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College Student Disaster Risk, Fear and Preparedness

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This research examines college students' perceived risk of tornados and earthquakes affecting their college residence and community, fear, perceived levels of disaster preparedness and preparedness actions at a Midwestern university. Using questionnaires, we collected a sample of 192 college students from a variety of majors and class ranks. We conclude that these students do know the potential likelihood and risks of tornados and earthquakes, perceive that they are prepared for tornados but not for earthquakes, and do not take many of the appropriate actions to prepare themselves.

Key Words: Risk Perception, Disaster Preparedness, Earthquake, Tornado

Introduction

Recent studies have identified vulnerable populations as disproportionately affected by natural disasters. These groups are often less prepared for disasters, perceive that they are at greater risk, and are often less capable of recovering after disasters. In this research, we examine college students' at a Midwestern University located on the eastern edge of "tornado alley" and on the northern edge of the New Madrid earthquake fault zone. The guiding research question is, "What are the patterns perceived risk, fear, perceived preparedness and preparedness activities of college students who are vulnerable to earthquakes and tornados?" Also, this research is timely in the wake of Hurricane Katrina where thousands of college students were displaced from their academic institutions, tornados impacting Union University, and recent shootings at other universities. Our research examines how college students' perceptions of risk and preparedness for disaster events vary by gender, race/ethnicity and class rank.

Literature Review

The vulnerability perspective provides a framework for this research to examine patterns of college student disaster preparedness, perceived preparedness and fear of earthquakes and tornados at a Midwestern University. The vulnerability perspective suggests that environmental hazards do not exist independently of society and are “defined, reshaped, and redirected by human actions” (Mileti 1999:18). Also, communities consist of heterogeneous ecological elements and networks whereby power and resources are unequally distributed (Bates and Pelanda 1994; Blaikie, Cannon, Davis, and Wisner 1994; Peacock, Morrow, and Gladwin 1997; Peacock and Ragsdale 1997).

Sociological research on gender and social roles also helps to clarify variations in vulnerability. For example, one of the major factors contributing to women’s greater disaster vulnerability is the social roles that they occupy that create systems of stratification and inequality in our society. This is also evident in the disaster field, as there has been a systematic and persistent “gender silence” in disaster work and women’s voices have been most noticeably absent in the literature (Bhatt 1995; Bolin, Jackson, and Crist 1998). This pattern of exclusion mirrors the historical silencing and oppression of women in many facets of society (Fothergill 1998; Oliver-Smith 1998; Scanlon 1998). The current disaster literature is beginning to focus on gender vulnerability and how social roles are influenced by disasters and influence vulnerability. For example, poor, minority women were the most vulnerable to Hurricane Andrew because they lacked status, power and resources (Morrow and Enarson 1996). This is partially due to the traditional gendered divisions of labor and divisions in social roles deemed appropriate for men and women. Although some research suggests that the gendered division of labor and traditional gender roles break down during disasters, more recent research shows that women’s roles are expanded (Fothergill 1999a). Women often take on additional roles in disaster situations experiencing role accumulation, further influencing their vulnerability. Also, the fulfillment of women’s traditional gender-based roles becomes even more difficult (Paul 1997:104). For example, as women most often perform the role of primary caregivers, they are more vulnerable because they must stay with, assist, protect, and manage family members emotional, health and material needs (Morrow and Phillips 1999; Rivers 1982).

As women tend to be more active in preparing their families for disasters, they also work at the grassroots community level more than men. Many contributors to the on-line conference of the United Nations Division for the Advancement of Women noted, “women’s domestic responsibilities situate them to act proactively to reduce risks and protect the most vulnerable”(Enarson 2001:5). In Hurricane Andrew, women were responsible for preparing family members, stocking supplies and getting the household ready for the hurricane. When present, men are responsible for the external areas of the house (Morrow and Enarson 1996). Also, Neal and Phillips (1990) found that women

outnumbered men as leaders and members of emergent grassroots organizations working on community disaster issues. In another study, women were more likely to volunteer and to be willing to be trained for programs in their communities related to emergency management (Nehnevajsa 1989). Again, this is often perceived as an extension of their traditional gender roles and responsibilities.

Also, the social roles we occupy may influence our risk perceptions and fear levels. In fact, research does show that there is some gendered difference in risk perception. Fothergill (1996) states that women tend to perceive disasters as more serious and risky than do men and speculates that “it is possible that women are more concerned because of their relative lack of power and control in society” (p.37). Cutter et al. (1992) found that women and men perceive the world differently and conclude that men are risk-takers, while women are risk-avoiders (p.10). Most disaster researchers concur that women and men perceive disaster warnings differently and also respond to them differently. Fothergill (1996) states, “women are more likely to receive risk communication, due to their social networks, and to respond with protective actions, such as evacuation” (p.39). Also, rates of violence against women, especially spousal abuse, have been found to increase in times of disasters (Anam 1999) increasing women’s fear (Fothergill 1999b; Honeycombe 1994; Wilson, Phillips, and Neal 1998). Women and children experience more emotional trauma and anxiety, while men are more likely to suffer from alcohol abuse (Fothergill 1996;1999b). Women also tend to exhibit higher levels of posttraumatic stress disorder than men following disasters (Ollenburger and Tobin 1998). Women are most often subject to higher levels of stress and anxiety than men because of their roles as primary caregivers. After Hurricane Floyd, women in counties that were moderately to severely affected reported lower levels of social support and sense of purpose than men (Van Willigen 2001:75). All of these patterns are related to the fact that women do occupy different social positions in society. Simply stated, women are more fearful because they must consider the safety of the children, household, etc. Men have historically been removed from these obligations.

