PERCEPTIONS OF SOCIAL AND ENVIRONMENTAL RISKS:

THE INFLUENCE OF PLACE AND POLITICS

AMONG COLLEGE STUDENTS

THESIS

Presented to the Graduate Council of
Texas State University-San Marcos
in Partial Fulfillment
of the Requirements

for the Degree

Master of SCIENCE

by

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San Marcos, Texas
August 2010

Acknowledgments

To the friends I have made along this journey, you have all been invaluable to me, and are like family now. I cannot thank you enough. Especially my colleagues that I grew and learned with in the Geography Department, you are all such amazing people.

Thank you to my family, and Johnny's family, for your love and belief in me. I could never have done it without you. Thank you Mom and Dad for everything, you are my best friends.

Thank you to my committee, for your unrelenting support. Each of you has been critical to my achievement. Dr. Hagelman, thank you especially for working so diligently with me. I really appreciate all of your guidance. Thank you Dr. Tiefenbacher and Dr. Day for creating a support system for me that guaranteed my success through hard work. Thank you Allison Glass-Smith for having an open door policy, and for being the voice of reason. You have all helped me to become a better person. I mean that.

Johnny, thank you for always being there for me, for putting up with me no matter how crazy things got, and for your unconditional love. I could never have done this without you.

This thesis was submitted on 18 June, 2010.

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CHAPTER 1

INTRODUCTION

Hazards are a part of our everyday lives. Depending on where you live, various natural hazards such as hurricanes or earthquakes may pose risks to you, your family, and your home. Technology produces hazards too, such as pollution or chemical pesticides. To further complicate the situation, we are not sure how many of these technologies will affect us in the long run. As we increasingly occupy dynamic geophysical landscapes, such as floodplains and coastal zones, and technology progresses, new and unfamiliar risks emerge that we must strive to assess and manage. Social risks continue to evolve as well. How dangerous is secondhand smoke? How likely is a major flu epidemic? The broad and evolving nature of environmental hazards means that we must often decide how to manage familiar and unfamiliar hazards and the risks they pose concurrently. Laypeople rely on what is termed *risk perception* to help them make judgments about hazards in their day-to-day lives, while the field of *risk assessment* has emerged to assist in the identification, characterization, and quantification of risks by scientists (Slovic 1987). Our perceptions of environmental risk, whether familiar or not, influence our decision-making and our approaches to managing environmental hazards. The purpose of this study is to answer these questions: To what degree do place, politics, and

demographics influence college students' perceptions of natural, technological, and social risks? Do emerging (or unfamiliar) hazards pose risks that are more salient among college students when compared to familiar ones? Understanding the influence of socio-political attitudes and the relative priority placed on various environmental risks can help environmental management decision-makers improve their management of risks and allocation of resources.

Previous risk perception studies have asked people to evaluate hazardous activities, substances, and technologies in order to assess the opinions people hold about risks posed by these phenomena (Slovic 1987). One group singled out in risk perception research is college students (Fischhoff et al., 1978; Slovic et al., 1985; Cutter, Tiefenbacher and Solecki 1992). College students are a part of a generation that will continue to confront these risks, and many will become decision makers in the future, therefore their opinions, perceptions, and attitudes can be particularly important to assess.

An understanding of the public's perception of risk can aid policy makers in creating effective policies that the public will respond to and support. Knowledge of the public's judgment of potential hazards can aid in the development of successful hazards-response systems and mitigation strategies. It is important to understand the risk perception of various age and social groups in numerous geographic locations because people's perceptions of risks are complex and diverse, as are the hazards that they face (Sjöberg 2000, 2008).

CHAPTER 2

LITERATURE REVIEW

Risk

Living within dynamic physical landscapes exposes people and their belongings to environmental risks. Natural geophysical events are termed "hazards" when they have the potential to affect people. These events become disasters when they have a large impact on society (Tobin and Montz 1997). "Risk" is the likelihood of the event occurring and is composed of the potential source, the impact, and its estimated frequency of occurrence (Cutter 1993; Cutter, Mitchell, and Scott 2000). *"Risk as feelings* refers to our instinctive and intuitive reactions to danger and *risk as analysis* brings logic, reason, and scientific deliberation to bear on risk assessment and decision making" (Slovic et al. 2005, S35). People tend to judge risks by how they think *and* feel about them. Good mitigation policy can aid in the reduction of risks, while the absence of mitigation policies or weak policies can heighten risks (Cutter, Mitchell, and Scott 2000). The public's perception of risk plays an important role in the effectiveness of mitigation decision-making. Technological and natural risk management has been

assumed to be beyond the control of individuals or social groups and is therefore considered the responsibility of government agencies (Sjöberg 2003; Etkin and Ho 2007).

Many contemporary hazards are new to the public and possess unique risks for human systems. For example, the scientific community has noted that the climate is warming at the fastest rate the Earth has experienced since the beginning of modern civilization 10,000 years ago (Berliner 2003). This has led to a slow increase in public awareness about the implications of climate change. In addition, since the events of 11 September 2001, domestic terrorism has become a major threat for the American public. The topic of terrorism has unique dimensions not seen in other technological or natural risks, such as "human agents who purposefully create the risk" (Sjöberg 2005, 44). Also, biotechnologies, including genetically modified foods, have become of increasing concern among the public. While seen as extremely beneficial by many scientists, many environmentalists and some members of the general public view them as potentially harmful and risky (Gaskell 2004). Climate change, terrorism, and biotechnology are a few of the risks we are just beginning to observe, understand, and incorporate into our collective assessment of environmental risks (Frewer, Howard, and Shepard 1997; Savadori et al. 2004; Lusk and Coble 2005; Sjöberg 2005).

Risk Perception

Risk perception is a product of intuitive risk judgments that the layperson relies on to evaluate potential hazards (Slovic 1987). Psychologists are interested in this cognitive process, while geographers are more concerned with the resulting response. Geographers often study risk perception related to environmental and technological

hazards with a focus on behavior, spatial patterns, and physical processes. Understanding both the spatial scale and geographical patterns of environmental hazards are important when considering the distributions, impacts, and mitigation of these hazards (Cutter 1993). Geographers often study the interaction between the physical and human environment (Marsh and Grossa 2002).

> Almost all hazards have both natural and technological components, with the mix differing from one place to another. A flash flood episode always has its human components of land use and warnings or lack thereof. A chemical spill's consequences are heavily influenced by factors of terrain, weather, and vegetation. It is extremely rare that any natural event fails to have human consequences and that the magnitude and extent of such consequences are not the product of natural-social interactions (White 1988, 173).

Policymakers must know what the public will support and respond to in order to design effective regulations (Bord 1998). Public opinion is important because mitigating the effects of hazards, especially complex ones such as climate change, requires voluntary actions and lifestyle changes by the public, as well as effective policy from the government. Misconceptions held by the public can lead to ineffective actions toward reducing negative effects of hazards (Etkin and Ho 2007).

However, the public does not always trust scientists and this can confound their risk perceptions. An analysis of an ABC poll from 2006 and 2007 showed that only 32 percent of Americans trusted what scientists said about the environment "completely" or "a lot," while 24 percent and 27 percent trusted what scientists said only a "little" or "not at all," respectively. Furthermore, about one third of respondents believed that news coverage was "generally exaggerated," another third believed it was "generally correct," while the last third believed the news coverage was "generally underestimated" (Nisbet 2007). Survey respondents believed that scientists understood most hazards better than

the public did. In addition, experts usually judged risk by annual fatalities, while risk perceptions of laypersons were more likely equated with other factors (Slovic, Ficshhoff, and Lichtenstein 1985).

Many different factors affect a person's risk perception. Previous research has shown that average personal risk (risk posed to oneself) is less threatening than general risk (risk posed to others or by others). The public's desire for mitigation measures related to general rather than personal risk unless the perception of personal risk was as high as general risk (Sjöberg 2003). Alternatively, past risk-reduction actions and willingness-to-pay was greater for direct personal risks than for environmental or general risks (Fischer et al. 1991). Liberals tended to be more egalitarian and therefore more technologically risk-averse and conservatives alternatively tended to be more hierarchical and therefore more willing to take risks involving technology and the environment (Wildavsky and Dake 1990).

Sex, race, and power have roles in the perception of risk. Males and whites typically have more powerful and beneficial places in society and lower levels of risk perceptions of hazards (Flynn, Slovic, and Mertz 1994; Satterfield, Mertz, and Slovic 2004). In addition, nonwhite females have had the highest perceptions of risks when compared to other groups (Satterfield, Mertz, and Slovic 2004). It is likely that women, minorities, and those with lower incomes have felt greater personal exposure to risks and therefore have had higher risk perceptions. Men, those with higher incomes, and older people believed they were less likely to experience hazards, even in cases when they actually had higher risks; the same was true when the men, those with higher incomes, and older people were actually at a lower risk (Savage 1993). The perception of risk

among lower-income groups was also higher than that perceived by higher-income groups (Savage 1993; Sjöberg 2003). Women more often saw hazards as having more catastrophic potential, as more dreadful, and more likely to cause fatalities. They were more pessimistic about the severity of risks and the fatal consequences of various hazards, wanted stricter regulations on these hazards when compared to men (Cutter, Tiefenbacher, and Solecki 1992), and were more risk averse (Davidson and Freudenburg 1997; Kalof et al. 2002). Females perceived both personal and general risk to be substantially greater than males did, but differences were smaller for personal risk than for general risk (Sjöberg 2003).

People who knew more about certain technologies perceived greater benefits in that technology. Those with more education perceived lower risks associated with war (Wildavsky and Dake 1990), while people with less education and younger people had greater dread for hazards (Savage 1993). Numerous studies, however, have found that lack of knowledge does not correlate with a higher perception of risk (Davidson and Freudenburg 1996). Higher perceptions of environmental risks were partially associated with feelings of vulnerability, discrimination, and environmental injustice claims. White males who felt a higher level of vulnerability tended to have risk perceptions similar to women and nonwhite men, though the difference was a relatively small one (Satterfield, Mertz, and Slovic 2004). When asked to identify the risks that were of primary concern to them, males and older people expressed greater concern with health and safety, while females and younger people were more concerned with environmental issues (Fischer et al. 1991).

Many contemporary hazards are new to the public and generate unique threats to human systems. Risk perception is a complex issue subject to biases and illustrates how people will respond to hazards, like climate change for instance. It would seem economically irrational (at least in terms of climate change) for an individual to take action without collective action, because the costs of mitigation for an individual would be high while the benefits might be small. Many other factors affect one's perceptions, including the extent to which a hazard is voluntary, catastrophic, known, fatal, dreaded, delayed, controllable or familiar. The perceived benefits, one's ideology, and one's environmental and social values play important roles as well (Etkin and Ho 2007). People have felt that it is their responsibility to manage their own health risks, while it is the government's responsibility to manage environmental risks, and risks associated with social, political and economic conflicts. People were most likely to act on risks when they felt their actions could have a meaningful impact and when they felt they could have access to the necessary information to manage the risks (Fischer et al. 1991).

Previous research has used many different approaches to compare and evaluate risk perceptions of various hazards. The most popular approaches have been the psychometric approaches, which involve various forms of questionnaires and ranking or rating scales. Ranking methods illustrate the significance of various hazards among populations. Rankings were used in this study where, within individual categories, the various natural, technological, and social hazard ranks identified by survey respondents illustrated which hazards they considered more or less risky.

CHAPTER 3

DATA AND METHODS

To investigate the risk perceptions of a population sub-group toward specific hazards, a survey was administered to university students asking them to rank ten natural hazards, ten technological hazards, and ten social hazards according to how likely they believed the event, activity, or technology would cause serious injury or death (Appendix A). They ranked the same hazards according to how much time and money they felt local, state, and federal governments should apply to their management. Each respondent provided his or her age, sex, race, academic major, and academic class. Each also categorized their political philosophies as conservative, moderate, liberal, other, or none. They were asked to categorize their political party affiliation as Republican, Democrat, Libertarian, Independent, other, or none and to indicate the strength of their connection to that party. Each respondent was asked if there was a place they considered their "hometown." If there was such a place, they identified it (town/city, state, and country) and categorized the environment in which they grew up, or at least spent the most time in, as urban, suburban, or rural (Table 1).

Table 1: Conceptual and Operational Variables

Conceptual Variables	Operational Variables
Risk Perception (Dependent Variable)	Ranking of Various Natural, Technological, and Social Hazards
Sex	Male Female
Age	Open Ended Question
Race	White/Non-Hispanic Hispanic/Latino Black/African-American Asian American Indian/Pacific Islander Other Multi-Racial/Bi-Racial
Academic Major(s)	Open Ended Question
Academic Classification	Freshman Sophomore Junior Senior
Political Philosophy	Conservative Moderate Liberal Other None Prefer Not to Answer
Political Party Affiliation	Republican Democrat Libertarian Independent Other None Prefer Not to Answer
Strong Connection to Political Party	Strongly Agree Agree Neutral Disagree Strongly Disagree
Place Considered Hometown	Yes or No

Table 1 Continued: Conceptual and Operational Variables

Hometown – City/State/Country	Open Ended Question
Environment While Growing Up	Rural Suburban Urban/Downtown Don't Know

The list of hazards was derived from lists used in previous research studies of risk perception. This study included hazards that are specific to the study area (central Texas), but also included some hazards that are endemic to other regions of the U.S. Natural hazards such as floods, drought, and hurricanes are prevalent in the region. Risks were "gender-neutral" in order to allow for the analysis of the importance of sex in risk perception as suggested by Cutter, Tiefenbacher, and Solecki (1992). Additionally, the hazard list included hazards such as terrorism, climate change, and biotechnology in part to illustrate the salience of these risks in the opinions of university students, but also to allow comparison of risk perceptions of the study population to previous studies.

The Kruskal-Wallis one-way analysis of variance by ranks aided in determining if there were any significant variances between groups related to place, politics, or demographics. The dependent variables for this analysis were the risk-ranking data. The average ranked positions of each hazard were determined for each group based on place, politics, and demographics. The aggregate degree to which the group means differ exhibited whether there were differences and/or similarities between groups. The Kruskal-Wallis test is a non-parametric test that handles uneven sample sizes and compares ranked data between two or more categories. A post-hoc analysis using the Games-Howell procedure illustrated which groups possessed statistically significant variance.

