21-25 officers	19	5.4
Total	350	100.0
Region of country		
Northeast	54	15.4
South	114	32.6
Midwest	136	38.9
West	46	13.1
Total	350	100.0
Rural-urban continuum code		
1	38	10.9
2	36	10.3
3	51	14.6
4	40	11.4
5	39	11.1
6	38	10.9
7	38	10.9
8	36	10.3
9	34	9.7
Total	350	100.0

Table 3.
Percent of agencies taking steps or activities to enhance homeland security prevention, preparedness, response, and recovery [1]

Type of Step or Activity for Enhancement of Homeland Security[2]	Mean	Standard Deviation
Public safety agencies operating in or nearby jurisdiction (including responding agency) use a shared radio network that achieves interoperability	0.910	0.287
Has in place one or more mutual aid or cooperative agreements with other law enforcement organizations that cover homeland security issues	0.790	0.408
Has in place systematic procedures ensuring that homeland security advisories/emergency notifications are distributed to appropriate personnel	0.633	0.483
Has a written directive or protocol for contacting the proper authorities in the event of a homeland security incident or threat within jurisdiction	0.592	0.492
Part of a regional interagency task force or working group that functions, in part, to address issues of prevention, preparedness, response, and/or recovery related to homeland security	0.516	0.500
Has a written response plan outlining preparedness, response, and/or recovery issues in the event of a homeland security-related incident	0.487	0.501
Has in place one or more mutual aid or cooperative agreements with non-law enforcement agencies such as transit services, public works, or other governmental agencies that cover homeland security issues	0.458	0.499
Members of agency trained in homeland security procedures in past 12 months	0.437	0.497
Members of agency participated in homeland security-focused field training or table top exercises in past 12 months	0.373	0.484
Completed an inventory of threats or hazards in jurisdiction in past 12 months	0.329	0.471
Conducted a risk assessment to identify high-risk or high-value targets or assets within jurisdiction in past 12 months	0.321	0.467
Disseminated information to members of the community in an attempt to increase citizen preparedness in past 12 months	0.262	0.441
Has individual(s) or special unit specifically assigned to address the homeland security function	0.239	0.427

[1]Each question asked whether or not agencies engaged in these steps or activities. Higher mean scores indicate higher engagement in steps or activities.

[2]n=343

Perceived risk of terrorism-related and non-terrorism related homeland security incidents are also endogenous variables. In the law enforcement survey, homeland security was defined broadly using an all-hazards approach, and included efforts to protect against, prepare for, respond to, and recover from threats or hazards posed not only by terrorism but also major disasters/emergencies and catastrophic events that involve significant casualties and/or substantial destruction of property (e.g., severe weather, chemical spills, large explosions). This definition was given directly before the perceived risk questions. Agencies were asked to rate the likelihood, on a scale of 0 (not at all likely) to 10 (very likely), of specific events occurring within their jurisdiction in the next five years (see Table 4). Perceived risk is measured as a latent construct, and an assessment of the measurement model is presented in the analysis section.

Table 4.
Perceived likelihood of homeland security incidents occurring within the next five years (mean scores) [1]

Type of Incident	Mean scores	Standard Deviation
Terrorism-related incident[2]		
Cyber-terrorism	2.76	2.52
Conventional explosive	2.71	2.35
Chemical	2.42	2.42
Biological	1.95	2.03
Terrorism incident involving military weapons	1.85	2.06
Radiological	1.71	2.03
Non-terrorism related incident[3]		
Severe weather, earthquake, or wildfire	6.46	2.60
Chemical spill or radiological leak	3.98	2.90
Medical pandemic	3.51	2.30
Explosion involving mass casualties	3.11	2.47
Structural failure involving mass casualties	2.59	2.32

[1]Each incident was ranked on a scale from 0 (not at all likely) to 10 (very likely). Higher scores reflect a greater perceived likelihood of each incident type occurring.

[2]n=344

[3]n=348

Exogenous Variables

Past hazards.

The exogenous variables in this study are the objective risk factors. These include past hazards, urbanization, and social vulnerability. Utilizing information from the Spatial Hazard Events and Losses Database for the United State (SHELDUS), past hazards were measured using three latent constructs represented by six indicators (a description of the measurement model is presented in the analysis section).. This dataset was compiled by the Hazards and Vulnerability Research Institute at the University of South Carolina, and provides county-level data that details information from eighteen different types of natural hazards.[1]. For this dataset, these eighteen types of natural hazards are included if they caused any injury or loss, monetary or human.

Data from SHELDUS were derived primarily from the monthly Storm Data publications from the National Climatic Data Center. Additional data sources include the National Geophysical Data Center, the National Hurricane Center, the Global Volcanism Program, and the United States Fire Administration, among others. This analysis includes all events that occurred during the ten year period between 2001 and 2010. The SHELDUS data provides the beginning and end dates of the hazard, the type of hazard, the location (county and state), the number of injuries, and the number of fatalities, as well as monetary amounts of property damage and crop damage both in dollars adjusted and unadjusted to inflation (Hazards & Vulnerability Research Institute,

[1] Types of hazards include avalanche, coastal, drought, earthquake, flooding, fog, hail, heat, hurricane/tropical storm, landslide, lightning, severe storm/thunder storm, tornado, tsunami/seiche, volcano, wildfire, wind, winter weather.