Also, research has shown that race/ethnicity is an important predictor of vulnerability, risk perception, fear and preparedness. For example, research shows that Mexican-Americans are less likely to rely on majority group authorities as credible information sources and rely more on the confidence and credibility of established social networks within their community (Perry and Lindell 1991). After Hurricane Andrew, much of the early relief information was disseminated only in English, preventing members of the Latino and Haitian populations from receiving food, medical supplies and recovery information (Yelvington 1997). After the Whittier Narrows earthquake, the Latino population reported that English-language radio contained better information than the Spanish stations that contained more human-interest stories. The result was that the ethnic communities received incorrect and inadequate information (Bolton, Liebow, and Olson 1993). As we can see, ethnicity shapes people’s perceptions of being at risk of

disasters as much as gender. For example, risk literature shows that people must hear, understand, believe and personalize the risk before they will take action (Nigg 1982; Whitney, Lindell, and Nguyen 2004; Mileti and Fitzpatrick 1993). Moreover, one must believe that they are personally responsible for their behavior and that resources are available for them to reduce risk (Mulilis, Duval, and Rombach 2001). Similarly, if they already perceive that they are prepared, they will be less likely to engage in such behaviors (Tierney, Lindell, and Perry 2001:36; Lindell and Whitney 2000).

Risk perception is closely related to overall disaster preparedness. The objective of preparedness is to “enhance the ability of social units to respond when a disaster occurs” (Tierney et al. 2001:27). Preparedness has been a major disaster research focus since the development of the field and is a critical area of study because it is one of the earliest ways to reduce the impact of disasters. Research generally shows that households with higher socioeconomic status are better prepared for disasters and ethnic minorities have a lower propensity of being prepared (Tierney et al. 2001:44). Turner, Nigg, Heller-Paz, and Young (1980) found that White residents of Southern California prepared more for earthquakes than African-Americans or Mexican-Americans. In addition, White residents of Southern California were more likely than African-Americans, Hispanics and Asians to make structural changes to their homes to reduce possible earthquake damage (Blanchard-Boehm 1997). This was directly related to the fact that the poor and marginalized have less access to information on hazards and fewer resources for preparedness (Turner, Nigg, and Heller-Paz 1986). Research also shows that racial and ethnic minorities engage in a variety of different preparedness activities. Black and Hispanic families were more likely than White families to be helped by relatives in preparing for Hurricane Andrew (Peacock, Morrow, and Gladwin 1997). As the literature indicates, it is important to recognize the racial/ethnic vulnerabilities that influence disaster preparedness.

This research examines race/ethnicity and gender influences on perceived risk, fear and preparedness of college students. Universities are one of the most important organizations in a community and it is critically important that they are disaster prepared. Evidence of this is based on the Pre-Disaster Mitigation (PDM) program as part of the Robert T. Stafford Disaster Relief and Emergency Assistance Act. “Funding provided to the Disaster Resistant University (DRU) program was granted by Congress under a special rule to set aside moneys to from be allocated specifically for universities to develop a planning strategy for vulnerability reduction”(Oyola Yemaiel 2006:179). We argue that in order to be disaster resistant, we must examine and understand students’ views of risk, fear and preparedness to disasters that are unique to particular institutions.

Hypotheses

- H1: Female and Black students will report a higher likelihood of tornados and earthquakes impacting them and their college community than male and White

students. Also, as class rank increases, the likelihood of tornados and earthquakes will increase. Additionally, students will report a higher likelihood of tornados than earthquakes.

H2: Female and Black students will be more fearful of tornados and earthquakes than males and White students and as class rank increases, fear level will decrease. Additionally, students will be more fearful of tornados than earthquakes.

H3: Female and Black students will perceive that they are less preparedness for tornados and earthquakes than males and White students and that an increase in class rank will also decrease perceived preparedness. Additionally, students will perceive that they are less prepared for earthquakes than tornados.

H4: Female and Black students will be more likely to engage in survival preparedness activities than male and White students. Conversely, we hypothesize that female and Black students will be less likely to engage in hazard mitigation activities, which often require resources, while male and White students will be more prepared. Finally, we hypothesize that most activities students will have completed will be survival preparedness activities and that as class rank increases, so will disaster preparedness.

Method

We utilized survey research and distributed questionnaires in two phases to measure college student perceived preparedness, preparedness actions, and fear levels for tornados and earthquakes at a Midwestern University. The questionnaires administered to the samples were adapted from earlier surveys to study community awareness and response to earthquake predictions in the 1970's and to the 1987, 1989, and 1994 California earthquakes, thereby enhancing the validity of the questions we asked students (Turner et al. 1986; Bourque, Shoaf, and Nguyen 1997). We generated 192 subjects for this study by selecting a non-probability sample of all students enrolled in Introductory Sociology & Anthropology classes during the fall semester 2006 and spring semester 2007. This produced a convenience sample of approximately 500 students each term, a total of approximately 1000 student sample, from a variety of disciplines and class standings. In the second wave of questionnaire dissemination and data collection, we instructed students who had participated the previous semester that they were exempt from participation a second time. This ensured that we did not have students completing the same questionnaire twice.

We distributed questionnaires at the end of class sessions, provided all participants with a description of the study, indicated that their participation was completely voluntary, and informed them that there were no benefits for participation or punishments for lack of participation. We also guaranteed complete anonymity, as we were not able to link information in the questionnaires back to students who completed them. To ensure complete anonymity and voluntary participation in the principal investigators' introductory sociology classes, the co-principal investigator (project research assistant) entered the classroom, introduced the research and disseminated the questionnaires. Students then completed the paper questionnaires after class and returned them in a secure drop box in the main Sociology department office, in a secure envelope in their classroom the next class meeting, or via a secure online website. Since we were entering classrooms to generate volunteers, we did not conduct any follow-ups to increase response rate because we felt this could become disruptive to classes and possibly jeopardize voluntary participation.

