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Deconstructing Gender in New Orleans: The Impact of Patriarchy and Social Vulnerability Before and After a Natural Disaster

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Deconstructing Gender in New Orleans:
The Impact of Patriarchy and Social Vulnerability Before and After a Natural Disaster

A Dissertation

Submitted to the Graduate Faculty of the
University of New Orleans
in partial fulfillment of the
requirements of the degree of

Doctor of Philosophy
in
Political Science

by

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May, 2010

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Dedication

This dissertation is dedicated to Tammy, Michael, Shelly, and Mary Jencik, as well as Lauren Ransom, for their love and support.

Acknowledgement

I would like to thank Dr. Christine Day, Dr. Susan Howell, and Dr. Ed Chervenak for all of their hard work, dedication, and useful feedback.

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Abstract

On August 29th, 2005, Hurricane Katrina made landfall near New Orleans, LA, causing catastrophic damage to the metropolitan area. The hurricane also exposed many of the racial, ethnic, and class-based vulnerabilities experienced by many New Orleanians. However, as is typically the case, gender was ignored in most media accounts in the aftermath of the disaster. This project examines the gendered dimensions of the disaster experience using New Orleans and Hurricane Katrina as a case study. Evidence from University of New Orleans Survey Research data indicates various gender differences from the initial response to the recovery efforts months later. Few gender differences were found regarding physical loss and displacement after the storm; however, psychological effects did often differ along gender lines, with women more likely than men to experience psychological symptoms directly after the storm, while men were likely than women to be affected approximately one year later. Interestingly, gender differences in evacuation plans and behavior varied according to whether or not a disaster had recently occurred. Prior to Hurricane Katrina, women were more likely than men to report having evacuated for Hurricane Georges, though no other variable was statistically significant. After Katrina, men were more likely than women to have an evacuation plan in place, while women were more likely than men to report a willingness to evacuate when recommended by local level officials, which they did when Hurricane Rita threatened the area. Public policy implications are discussed.

Key Words: Hurricane Katrina, New Orleans, Patriarchy, Social Vulnerability, Gender and Disasters, Natural Disasters

Introduction

For years, scholars have engaged in a discourse concerning what has been termed the 'invisibility' of women. With many improvements in the status of women's equality, this topic now garners less attention than it once did. However, in the face of several tragic natural disasters, some scholars have put the invisibility of women back into the spotlight. This is because studies have demonstrated that while natural disasters are detrimental and potentially fatal to all involved, women are disproportionately affected. While important for a variety of reasons, for the most part this trend has gone unnoticed by both scholars and the media.

This dissertation brings women's invisibility following natural disasters to the forefront by examining one of the most devastating natural disasters in United States history, Hurricane Katrina. This project examines gender disparities in the physical, economic, and mental conditions of men and women in a post-natural disaster environment. It also takes into consideration variations between men and women in terms of actual effects of the hurricane, reported plans and behaviors, and the experience of psychological symptoms. Scholars such as Susan Cutter, Elaine Enarson, and Alice Fothergill argue that it is necessary to have more context-specific gender analysis to determine how women and men are disproportionately affected by natural disasters in different societies, since women are not necessarily more vulnerable in all aspects in all situations. In this project, the city of New Orleans is used as a case study to examine any differences that may exist between the sexes following Hurricane Katrina. A multitude of variables that are suggested to be important by the literature are utilized, as is data from both before and after the hurricane.

Previous case studies have demonstrated that gender inequalities help explain the disproportionate impacts of disasters on the female sex. As such, gender often intersects with

factors such as poverty, race, and location. According to Krishnamurty (2001), this can result in multiple and cumulative disadvantages for women. Additionally, socioeconomic status is an important indicator of an individual's, as well as a community's, ability to deal with and recover from losses. Individuals and communities with greater wealth are able to recover from losses at a faster rate due to social safety nets, insurance, and entitlement programs (Blaikie et al. 1994; Burton, Kates, and White 1993; Cutter, Mitchell, and Scott 2000; Hewitt 1997; Peacock, Gladwin, and Morrow 1997; Peacock, Morrow, and Gladwin 2000; Platt 1995, 1999; and Puente 1999). However, few scholars have noticed the political nature of recovery efforts. Disaster response and the allocation of recovery funds, in some instances, hinge greatly on partisan lines and political ties.