Texas State University-San Marcos students taking classes from the Department of Geography in the spring semester of 2010, approximately 1200 undergraduate students, served as a convenience sample for this study. Employing a confidence level of 95 percent and an interval of +/- 6, a sample size of 214 students was selected.

CHAPTER 4

RESULTS

Composition of Surveyed Population

Two hundred and fourteen completed surveys were acquired from students in undergraduate Geography classes at Texas State (Table 2). More than half of the students were female. More than half (70.1 percent) of the participants identified themselves as white/non-Hispanic, while 18.8percent were Hispanic/Latino. The remaining 11 of the sample was composed of those who identified themselves as Black/African-American, Asian, American Indian/Pacific Islander, Other, or Multi-Racial or Bi-Racial. Most respondents were eighteen to twenty-two years old. There was a fairly even distribution between academic classifications and between population sizes for the cities and towns the students were from. There was also a fairly even distribution between political philosophies, with the most people (34 percent) identifying themselves as moderate, and political party groups, with the most people identifying themselves as Republican (29 percent) and having no political party affiliation. Most of the students described their environmental background as suburban.

Table 2: Sample Population

Variable	*N*	%
Sex		
Female	114	53.3
Male	100	46.7
Race		
Non-White	62	28.9
White	151	70.1
Age		
18-19 Years Old	71	33.2
20-22 Years Old	82	38.3
23-25 Years Old	30	14
26 and Up	31	14.5
Academic Classification		
Freshman	49	22.9
Sophomore	45	21
Junior	56	26.2
Senior and Up	64	29.9
Political Philosophy		
Conservative	40	18.7
Liberal	47	22
Moderate	72	33.6
Other/None/Prefer Not to Answer	55	25.7
Political Party Affiliation		
Democrat	50	23.3
Republican	62	29
Libertarian/Independent/Other	40	18.7
None	62	29
Background		
Rural	44	20.6
Suburban	133	62
Urban	30	14
Don't Know	6	2.8
Hometown Population		
2500 or Less	13	6.1
2500-25,000	35	16.3
25,000-50,000	16	7.4
50,000-200,000	55	25.7
200,000-1,000,000	42	19.6
1,000,000 and Up	39	18.2

Perceptions of Risk

The Kruskal-Wallis procedure determined median ranks for each of the various hazards. The hazards with the highest median ranks were considered to be the most risky because the hazards were ranked one though ten with ten being the most risky. The procedure used the sum of the ranks to determine which groups had significantly different risk perceptions at a 90 percent ($p \leq 0.10$) and 95 percent ($p < 0.05$) confidence level. In certain cases, the Games-Howell post-hoc procedure illustrated which groups within the variables had the statistically significant differences between them ($p \leq 0.10$). This procedure was not able to identify all of the significant differences though. Box plots illustrate the median rankings of all hazards by all students as one group, with outlying ranks exhibited by displaying the outlier's survey number.

Hurricanes and tornadoes had the highest median ranks for risk perceptions of hazards for all age groups. Flooding also had a high median rank. The emerging hazards of climate change and sea-level rise, which are linked geophysically, were consistently two of the lowest ranked hazards. Winter storms also ranked low (Figure 1). The technological hazards with the highest median ranks of risk perceptions for all groups were nuclear weapons, water pollution, and nuclear power. Cell phones, antibiotics, and vaccines had the lowest ranks (Figure 2). The social hazard with the highest median rank of risk perceptions for all groups was auto travel. Alcohol consumption, cigarette smoking, handguns, sexually transmitted diseases, and terrorism all had similar median ranks after auto travel. Air travel had the lowest median rank (Figure 3).

Hurricanes and flooding were the natural hazards with the highest median ranks for how much time and money the government should apply to the hazard. The lowest

median ranks were for winter storms, climate change, sea-level rise, and heat waves (Figure 4). The technological hazards with the highest median ranks for how much time and money the government should apply to the hazards were nuclear weapons, nuclear power, and water pollution. The lowest median ranks were for cell phones and building fires (Figure 5). The hazard with the highest median rank for the amount of time and money the government should apply to the hazard is terrorism. Auto travel, flu epidemics, handguns, sexual assault, and sexually transmitted diseases all had similar median ranks after terrorism. Secondhand smoke had the lowest median rank (Figure 6).