Dependent Variables

Perceived Risk. We asked students four questions measuring the risk of a tornado affecting them directly at their current college residence, an earthquake affecting them at their current college residence, a tornado striking the community where they attend college and an earthquake striking the community where they attend college. They selected a risk level ranging from zero to ten with each number representing a ten percentage point increase in the risk level.

Fear. We also asked the respondents two questions measuring fear by asking them how fearful they are of a possible tornado and how fearful they are of a possible earthquake striking the residence that they live in. Using a Likert scale, responses were coded as not at all fearful (1), not very fearful (2), somewhat fearful (3) and very fearful (4).

Perceived Preparedness. We asked the respondents four separate questions that are used in the following analysis measuring how prepared they think they are for tornados, how prepared they think they are for earthquakes, how prepared they think university staff and officials are for tornados and how prepared they think university staff and officials are for earthquakes. Using a Likert scale, responses were coded as totally unprepared (1), fairly unprepared (2), somewhat prepared (3) and very well prepared (4).

Preparedness: We asked respondents to actions they had completed from a list of disaster preparedness measures. We arranged the questions around three dimensions of preparedness and created an index score for each dimension: (a) survival—collecting and maintaining supplies and learning techniques for the basic purpose of survival; (b) planning—activities that reflect cognitive preparation and resource allocation; and (c) hazard mitigation—securing and reinforcing homes and their contents (Russell, Goltz, and Bourque 1995).

We coded the response to each preparedness question as (1) not having completed the activities, (2) not sure or did not know, and (3) completed the activities¹. We also examined the influence of race/ethnicity, gender and class rank on each of our dependent variables². In the next section, we use repeated measures analysis of variance (ANOVA) to examine differences in perceived risk, fear, and perceived preparedness by hazard agent (tornado and earthquake), preparedness actions by type (survival activities, preparedness planning, hazard mitigation). We also examined the influence of race/ethnicity, gender and class rank.

Table 1: Disaster Preparedness Items

Category	Items
Survival Activities	Store water
	Store canned or dehydrated food
	Have working, battery operated radio
	Have first-aid kit or medical supplies
	Have working flashlight
	Learned First Aid & CPR
	Learned how to turn off gas, electricity, and water
Preparedness Planning	Secured hot water heater
	Have disaster insurance
	Discuss with others what to do
Hazard Mitigation	Establish plans for what to do at your residence
	Structural support or reinforcement of your home
	Rearrange contents of cupboards or storage cabinets
	Cupboard or storage cabinet latches
	Securing furniture like tall bookshelves to the wall

Results

Basic Demographic Information

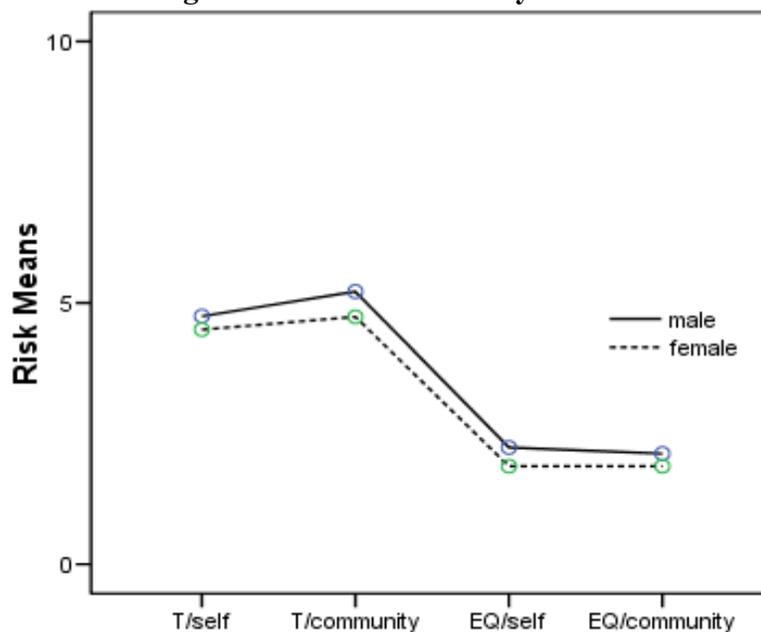
The sample ($N = 192$) differed only slightly from the larger university population and had good gender and race/ethnic variation. Specifically, 73.4 percent of the students were female, whereas 26.6 percent were male. Also, 85.3 percent of our sample were White, 13.5 percent were Black and 3.2 percent other race/ethnicity³. Twenty-seven percent of the students were freshmen, 32.8 percent were sophomores, 24 percent were juniors, 15.6 percent were seniors and .5 percent were graduate students. Overall, the students in our study are White, non-married, live in residence halls initially and move off campus and rent later, work while attending school, and rely on some form of assistance while attending college.

Perceived Risk

The first critical component of assessing disaster preparedness is to examine respondents' understanding of the risk of a disaster. We asked students to indicate the chances of a tornado and earthquake affecting them directly at their current college residence and in the college community. On average, they reported a 45.5 percent chance that a tornado will impact them directly at their current college residence. Similarly, they averaged a 48.6 percent chance that a tornado will impact the larger community that they live in while attending college. Conversely, they reported a 19.7 percent chance of an earthquake impacting them directly at their current college residence and only a 19.4 percent likelihood of an earthquake impacting the community that they live in while attending college.