This project applies a vulnerability approach to the study of natural disasters as an analytical concept following other seminal works (Cannon 1994, 2000; Cuny 1983; Cutter 1996; Fordham 2004; Hewitt 1983; O'Keefe, Westgate, and Wisner 1976; Varley 1994; Wisner et al. 1994; and Wisner 2004). However, while many scholars from a variety of fields examine social vulnerability, Enarson aptly notes "Social class, race and ethnicity, age, and physical abilities are generally recognized as determinants of vulnerability but gender is conspicuous by its absence" (2006, 1). According to Jones, "vulnerability to natural disasters and their consequences is gendered and socially constructed, meaning that women and men face different challenges during natural disasters because their roles in society have been constructed differently" (2005, 1). Essentially, natural disasters affect women and men differently because society assigns different responsibilities and roles to the sexes (Krishnamurty 2001).

Enarson explains that at most, gender is examined in disaster research merely as a demographic variable, but not as the basis for a complex set of relationships. Additionally,

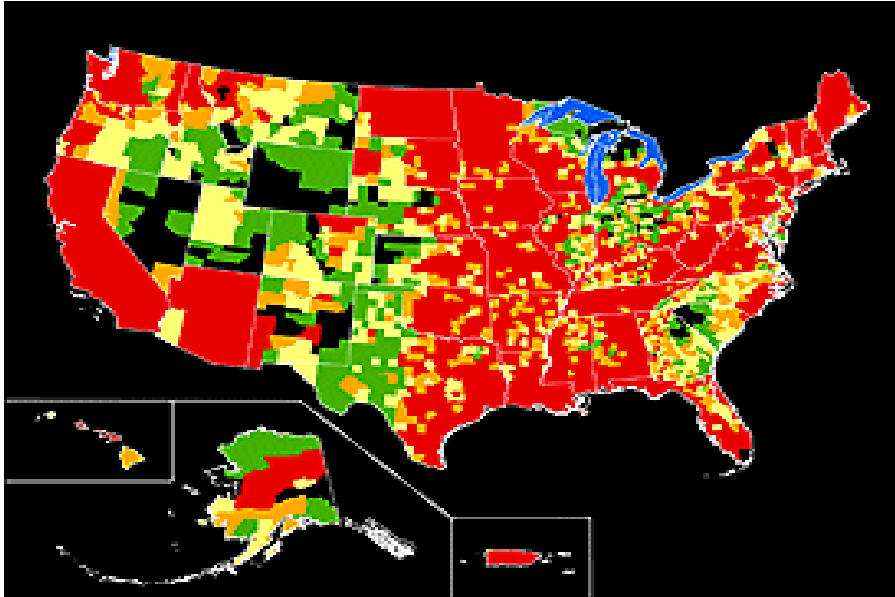
gender is viewed in terms of women's lives rather than men's, as well as a derivative of socioeconomic status. Despite the dominant technocratic emergency management approach, feminist theory and vulnerability theory are gaining ground suggesting a new approach that places gender in the center of disaster planning and policy formation. Thus, although gender has been ignored for decades in disaster research, a new paradigm has begun.

Despite the general lack of research on gender-related vulnerability to and impact from natural disasters, natural disasters are a common occurrence in the United States. For instance, according to the United States Geological Survey (2006) conducted by the U.S. Department of the Interior, there is approximately \$6 billion in average annual losses per year due to flooding in the United States alone. The flooding in New Orleans after Hurricane Katrina resulted in over \$200 billion in losses becoming the costliest natural disaster in United States history. While many people saw the extensive damage that flooding created in New Orleans following Hurricane Katrina, most people do not realize that flooding actually causes billions of dollars in damage every year and threatens people and property in every state in the U.S. (U.S. Department of the Interior Geological Survey 2006).

Flooding can result from hurricanes, snowmelt, weather systems, inadequate drainage, or dam and levee breaks and tends to differ by region. Figure 1 shows the number of flood declarations in the United States between 1965 and 2003 (U.S. Department of the Interior Geological Survey 2006). Additionally, according to the American Society of Landscape Architects (2006), hurricanes can be considered the worst and most widespread natural hazard, resulting in damage through high wind speeds, storm surge, and flooding.

Illustration 1

Flood Hazards in the United States



U.S. presidential disaster declarations due to flooding, by county. Colors represent the number of declarations. Green represents one declaration; yellow represents two declarations; orange represents three declarations; red represents four or more declarations. All declarations occurred between June 1, 1965, and June 1, 2003.

Note: Map is not to scale.

Source: U.S. Department of the Interior Geological Survey (2006)

According to the World Health Organization, the minimal amount of information currently available regarding the effects of natural disasters points to a pattern of gender differentiation at every level over the course of a disaster – exposure to risk; risk perception; preparedness; response; physical impact; psychological impact; recovery; and reconstruction. There is a need for gender-specific data in order to allow for better planning and budgeting, as well as to determine whether there have been improvements over the years. According to the Pan American Health Organization, a gender-based approach to the study of natural disasters could lead to a decrease in women's vulnerability, as well as the inclusion of women in disaster relief efforts, which could help change societal beliefs about women. Therefore, disasters have the potential to create a window of opportunity for women.