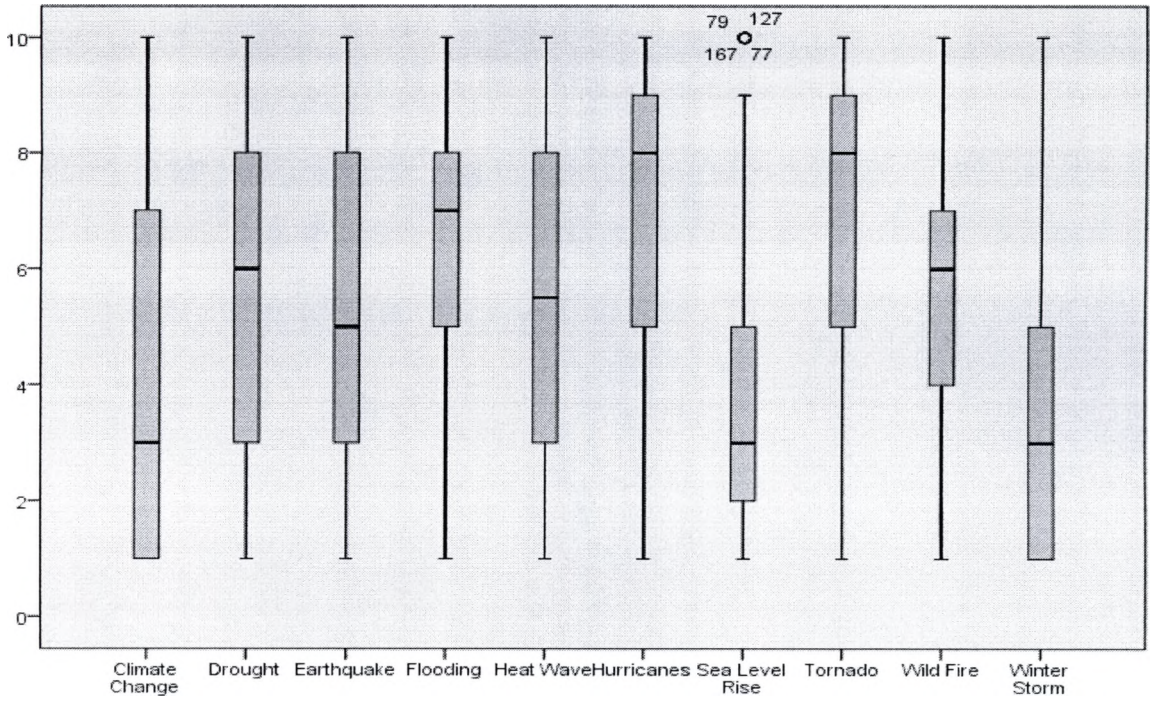

Figure 1: Risk Perceptions of Natural Hazards

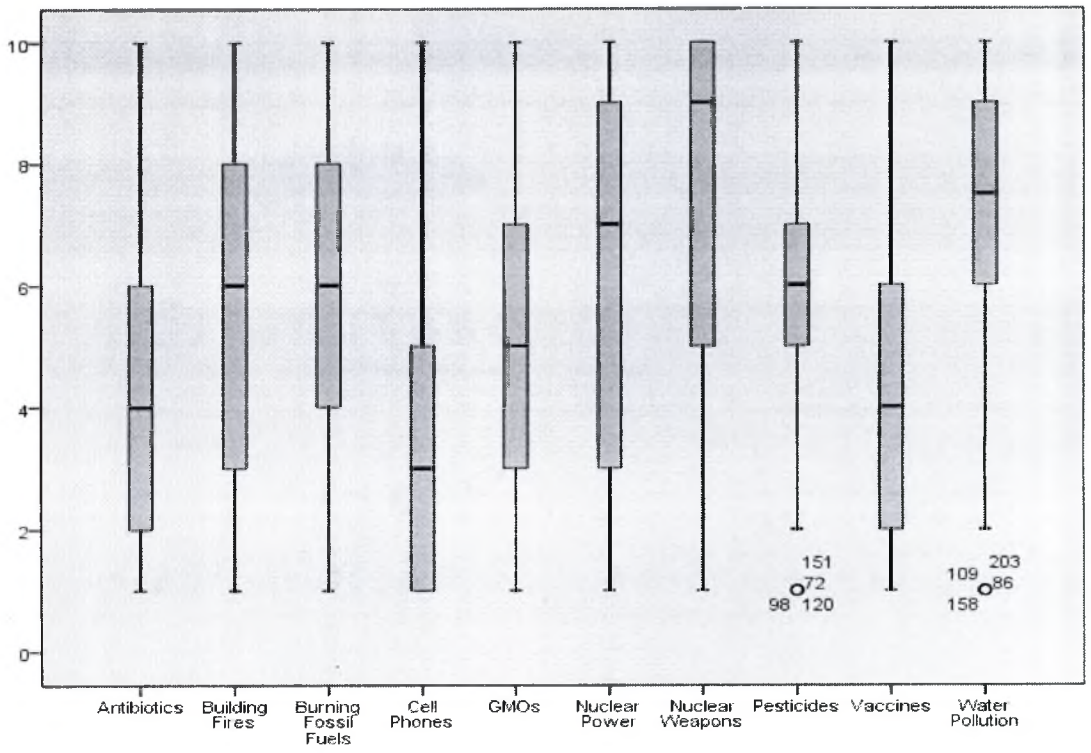

Figure 2: Risk Perceptions of Technological Hazards

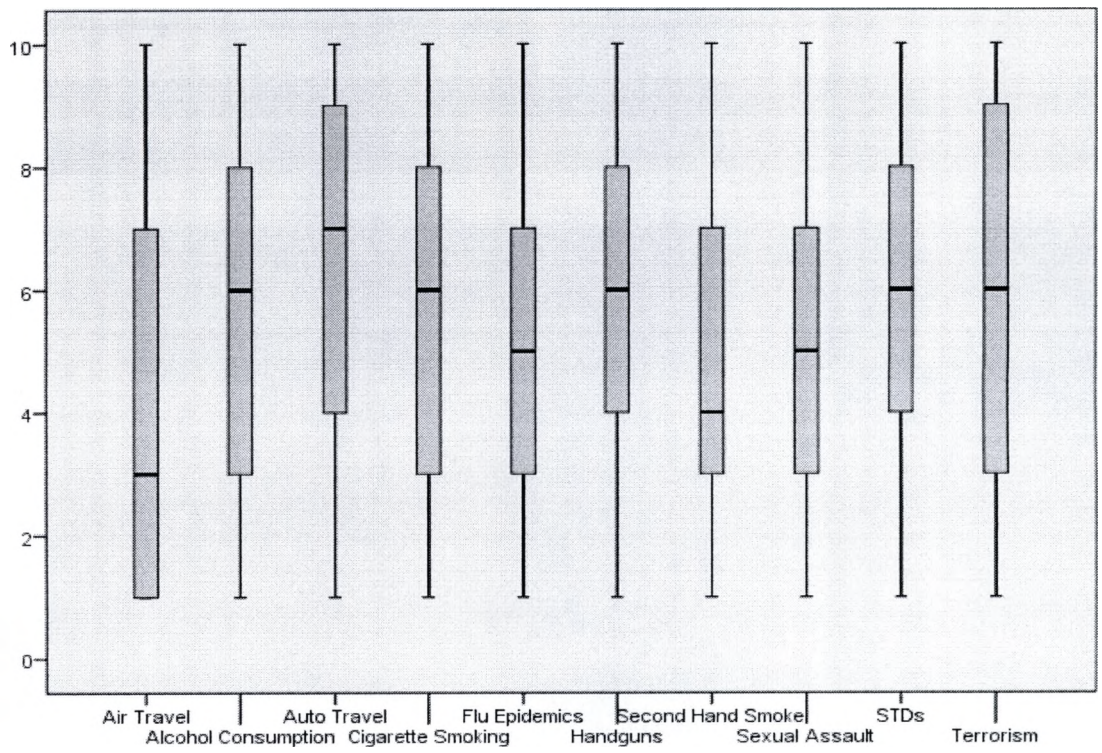

Figure 3: Risk Perceptions of Social Hazards

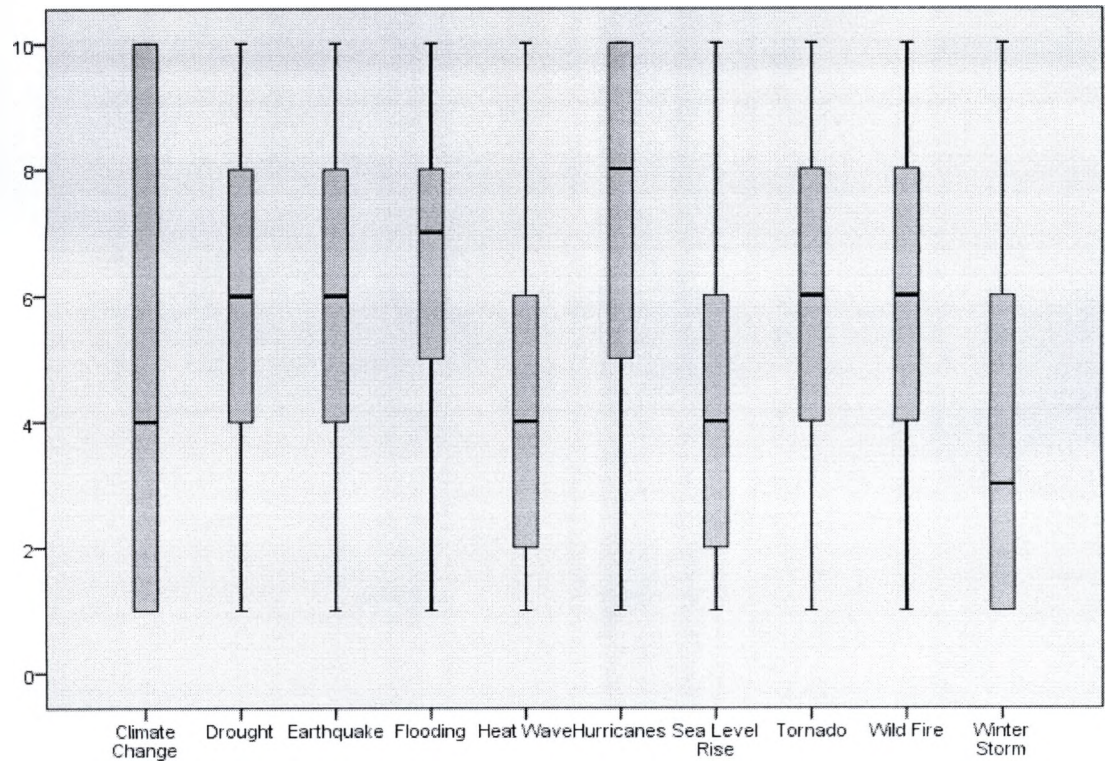

Figure 4: Management Preferences of Natural Hazards

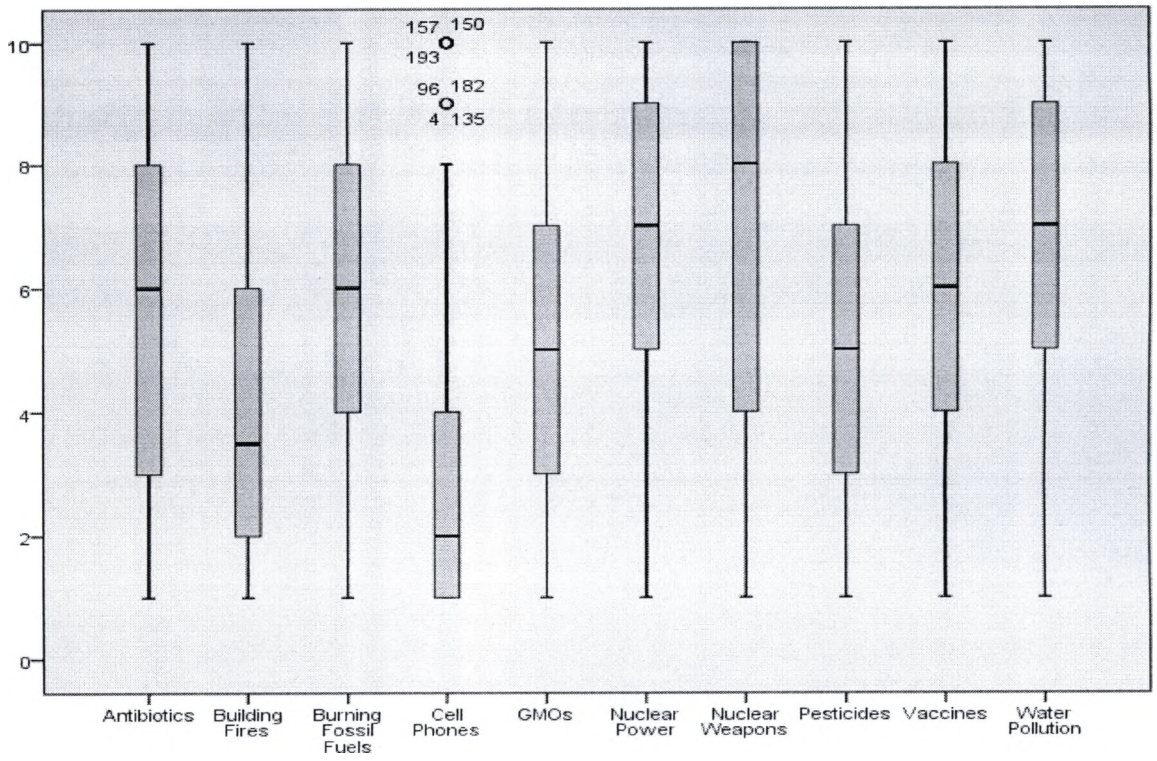

Figure 5: Management Preferences of Technological Hazards

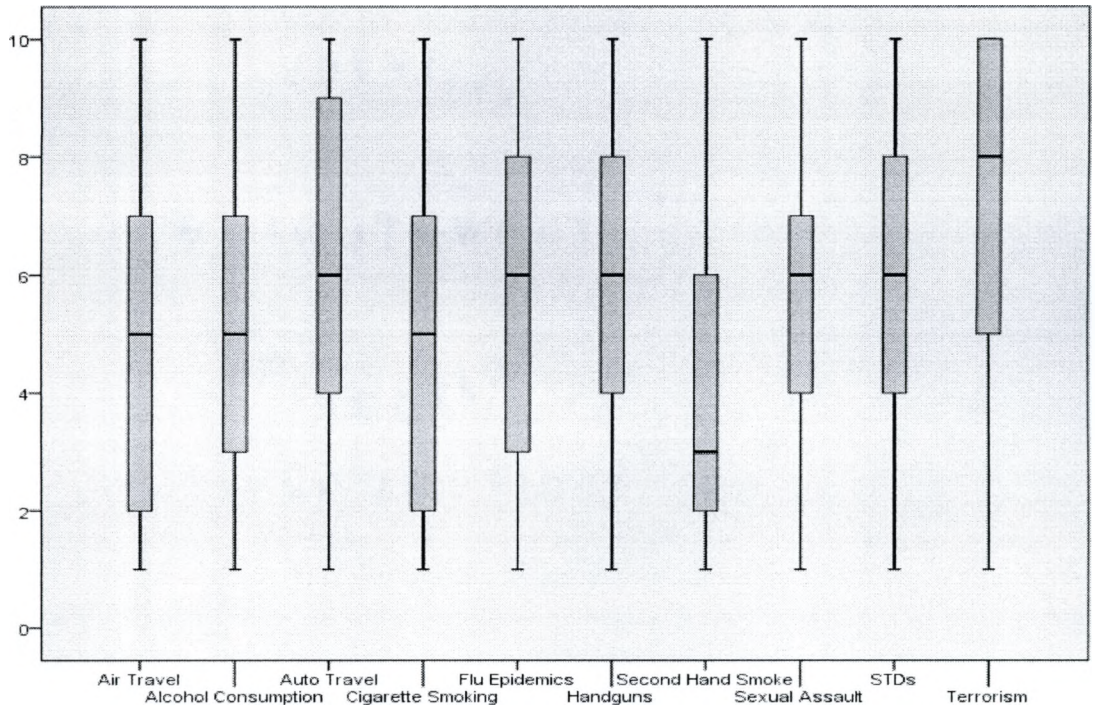

Figure 6: Management Preferences of Social Hazards

Risk Perception and Demographics

The Kruskal-Wallis procedure illustrated when statistically significant differences in risk perception existed between groups. The procedure also produced mean ranks for each of the hazards, which illustrated how risky the respondents felt the various hazards were. The Games-Howell post-hoc procedure was often able to exhibit the significant differences between the groups, depending on the strength of the significance of the differences.

Sex seems to have significantly affected risk perceptions of certain hazards (Table 3). More than half (114 or 53.3 percent) of the participants were female. Women perceived nuclear power (p = .045), secondhand smoke (p = 0.018), and sexual assault (p = 0.00) to be more risky than males. Men perceived alcohol consumption (p = 0.035), cigarette smoking (p = 0.90), and flu epidemics (p = 0.087) as more risky than women did.

The comparison of how much time and money the government should apply to the hazards also produced statistically significant differences between women and men (Table 4). Women wanted more government time and money focused on nuclear power (p= 0.060) and sexual assault (p = 0.01) than men did, while men wanted more time and money spent on pesticides (p = 0.082) and water pollution (p = 0.001) when compared to women.

Table 3: Risk Perceptions of Hazards by Sex

Hazard	Mean Rank n = 214 Female	Male	Sig.	Sig.at 0.05	Sig. at 0.10
Natural					
Climate Change	107.66	107.32	.967		
Drought	105.50	109.79	.611		
Earthquake	109.78	104.91	.564		
Flooding	107.83	107.12	.932		
Heat Wave	102.84	112.82	.237		
Hurricanes	107.67	107.31	.966		
Sea Level Rise	108.09	106.83	.880		
Tornado	105.18	110.15	.554		
Wildfires	111.46	102.98	.313		
Winter Storm	111.51	102.93	.302		
Technological					
Antibiotics	106.31	108.86	.762		
Building Fires	101.08	114.82	.104		
Burning Fossil Fuels	107.15	107.90	.930		
Cellular Phones	104.29	111.17	.402		
GMOs	105.03	110.32	.530		
Nuclear Power	115.34	98.56	.045	X	
Nuclear Weapons	109.81	104.87	.542		
Pesticides	106.39	108.77	.777		
Vaccines	113.50	100.66	.127		
Water Pollution	104.49	110.93	.443		
Social					
Air Travel	103.73	111.80	.335		
Alcohol Consumption	99.20	116.96	.035	X	
Automobile Travel	104.32	111.13	.418		
Cigarette Smoking	100.81	115.13	.090		X
Flu Epidemics	100.75	115.20	.087		X
Handguns	106.30	108.87	.760		
Secondhand Smoke	116.84	96.86	.018	X	
Sexual Assault	130.93	80.80	.000	X	
STDs	106.38	108.78	.776		
Terrorism	102.15	112.48	.430		

Table 4: Management Preferences of Hazards by Sex

Hazard	Mean Rank $n = 214$ Female	Male	Sig.	Sig. at 0.05	Sig. at 0.10
Natural					
Climate Change	102.79	112.88	.225		
Drought	107.56	107.44	.998		
Earthquake	112.96	101.27	.165		
Flooding	106.97	108.11	.893		
Heat Wave	105.25	110.07	.567		
Hurricanes	107.54	107.46	.993		
Sea Level Rise	107.29	107.74	.957		
Tornado	105.89	109.34	.683		
Wildfires	112.29	102.04	.223		
Winter Storm	111.17	103.32	.48		
Technological					
Antibiotics	110.50	104.08	.446		
Building Fires	106.41	108.75	.781		
Burning Fossil Fuels	101.07	114.84	.102		
Cellular Phones	108.10	106.82	.876		
GMOs	109.49	105.23	.613		
Nuclear Power	114.87	99.10	.060		X
Nuclear Weapons	112.33	101.99	.215		
Pesticides	100.66	115.30	.082		X
Vaccines	113.86	100.26	.106		
Water Pollution	94.61	122.19	.001	X	
Social					
Air Travel	112.01	102.36	.251		
Alcohol Consumption	106.15	109.04	.733		
Automobile Travel	103.35	112.23	.292		
Cigarette Smoking	101.60	114.23	.134		
Flu Epidemics	102.48	113.23	.203		
Handguns	109.93	104.73	.537		
Secondhand Smoke	107.21	107.84	.940		
Sexual Assault	120.20	93.03	.001	X	
STDs	107.57	107.43	.987		
Terrorism	104.61	110.80	.457		

Race significantly affected risk perceptions of hazards (Table 5). The categories compared were those who identified themselves as white and those who identified themselves as non-white (from here on referred to as non-whites and whites) (Table 4). Due to this, the two categories analyzed were white/non-Hispanic and non-white. One participant did not respond to the question regarding race and was not included in the analysis. Non-whites were more concerned with sexually transmitted diseases ($p = 0.019$), while whites were more concerned about pesticides ($p = 0.001$).

The comparison of how much time and money the government should apply to the hazards produced statistically significant differences between non-whites and whites (Table 6). Non-whites wanted more time and money applied to the management of earthquakes ($p = 0.098$), burning fossil fuels ($p = 0.60$), nuclear power ($p = .004$) and secondhand smoke ($p = 0.025$). Whites did not want significantly more time and money applied to the management of any hazards when compared to non-whites.

Table 5: Risk Perceptions of Hazards by Race

Hazard	Mean Rank $n = 213$ Non-White	White	Sig.	Sig. at 0.05	Sig .at 0.10
Natural					
Climate Change	102.55	108.83	.493		
Drought	106.89	107.05	.986		
Earthquake	114.04	104.11	.283		
Flooding	102.54	108.83	.494		
Heat Wave	99.51	110.08	.253		
Hurricanes	112.69	104.67	.383		
Sea Level Rise	110.08	105.74	.636		
Tornado	106.48	107.21	.937		
Wildfires	102.45	108.87	.486		
Winter Storm	114.59	103.89	.240		
Technological					
Antibiotics	116.73	103.01	.136		
Building Fires	105.26	107.72	.789		
Burning Fossil Fuels	101.89	109.10	.434		
Cellular Phones	109.90	105.81	.649		
GMOs	103.62	108.39	.606		
Nuclear Power	115.31	103.59	.201		
Nuclear Weapons	106.62	107.16	.952		
Pesticides	85.77	115.72	.001	X	
Vaccines	111.05	105.34	.536		
Water Pollution	108.93	106.21	.768		
Social					
Air Travel	99.30	110.16	.236		
Alcohol Consumption	102.87	108.70	.529		
Automobile Travel	96.59	111.27	.111		
Cigarette Smoking	104.90	107.86	.748		
Flu Epidemics	105.60	107.57	.831		
Handguns	108.76	106.28	.788		
Secondhand Smoke	116.33	103.17	.154		
Sexual Assault	115.97	103.32	.171		
STDs	122.30	100.72	.019	X	
Terrorism	105.77	107.50	.851		

Table 6: Management Preferences of Hazards by Race

Hazard	Mean Rank $n = 213$		Sig.	Sig. at 0.05	Sig. at 0.10
	Non-White	White			
Natural					
Climate Change	108.22	106.52	.851		
Drought	111.81	105.03	.463		
Earthquake	117.85	102.55	.098		X
Flooding	101.59	109.22	.407		
Heat Wave	101.52	109.25	.402		
Hurricanes	111.85	105.01	.456		
Sea Level Rise	100.15	109.81	.294		
Tornado	106.59	107.17	.950		
Wildfires	108.88	106.23	.774		
Winter Storm	103.50	108.44	.590		
Technological					
Antibiotics	100.66	109.60	.333		
Building Fires	108.13	106.54	.863		
Burning Fossil Fuels	94.69	112.06	.060		X
Cellular Phones	109.53	105.96	.691		
GMOs	113.88	104.18	.293		
Nuclear Power	125.86	99.25	.004	X	
Nuclear Weapons	115.64	103.45	.182		
Pesticides	96.98	111.11	.126		
Vaccines	99.68	110.01	.263		
Water Pollution	99.91	109.91	.277		
Social					
Air Travel	100.93	109.49	.353		
Alcohol Consumption	102.38	108.90	.480		
Automobile Travel	102.97	108.66	.538		
Cigarette Smoking	108.19	106.51	.855		
Flu Epidemics	104.05	108.21	.652		
Handguns	103.93	108.26	.639		
Secondhand Smoke	121.62	101	.025	X	
Sexual Assault	107.03	106.99	.996		
STDs	110.72	105.47	.570		
Terrorism	111.42	105.19	.494		

Age did not significantly affect risk perceptions of hazards (Table 7), but the desired amount of time and money the different age groups felt the government should apply to hurricanes ($p = 0.017$), burning fossil fuels ($p = 0.027$), water pollution ($p = 0.089$), and alcohol consumption ($p = 0.070$), were significantly different (Table 8). Eighteen and nineteen year olds wanted the most time and money spent on hurricanes, followed by twenty to twenty-two year olds, twenty-three to twenty-five year olds, and those twenty-six and up, respectively . The post-hoc test illustrated there was a significant difference for the management of hurricanes between eighteen and nineteen year olds and those twenty-six and up ($p = 0.022$). Twenty-three to twenty-five year olds wanted the most time and money applied to the management of burning fossil fuels, followed by eighteen and nineteen year olds, twenty-six year olds and up, and twenty to twenty-two year olds, respectively. The post-hoc procedure shows that there is a significant difference for the management of burning fossil fuels between the eighteen and nineteen years old group and the twenty to twenty-two years old group ($p = 0.039$).