When examining the influence of gender, Figure 1 shows that perceived risk of tornados affecting students at their residence and at their community were significantly greater than for reported risk of earthquakes for both males and females ($F = 146.93, p = .000$)⁴ but there were no significant differences between men and women in their risk judgments ($F = 1.63, p = .203$).

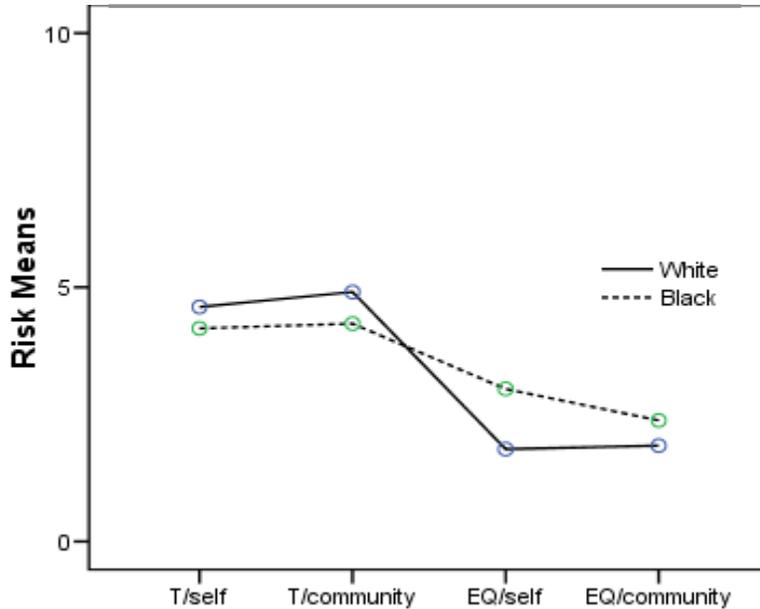
Figure 1: Perceived Risk by Gender



Also, in Figure 2, risk of tornados impacting students at their residence and impacting their community were significantly greater than for reported risk of earthquakes for both White and Black students ($F = 48.78, p = .000$). Also, there is a significant interaction between hazard and race/ethnicity, as patterns of perceived risk differ for Whites and Blacks by hazard ($F = 5.13, p = .006$). Whereas White students reported a higher risk of

tornados than Black students, they reported lower risk of earthquakes than Black students.

Figure 2: Perceived Risk by Race/Ethnicity



Finally, in Figure 3, the perceived risks of tornados affecting students at their residence and their community were significantly greater than for reported risk of earthquakes for students in all class ranks ($F = 173.26, p = .000$). There was also a significant difference in reported risk by class rank ($F = 2.92, p = .035$). Freshmen reported the lowest risk of tornados and earthquakes whereas Juniors and Seniors perceived the highest risk levels. Hence, we see that risk perceptions vary significantly by hazard agent, by race/ethnicity, and class rank, but not by gender.

Fear

We asked students to report their level of fear for a tornado or earthquake striking their residence and community. We found that 71.9 percent of the students are not fearful of a tornado impacting the residence they live in while attending college and 83.9 percent of the students are not fearful of an earthquake impacting their residence. When examining the influence of gender, Figure 4 illustrates that fear of a tornado striking their residence was significantly greater than fear of earthquakes for both males and females ($F = 59.25, p = .000$) and there was a significant difference in reported fear between male and female students ($F = 5.82, p = .017$). Female students reported that they were significantly more fearful of tornados and earthquakes than male students.