2011b). The first indicator will be the diversity of incidents, measured as how many different types of the 18 natural hazards occurred from 2001 to 2010. The second indicator is the total number of natural hazards in each county per year. Following Borden and colleagues' (2009) use of this dataset, the magnitude of past hazards were calculated. The magnitude of damage is measured as the total dollar amount of crop damage divided by the county's calculated domestic product, and the total dollar amount of property damage divided by the county's calculated domestic product[2]. As the final two indicators, the magnitude of injuries and fatalities will be measured as the calculated rate per 10,000 in the population[3]. To address problems with skewness and kurtosis with the hazards variables, the logs of these variables were used (excluding the diversity of incidents, which did not have these problems) (see Table 5).

Vulnerability.

The Hazards and Vulnerability Research Institute at South Carolina has developed a Social Vulnerability Index (SoVI) that combines thirty-one factors indicating the level of social vulnerability of all counties across the United States (see Table 1 for a full list of variables). The primary source of data for the SoVI is the United States

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[2]Property damage and crop damage, in dollars, were first standardized to 2011 dollars. To determine the magnitude of the loss specific to each county, the state's gross domestic product from 2006 was multiplied by the county's employment as a proportion of the state employment from 2006. The resulting dollar amount is estimated as the county's domestic product of 2006. The total property damage and total crop damage for each county was divided by its' domestic product to determine the magnitude of the damage as a percent of its' domestic product (Bureau of Economic Analysis, 2011).

[3] To determine the magnitude of the injuries and fatalities, the total injuries and fatalities in the time period were divided by the population of the county and multiplied by 10,000 to give the injuries and fatalities per 10,000 people in the population (United States Census Bureau, 2007).

Table 5.
Descriptive statistics for hazards variables and normality issues addressed by log transformation

	Original variable				Logged variable	
	Mean	Standard deviation	Skewness	Kurtosis	Skewness	Kurtosis
Injury rate[1]	1.689	4.871	7.631	76.750	1.879	4.005
Fatality rate[1]	0.298	0.695	4.584	25.895	2.667	7.987
Incidents per year[2]	5.827	5.369	5.369	7.918	0.228	2.950
Diversity of incidents[3]	6.648	1.659	1.659	0.142		
Property damage[4]	2.928	12.531	12.531	92.514	2.510	7.505
Crop damage[4]	0.773	3.424	3.424	119.093	3.206	11.039

[1]Per 10,000 people

[2]Total number of incidents divided by 10 years

[3]On a scale of 0-18, how many different types out of hazards occurred from 2001-2010

[4]As a percent of 2006 county domestic product

Census Bureau, and is based on the years 2005 to 2009. Other data sources include the American Community Survey, the Geographic Names and Information System, and the Small Area Health Insurance Estimates (Hazards & Vulnerability Research Institute, 2011a). Each of the seven components are added together (not weighted) to come up with the final SoVI value. This is a unitless, comparative scale, so the particular numbers have no true value. Higher scores indicate higher levels of social vulnerability.

Lacking an appropriate measurement for physical vulnerability, the rural to urban continuum code was used.

Control Variable

Past studies have found that agency size has a significant impact on preparedness activities (see Burruss et al., 2010). Therefore, agency size will be used as a control variable

Data Analysis

Structural equation modeling (SEM) is a category of statistical techniques that uses a variance-covariance matrix to compare the research model to the data (Gau, 2010). SEM is ideal for the present study, because it allows the use of latent (or unmeasured) variables in the examination of both direct and indirect effects of the independent variables. With regression, only the direct relationships can be uncovered. However, past research has indicated that perceived risk mediates the relationship between the objective risk factors and preparedness, suggesting that these are indirect relationships. Additionally, SEM produces fit indices that allow for the comparison and evaluation of models. SEM also takes into account measurement error (Bryne, 2012; Gau, 2010). Therefore, SEM is an appropriate analysis plan.

The first step was to use confirmatory factor analysis to demonstrate the validity for the hypothesized latent variables (risk and hazards). Once this is established, both models' (direct and indirect) fit indices are compared. The fit statistics that are most useful for determining the goodness-of fit of the model to the data are the comparative fit index (CFI), the Tucker-Lewis index (TLI), and the root mean square error of approximation (RMSEA). Both the CFI and the TLI indicate the model fit improvement by comparing the hypothesized model to the nested baseline model. CFI values range from 0 to 1.00, and values above 0.90 or 0.95 are indicative of a good fit. TLI values

can exceed 1.00, and values close to 1.00 indicate a good fit (Byrne, 2012). The RMSEA is an absolute fit index which takes into account the complexity of the model, and lower values represent an increase in goodness of fit. Values less than 0.05 indicate a good fit, values between 0.08 and 0.10 indicate mediocre fit, and values greater than 0.10 indicate poor fit (Bryne, 2012). An additional fit statistic is the chi-square statistic (X^2). If this value is significant, this may indicate a poor fit. However, this statistic is sensitive to sample size, and since the sample size used here is 350, the other indices will be used to judge the fit of the model. Finally, to compare two models to one another, these fit statistics, in addition to the Akaike information criterion (AIC), are used. This also takes into account the complexity of the model, but the value of the AIC itself is used for comparison only. The model with a lower AIC value fits the data better than a model with a higher AIC value (Bryne, 2012).