Respondents twenty-six and older wanted the most time and money applied to water pollution, followed by twenty to twenty-two year olds, eighteen and nineteen year olds , and twenty-three to twenty-five year olds, respectively. The post-hoc test could not discriminate between age groups to indicate who were significantly more aggressive regarding the management of water pollution. Eighteen and nineteen year olds wanted the most time and money applied to the management of alcohol consumption, followed by twenty to twenty-two year olds, twenty-three to twenty-five year olds, and those 26 years old and up. The post-hoc procedure could not exhibit a significant difference regarding the management of alcohol consumption.

Table 7: Risk Perceptions of Hazards by Age

Hazard	Mean Rank $n = 214$				Sig.	Sig at 0.05	Sig. at 0.10
	18-19	20-22	23-25	26 and up			
Natural Hazard							
Climate Change	105.59	115.04	100.88	100.61	.539		
Drought	104.20	113.59	101.68	104.58	.719		
Earthquake	110.04	108.07	109.85	97.89	.819		
Flooding	102.99	107.51	114.10	111.42	.835		
Heat Wave	104.65	107.51	112.27	109.40	.948		
Hurricanes	115.58	102.70	102.82	106.23	.588		
Sea Level Rise	106.99	101.80	116.45	115.06	.607		
Tornado	104.61	107.93	110.35	110.23	.962		
Wildfires	110.48	109.23	97.87	105.44	.800		
Winter Storm	113.96	101.16	97.75	118.90	.312		
Technological							
Antibiotics	105.77	102.02	117.17	116.60	.544		
Building Fires	105.44	104.41	102.32	125.42	.373		
Burning Fossil Fuels	114.15	108.56	104.18	92.66	.431		
Cellular Phones	101.43	108.53	111.63	114.68	.719		
GMOs	101.32	109.64	110.45	113.15	.766		
Nuclear Power	116.18	103.13	111.00	95.79	.378		
Nuclear Weapons	107.47	104.73	112.37	110.18	.930		
Pesticides	110.90	107.71	111.22	95.56	.681		
Vaccines	110.25	113.99	100.35	90.95	.294		
Water Pollution	100.77	115.60	97.33	111.34	.357		
	105.65	102.35	111.90	121.10	.505		
Social							
Air Travel							
Alcohol Consumption	109.50	114.15	105.50	87.26	.220		
Automobile Travel	109.16	104.60	104.70	114.08	.884		
Cigarette Smoking	102.80	113.62	103.90	105.56	.715		
Flu Epidemics	107.15	105.09	109.32	112.92	.941		
Handguns	107.00	98.65	119.72	120.24	.239		
Secondhand Smoke	104.71	113.24	103.93	102.15	.754		
Sexual Assault	106.99	108.01	107.18	107.65	1.00		
STDs	105.41	115.52	110.95	87.73	.189		
Terrorism	114.35	98.98	101.73	119.95	.262		

Table 8: Management Preferences of Hazards by Age

Natural Hazard	Mean Rank n=214				Sig.	Sig. at 0.05	Sig. at 0.10
	18-19	20-22	23-25	26 and up			
Climate Change	96.74	115.38	106.27	112.48	.280		
Drought	101.14	106.14	108.12	125.06	.344		
Earthquake	116.57	104.74	110.47	91.16	.266		
Flooding	101.85	112.81	109.98	104	.713		
Heat Wave	101.96	104.85	111.02	123.79	.390		
Hurricanes	123.75	104.35	102.52	83.45	.017	X	
Sea Level Rise	104.09	105.41	111.85	116.63	.765		
Tornado	109.61	101.60	117.13	108.95	.661		
Wildfires	115.04	106.63	91.72	107.79	.382		
Winter Storm	117.17	106	100.57	96.03	.346		
Antibiotics	109.84	110.12	95.82	106.53	.720		
Building Fires	112.20	96.44	116.18	117.60	.210		
Burning Fossil Fuels	116.54	91.47	120.75	116.39	.027	X	
Cellular Phones	110.83	99.68	116.55	111.79	.481		
GMOs	93.10	114.15	116.13	114.53	.119		
Nuclear Power	110.61	112.29	93.47	101.29	.460		
Nuclear Weapons	111.98	107.93	112.23	91.53	.439		
Pesticides	106.84	108.68	97.60	115.47	.720		
Vaccines	106.44	117.73	103.98	86.26	.107		
Water Pollution	98.18	113.05	94.87	126.40	.089		X
		96.49	119.63	122.18	.133		
Air Travel	108.68						
Alcohol Consumption	114.50	114.57	91.50	88.24	.070		X
Automobile Travel	101.52	108.45	113.90	112.06	.748		
Cigarette Smoking	107.60	108.39	96.98	115.10	.714		
Flu Epidemics	101.57	104.52	121.10	115.79	.411		
Handguns	99.17	111.97	121.90	100.82	.291		
Second Hand Smoke	109.39	108.27	111.60	97.15	.777		
Sexual Assault	105.98	108.05	106.53	110.45	.988		
STDs	111.85	110.08	105.38	92.77	.511		
Terrorism	114.70	105.66	89.75	113.06	.272		

Risk Perception and Academic Class

Academic class was significantly related to risk perceptions of cigarette smoking ($p = 0.083$) (Table 9). Juniors seem to be the most concerned with the risks associated with cigarette smoking, followed by sophomores, seniors, and freshmen, respectively. The post-hoc procedure was unable to exhibit which academic classifications were significantly different regarding the risk perception of cigarette smoking.

The comparison of how much time and money the government should apply to the management of hurricanes ($p = 0.016$) and automobile travel ($p = 0.011$) produced statistically significant differences between academic classifications (Table 10). Freshman wanted more time and money applied to hurricanes, followed by sophomores, juniors, and then seniors. The post-hoc identified a significant difference for the management of hurricanes was between freshmen and seniors ($p = 0.010$). Seniors wanted more time and money applied to automobile travel, followed by juniors, sophomores, and then freshmen. The post-hoc procedure showed a significant difference for the management of automobile travel between freshmen and seniors ($p = 0.010$).

Table 9: Risk Perceptions of Hazards by Academic Classification

Natural Hazard	Mean Rank $n = 214$				Sig.	Sig. at 0.05	Sig. at 0.10
	Freshman	Sophomore	Junior	Senior			
Climate Change	99.26	116.78	105.85	108.73	.571		
Drought	99.59	102.12	113.09	112.45	.567		
Earthquake	116.37	111.40	108.22	97.34	.400		
Flooding	104.22	104.96	106.47	112.70	.874		
Heat Wave	105.18	102.56	102.09	117.48	.479		
Hurricanes	122.38	108.77	105.15	97.27	.189		
Sea Level Rise	101.28	111.90	111.82	105.39	.778		
Tornado	106.35	106.42	105.89	110.55	.973		
Wildfires	109.29	101.11	119.59	100.05	.303		
Winter Storm	111.29	112.03	100.28	107.73	.744		
Antibiotics	106.17	99.93	109.51	112.08	.771		
Building Fires	117.23	93.48	106.82	110.50	.293		
Burning Fossil Fuels	100.03	105.06	107.25	115.16	.617		
Cellular Phones	97.06	107.07	109.59	113.97	.511		
GMOs	98.12	111.23	109.77	110.07	.684		
Nuclear Power	118.70	115.79	94.79	104.21	.166		
Nuclear Weapons	112.72	111.23	104.60	103.41	.800		
Pesticides	116.88	109.40	101.75	104.02	.595		
Vaccines	108.12	109.97	111.26	102	.850		
Water Pollution	99.68	112.74	114.52	103.66	.550		
Air Travel	103.96	108.28	104.54	112.26	.875		
Alcohol Consumption	105.92	105.74	116.14	102.38	.656		
Automobile Travel	109.08	104.34	102.58	112.81	.803		
Cigarette Smoking	88.99	115.80	117.38	107.02	.083		X
Flu Epidemics	110.82	102.94	102.72	112.34	.772		
Handguns	119.84	94.03	104.79	109.90	.228		
Secondhand Smoke	101.06	117.23	108.29	104.90	.618		
Sexual Assault	116.50	102.30	104.63	106.77	.682		
STDs	103.63	118.53	104.78	105.09	.604		
Terrorism	115.71	106.52	108.22	101.27	.670		

Table 10: Management Preferences of Hazards by Academic Classification

Hazard	Mean Rank $n = 214$				Sig.	Sig. at 0.05	Sig. at 0.10
	Freshman	Sophomore	Junior	Senior			
Natural							
Climate Change	94.22	116.02	112.07	107.67	.315		
Drought	98.27	101.57	103.36	122.37	.138		
Earthquake	114.17	100.33	112.43	103.12	.600		
Flooding	95.98	109.73	107.04	115.15	.426		
Heat Wave	101.34	116.67	106.67	106.50	.677		
Hurricanes	128.35	111.91	103.47	91.96	.016	X	
Sea Level Rise	111.97	105.99	98.15	113.32	.539		
Tornado	113.37	105.62	99.52	111.31	.642		
Wildfires	115.63	99.90	119.69	95.95	.111		
Winter Storm	110.07	110.04	108.36	102.99	.913		
Technological							
Antibiotics	113.94	102.32	105.58	107.89	.823		
Building Fires	112.26	95.30	100.19	118.84	.168		
Burning Fossil Fuels	115.33	102.69	93.08	117.51	.120		
Cellular Phones	98.60	113.29	107.77	110.01	.655		
GMOs	98.50	101.20	118.71	109.02	.332		
Nuclear Power	112.33	121.07	98.77	101.91	.241		
Nuclear Weapons	118.44	109.07	109.32	96.43	.286		
Pesticides	105.86	110.68	115.88	99.20	.500		
Vaccines	107.46	112.01	109.03	103.02	.893		
Water Pollution	97.87	108.09	116.92	106.22	.464		
Social							
Air Travel	104.94	107.48	105.04	111.63	.927		
Alcohol Consumption	113.82	110.33	116.50	92.80	.141		
Automobile Travel	83.06	108.42	113.41	120.39	.011	X	
Cigarette Smoking	106.07	112.77	100.25	111.23	.713		
Flu Epidemics	105.81	99.29	110.92	111.58	.731		
Handguns	108.07	101.36	110.45	108.80	.894		
Secondhand Smoke	111.84	120.51	99.63	101.92	.293		
Sexual Assault	114.70	95.82	111.30	106.87	.472		
STDs	108.41	117.83	99.63	106.16	.540		
Terrorism	121.77	99.43	110.21	99.88	.201		

Risk Perception and Politics

Political philosophies were linked (at statistically significant levels) to risk perception of hazards (Table 11). Climate change ($p = 0.031$), drought ($p = 0.064$), heat wave ($p = 0.085$), sea level rise ($p = 0.082$), nuclear weapons ($p = 0.082$), automobile travel ($p = .087$) and terrorism ($p = 0.039$) produced statistically significant differences in risk perception between those with conservative ($n = 40$), liberal ($n=47$), and moderate ($n = 72$) political philosophies. An additional category included those with other political philosophies, those with no political philosophy, or those who preferred not to answer ($n = 55$). Liberals were the most concerned with climate change, followed by "others," moderates, and conservatives, respectively. The post-hoc procedure could not exhibit which philosophical perspectives were significantly different regarding the risk perception of climate change.

Liberals were also the most concerned with drought, followed by "others", conservatives, and moderates, respectively. The post-hoc analysis indicated that there was a significant difference between liberals and moderates ($p = 0.056$). "Others" were the most concerned with heat waves, followed by liberals, conservatives, and moderates, respectively. The post-hoc analysis illustrated that the significant difference was between "others" and moderates ($p = 0.075$).

Moderates were the most concerned with sea level rise, followed by "others," liberals, and conservatives, respectively. The post-hoc analysis illustrated the significant difference was between moderates and conservatives ($p = 0.037$). Liberals were the most concerned with nuclear weapons, followed by "others," moderates, and conservatives,

respectively. The post-hoc procedure could not exhibit any significant difference between groups regarding the risk perception of nuclear weapons.

"Others" were the most concerned with automobile travel, followed by moderates, conservatives, and liberals, respectively. Conservatives were the most concerned with terrorism, followed by moderates, then "others," and liberals, respectively. The post-hoc procedure was unable to illustrate which political philosophy groups were significantly different regarding the risk perception of automobile travel and terrorism.

The comparison of how much time and money the government should apply to the management of climate change ($p = 0.004$), hurricanes ($p = 0.025$), sea level rise ($p = 0.087$), tornadoes ($p = 0.013$), winter storms ($p = 0.031$), handguns ($p = 0.030$), and terrorism ($p = 0.021$) reflected statistically significant differences between the philosophies (Table 12). Liberals desired the most time and money applied to the management of climate change compared to the other groups, followed by moderates, "others," and conservatives, respectively. The post-hoc procedure showed there to be a significant difference for the management of climate change between liberals and conservatives ($p = 0.002$). Conservatives wanted the most time and money applied to the management of hurricanes, followed by moderates, "others," and liberals, respectively. The post-hoc procedure illustrated there to be a significant difference for the management of hurricanes between conservatives and liberals ($p = 0.081$).