Figure 3: Perceived Risk by Class

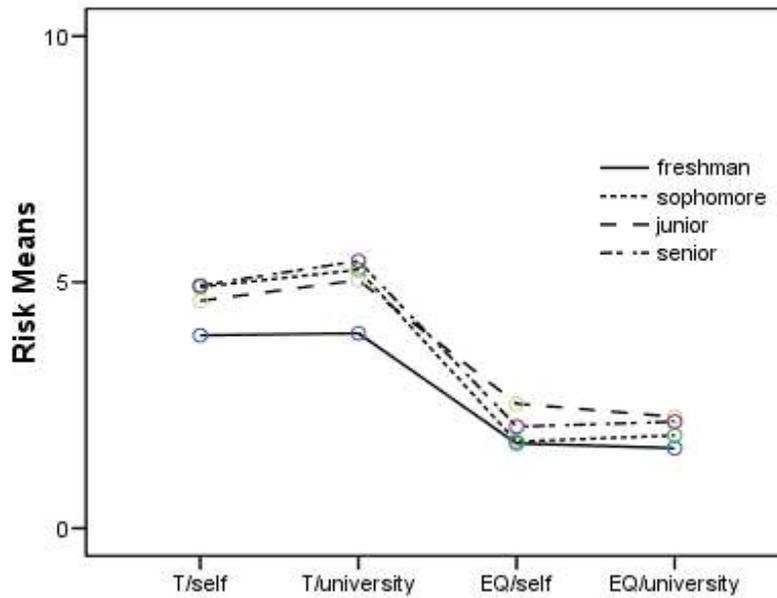
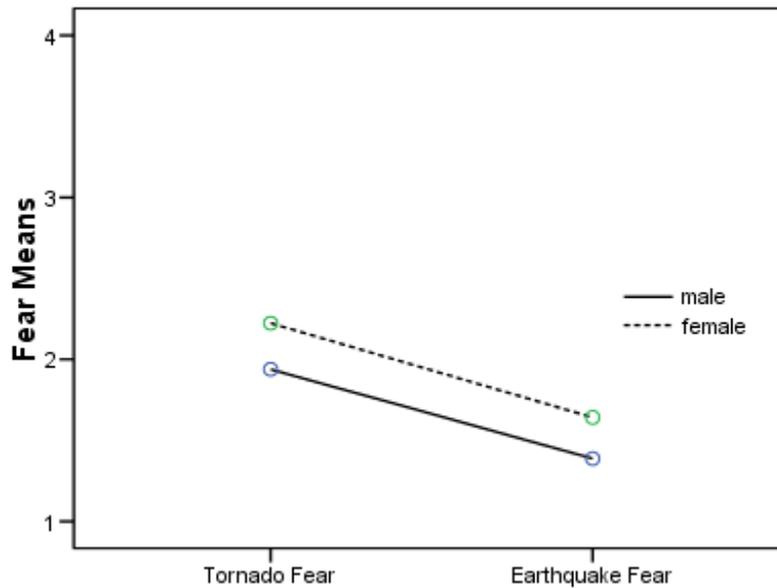
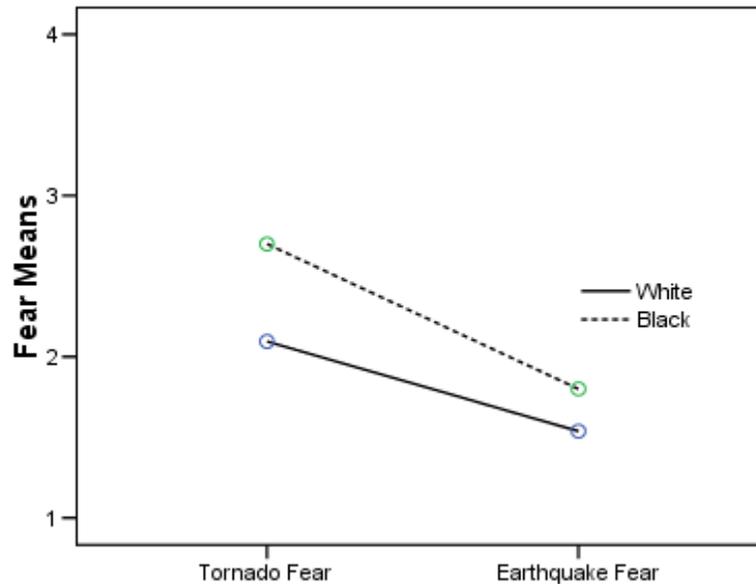


Figure 4: Fear by Gender



Also, in Figure 5, fear of tornados was significantly greater than for reported risk of earthquakes for both White and Black students ($F = 52.31, p = .000$) and there were significant differences in reporting patterns between White and Black students ($F = 7.58, p = .007$). Black students reported that they were significantly more fearful for both tornados and earthquakes than White students.

Figure 5: Fear by Race/Ethnicity

Finally, when controlling for class rank in Figure 6, fear of tornados was significantly greater than risk of earthquakes for students of all class ranks ($F = 73.83, p = .000$) but there were no significant differences among class ranks ($F = .285, p = .865$). In sum, fear levels are generally much lower for earthquakes than for tornados, females and Black students are significantly more fearful than males and White students, and there are no significant differences by class rank.

Perceived Preparedness

We asked respondents how prepared they think they are for a tornado or earthquake and how prepared university staff and officials are. Generally, 62.1 percent of the students reported that they were prepared for a tornado whereas only 31.1 percent reported that they were unprepared. Also, 64 percent of students reported that they think University staff and officials are prepared. Interestingly, findings for perceived preparedness for earthquakes are almost directly opposite the findings for tornado preparedness. A total of 76.5 percent of respondents reported that they were *not* prepared for an earthquake and 61.8 percent of them reported that University staff and officials are unprepared for an earthquake.

Figure 6: Fear by Class

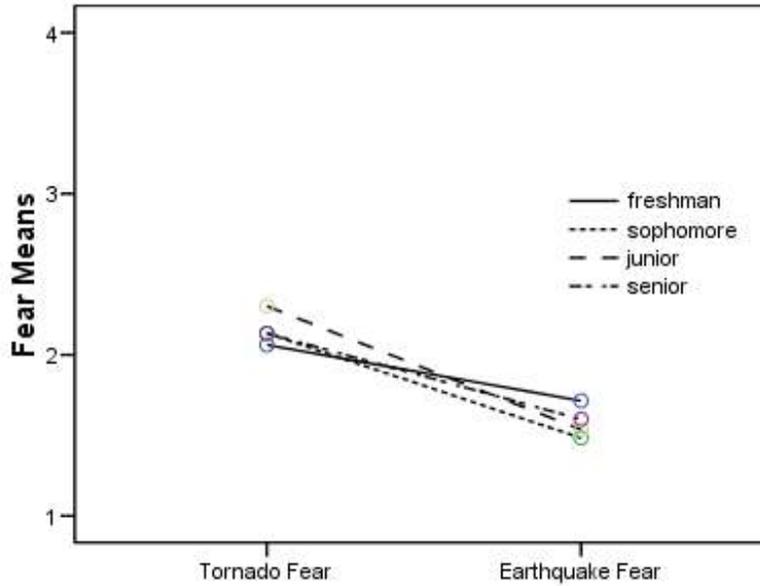


Figure 7 shows that perceived self and university preparedness for tornados were significantly greater than for self and university perceived preparedness for earthquakes by both males and females ($F = 71.64, p = .000$), but there were no significant differences between men and women in perceived preparedness ($F = .033, p = .857$).