CHAPTER 4

FINDINGS

Past research indicates that terrorism risk and non-terrorism risk are discrete constructs (Giblin, Burruss, & Schafer, in press). The fit statistics for risk as a single latent factor indicated that this was not a good fit to the data (see Figure 3). In contrast, when risk of homeland security incidents was broken down to terrorism-related risk (chemical, biological, radiological, conventional explosive, cyber-terrorism, military weapons) and non-terrorism related risk (structural failure, severe weather, explosion, chemical spill/radiological leak, medical pandemic); the model fit the data better (see Figure 4). In this two-factor model, the fit statistics indicated a good overall fit. The risk of both terrorism-related and non-terrorism related chemical incidents were correlated because it is likely that these two types of incidents, whether intentional or otherwise, are most likely driven by chemicals facilities in the area (Giblin et al., in press).

The hazards model used by Borden and colleagues (2007) and Piegorsch and colleagues (2007) included two latent factors (injury, death and property losses; number and diversity of incidents), and one directly observed variables (crop damage). However, this produced poor model fit statistics (see Figure 5). This could be sample-specific, as both previous studies used large cities only, while the sample used in this study includes both rural and urban counties.

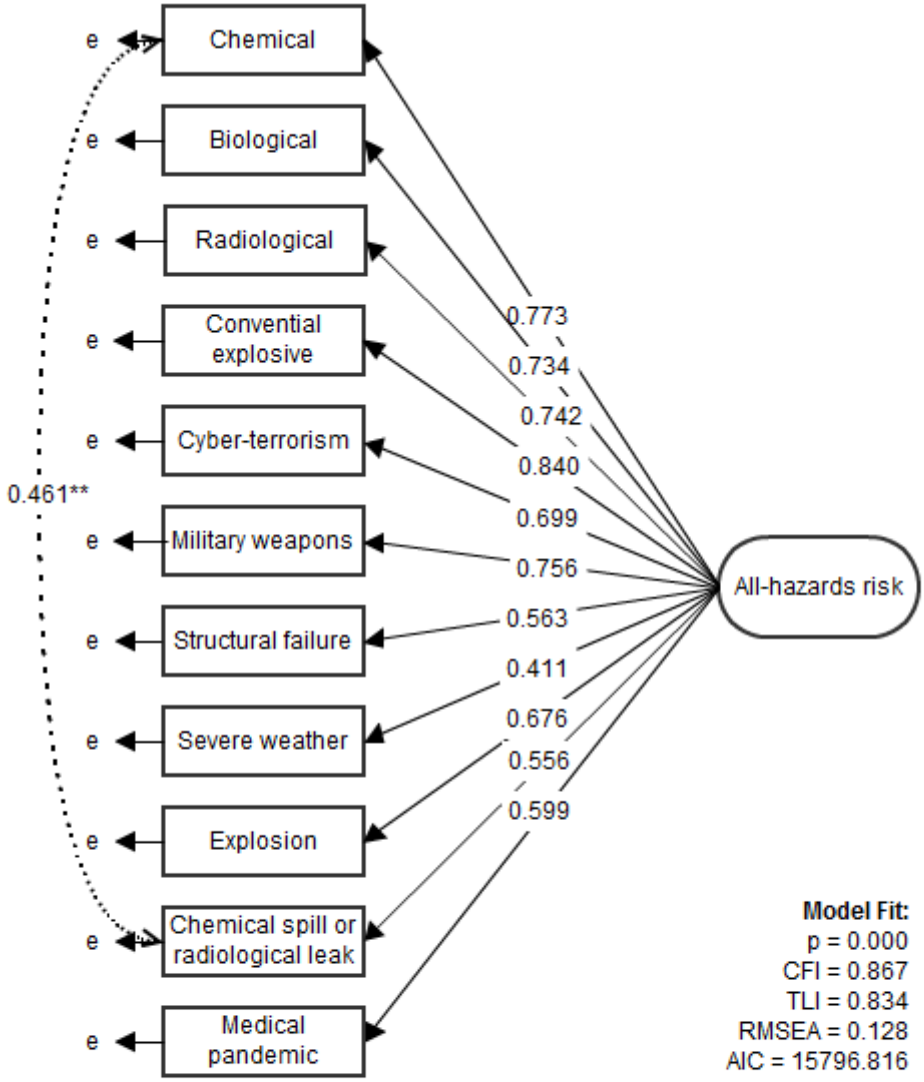


Figure 3.
Factor analysis of risk as one latent construct

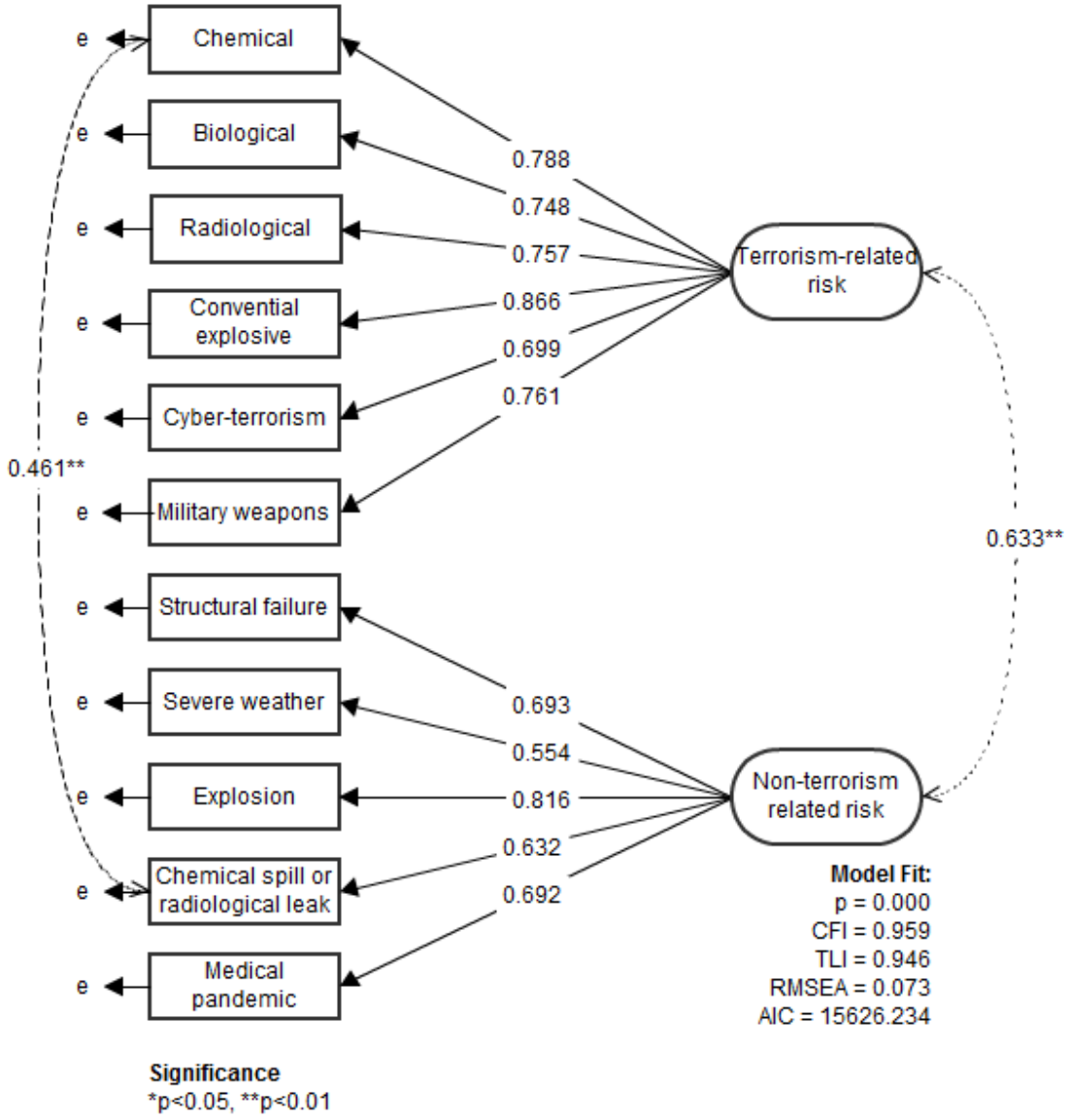


Figure 4.
Factor analysis of risk as two latent constructs

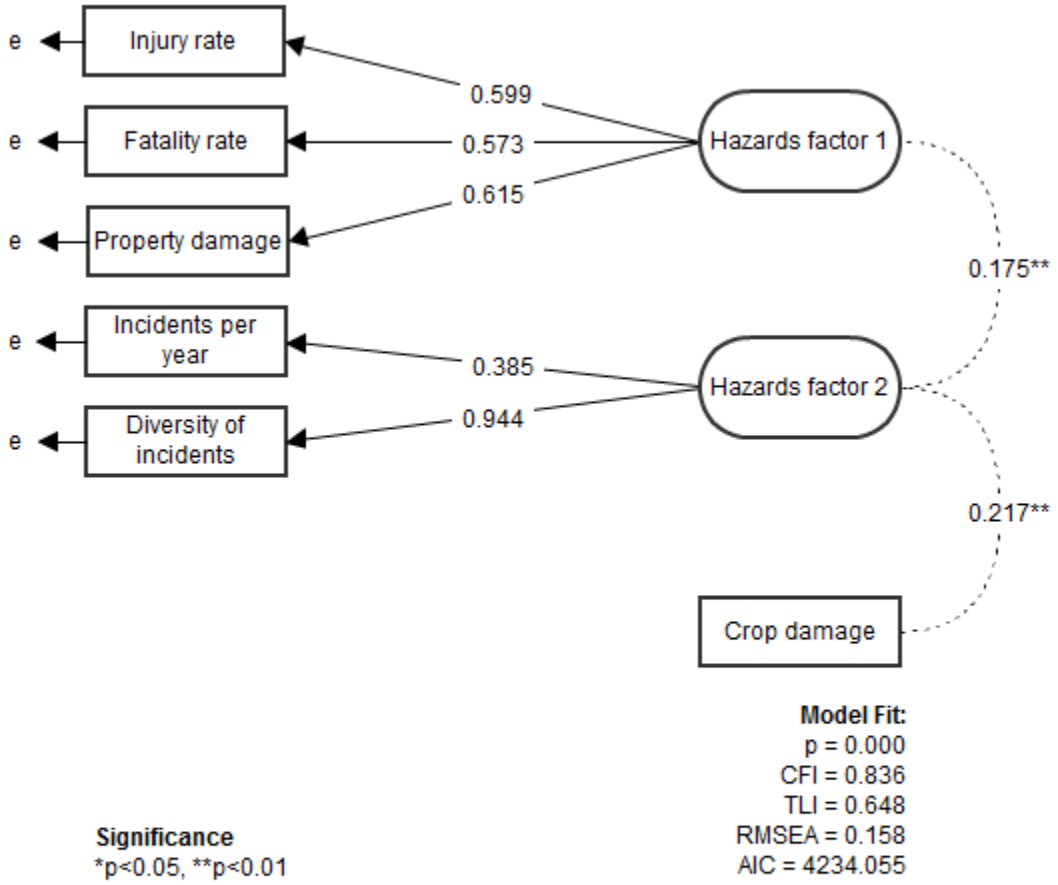


Figure 5.
Factor analysis of hazards variables, as modeled by Borden and colleagues (2007)

Using exploratory factor analysis with Varimax rotation, the six variables measuring hazards loaded onto three factors: monetary losses (property and crop damage in dollars), human casualties (rate of injuries or deaths), and number and diversity of incidents. The models did not fit the data when one and two factors were used, but with three factors, the fit statistics indicated that this model approaches a good fit. The factor measuring the number and diversity of incidents is correlated with both human casualties and monetary damage, because those areas with more incidents

and types of incidents will most likely have greater damage. The factor loading scores and fit statistics are presented in Figure 6.