Moderates wanted the most time and money applied to sea level rise, followed by "others," liberals, and conservatives, respectively. The post-hoc procedure illustrated the significant difference for the management of sea level rise was between moderates and conservatives ($p = 0.064$). Conservatives also wanted the most time and money applied to

the management of winter storms, followed by "others," liberals, and moderates, respectively. Conservatives wanted the most time and money applied to the management of tornadoes, followed by "others," moderates, and liberals, respectively. The post-hoc procedure showed that there was a significant difference for the management of tornadoes between conservatives and liberals ($p = 0.016$).

The post-hoc procedure illustrated the significant difference for the management of sea level rise was between conservatives and moderates ($p = 0.057$). Liberals and moderates wanted the most money applied to the management of handguns, followed by "others," and conservatives, respectively. The post-hoc procedure was unable to exhibit which political philosophy groups were significantly different regarding the management preferences of handguns.

Moderates wanted the most time and money applied to terrorism, followed by conservatives, "others," and liberals, respectively. The post-hoc procedure illustrated the significant difference for the management of terrorism was between moderates and liberals ($p = 0.023$).

Table 11: Risk Perceptions of Hazards by Political Philosophy

Hazard	Mean Rank $n = 214$				Sig.	Sig. at 0.05	Sig. at 0.10
	Conservative	Liberal	Moderate	O/N/P			
Natural							
Climate Change	92.75	126.15	98.63	113.90	.031	X	
Drought	101.73	127.87	97.94	106.81	.064		X
Earthquake	113.76	93.15	117.47	102.15	.153		
Flooding	111.19	113.12	103.33	105.48	.817		
Heat Wave	111.90	112.16	92.88	119.45	.085		X
Hurricanes	112.59	96.51	116.16	101.85	.296		
Sea Level Rise	93.76	101.30	121.90	103.94	.082		X
Tornado	120.18	98.73	114.46	96.66	.150		
Wildfires	121.89	95.66	105.83	109.34	.256		
Winter Storm	105.78	96.61	104.55	121.93	.185		
Technological							
Antibiotics	112.99	119.46	99.99	103.12	.325		
Building Fires	119.34	89.40	110.94	109.85	.119		
Burning Fossil Fuels	111.33	115.17	105.55	100.72	.652		
Cellular Phones	100.21	110.26	104.27	114.67	.639		
GMOs	112.56	104.22	102.44	113.25	.712		
Nuclear Power	102.73	104.19	117.28	101.00	.416		
Nuclear Weapons	94.63	101.94	121.56	103.18	.082		X
Pesticides	109.72	113.98	102.20	107.27	.773		
Vaccines	115.01	104.73	97.18	117.91	.231		
Water Pollution	102.63	116.07	110.90	99.26	.496		
Social							
Air Travel	103.05	110.05	102.70	114.84	.675		
Alcohol Consumption	93.51	108.55	108.31	115.72	.381		
Automobile Travel	113.40	113.60	92.58	117.53	.087		X
Cigarette Smoking	91.55	115.20	110.53	108.55	.307		
Flu Epidemics	113.73	111.21	105.17	102.85	.802		
Handguns	100.91	112.00	112.11	102.41	.684		
Secondhand Smoke	120.60	106.91	106.99	99.15	.417		
Sexual Assault	100.93	106.52	103.11	118.86	.439		
STDs	109.13	93.84	119.17	102.72	.153		
Terrorism	122.56	93	116.81	96.75	.039	X	

Table 12: Management Preferences of Hazards by Political Philosophy

Hazard	Mean Rank $n = 214$				Sig.	Sig. at 0.05	Sig. at 0.10
	Conservative	Liberal	Moderate	O/N/P			
						X	
Natural Hazard							
Climate Change	83.06	129.13	111.66	101.35	.004		
Drought	89.63	121.87	108.08	107.45	.114		
Earthquake	118.45	96.50	115.74	98.15	.149		
Flooding	121.25	107	99.89	107.89	.373		
Heat Wave	100.40	110.30	105.47	112.94	.767		
Hurricanes	128.63	91.06	112.04	100.24	.025	X	
Sea Level Rise	87.16	104.13	116.40	113.52	.087		X
Tornado	125.61	89	100.29	119.57	.013	X	
Wildfires	114.81	110.06	105.49	102.62	.784		
Winter Storm	129.20	101.81	95.01	112.94	.031	X	
Technological							
Antibiotics	109.11	117.35	106.43	99.31	.527		
Building Fires	103.36	103.03	104.26	118.57	.489		
Burning Fossil Fuels	102.79	113.87	103.65	110.52	.764		
Cellular Phones	113.58	110.21	105.76	103.05	.831		
GMOs	92.66	97.95	113.15	119.06	.111		
Nuclear Power	113.53	100.70	112.04	102.98	.645		
Nuclear Weapons	104.68	94.49	120.95	103.06	.109		
Pesticides	105.76	112.44	97.93	117.07	.332		
Vaccines	121.95	110.79	103.13	99.90	.314		
Water Pollution	104.91	116.34	104.19	106.15	.733		
Social							
Air Travel	111.53	94.68	102.64	121.89	.128		
Alcohol Consumption	106.83	115.59	102.30	107.89	.721		
Automobile Travel	114.89	107.47	95.78	117.49	.200		
Cigarette Smoking	104.66	108.78	105.06	111.66	.925		
Flu Epidemics	104.43	108.73	114.81	99.12	.542		
Handguns	91.39	118.88	118.56	95.01	.030	X	
Secondhand Smoke	110.50	101.98	103.36	115.45	.630		
Sexual Assault	109.41	123.51	101.42	100.39	.198		
STDs	109.54	109.09	107.26	104.98	.983		
Terrorism	112.06	85.38	120.35	106.26	.021	X	

The comparison of risk perceptions of hazards between those who identify with different political parties produced statistically significant results regarding climate change ($p = 0.020$), wildfires ($p = 0.018$), vaccines ($p = 0.025$), air travel ($p = 0.092$) and terrorism ($p = 0.037$) (Table 13). The categories included Democrats ($n = 50$), Republicans ($n = 62$), Libertarians/Independents/Others (from now on referred to as "others") ($n = 62$), and those with no political party affiliation ($n = 40$).

Democrats were the most concerned with climate change, followed by "others," those with no political party affiliation, and Republicans, respectively. The post-hoc procedure illustrated the significant difference for the risk perception of climate change was between Democrats and Republicans ($p = 0.014$). Republicans were the most concerned with wildfires, followed by those with no political party affiliation, "others", and Democrats, respectively. The post-hoc procedure illustrated the significant difference for the risk perception of wildfires was between Republicans and Democrats ($p = 0.052$).

"Others" were the most concerned with vaccines, followed by those with no political party affiliation and Republicans, and Democrats, respectively. The post-hoc procedure exhibited the significant difference for the risk perception of vaccines was between "others" and Democrats ($p = 0.01$). "Others" were the most concerned with air travel, followed by Republicans, Democrats, and those with no political party affiliation, respectively. The post-hoc procedure illustrated the significant difference for the risk perception of vaccines was between Democrats and "others" ($p = 0.074$). Republicans were the most concerned with terrorism, followed by "others", Democrats, and those with no political party affiliation, respectively. The post-hoc procedure illustrated the

significant difference for the risk perception of terrorism was between Republicans and "others" ($p = 0.063$).

The comparison of how much time and money the government should apply to the management of climate change ($p = 0.00$), drought ($p = 0.047$), earthquakes ($p = 0.021$), hurricanes ($p = 0.012$), tornadoes ($p = 0.013$), and air travel ($p = 0.016$) produced statistically significant differences between political party groups (Table 14). "Others" wanted the most time and money devoted to climate change, followed by Democrats, those with no political party affiliation, and Republicans, respectively. The post-hoc procedure illustrated the significant difference for the management preference of climate change was between Democrats and Republicans ($p = 0.02$), and Republicans and "others" ($p = 0.001$).

"Others" wanted the most time and money applied to the management of drought, followed by those with no political party affiliation, Democrats, and Republicans, respectively. The post-hoc procedure illustrated the significant difference for the management preference of drought was between "others" and Republicans ($p = 0.03$). Republicans were the most concerned with earthquakes, followed by those with no political party affiliation, Democrats, and "others", respectively. The post-hoc procedure exhibited the significant difference for the management preference of earthquakes was between Republicans and "others" ($p = 0.01$). Republicans also wanted the most time and money applied to hurricanes, followed by those with no political party affiliation, Democrats, and "others", respectively. The post-hoc procedure exhibited the significant difference for the management preference of hurricanes was between Republicans and those "others" ($p = 0.01$). Those with no political party affiliation wanted the most time

and money applied to tornadoes, followed by Republicans, "others", and Democrats, respectively. The post-hoc procedure illustrated the significant difference for the management preference of tornadoes was between Democrats and those with no political party affiliation ($p = 0.02$). "Others" wanted the most government time and money applied to the management of air travel, followed by Republicans, those with no political party affiliation, and Democrats, respectively. The post-hoc procedure illustrated the significant difference for the management preference of air travel was between 'others" and Democrats ($p = 0.01$).

Table 13: Risk Perceptions of Hazards by Political Party Affiliation

Hazard	Mean Rank $n = 214$				Sig.	Sig. at 0.05	Sig. at 0.10
	Democrat	Republican	Lib/Ind/O	None			
						X	
Natural Hazard							
Climate Change	122.09	88.16	114.10	109.01	.020		
Drought	114.74	100.56	114.49	98.36	.368		
Earthquake	104.36	121.06	98.92	103.70	.213		
Flooding	106	104.35	115.82	101.35	.627		
Heat Wave	106.12	103.16	112.77	107.78	.852		
Hurricanes	103.47	115.31	100.31	111.59	.521		
Sea Level Rise	110.80	107.27	112.15	96.53	.616		
Tornado	101.10	120.43	96.61	112.34	.138		
Wildfires	88.20	121.05	101.65	119.70	.018	X	
Winter Storm	99.42	103.87	111.19	117.51	.489		
Technological							
Antibiotics	106.97	111.78	108.08	100.63	.846		
Building Fires	98.49	118.27	102.56	109.73	.332		
Burning Fossil Fuels	117.42	105.54	96.22	115.63	.245		
Cellular Phones	109.55	99.19	111.22	112.05	.632		
GMOs	113.50	107.77	106.37	101.34	.826		
Nuclear Power	117.69	113.19	100.94	96.11	.258		
Nuclear Weapons	114.78	106.13	96.87	117	.279		
Pesticides	102.55	103.60	113.56	110.35	.736		
Vaccines	86.85	107.21	123.54	107.65	.025	X	
Water Pollution	103.89	102.26	114.36	109.50	.695		
							X
Social							
Air Travel	97.42	106.88	122.89	97.21	.092		
Alcohol Consumption	106.44	102.97	107.28	116.19	.766		
Automobile Travel	114.68	101.48	109.14	105.33	.711		
Cigarette Smoking	107.49	97.92	106.41	124.05	.221		
Flu Epidemics	107.27	105.66	113.18	101.84	.820		
Handguns	113.90	104.73	105.78	106.45	.867		
Secondhand Smoke	118.26	102.87	105.32	104.60	.563		
Sexual Assault	106.18	104.16	107.48	114.35	.873		
STDs	100.21	117.19	98.94	114.86	.260		
Terrorism	101.39	126.03	102.64	93.95	.037	X	

Table 14: Management Preferences of Hazards by Political Party Affiliation

Hazard	Mean Rank $n = 214$				Sig.	Sig. at 0.05	Sig. at 0.10
	Democrat	Republican	Lib/Ind/O	None			
Natural							
Climate Change	121.83	81.95	123.41	104.53	.000	X	
Drought	105.82	92.83	123.85	106.99	.047	X	
Earthquake	105.76	123.94	89.89	111.49	.021	X	
Flooding	114.63	112.41	100.57	101.71	.528		
Heat Wave	110.11	102.35	118.32	95.45	.262		
Hurricanes	101.27	127.36	92.27	108.11	.012	X	
Sea Level Rise	107.56	109.56	111.96	97.33	.683		
Tornado	89.96	117.81	99.06	126.51	.013	X	
Wildfires	104.98	112.15	101.04	113.45	.682		
Winter Storm	104.90	118.32	101.79	102.83	.421		
Technological							
Antibiotics	98.72	114.06	109.51	105.20	.606		
Building Fires	106.37	102.98	109.79	112.38	.875		
Burning Fossil Fuels	115.30	104.60	109.37	99.34	.636		
Cellular Phones	108.57	99.97	119.44	99.33	.239		
GMOs	102.35	109.88	103.91	115.81	.709		
Nuclear Power	113.64	113.89	102.92	97.03	.440		
Nuclear Weapons	111.69	110.29	103.54	104.08	.860		
Pesticides	102.22	104.16	116.77	104.91	.566		
Vaccines	100.67	111.40	107.69	109.70	.821		
Water Pollution	106.10	103.1	103.29	122.48	.390		
Social							
Air Travel	88.21	109.20	124.90	102.01	.016	X	
Alcohol Consumption	117.45	108.11	93.54	115.75	.156		
Automobile Travel	109.01	103.64	115.23	99.63	.592		
Cigarette Smoking	111.26	102.63	105.35	113.69	.788		
Flu Epidemics	109.88	101.82	110.30	108.99	.861		
Handguns	110.97	109.93	101.60	108.55	.841		
Secondhand Smoke	113.98	96.91	117.34	00.56	.211		
Sexual Assault	108.48	117.41	96.40	108.13	.302		
STDs	103.17	107.22	112.63	105.40	.867		
Terrorism	98.70	121.37	98.32	111.23	.118		

Risk Perception and "Hometown"

The comparison of risk perceptions of hazards for respondents who came from rural, suburban, and urban backgrounds produced statistically significant results regarding sea level rise ($p = 0.033$) and water pollution ($p = 0.006$) (Tables 39-41). Over half (62.4 percent or 133) of the respondents were from suburban backgrounds, 20.6 percent or 44 of the respondents were from rural backgrounds, 14 percent or 30 respondents were from urban backgrounds, and only 2.8 percent or 6 answered "don't know." One respondent did not answer the question and therefore was not included in the analysis.