Chapter Outline

Chapter One lays the theoretical groundwork for the study by reviewing the academic literature on patriarchy and women's vulnerability in society. Poverty and the feminization of poverty are discussed. Social vulnerability theory is also introduced and linked to natural disasters. Chapter Two presents the methodology. Specifically, the universe of cases is discussed, as are the operationalization and measurement of the variables being used. The chapter concludes with information regarding data collection and a presentation of the analytic design. Each of the next three chapters examines a different aspect of disaster—physical loss, psychological impact, and evacuation behavior, respectively—and includes tests of hypotheses about the effects of gender on each one.

Chapter Three examines the city of New Orleans before, during, and after Hurricane Katrina made landfall near the city. Information regarding the social vulnerability of the New Orleans population, in general, is provided, followed by a detailed examination of the disaster itself. The politicization of the disaster is also examined, specifically in terms of how the local, state, and federal government worked together – or failed to work together – to avert further damage once Hurricane Katrina made landfall. The chapter concludes with an examination of gender disparities in terms of displacement, loss of possessions, ability to replace possessions, and economic perceptions following a natural disaster.

Chapter Four adopts a biological and psychological approach to the study of gender disparities following natural disasters. First, biological and psychological differences between the sexes are examined, though it becomes necessary also to examine the potential of even these differences having some inherently sociological qualities. Next, quality of life issues are examined. The general quality of life question allows individuals to rank political, social, and

economic issues in order of importance to them when deciding how satisfied they feel with their life. Then, research regarding how much individuals worry about their future is examined. Finally, psychological well-being and symptoms of stress before, but especially after, natural disasters are discussed.

Chapter Five examines disaster-specific behaviors, specifically taking into account gender differences in evacuation plans and behavior. Next, the “doomsday scenario” warnings that had been in existence for years prior to Hurricane Katrina’s landfall, which warned New Orleans metro area residents about what could happen if a hurricane made landfall in the region, are explored. Pre- and post-Katrina New Orleans-specific evacuation behavior information is also examined. Chapter Six provides a summary discussion of the results, as well as the significance and implications of this project. Policy implications and suggestions for recovery agencies, as well as the government, are provided, as are ideas for future research.

Chapter One

Patriarchy and Women's Vulnerability in Society

Natural disasters affect all people in a community, but not everyone is equally at risk or equally able to recover. While many scholars have examined how members of different races or class backgrounds are affected, few have noticed the importance of gender. For instance, women are more likely to be killed, injured, or fall ill after a natural disaster; incur economic losses; see changes in their workload; suffer from post-disaster stress and other psychological symptoms; and suffer from increased rates of sexual and domestic violence (Enarson 2000). The differences reach even further with women being less likely than men to make household decisions regarding preparedness, evacuation, mitigation, and the utilization of relief assets; have access to shelter and relief goods; and find employment following a natural disaster (Enarson 2000). All of these topics will be discussed throughout the following chapters.

First, however, it is important to define two terms that are integral to this study – ‘natural disaster’ and ‘hazard’. The United Nations defines a natural disaster as: “the consequences of events triggered by natural hazards that overwhelm local response capacity and seriously affect the social and economic development of a region” (InterAgency Standing Committee 2006). There are two types of natural disasters – slow-onset (e.g.: desertification) and rapid-onset (e.g.: hurricanes). On average, 81,000 people die each year as a result of natural disasters (Landesman et al. 2005) and in 2005 approximately 92,000 fatalities were reported (World Health Organization CRED 2005).

A hazard, on the other hand, can be defined as an existing condition, a possible situation, or an actual event, such as a hurricane, that has the potential to become a disaster. According to Shodell (2006), hazards do not necessarily create disasters. For instance, if an earthquake struck

a remote part of Antarctica, it would not be referred to as a disaster. Instead, Shodell argues that whether a disaster occurs depends on a population's exposure to a hazard, the vulnerability of that population, and their ability to respond to the hazard. Therefore, communities that are well prepared for a hazard may be protected from a disaster. As Neumayer and Plümper note, "natural disasters do not affect people equally as if by an arbitrary stroke of nature" (2007, 561). Physical geographers and public health scholars agree that improved mitigation of natural disaster impacts is dependent on an enhanced understanding of the socially constructed vulnerabilities of particular groups of affected people (for a similar view see Alcántara-Ayala 2002; Degg and Chester 2005; Noji 1997, 2000). This chapter will specifically examine the patriarchal structuring of society and its effects in creating vulnerable populations.