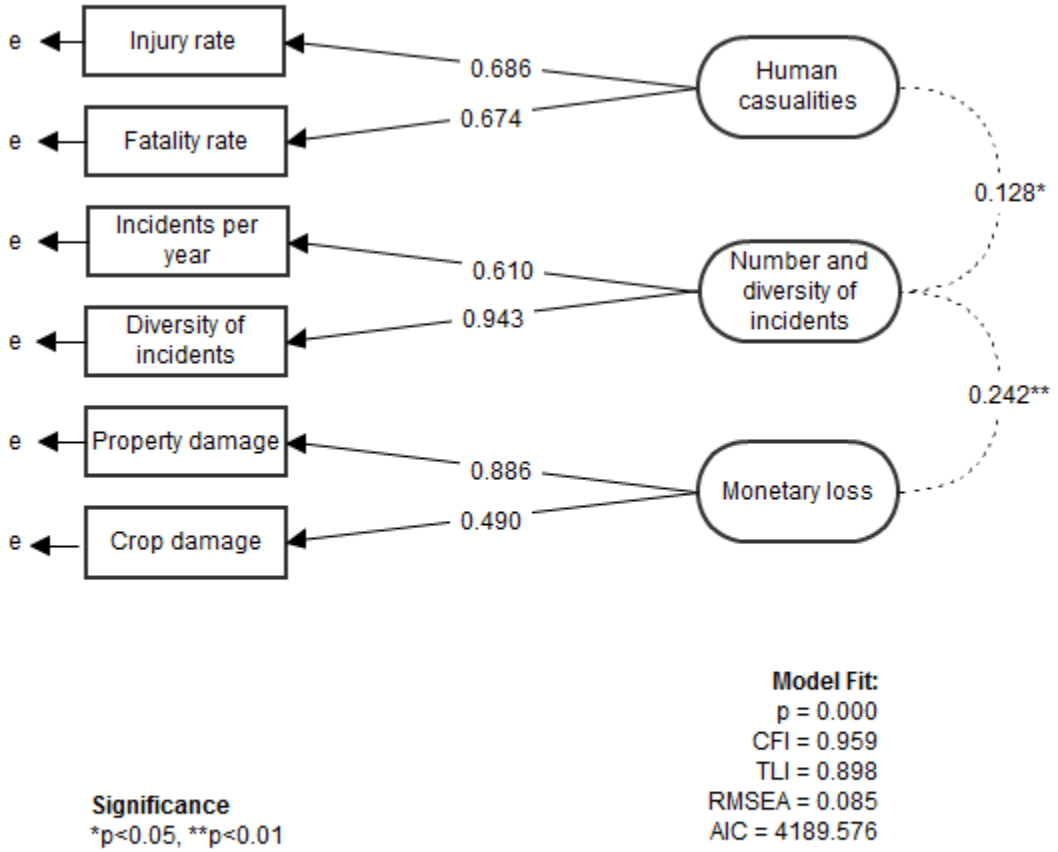


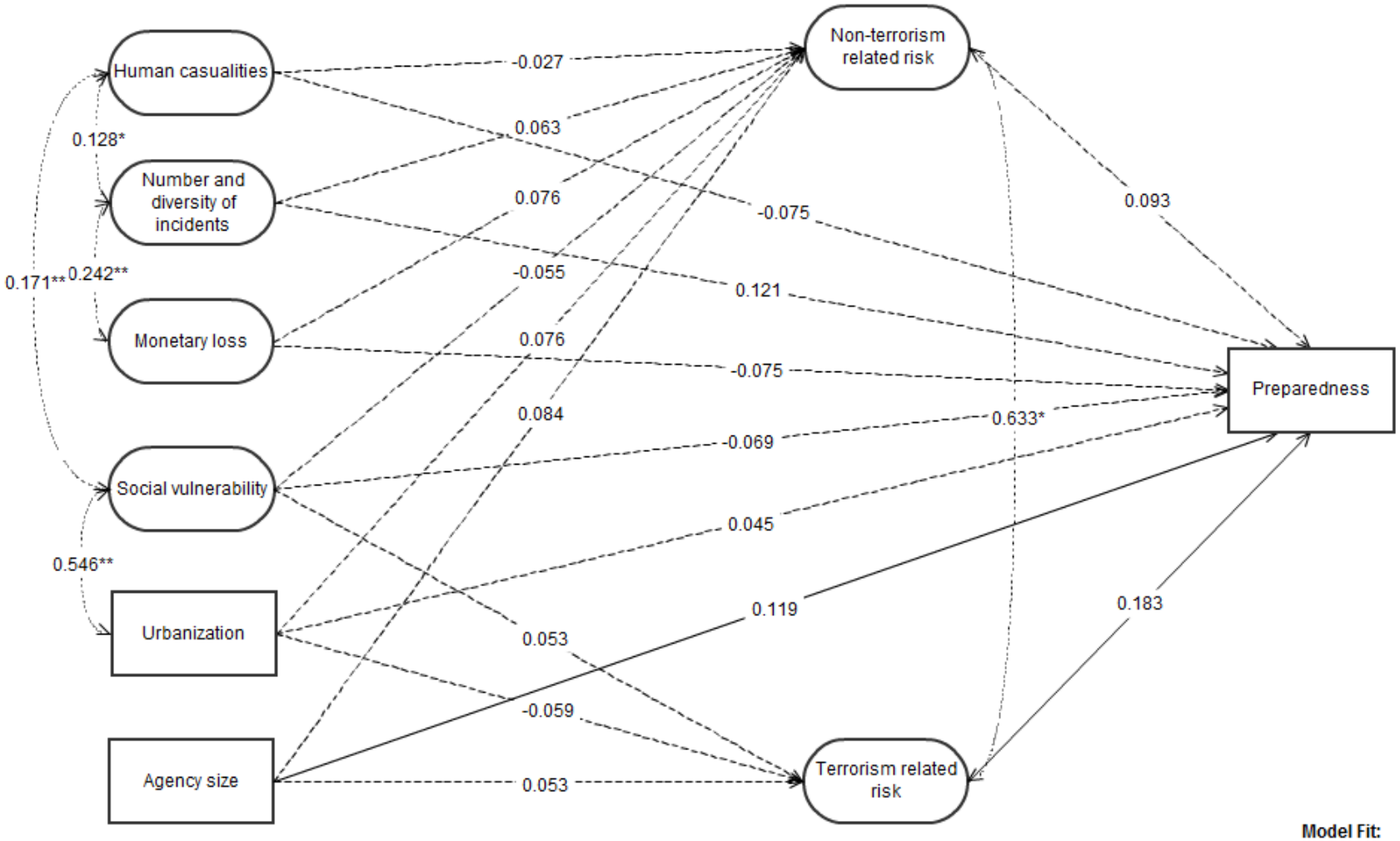
Figure 6.
Factor analysis of hazards variable using three latent constructs

To test the hypothesized model, the structural model was entered into Mplus with the indirect paths identified. The curved dotted lines represent correlations. Based on the modification indices in Mplus, as well as past research (Burruss et al., 2010; Giblin et al., in press), terrorism and non-terrorism related risk were correlated. Additionally, the social vulnerability index was correlated with human casualties, as more socially vulnerable areas have higher potential for harm to people. The SoVI was also

correlated with urbanization, because several of the variables that comprise the index would be more likely in an urban area. The fit statistics indicated the model approached a good fit; however, no objective risk factor was significantly associated with perceived risk or preparedness (see Figure 7). Perceived risk of a terrorism-related homeland security incident was the only variable significantly associated with preparedness, and none of the indirect models identified were significant (see Table 6).[4]

The R^2 for this model indicates that only 0.7 percent of the variation in terrorism-related risk and 1.9 percent of the variation in non-terrorism risk are explained. In other words, over 98 percent of the variation in perceived risk is explained by factors not included in this model. The model explains 13.7 percent of the variation in homeland security preparedness.

[4] A model with only direct paths to preparedness was also tested. The results were not significantly different from the model with both direct and indirect paths. The only significant predictors of preparedness were terrorism-related risk and agency size.



Significance of correlations
*p<0.05, **p<0.01

Significance of paths
Paths in bold are significant at the 0.05 level. Dashed paths are not significant.