Figure 7: Perceived Preparedness by Gender

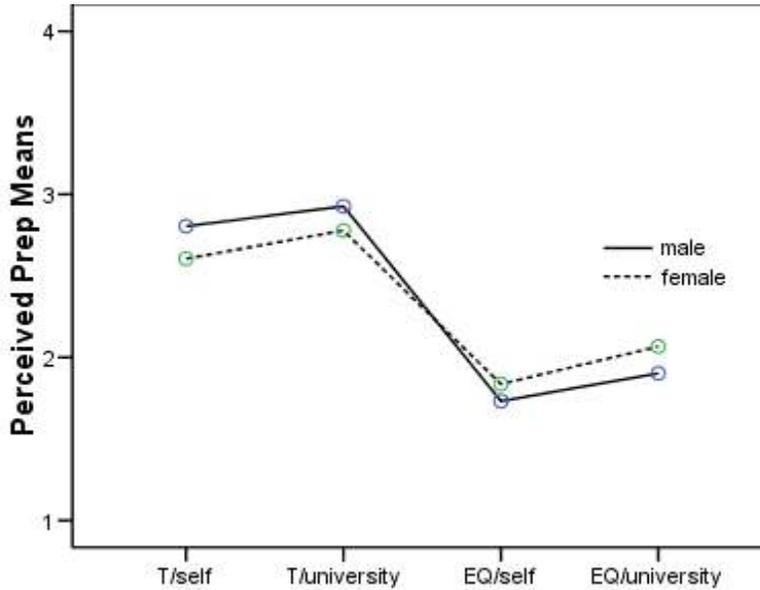
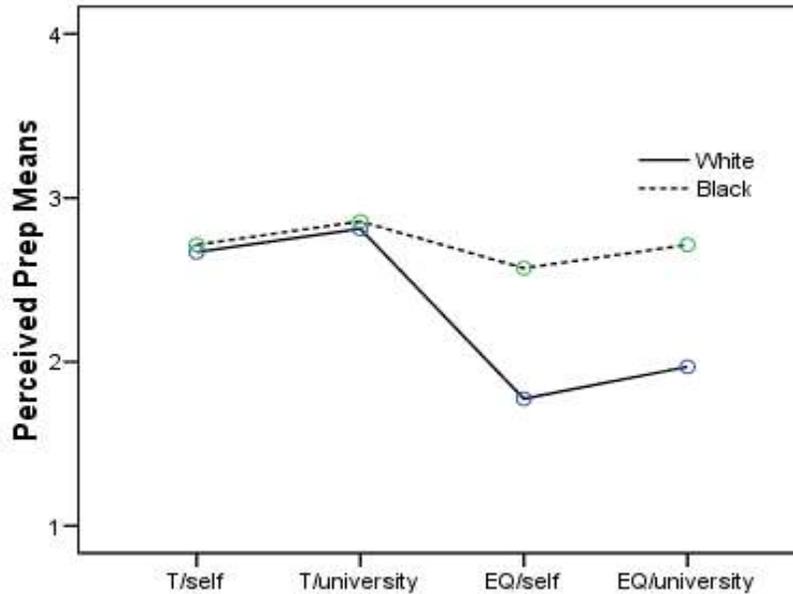


Figure 8 shows perceived preparedness of tornados is significantly greater than perceived preparedness of earthquakes for both White and Black students ($F = 5.46, p = .002$), but there were no significant differences between White and Black students ($F = 3.39, p = .068$).

Figure 8: Perceived Preparedness by Race/Ethnicity



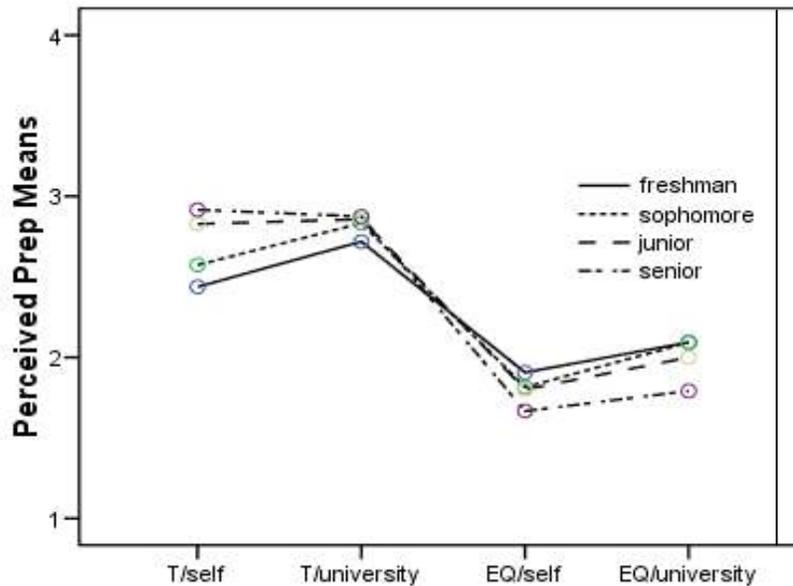
Finally, in Figure 9, perceived self and university preparedness for tornados was significantly greater than for perceived self and university preparedness for earthquakes in all class ranks ($F = 75.47, p = .000$). There was no significant difference in perceived preparedness among class ranks ($F = .117, p = .950$). Hence, we see that perceived risk varies significantly only by hazard and there are no race/ethnicity, gender or class rank differences.

Preparedness

The data show that students are generally more likely to engage in basic survival preparedness activities than any other activity—an average of 38.6 percent of students completed these activities. The most common basic survival preparedness activities are having a first-aid kit or medical supplies (50.3%), having a working flashlight (59.4%), having taken first aid classes (57.6%), and having taken CPR classes (69.1%). Overall, 36.3 percent of students completed preparedness planning actions. The most common preparedness planning tasks completed are having insurance (24.0%), discussing what to do with others (36.5%), establishing plans in their place of residence (34.4%), and participating in preparedness procedures at work (24.1%). Interestingly, almost half of all students (49.0%) reported that they did not know if they had insurance to safeguard

themselves from a tornado or earthquake. On average, only 7.2 percent of students completed the hazard mitigation actions. Less than 11 percent of students structurally reinforced their homes, 4.2 percent have installed cabinet latches and 3.1 percent rearranged contents of their cupboards. This is probably reflective of the fact that many students live in residence halls or rent and do not own their residences.