Those from a suburban background were the most concerned with sea level rise, followed by those who "don't know," those who came from a rural background, and those who came from an urban background, respectively. The post-hoc procedure illustrated the significant difference for the risk perception of sea level rise was between those from a suburban background and those from an urban background ($p = 0.058$). Those from a rural background were the most concerned with water pollution, followed by those from a suburban background, then those from an urban background, and finally those who answered, "don't know." The post-hoc procedure exhibited the significant differences for the risk perception of water pollution were those from a rural background and those with a suburban background ($p = 0.022$).

The comparison of how much time and money the government should apply to the management of wildfires ($p = 0.077$), water pollution ($p = 0.028$), and alcohol consumption ($p = 0.057$) produced statistically significant differences between the

rural/suburban/urban groups (Tables 42-44). Those from rural backgrounds wanted the most time and money applied to the management of wildfires, followed by those who "don't know," those from suburban backgrounds, and those from urban backgrounds, respectively. The post-hoc procedure reveals a significant difference for risk perception of wildfires between those from rural backgrounds and those from urban backgrounds ($p = 0.031$), and between those who "don't know" and those from an urban background ($p = 0.037$).

Respondents from a rural background wanted the most time and money applied to the management of water pollution, followed by those from suburban and urban backgrounds and those who answered "don't know." The post-hoc procedure exhibited the significant difference for the management preference of water pollution was between those from a rural background and those who "don't know" ($p = 0.012$). Respondents who "don't know" wanted the most time and money applied to the management of alcohol consumption, followed by those from a rural background, those from a suburban background, and those from an urban background, respectively. The post-hoc procedure illustrated the significant difference for the management preference of alcohol consumption was between those who "don't know" and those from an urban background ($p = 0.039$).

Table 15: Risk Perceptions of Hazards by Rural/Urban/Suburban Background

Hazard	Mean Rank $n = 207$				Sig.	Sig. at 0.05	Sig. at 0.10
	Rural	Suburban	Urban	Don't Know			
Natural							
Climate Change	107.84	106.42	112.70	85.08	.785		
Drought	106.19	108.17	112.70	84.42	.832		
Earthquake	92.77	108.51	118.43	120.67	.285		
Flooding	105.81	102.68	127.68	108	.247		
Heat Wave	111.10	110.26	91.82	80.50	.315		
Hurricanes	104.30	106.72	106.15	137.33	.664		
Sea Level Rise	105.09	114.18	77.95	107.17	.033	X	
Tornado	103.38	107.21	105.75	135.08	.696		
Wildfires	124.24	103.09	95.57	124.42	.134		
Winter Storm	106.31	104.44	119.80	104.92	.660		
Technological							
Antibiotics	97.97	111.46	103.52	91.75	.543		
Building Fires	114.39	103.69	110.42	109.17	.770		
Burning Fossil Fuels	116.78	104.60	99.72	124.94	.518		
Cellular Phones	91.97	114.05	100.90	91.42	.145		
GMOs	101.56	107.30	110.75	121.42	.850		
Nuclear Power	107.83	101.12	124.48	143.83	.115		
Nuclear Weapons	103.84	105.45	111.90	140.08	.506		
Pesticides	113.08	109.10	98.32	59.33	.181		
Vaccines	108.45	108.56	90.95	142	.247		
Water Pollution	127.58	101.44	113.80	45.25	.006	X	
Social							
Air Travel	101.74	113.21	86.43	110.75	.160		
Alcohol Consumption	115.19	107.18	97.38	90.92	.585		
Automobile Travel	98.70	111.86	93.72	126.58	.297		
Cigarette Smoking	110.38	103.34	120.55	95.58	.516		
Flu Epidemics	107.89	105.13	115.43	99.83	.853		
Handguns	102.70	107.72	109.22	111.50	.959		
Secondhand Smoke	112.07	103.53	111.63	123.67	.718		
Sexual Assault	93.53	107.62	123.63	108.92	.226		
STDs	116.06	101.37	116.42	188.25	.392		
Terrorism	108.53	108.53	100.83	92.67	.863		

Table 16: Management Preferences of Hazards by Urban/Rural/Suburban Background

Hazard	Mean Rank $n = 207$				Sig.	Sig. at 0.05	Sig. at 0.10
	Rural	Suburban	Urban	Don't Know			
Natural							
Climate Change	108.53	106.40	111.40	87	.836		
Drought	108.76	105.39	119.77	65.92	.248		
Earthquake	101.66	103.52	127.92	118.83	.213		
Flooding	114.32	103.34	112.85	105.17	.708		
Heat Wave	91.56	109.20	122.87	92.08	.147		
Hurricanes	97.28	108.32	104.60	160.92	.114		
Sea Level Rise	110.31	107.47	97.60	119.25	.780		
Tornado	112.17	107.90	91.78	125.17	.436		
Wildfires	120.35	107.38	83.30	119.17	.077		X
Winter Storm	105.43	108.94	101.27	104.17	.931		
Technological							
Antibiotics	107.34	103.03	126.03	97.33	.308		
Building Fires	101.48	108.27	112.30	92.83	.809		
Burning Fossil Fuels	103.81	110.10	93.32	130.08	.421		
Cellular Phones	104.50	108.15	102.23	123.58	.853		
GMOs	94.51	112.12	105.10	94.58	.386		
Nuclear Power	113.75	101.30	116.23	137.67	.270		
Nuclear Weapons	104.48	106.41	107.03	138.42	.636		
Pesticides	102	113.18	93.42	74.67	.186		
Vaccines	101.83	108.53	107.38	109.08	.939		
Water Pollution	121.34	105.65	104.70	43.25	.028	X	
Social							
Air Travel	98.97	108.51	115.13	91.83	.628		
Alcohol Consumption	117.03	106.12	87.25	151.67	.057		X
Automobile Travel	96.68	111.55	97.90	127.33	.347		
Cigarette Smoking	126.30	102.14	105.25	82.08	.101		
Flu Epidemics	94.60	110.47	116.78	72.08	.176		
Handguns	92.89	110.73	109.07	117.42	.386		
Secondhand Smoke	105.50	103.31	117.55	147.00	.263		
Sexual Assault	119.40	103.51	106.47	96.08	.488		
STDs	121.60	101.79	108.17	109.67	.322		
Terrorism	104.65	110.06	103.20	75.42	.538		

The comparison of risk perceptions of hazards for respondents who came from "hometowns" with different population sizes produced statistically significant results regarding hurricanes ($p = 0.071$), building fires ($p = 0.008$), and cellular phones (0.084) (Table 17). The categories included towns or cities with populations of twenty-five hundred or less, and cities with populations from twenty-five hundred to twenty-five thousand, twenty-five thousand to fifty thousand, fifty thousand to two-hundred thousand, two-hundred thousand to one million, and cities with a population over one million.

Respondents from a city with a population of over one million were the most concerned with hurricanes, followed by those from a city with a population between twenty-five thousand and fifty thousand. Respondents from a city with the population between two-hundred thousand and one million were the least concerned with hurricanes. Respondents from a city of twenty-five hundred to twenty-five thousand were the most concerned by building fires, followed by those from a city of twenty-five thousand to fifty thousand, while those from a city with a population between fifty thousand and two-hundred thousand were the least concerned. The post-hoc procedure illustrated the significant difference for the risk perception of building fires was between respondents from a city with a population from twenty-five hundred to twenty-five thousand and respondents from a city with the population between fifty thousand and two-hundred thousand ($p = 0.05$).

Respondents from a city with a population between twenty-five thousand and fifty thousand were the most concerned with cellular phones, followed by those from a city with the population between fifty thousand and two-hundred thousand, while those from

a city with a population that is twenty-five hundred or less were the least concerned. The post-hoc procedure was unable to find the significant differences in the risk perception of cellular phones between those from cities with different population sizes.

The comparison of how much time and money the government should apply to the management of flooding ($p = 0.011$), produced statistically significant differences between groups with different "hometown" populations (Table 18). Respondents from a city or town with a population of twenty-five hundred or less wanted the most government time and money applied to the management of flooding, followed by those from cities between fifty thousand and two-hundred thousand, then those from cities with a population between twenty-five hundred and twenty-five thousand, and between twenty-five thousand and fifty thousand, respectively. The post-hoc procedure illustrated the significant difference for management preference of flooding was between respondents from a city or town with a population of twenty-five hundred or less and those from a city with the population between twenty-five thousand and fifty thousand ($p = 0.046$).

Table 17: Risk Perceptions of Hazards by "Hometown" Population

Hazard	Mean Rank $n = 200$						Sig.	Sig. at 0.05	Sig. at 0.10
	2500 or less mill+	2500-25,000	25,000-50,000	50,000-200,00	200,000-1mill.	1			
Natural									
Climate Change	86	103.63	90.53	103.56	110.42	91.62	.575		
Drought	85.38	90.87	102.72	100.66	113.04	95.54	.563		
Earthquake	86.15	104.90	100.59	94.34	101.49	108.92	.778		
Flooding	97.15	101.73	79.38	113.11	94.04	98.36	.358		
Heat Wave	94.56	91.10	114.69	111.38	94.18	96.26	.454		
Hurricanes	102.69	94.13	103.59	96.18	87.06	124.78	.071		X
Sea Level Rise	99.23	101.83	110.97	103.64	90.17	102.14	.830		
Tornado	122.50	95.03	115.28	96.23	107.74	90.24	.355		
Wildfires	120.12	111.61	100.88	96.19	95.44	95.36	.581		
Winter Storm	108.46	111.31	93.81	94.56	99.06	100.81	.794		
Technological									
Antibiotics	94.62	98.69	94.41	101.32	114.80	90.04	.511		
Building Fires	130.73	122.01	107.13	80.95	94.31	102.64	.008	X	
Burning Fossil Fuels	109.62	105.07	106.63	99.82	96.81	95.78	.947		
Cellular Phones	76.81	102.19	115.75	113.96	86.04	97.22	.084		X
GMOs	89.54	90.70	115.53	94.80	105	109.97	.488		
Nuclear Power	81.04	101.46	99.97	94.75	98.60	116.50	.395		
Nuclear Weapons	97.35	104.60	92.66	93.71	108.15	102.42	.815		
Pesticides	109.38	102.02	77.44	109.28	102.81	90.60	.361		
Vaccines	104.46	91.43	88.25	112.42	98.30	97.91	.525		
Water Pollution	128.58	90.60	114.47	103.29	94.06	97.29	.317		
Social									
Air Travel	101.73	108.79	105.09	107.13	94.96	87.38	.545		
Alcohol Consumption	108	91.73	123.34	105.64	97.57	92.41	.432		
Automobile Travel	109.23	105.30	114.66	92.97	105.38	92.83	.627		
Cigarette Smoking	102.92	100.14	91.63	112.26	100.90	86.63	.420		
Flu Epidemics	92.65	98.31	98.28	104.61	88.31	113.32	.490		
Handguns	130.85	96.37	97.28	90.92	94.14	115.77	.124		
Secondhand Smoke	102.27	106.63	71.34	109.65	96.44	97.83	.286		
Sexual Assault	82.08	86.44	86.72	106.20	107.36	109.49	.266		
STDs	100.08	90.89	113.16	91.88	113.82	101.88	.384		
Terrorism	93.04	112.84	84.78	86.55	106.19	111.91	.144		

Table 18: Management Preferences of Hazards by "Hometown" Population

Hazard	Mean Rank $n = 200$						Sig.	Sig. at 0.05	Sig. at 0.10
	2500 or less	2500-25,000	25,000-50,000	50,000-200,00	200,000-1mill.	1 mill+			
Natural									
Climate Change	85.42	101.17	118.66	95.04	106.18	99.06	.622		
Drought	100.38	92.50	103.44	99.85	99.74	108.26	.920		
Earthquake	89.88	111.27	93.03	99.64	110.86	87.50	.380		
Flooding	135.58	90.19	73.41	116.35	95.56	92.15	.011	X	
Heat Wave	90.35	96.80	108.72	93.20	101.05	113.54	.580		
Hurricanes	109.50	104.41	112.41	90.37	95.36	108.92	.533		
Sea Level Rise	80.15	81.76	101.56	111.58	110.44	97.33	.116		
Tornado	128.73	108.91	92.06	100.60	87.81	100.53	.280		
Wildfires	105.77	104.01	92.22	92.55	100.17	110.56	.727		
Winter Storm	94.77	112.72	112.50	104.72	91.96	89.76	.409		
Technological									
Antibiotics	93.73	103	104.66	93.73	106.32	102.09	.907		
Building Fires	92.73	118.43	104.97	93.22	98.17	97.95	.442		
Burning Fossil Fuels	101.38	101.73	112.63	100.50	107.75	86.32	.583		
Cellular Phones	92.08	91.73	106.91	101.80	104.96	101.91	.890		
GMOs	96.38	85.59	79.44	109.75	96.81	114.15	.140		
Nuclear Power	101.54	100.79	96.81	98.43	101.29	103.49	.998		
Nuclear Weapons	99.46	106.86	107.41	90.51	98.80	108.23	.681		
Pesticides	98.31	100.43	79.28	104.57	106.71	97.56	.689		
Vaccines	111	95.64	97.19	102.60	91.36	109.60	.723		
Water Pollution	108.38	95.83	103.47	113.35	98.37	85.01	.288		
Social									
Air Travel	92.73	98.81	82.69	109.33	99.10	100.97	.679		
Alcohol Consumption	108.73	99.76	123.50	96.03	88.31	108.42	.327		
Automobile Travel	88.19	94.06	109.69	103.60	104.37	98.08	.868		
Cigarette Smoking	114.88	112.90	83.50	104.61	92.38	94.50	.372		
Flu Epidemics	75.77	101.23	106.13	102.77	91.90	111.83	.405		
Handguns	108.12	80.40	95.03	101.97	102.83	113.65	.237		
Secondhand Smoke	107.15	108.76	76.91	102.11	100.51	98.27	.591		
Sexual Assault	121.58	98.97	101	96.29	114.10	85.94	.226		
STDs	103.96	105.80	130.69	90.21	107.01	89.71	.134		
Terrorism	83.12	108.14	98.44	92.62	106.69	104.73	.598		

The results suggest that, of the variables analyzed, political philosophy was the best predictor of risk perceptions of hazards at a 90 percent confidence level, followed by sex and political party affiliation. Sex, followed by political party affiliation, was the best predictor of risk perceptions of hazards at the 95 percent confidence level. This leads us to believe that sex and politics have a major influence on risk perceptions.