Model Fit:
p = 0.000
CFI = 0.943
TLI = 0.926
RMSEA = 0.050
AIC = 26401.677

Figure 7.
Results of the proposed structural model predicting risk and preparedness

Table 6.
Results of a structural model predicting preparedness, including both direct and indirect paths

	Terrorism-related risk	Non-terrorism related risk	Preparedness
	β	β	β
Direct effects			
Hazards			
Monetary losses		-0.027	-0.075
Human casualities		0.063	0.121
Number and diversity of events		0.076	-0.075
Social vulnerability	0.013	-0.055	-0.069
Urbanization	-0.059	0.076	0.045
Agency size	0.053	0.084	0.119*
Terrorism-related risk			0.183*
Non-terrorism related risk			0.093
Indirect effects via terrorism-related risk			
Social vulnerability			0.003
Urbanization			-0.014
Agency size			0.005
Indirect effects via non-terrorism related risk			
Social vulnerability			-0.007
Urbanization			0.009
Agency size			0.004
Monetary damage			-0.016
Human damage			0.037
Number and diversity of events			0.041
R^2	0.007	0.019	0.137

*p<0.05

CHAPTER 5

DISCUSSION AND CONCLUSION

The connection between perceived risk of homeland security incidents and homeland security preparedness has received considerable support in policing literature. From a contingency theory perspective, organizations rationally respond to risks in their external environments by taking steps to prepare for homeland security incidents. However, contrary to expectations, perceptions of risk and objective risk factors of homeland security incidents were not significantly associated in this study.

When assessing *actual* risk for terrorist incidents and natural hazards, researchers and government organizations consider objective risk factors such as the vulnerability of the place and the population. Within the psychological literature, these factors, in addition to experience with past hazards, shape perceptions of risk. In the present study, the objective risk factors of social vulnerability, experience with past hazards, and urbanization not only do not impact risk perceptions, but they also are not associated with preparedness measures. In other words, the homeland security preparedness levels of agencies are not influenced by the actual risk of those agencies' jurisdictions. Regardless of the statistical significance, within the sample the objective risk factors only explained less than two percent of the variation in perceived risk.

Interestingly, while preparedness is not directly or indirectly influenced by objective risk factors, it is significantly associated with perceived risk. Agency leaders who perceive their risk to be higher, independent of the actual risk of the jurisdiction, are more likely to take steps to enhance their preparedness. Therefore, this study provides mixed support for contingency theory. While perceived risk influences preparedness,

objective risk factors do not. These results indicate that either the measures of objective risk used in this study are flawed (i.e., they may not be the most relevant risk factors to small municipal police agencies), or something other than these objective risk factors impact agency respondents' perceptions of risk. These could be individual-level characteristics of the respondents not captured in this survey, such as gender, race, and age. This would mean that the responses depend on the member of the organization that responded to the survey. To test whether individual-level characteristics are influencing perceived organizational-level risk, future studies should consider whether perceived risk is consistent across the department. This type of study, when analyzed with objective risk factors, could determine not only if specified objective risk factors are associated with perceived risk, what personal characteristics are related to perceived risk.

Policy Implications

Homeland security has become an important aspect of policing in recent years, and there has been considerable funding allocated to this new function. However, this study indicates that those departments that are the most prepared may not be the most at risk. Whether using grants or local department funds, departments may not be using their resources wisely, as funds allocated to preparedness may be better used elsewhere in departments with low risk. The databases used in this study are publicly available, and could be utilized at the national-level to determine which jurisdictions are the most at-risk or are the most vulnerable to homeland security incidents. The Department of Homeland Security could target those departments to make them aware of their elevated risk levels and the availability of funding.

Limitations

This study has several limitations that should be addressed in future research. All measures of objective risk factors (hazards, social vulnerability, and urbanization) are at the county-level, while the agency respondents were surveyed on the risk of incidents occurring within their jurisdiction. Using the risk factors for specific jurisdictions would have been preferable, but data at this level were not available. Using the rural to urban continuum code instead of actual measures of physical vulnerability may not be a precise measurement of the actual physical vulnerability for a jurisdiction. Unfortunately, there is not a database available that assesses physical vulnerability (like the social vulnerability database). Future researchers, guided by past studies, should include true measures of physical vulnerability.

The measures for past natural hazards were combined over the past ten years. Some of the agency respondents may not have lived in the same area so may not have personally experienced these hazards. However, as long as the agency executive had lived in the area and experienced the past hazards, research has indicated that even six years after a hurricane, residents of cities who were exposed to the hurricane rated their risk of experiencing any natural disaster as higher in a control city that did not experience the hurricane (Norris, Smith, & Kaniasty, 1999). Additionally, up to seven years after a fatal lightning storm, adolescents who went to school with a child who was killed still rated their perceived risk of encountering another fatal natural disaster as higher than those who did not (Greening et al., 1996). However, future studies should collect data on the respondents' history with the department to rule out this possible limitation.

Additionally, some hazards may have occurred in neighboring counties which the department may have assisted with. Research has indicated that, while not as strong of a predictor as personal victimization, indirect or vicarious victimization has a significant association with perceived risk (Ferraro, 1995). Furthermore, events that occurred last year may be more influential than hazards that occurred nine years ago. For a more accurate picture of the effect of past hazards, using spatial and temporal factors would be ideal.

While the social vulnerability index used is from the years 2005-2009, and our survey was mailed in 2011, it has been shown to be relatively stable over time. From 1960 to 2000, only 484 out of 3141 counties (15.4%) in the United States had a statistically significant change in their social vulnerability. This was mostly due to an increase or decrease in population size or density (Cutter & Finch, 2008).