Figure 9: Perceived Preparedness by Class



When examining the influence of gender, Figure 10 shows that engaging in survival and planning activities was significantly greater than hazard mitigation for both males and females ($F = 82.34, p = .000$) but there was no significant difference between male and female students ($F = .411, p = .523$).

Also, Figure 11 shows that engaging in survival and planning activities was significantly greater than hazard mitigation for both White and Black students ($F=27.85, p = .000$). Similar to gender, there were no significant differences in preparedness between White and Black students ($F = .017, p = .898$).

Figure 10: Preparedness by Gender

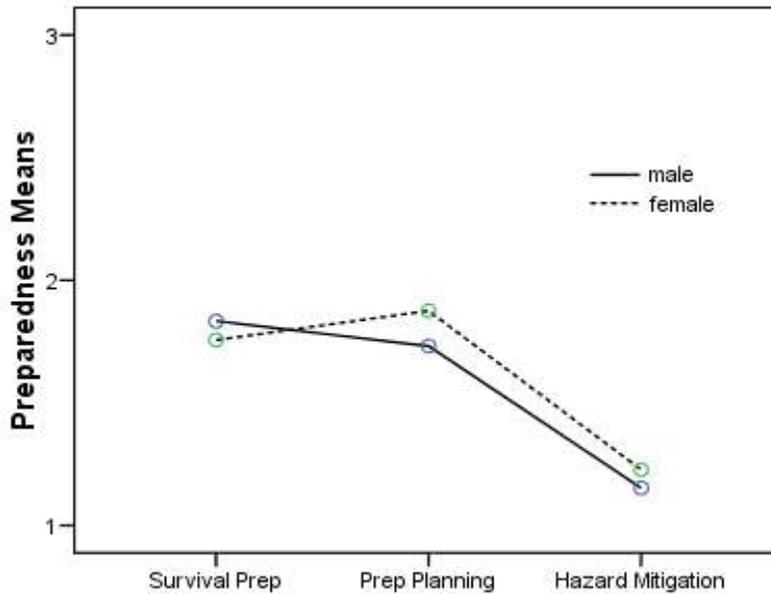
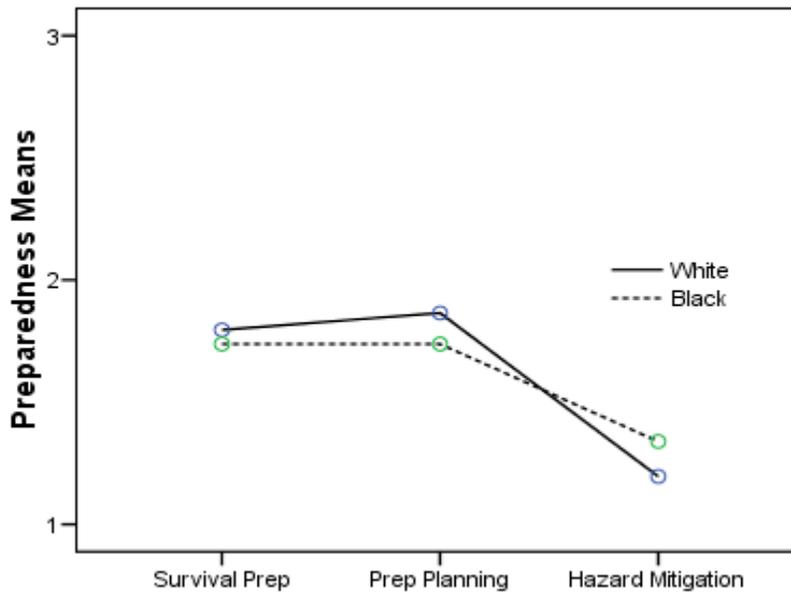
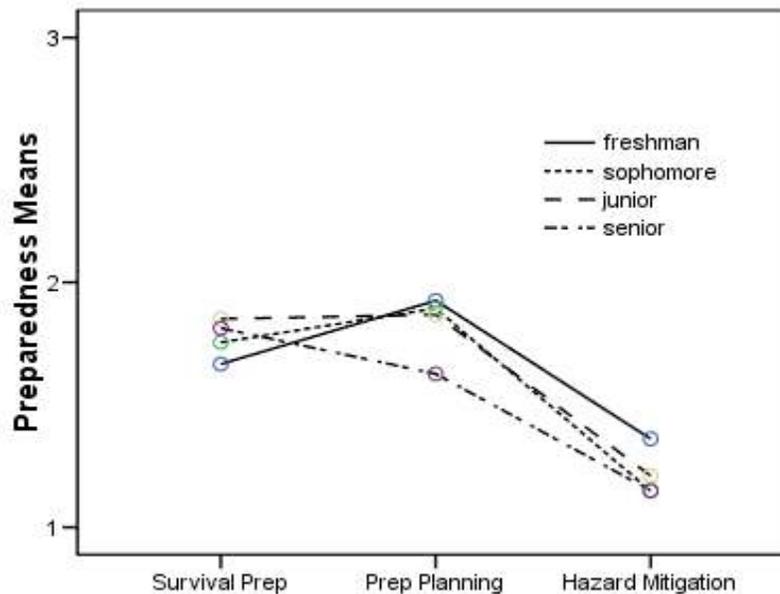


Figure 11: Preparedness by Race/Ethnicity



Finally, in Figure 12, engaging in survival and planning activities was significantly greater than hazard mitigation for all class ranks ($F = 93.82, p = .000$). Also, there is a significant interaction between hazard and class rank as preparedness is different for class rank by hazard ($F = 2.38, p = .033$). The completion of survival preparedness actions increased as class rank increased. In other words, seniors were significantly more likely to engage in survival preparedness actions than freshmen.