The exploratory variables of "place" did have an effect on risk perceptions. Where people came from geographically may have influenced how they perceived risk, because they had different experiences in these different areas. Age was the only variable that did not have an effect on risk perception, perhaps because the survey group's ages were so similar. Political philosophy and political party affiliation were the best predictors of how much time and money the respondent felt the government should apply to the management of the hazards. Respondents differed in their opinions about what hazards they felt significantly more threatened by, and to what hazards they wanted significantly more time, and money applied.

Table 19: Risk Perceptions of Hazards

Hazard	Sex	Race	Age	Academic Class	Political Phil	Political Party	R/S/U	City Pop
Climate Change	.967	.493	.539	.571	*.031	*.020	.785	.160
Drought	.611	.986	.719	.567	*.064	.368	.832	.585
Earthquake	.564	.283	.819	.400	.153	.213	.285	.297
Flooding	.932	.494	.835	.874	.817	.627	.247	.516
Heat Wave	.237	.253	.948	.479	*.085	.852	.315	.853
Hurricanes	.966	.383	.588	.189	.296	.521	.664	.959
Sea Level Rise	.880	.636	.607	.778	*.082	.616	*.033	.718
Tornado	.554	.937	.962	.973	.150	.138	.696	.226
Wild Fire	.313	.486	.800	.303	.256	*.018	.134	.392
Winter Storm	.302	.240	.312	.744	.185	.489	.660	.863
Antibiotics	.762	.136	.544	.771	.325	.846	.543	.511
Building Fires	.104	.789	.373	.293	.119	.332	.770	*.008
Burning Fossil Fuels	.930	.434	.431	.617	.652	.245	.518	.947
Cellular Phones	.402	.649	.719	.511	.639	.632	.145	*.084
GMOs	.530	.606	.766	.684	.712	.826	.850	.488
Nuclear Power	*.045	.201	.378	.166	.416	.258	.115	.395
Nuclear Weapons	.542	.952	.930	.800	*.082	.279	.506	.815
Pesticides	.777	*.001	.681	.595	.773	.736	.181	.361
Vaccines	.127	.536	.294	.850	.231	*.025	.247	.525
Water Pollution	.443	.768	.357	.550	.496	.695	*.006	.317
Air Travel	.335	.236	.505	.875	.675	*.092	.160	.545
Alcohol Consumption	*.035	.529	.220	.656	.381	.766	.585	.432
Automobile Travel	.418	.111	.884	.803	*.087	.711	.297	.627
Cigarette Smoking	*.090	.748	.715	*.083	.307	.221	.516	.420
Flu Epidemics	*.087	.831	.941	.772	.802	.820	.853	.490
Handguns	.760	.788	.239	.228	.684	.867	.959	.124
Secondhand Smoke	*.018	.154	.754	.618	.417	.563	.718	.286
Sexual Assault	*.000	.171	1.00	.682	.439	.873	.226	.266
STDs	.776	*.019	.189	.604	.153	.260	.392	.384
Terrorism	.430	.851	.262	.670	*.039	*.037	.863	.144

* denotes significant results

Table 20: Management Preferences of Hazards

Hazard	Sex	Race	Age	Academic Class	Political Phil	Political Party	R/S/U	City Pop
Climate Change	.225	.851	.280	.315	*.004	*.000	.836	.622
Drought	.998	.463	.344	.138	.114	*.047	.248	.920
Earthquake	.165	*.098	.266	.600	.149	*.021	.213	.380
Flooding	.893	.407	.713	.426	.373	.528	.708	*.011
Heat Wave	.567	.402	.390	.677	.767	.262	.147	.580
Hurricanes	.993	.456	*.017	*.016	*.025	*.012	.114	.533
Sea Level Rise	.957	.294	.765	.539	*.087	.683	.780	.116
Tornado	.683	.950	.661	.642	*.013	*.013	.436	.280
Wild Fire	.223	.774	.382	.111	.784	.682	*.077	.727
Winter Storm	.48	.590	.346	.913	*.031	.421	.931	.409
Antibiotics	.446	.333	.720	.823	.527	.606	.308	.907
Building Fires	.781	.863	.210	.168	.489	.875	.809	.442
Burning Fossil Fuels	.102	*.060	*.027	.120	.764	.636	.421	.583
Cellular Phones	.876	.691	.481	.655	.831	.239	.853	.890
GMOs	.613	.293	.119	.332	.111	.709	.386	.140
Nuclear Power	*.060	*.004	.460	.241	.645	.440	.270	.998
Nuclear Weapons	.215	.182	.439	.286	.109	.860	.636	.681
Pesticides	*.082	.126	.720	.500	.332	.566	.186	.689
Vaccines	.106	.263	.107	.893	.314	.821	.939	.723
Water Pollution	*.001	.277	*.089	.464	.733	.390	*.028	.288
Air Travel	.251	.353	.133	.927	.128	*.016	.628	.679
Alcohol Consumption	.733	.480	*.070	.141	.721	.156	*.057	.327
Automobile Travel	.292	.538	.748	*.011	.200	.592	.347	.868
Cigarette Smoking	.134	.855	.714	.713	.925	.788	.101	.372
Flu Epidemics	.203	.652	.411	.731	.542	.861	.176	.405
Handguns	.537	.639	.291	.894	*.030	.841	.386	.237
Second Hand Smoke	.940	*.025	.777	.293	.630	.211	.263	.591
Sexual Assault	*.001	.996	.988	.472	.198	.302	.488	.226
STDs	.987	.570	.511	.540	.983	.867	.322	.134
Terrorism	.457	.494	.272	.201	*.021	.118	.538	.598

* denotes significant results

CHAPTER 5

Discussion

Many different factors influence perceptions of risk. Previous research suggests that politics and demographics do have an effect on these perceptions. The additional variable of place (or the place of one's origin) was an exploratory one in this study. All three variables seemed to produce significant differences in risk perceptions and preferences for how much time and money respondents felt they wanted applied to the hazards.

Often respondents differed in their opinions about what hazards they felt significantly more threatened by, and to what hazards they wanted significantly more time and money applied. Many of the hazards that respondents wanted significantly more government time and money applied to when compared to others were natural hazards. This may mean that people felt that natural hazards are more out of their personal control; therefore, they felt that it is more the responsibility of the government to protect them from these hazards.

Overall, the natural hazards the respondents were the most concerned with were hurricanes, tornadoes, and flooding. Climate change, sea level rise, and winter storms were of least concern. The technological hazards respondents were the most concerned

with were nuclear weapons, followed by water pollution, and nuclear power. Cell phones were of least concern, followed by antibiotics and vaccines. The social hazard the respondents were most concerned with was auto travel, with air travel being the least concern.

The natural hazards respondents wanted the most government time and money applied to were hurricanes, followed by flooding. Respondents wanted the least government time and money applied to winter storms, climate change, sea-level rise, and heat waves. The technological hazard respondents wanted the most government time and money applied to was nuclear weapons, followed by nuclear power, and water pollution. Respondents wanted the least time and money applied to cell phones, followed by building fires. The social hazard respondents wanted the most government time and money applied to was terrorism, followed by auto travel, flu epidemics, handguns, sexual assault, and sexually transmitted diseases, which all had similar median ranks. The social hazard that respondents wanted the least government time and money applied to was secondhand smoke.

Women perceived nuclear power, secondhand smoke, and sexual assault to be more risky than men did. Men perceived alcohol consumption, cigarette smoking, and flu epidemics as more risky than women did. There were no significant differences between women and men pertaining to the risk perceptions of natural hazards. Women were most likely more concerned about sexual assault because significantly more sexual assault attacks are against women than men (Tjaden and Thoennes 1998). The 'white male affect" discussed in the literature may also be at play here. Seventy-seven percent of

the male respondents were white. White males may create and benefit more from technology and other hazardous activities compared to others. All three of the hazards that men perceived as significantly more risky than women were social and health related. However, two out of three of those hazards were (at least somewhat) within the respondents direct control, alcohol consumption and cigarette smoking, while all three of the hazards that women found significantly more risky than men were out of their direct control. All of the hazards women perceived as more risky than men were at the 95 percent confidence level, while only the risk perception of alcohol consumption was at the 95 percent confidence level for men. This suggests that women may perceive more hazards to be riskier than men do.

Women wanted more government time and money applied to nuclear power and sexual assault, while men wanted more government time and money applied to pesticides and water pollution. Even though women were more concerned with secondhand smoke when compared to men, they did not necessarily want a larger amount of government time and money focused on it, but did want more government time and money focused on nuclear power and sexual assault. Men wanted more time and money applied to the management of pesticides and water pollution than women did, even though they were not significantly more concerned with the hazard of water pollution. Two out of the three hazards that women felt were riskier, women also wanted more government time and money applied to, while men wanted more time and money applied to hazards that they did not feel were significantly more risky. Both of the hazards men wanted significantly more time and money applied to were technological, while they felt that social health hazards were more risky. This may mean that public health officials may want to target

college age men to re-educate them on health issues related to drinking and smoking, as well as introduce programs to fight addiction and dependency. There were no significant differences between women and men pertaining to preferences in the management of natural hazards.

Race did have a significant effect on the perceptions of two hazards, sexually transmitted diseases and pesticides. Non-whites were more concerned with sexually transmitted diseases, while whites were more concerned with pesticides. Non-whites also wanted significantly more time and money applied to the management of earthquakes, burning fossil fuels, nuclear power, and secondhand smoke. Whites did not want significantly more time and money applied to any hazards. Two of the hazards that women were more concerned with than men were also nuclear power and secondhand smoke. Pesticides are an environmental hazard as well as a health hazard, one that the respondent may be able to control somewhat, but one that often takes money and education to mitigate the negative health effects. Sexually transmitted diseases are also a health concern, but one that is also not completely out of the respondent's control.

Even though non-whites and whites both ranked only one hazard significantly higher, non-whites wanted more government time and money applied to four hazards. The 'white male affect' may again be why non-whites want more time and money applied to the management of burning fossil fuels and nuclear power. The only natural hazard that non-whites wanted more time and money applied to was earthquakes. This may be a result of the recent 7.0 magnitude earthquake in Haiti, and the 8.8 magnitude earthquake in Chile, which both occurred in early 2010 and received large amounts of media coverage. Secondhand smoke is another hazard related to health, possibly showing

that non-whites are particularly concerned with issues of personal health. This could mean that public health officials would want to focus on further educating non-white college students about preventing and treating sexually transmitted diseases and other health concerns.

Age did not significantly affect risk perceptions of hazards in this study. However, there were differences between age groups for the preferences in the management of hurricanes and burning fossil fuels. Respondents that were ages eighteen and nineteen wanted significantly more government time and money spent on the management of hurricanes compared to students' ages twenty-six and up. This may be a result of Hurricane Katrina, which occurred in 2005 and received widespread media attention. Hurricane Katrina is probably the largest natural hazard event in the United States in the memory of young Americans. Students age eighteen and nineteen also wanted significantly more time and money applied to the management of burning fossil fuels compared to those twenty to twenty-two years old. Although eighteen and nineteen year olds were not more concerned than others with hurricanes or the burning of fossil fuels causing them serious harm, injury or death, they did want more government time and money devoted to them. This may show that they do feel that these events are hazardous, but perhaps not to them personally.

Those twenty-six and older wanted the most time and money applied to water pollution, possibly because they are older and more experienced and therefore more acutely aware of the very real problem of water pollution, especially in an area with consistent water supply troubles. Eighteen and nineteen year olds wanted the most time and money applied to alcohol consumption. There is a direct correlation to age and

management of alcohol consumption. As age goes up, the desire for the application of more government time and money on alcohol consumption goes down. This is probably a result of the actual amount of alcohol consumed by a student in the course of their college career, and the ability to control what happens when under the influence of alcohol. It is possible that the younger and more inexperienced you are, the more likely you are to consume alcohol to fit in with your peers and cope with the transition to college.

Academic classification, and therefore education level, did have a significant effect on risk perception of cigarette smoking, with juniors being the most concerned and freshmen being the least concerned. Academic classification also had a significant effect on the management preferences of hurricanes and automobile travel. Freshman wanted the most time and money applied to hurricanes, while seniors wanted the least amount. This correlates with eighteen and nineteen year olds wanting more time and money spent on hurricanes when compared to those twenty-six and older, or could again be related to Hurricane Katrina. However, the same correlation does not exist for the burning of fossil fuels, something eighteen and nineteen year olds wanted more time and money spent on. Seniors wanted significantly more time and money applied to automobile travel than freshmen did. Since auto travel is actually one of the most hazardous activities people often face, this may suggest a higher level of education does make you more aware of the true risks of hazards, such as auto travel. This could also be due to more driving experience. As academic classification went up, the concern about auto travel also went up.

Political philosophy did have a significant effect on risk perception of climate change, drought, heat waves, sea level rise, nuclear weapons, auto travel and terrorism.

Liberals were the most concerned about climate change, while conservatives were the least concerned. Sea level rise is a result of climate change, but moderates were more concerned than liberals about it, with conservatives still being the least concerned. This may mean that the public does not necessarily directly correlate sea level rise with climate change or that they feel that applying more government time and money to climate change would be enough to also combat rising sea levels. Liberals were the most concerned with drought and "others" (none/other/prefer not to answer) were the most concerned with heat waves, with moderates being the least concerned with both of those hazards. Drought and heat waves are both prevalent hazards in the study area. "Others" were the most concerned with auto travel, while liberals were the least concerned.