Weinstein and Nicolich (1993) criticized much past research examining the correlation between risk perception and behaviors. They noted that, in order to be accurate, these types of studies must be done longitudinally as the relationship between risk and behavior is bidirectional. While this may be true of certain health protective behaviors (the example used in their article was risk of contracting AIDS – by taking protective measures, people could reduce their risk), this weakness does not apply to studies examining homeland security preparedness. While it may be possible to mitigate the damage incurred by future homeland security incidents, simply enhancing preparedness to respond to a homeland security incident does not decrease the risk that an incident could occur (Weinstein & Nicolich, 1993).

Directions for Future Research

Regardless of these limitations, this study is an important contribution because it indicates that small departments' preparedness levels are not associated with the actual risk factors within the counties in which they are located. This finding is contrary to expectations based on past research at the individual-level and in other fields. While perceived risk predicts preparedness, the objective risk factors used in this study are not associated with either perceived risk or preparedness. Future research should focus on determining whether department risk is consistent among all levels of the organization, what factors actually influence perceived risk, and the viability of the model in larger agencies.

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APPENDICES

APPENDIX A

Related Sections of the Survey Instrument

Survey questions address homeland security, defined broadly to include efforts to protect against, prepare for, respond to, and recover from threats and hazards posed not only by terrorism but also major disasters/emergencies and catastrophic events that involve significant casualties and/or substantial destruction of property (e.g., severe weather, chemical spills, large explosions). Please keep this broad all-hazards definition in mind when answering the following questions unless directed otherwise.

1. How would you rate the likelihood of the following types of terrorism-related and non-terrorism homeland security incidents occurring within your jurisdiction in the next five (5) years? Evaluate each possible incident on a scale from 0 (not at all likely) to 10 (very likely).

The following ***terrorism-related*** homeland security incidents?		Not at all likely (0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	Very likely (10)
1a.	Chemical incident	O	O	O	O	O	O	O	O	O	O	O
1b.	Biological incident (e.g., anthrax, contamination of water/food supply)	O	O	O	O	O	O	O	O	O	O	O
1c.	Radiological incident	O	O	O	O	O	O	O	O	O	O	O
1d.	Conventional explosive incident	O	O	O	O	O	O	O	O	O	O	O
1e.	Cyber-terrorism	O	O	O	O	O	O	O	O	O	O	O
1f.	Terrorism incident involving military weapons	O	O	O	O	O	O	O	O	O	O	O

The following ***non-terrorism*** homeland security incidents?		Not at all likely (0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	Very likely (10)
1g.	Structural failure involving mass casualties	O	O	O	O	O	O	O	O	O	O	O
1h.	Severe weather (e.g., tornado, flood, mudslide, hurricane), earthquake, or wildfire	O	O	O	O	O	O	O	O	O	O	O
1i.	Explosion involving mass casualties	O	O	O	O	O	O	O	O	O	O	O
1j.	Chemical spill or radiological leak (e.g., derailed train, nuclear power plant)	O	O	O	O	O	O	O	O	O	O	O
1k.	Medical pandemic (e.g., avian flu, small pox)	O	O	O	O	O	O	O	O	O	O	O

2. Agencies may take a variety of steps to enhance homeland security prevention, preparedness, response, and recovery. Please indicate whether your agency engages in any of the following activities or steps. Remember, homeland security is defined broadly to include both terrorism-related threats and major non-terrorism disasters or emergencies.

		Yes	No
2a.	Does your agency have an individual(s) or special unit specifically assigned to address the homeland security function?	O	O
2b.	Is your organization part of a regional interagency task force or working group that functions, in part, to address issues of prevention, preparedness, response, and/or recovery related to homeland security?	O	O
2c.	Within the past 12 months, have any members of your agency been trained in homeland security procedures?	O	O
2d.	Within the past 12 months, have members of your agency participated in homeland security-focused field training or table top exercises?	O	O
2e.	Does your agency have in place systematic procedures ensuring that homeland security advisories/emergency notifications are distributed to appropriate personnel?	O	O
2f.	Does your agency have a written directive or protocol for contacting the proper authorities in the event of a homeland security incident or threat within your jurisdiction?	O	O
2g.	Within the past 12 months, has your agency completed an inventory of threats or hazards in your jurisdiction?	O	O
2h.	Within the past 12 months, has your agency conducted a risk assessment to identify high-risk or high-value targets or assets within your jurisdiction?	O	O
2i.	Does your agency have a written response plan outlining preparedness, response, and/or recovery issues in the event of a homeland security-related incident?	O	O
2j.	Does your organization have in place one or more mutual aid or cooperative agreements with other law enforcement organizations that cover homeland security issues?	O	O
2k.	Does your organization have in place one or more mutual aid or cooperative agreements with non-law enforcement agencies such as transit services, public works, or other governmental agencies that cover homeland security issues?	O	O
2l.	Do the public safety agencies operating in or nearby your jurisdiction (including your agency) use a shared radio network that achieves interoperability?	O	O
2m.	Within the past 12 months, has your agency disseminated information to members of the community in an attempt to increase citizen preparedness?	O	O

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