Figure 12: Preparedness by Class

Discussion

We found that our hypotheses were partially supported as perceived risk, fear and perceived preparedness varied significantly by hazard and preparedness varied significantly by type of preparedness. When examining perceived risk of tornados and earthquakes, our hypothesis that Black students would report a higher risk of tornados than White students and increases in class rank would increase perceived risk was supported. When examining fear, our hypothesis that women and black students would be more fearful than males and white students was supported. Conversely though, our hypothesis that females, black students and students of lower class ranks would have lower levels of perceived preparedness was not supported. There were no significant differences by race/ethnicity, gender or class rank. Our hypothesis that women and black students would engage in more survival preparedness actions than males and white students was not supported. In support of our hypothesis, survival preparedness did increase as class rank increased. Finally, our hypothesis that perceived risk, fear and perceived preparedness would vary significantly by hazard agent (tornado v. earthquake) was supported.

Our results have some significant theoretical implications. First, our research lends support to the vulnerability perspective and previous research on women and minorities to explain differences in perceived risk and fear. Our research shows that Black students reported a higher risk of disasters than White students and women and Black students

reported higher levels of fear than males and White students. However, we may need to reevaluate the effectiveness of the vulnerability perspective to adequately explain preparedness of college students, as we found no significant differences in perceived preparedness or actual preparedness by gender or race/ethnicity. It seems that while the vulnerability perspective is able to explain differences in preparedness for traditionally marginalized groups, this perspective does not seem to explain differences in preparedness of our college students. Specifically, although vulnerability research shows that racial/ethnic minorities and women are not able to prepare in the same ways as majority groups and are thereby often less prepared or rely more on survival preparedness activities, this relationship was not substantiated in our research. We argue that the vulnerability perspective may need to be reexamined or expanded to include distinctive groups such as college students.

In conclusion, we recommend that additional research continue to examine gender and perceived risk. According to the vulnerability perspective, perceived risk and fear are often higher for women because of the social roles they occupy as emotion workers, nurturers, and providers for children. The lack of a gender difference may be apparent because these same vulnerabilities and social roles are simply not often apparent in female college students. Therefore, the gender differences would not be as pronounced in college student populations as in typical American households and research must continue to examine this gender dynamic. Future research also must continue to examine the relationship between disaster behavior and personal responsibility. While our research shows that gender and race/ethnicity are not significant predictors of perceived preparedness and preparedness, we believe that this might be related to a common understanding that as residents of the university, it is the university's responsibility to protect and take care of the students. It is likely that students take very few protective actions because they expect the university to take care of them in an emergency or disaster. To that end, we suggest that additional research must be conducted to examine college students' definitions of preparedness and their perceptions of personal responsibility as outlined by person-relative-to-event (PrE) theory (Mulilis et al. 2001). As Mulilis and his colleagues have reported, people must feel that they have the resources and are personally responsible before they will take protective actions. We can continue to examine this connection between personal responsibility and preparedness of college students.

When examining our original research question theoretically, we conclude that students are a distinctive population in the sense that they are transient, marginally aware of their vulnerabilities, and do very little to prepare for disasters. Additionally, the conventional use of the term vulnerability is quite different than more traditional classifications discussed in other literature that is based on gender, race/ethnic and social class inequalities. Quite simply, our findings suggest that many of our students are not disadvantaged or vulnerable in the theoretical sense as gender was only a significant

predictor of fear while race/ethnicity was a significant predictor of perceived risk and fear.

We must also acknowledge that the sample was limited in some very important ways. While we did have good gender and race/ethnic variation, the sample was small, highly educated, typically not married, had no children, and lived on campus or rented an apartment off campus. Hence, we were not able to examine critical variables that have been shown to be significant in other research. We suggest that future research continue to involve larger numbers of students at multiple universities with different disaster risks and demographic diversity. Also, future research must qualitatively examine students' understandings of vulnerability, risk, fear and preparedness to see how they define these concepts and why there seems to be a clear lack of preparedness. Future research should also examine the relationship between hazard experience and risk, fear and preparedness. Students in our research did not report having experience with tornados or earthquakes, eliminating the possibility of examining this relationship. However, future research should examine disaster experience more generally and not restrict the research only to earthquakes and tornados. Finally, if we are able to expand our research efforts and continue to address specific concerns that face students and universities, we will be able to move in a direction that increases student, college and university preparedness for disasters and align ourselves with the agenda set forth by the Federal Emergency Management Agency's (FEMA) Disaster Resistant University initiative.

Notes

- ¹ Treating don't know as an unsure category between no and yes was a direct result of having a small sample size of 192 and a large number of don't know responses for preparedness indicators such as having insurance (don't know = 94). Treating the don't know category as missing would reduce our sample size by approximately 50% and eliminate the possibility of meaningful statistical analysis.
- ² We used class rank as a measure similar to residency.
- ³ Other students (Hispanic, Asian & unclassified) were removed because the group size was too small for meaningful analysis.
- ⁴ When Mauchly's test of sphericity was significant (sphericity was violated), we corrected it by using Greenhouse-Geisser or Huynh-Feldt F-ratios and significance levels.

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