The two hazards associated with war produced opposite results. Liberals were the most concerned by nuclear weapons, followed by "others", moderates, and then conservatives, while conservatives were the most concerned with terrorism, followed by moderates, "others", and then liberals. This may illustrate what different people view as the threats associated with war and what types of military policies people with differing political philosophies will desire and want to support. This may show how strongly politics affect risk perceptions, shaping how an individual views and responds to the world. Only two of the seven hazards, climate change and terrorism, had significant differences in risk perceptions that were predicted at the 95 percent confidence level. This may mean that political philosophy does not influence risk perceptions as much as sex and political party affiliation. The reviewed literature suggests that conservatives tend to be more hierarchical, while liberals tend to be more equalitarian. This may be why conservatives only perceive terrorism to be more risky than any other group, while

liberals perceive climate change, drought, and nuclear weapons as more risky than any other group.

Political philosophy did significantly affect the management preferences of climate change, hurricanes, sea level rise, tornadoes, winter storms, and terrorism. Liberals wanted the most time and money applied to the management of climate change, significantly more than conservatives did. Conservatives wanted significantly more time and money applied to hurricanes than liberals. Conservatives also wanted significantly more time and money applied to the management of tornadoes than liberals did, and wanted more time and money applied to winter storms than moderates did. Liberals wanted the most time and money applied to handguns, while conservatives wanted the least. Moderates wanted significantly more time and money applied to terrorism than liberals did. Conservatives wanted more time and money applied to the more traditional hazards such as hurricanes, tornadoes, and winter storms, possibly because they are invested in structures that could be damaged by these events. Liberals were more concerned with climate change, an emerging hazard which has been highly politicized, and liberals have been known to be more concerned with. Moderates wanted the most time and money applied to terrorism, another emerging hazard with high levels of media attention, even though conservatives were the most concerned with it.

Political party affiliation had a significant effect on the risk perception of climate change, wildfires, vaccines, air travel and terrorism. Democrats were the most concerned with climate change, Republicans were the least concerned. Republicans were the most concerned with wildfires, while Democrats were the least concerned. "Others" (Libertarians, Independents, and others) were the most concerned with vaccines, while

Democrats were the least concerned. "Others" (Libertarians, Independents, and others) were the most concerned with air travel, while those with no political party affiliation were the most concerned. Republicans were the most concerned with terrorism while those with no political party affiliation were the least concerned. This number of significant differences implies that political party affiliation is a good predictor of risk perceptions of hazards. Like political philosophies, political party affiliation influences worldviews and shapes people's perceptions.

Political party affiliation affected the management preferences of the following six hazards: climate change, drought, earthquakes, hurricanes, tornadoes, and air travel. "Others", closely followed by Democrats, wanted the most time and money devoted to climate change, the significant difference was between Democrats and Republicans, and "Others" and Republicans. Republicans wanted significantly more time and money applied to drought than "others". Republicans wanted significantly more time and money applied to earthquakes than "others". Republicans also wanted the most time and money applied to hurricanes, significantly more than "others". Those with no political party affiliation wanted significantly more time and money applied to tornadoes than Democrats. "Others" wanted significantly more time and money applied to the management of air travel than Democrats. All but one of these hazards is a natural hazard. "Others" wanted more time and money applied to half of the hazards. Despite Democrats being the most concerned with climate change, "others" wanted the most time and money applied to its management. "Others" were the most concerned with air travel and wanted more time and money applied to it. These results suggest that political party

affiliation is a strong predictor of management preferences of hazards, especially natural hazards.

Coming from a rural, suburban, or urban background did have a significant effect on the risk perceptions of sea level rise and water pollution. Those from rural backgrounds were the most concerned with water pollution, significantly more than those who "don't know". People in rural areas are more likely to rely on wells and other systems aside from municipal water supplies, which could make them more aware of the hazards associated with water, such as pollution. Both those from rural and those from suburban backgrounds wanted significantly more time and money applied to water pollution than those who answered, "don't know," although it is unclear what this group represents.

Those from a city of twenty-five hundred or less were the most concerned with building fires, significantly more than those from a city with a population between fifty thousand and two hundred thousand. This may be because small towns often do not have full time fire departments, instead relying on volunteer fire departments or fire departments in nearby towns. Those from a city over one million were the most concerned with hurricanes. This may be because many of the respondents in this category were from Houston and other coastal cities. Those from a city with a population between twenty-five thousand and fifty thousand were the most concerned with cellular phones, while those from a city with a population that is twenty-five hundred or less were the least concerned.

The significant difference for management preference of flooding was between those from a city or town with a population of twenty-five hundred or less and those from

a city with the population between twenty-five thousand and fifty thousand. This may be because small towns have fewer resources such as barricades on low-water crossings after a heavy rainfall. These results suggest that the exploratory variable of place did significantly affect perceptions of risk and management preferences of hazards, though not as much as sex and politics do. Additional research is needed to further explore these variables.

Of the variables analyzed, politics and sex seemed to be the best predictors of risk perceptions, while age seemed to have no effect on risk perceptions of college students. Politics was also the best predictor of how much time and money the respondent felt the government should apply to the management of hazards. "Place" also seemed to have an effect on perceptions, leading us to believe that geography may play a role in how people perceive risks. In general, respondents did not seem to be more concerned with the hazards identified as emerging, and actually seemed less concerned about many of them.

Overall, respondents were most concerned with hurricanes, tornadoes, nuclear weapons and auto travel. They were the least concerned with climate change, sea level rise, winter storms, cell phones, and air travel. Respondents wanted the most government time and money applied to hurricanes, nuclear weapons, and terrorism. They wanted the least government time and money applied to climate change, winter storms, cell phones, and secondhand smoke. Emerging hazards such as climate change, genetically modified organisms, and cell phones did not seem to produce higher risk perceptions. In fact, the ranking of hazards such as climate change, sea level rise, and cell phones were relatively lower than other more long-standing hazards. Terrorism was the only emerging hazard that respondents seemed to be particularly concerned with, wanting the most government

time and money applied to it, perhaps because it is the only emerging hazard they felt they are knowledgeable about.

This research can aid policy makers and emergency planners in decision making with the knowledge of what different people, particularly college students, are concerned about, and to which hazards they want the most government time and money applied. Governments have limited financial resources and must make decisions on how to allocate those resources that the public will support. Risk perceptions of hazards can also give the government insight into what hazards the public expects them to manage and what hazards the public feels they should manage personally.

This research contributes to the study of hazards and the broad field of risk perception by providing primary data and new analysis describing contemporary perceptions of college students toward a host of environmental risks, both familiar and emerging. This research will also provide new insights into the influence of socio-political attitudes on environmental decision-making and the relative priority placed on various environmental risks.

APPENDIX

Risk Perception Survey

This survey is a research study for a Master's thesis project. Participation in this survey is completely voluntary. You may withdraw from the survey at any time if you feel uncomfortable answering the study questions.

Background Questions:

1. ☐ Female ☐ Male (check one)

2. Age _____

3. Race (check one)

☐ White/Non-Hispanic ☐ Hispanic/Latino ☐ Black/African-American

☐ Asian ☐ American Indian/Pacific Islander ☐ Other

_____

☐ Multi-Racial/Bi-Racial_____

4. Current academic major(s) at Texas State:

_____

5. Academic Classification (check one): ☐ Freshman ☐ Sophomore ☐ Junior

☐ Senior

6. Which term best describes your personal political philosophy (check one)?

☐ Conservative ☐ Moderate ☐ Liberal ☐ Other ☐ None ☐ Prefer Not to Answer

7. A. Which best describes your political party affiliation (check one)?

☐ Republican ☐ Democrat ☐ Libertarian ☐ Independent ☐ Other

☐ None ☐ Prefer Not to Answer

B. I am very strongly connected with this political party (check one).

☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree

8. Is there a place you consider your hometown? (check one) ☐ Yes ☐ No
   If no, skip question #9.

9. A. Hometown: city_____ State _____

   Country _____

   B. How would you best describe the environment you spent the most time in while growing up:
   (check one)

   ☐ Inner City ☐ Suburban ☐ Rural ☐ Don't Know

Different people consider certain activities, events, or technologies to be more or less hazardous than others. **In each column, rank** (1-10) each activity, event, or technology on how likely you think it is that it will cause you serious injury or death? **Use each number only once per column.**

1 = Not Likely **10 = Highly Likely**

Natural Hazards (rank 1-10)	Technological Hazards (rank 1-10)	Social Hazards (rank 1-10)
___Climate Change	___Antibiotics	___Air Travel
___Drought	___Building Fires	___Alcohol Consumption
___Earthquake	___Burning Fossil Fuels	___Automobile Travel
___Flooding	___Cellular Phones	___Cigarette Smoking
___Heat Wave	___Genetically Modified Organisms	___Flu Epidemics
___Hurricanes	___Nuclear Power	___Handguns
___Sea Level Rise	___Nuclear Weapons	___Secondhand Smoke
___Tornado	___Pesticides	___Sexual Assault
___Wildfires	___Vaccines	___STDs
___Winter Storm	___Water Pollution	___Terrorism

The amount of money the government has to spend on the management of these hazards is limited. **In each column, rank** (1-10) each activity, event, or technology on how much time and money you think local, state, and federal government agencies should apply to their management? **Use each number only once per column.**

1 = Least Time and Money **10 = Most Time and Money**

Natural Hazards (rank 1-10)	Technological Hazards (rank 1-10)	Social Hazards (rank 1-10)
___Climate Change	___Antibiotics	___Air Travel
___Drought	___Building Fires	___Alcohol Consumption
___Earthquake	___Burning Fossil Fuels	___Automobile Travel
___Flooding	___Cellular Phones	___Cigarette Smoking
___Heat Wave	___Genetically Modified Organisms	___Flu Epidemics
___Hurricanes	___Nuclear Power	___Handguns
___Sea Level Rise	___Nuclear Weapons	___Secondhand Smoke
___Tornado	___Pesticides	___Sexual Assault
___Wildfires	___Vaccines	___ STDs
___Winter Storm	___Water Pollution	___Terrorism

REFERENCES

Berliner, L.M. 2003. Uncertainty and climate change. *Statistical Science* 18(4):430-435.

Cutter, S., J. Tiefenbacher, and W. Solecki. 1992. En-gendered fears: Femininity and technological risk perception. *Industrial Crisis Quarterly* 6:5-22.

Cutter, S. 1993. *Living With Risk.* New York: Routledge, Chapman, and Hall, Inc.

Cutter, S., J. Mitchell, and M. Scott. 2000. Revealing the vulnerability of people and places: A case study of Georgetown County, South Carolina. *Annals of the Association of American Geographers* 90(4):713-737.

Davidson, D., and W. Freudenburg. 1997. Gender and environmental risk concerns: A review and analysis of available research. *Environment and Behavior* 28:302-339.

Etkin, D., and E. Ho. 2007. Climate change: Perceptions and discourses of risk. *Journal of Risk Research* 10(5):623-641.

Fischer, G.W., M. Granger Morgan, B. Fischhoff, I. Nair, and L. B. Lave. 1991. What risks are people concerned about? *Risk Analysis* 11(2):303-314

Fischhoff, B., P. Slovic, S. Lichtenstein, S. Read, and B. Combs. 1978. How safe is safe enough? A psychometric study of attitudes towards technological risks and benefits. *Policy Sciences 9*(2):127-152.

Flynn, J., P. Slovic, C.K. Mertz. 1994. Gender, race, and perception of environmental health risks. *Risk Analysis* 14(6):1101-1108.

Frewer, L., C. Howard, and R. Shepherd. 1997. Public concerns in the United Kingdom about general and specific applications of genetic engineering: Risk, benefit, and ethics. *Science, Technology, & Human Values* 22(1):98-124.

Gaskell, G., N. Allum, W. Wolfgang, N. Kronberger, H. Torgersen, J. Hampel, and J. Bardes. 2004. GM Foods and the misperception of risk perception. *Risk Analysis* 24(1):185-194.

Kalof, L., T Dietz, G. Guagnano, and P.C. Stern. 2002. Rance, gender and environmentalism: The atypical values and beliefs of white men. *Gender, Race, and Class* 9(2):1-19.

Lusk, J., and K. Coble. 2005. Risk perceptions, risk preference, and acceptance of risky food. *American Agricultural Economics* 87(2):393-405.

Marsh, W., and J. Grossa. 2002. Environmental geography: Science, land use, and earth systems. New York: *John Wiley and Sons, Inc.*

Nisbet, M.C. 2007. The polls-trends: twenty years of public opinion about global warming. *Public Opinion Quarterly* 71(3):444-470.

Satterfield, T., C.K. Mertz, and P. Slovic. 2004. Discrimination, vulnerability, and justice in the face of risk. *Risk Analysis* 24(1):115-129.

Savadori, L., S. Savio, E. Nicotra, R. Rumiati, M. Finucane, and P. Slovic. 2004. Expert and public perception of risk from biotechnology. *Risk Analysis: An International Journal 24*(5):1289-1299.

Savadori, L., S. Savio. E. Nicotra, R. Rumiati, M. Finucane, and P. Slovic. 2004. Expert and public perception of risk from biotechnology. *Society for Risk Analysis* 24(5):1289-1299.

Savage, I. 1993. Demographic influences on risk perceptions. *Risk Analysis* 13(4):1-13.

Sjöberg, L. 2000. Factors in risk perception. *Risk Analysis* 20(1):1-11.

Sjöberg, L. 2000. The methodology of risk perception research. *Quality & Quantity 34*(4): 407.

Sjöberg, L. 2003. The different dynamics of personal and general risk. *Risk Management* 5(3):19-34.

Sjöberg, L. 2005. The perceived risk of terrorism. *Risk Management 7*(1):43-61.

Slovic, P. 1987. Perception of risk. *American Association for the Advancement of Science* 236(4799):280-285.

Slovic, P., E. Peters, D. MacGregor, and M. Finucane. 2005. Affect, risk, and decision making. *Health Psychology* 24(4):S35-S40.

Slovic, P., B. Fischhoff, and S. Lichtenstien 1985. Characterizing perceived risk. *Perilous progress: Managing the hazards of technology.* Boulder, Co: Westview Press.

Slovic, Paul. 2000. *The perception of risk.* London, UK: Earthscan Publications Ltd.

Tobin, G. and B. Montz. 1997. *Natural hazards: explanation and integration.* New York: The Guilford Press.

White, G. 1988. Paths to risk analysis. *Risk Analysis* 8(2):171-175.

Wildavsky, A., and A. Dake. 1990. Theories of risk perception: Who fears what and why? *Daedalus* 119(4):41-60.

VITA

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