Patriarchy as the Root Cause of Women's Vulnerability

Before specifically examining the concept of patriarchy it is first important to define and discuss the differences between sex and gender. According to Glenn (1999), many sociologists and feminists utilize gender as an analytic concept, but they look at it from differing perspectives. For instance, some scholars argue that gender refers to sociologically created meanings, identities, and relationships that are organized around reproductive differences (Connell 1989; Laslett and Brenner 1989; Scott 1986). Yet, other scholars, such as Acker (1990) and Lorber (1994) examine gender as a type of social status and organizational principle of social institutions that is either detached from or goes beyond reproductive differences.

Alternatively, scholars like Thorne (1993) and West and Zimmerman (1987) view gender as a constantly evolving product of everyday social practices. Glenn states, "By examining gender as a constitutive feature and organizing principle of collectivities, social institutions, historical processes, and social practices, feminist scholars have demonstrated that major areas of

life – including sexuality, family, education, economy, and state – are organized according to gender principles and shot through with conflicting interests and hierarchies of power and privilege” (1999, 5). However, it is worth noting that some poststructuralist feminist critics argue that sex and sexual meanings are problematic distinctions because they are culturally constructed (Butler 1999; Glenn 1999). For instance, Lorber (1994) deconstructs the concepts of biological sex, sexuality, and gender, concluding that they are all socially constructed, thus undermining the idea of two sexes (female and male), two genders (women and men), or even two sexualities (homosexual and heterosexual). Essentially, scholars like Butler (1999) and Lorber (1994) remind us that these concepts are still being debated and may be far more intertwined and complex than we often realize.

Differences between the sexes – whether reproductive, hormonal, physical, psychological, sociological, or behavioral – result in women and men potentially having different abilities, reactions, opportunities, outlooks, and outlets. These are critical to take into consideration when analyzing how people are differentially affected by natural disasters. These are also important background elements in helping to understand other more obvious causes of discrepancies between the sexes, such as different levels of education, types of occupations, level of income and the like. These topics will all be discussed throughout this project, so it is important to understand how they are a product of living in a patriarchal society.

In its most basic form, patriarchy can be defined as the structuring of society on the basis of family units where the male assumes dominance as a result of taking on the principal responsibility for the welfare of the family unit (Goldberg 1973). In a broader societal context, however, patriarchy is a reflection of deeper expectations for formal male dominance in a wide range of social relationships. The opposite of patriarchy is matriarchy. While there have been

matrilineal or matrilineal societies throughout history, there has never been a matriarchal society (Bamberger 1974; Brown 1991; Eller 2001; Goldberg 1973, 1993; Marks 2007). Anthropologist Margaret Mead once stated in an interview, “All the claims so glibly made about societies ruled by women are nonsense. We have no reason to believe that they ever existed... men everywhere have been in charge of running the show... men have been the leaders in public affairs and the final authorities at home” (Goldberg 1993, 18). While some scholars and people, in general, argue that patriarchy is advantageous and pragmatic in terms of social organization, many others including most feminists argue that patriarchy is an uncritically adopted social system based on male strength and masculine principles. For instance, Pateman (1988) writes, “The patriarchal construction of the difference between masculinity and femininity is the political difference between freedom and subjection” (207).

For decades, feminist political theorists have been examining the denial of first-class citizenship to women (Glenn 1999). For instance, scholars such as Okin (1979), Pateman (1988, 1989), and Young (1989) have studied the concept of citizenship as proposed by Hobbes, Locke, and Rousseau, among others, finding that the citizens described in these writings were male. Furthermore, Pateman (1988, 1989) argues that the basis for women’s exclusion exists within the public/private binary which exists in opposition to each other and where men fall within the public realm of citizenship, generality, and rights, while women fall in the private realm of sexuality, specificity, and feeling. “Citizenship thus is defined in opposition to womanhood” (Glenn 1999, 21).

Additionally, Glenn points out that there has been an interest in the concept of social citizenship over the past several decades. Some feminist critics, such as Abramovitz (1996) and Sapiro (1984) argue that the state is an entity that is patriarchal in its provision of welfare by

supporting the male-headed household and regulating the behavior of women. Other feminist critics like Gordon (1994), Michel (1996), and Nelson (1990), however, argue that since the 1890s, the U.S. operates with a two-tiered system of human rights where men receive upper level benefits (unemployment benefits, disability payments, and old-age insurance), while women receive lower-level or means-tested benefits (welfare like Aid to Families with Dependent Children or its replacement, Temporary Assistance for Needy Families).

This has also been seen in the allocation of resources after a natural disaster. As will be demonstrated shortly, men are often considered the head of the household and are more likely than women to receive recovery funds. Women are more vulnerable, in general, and to natural disasters, in particular, due to the socially constructed roles of the female gender that have resulted from the patriarchal structuring of society. Since part of this vulnerability revolves around finances, that will be the focus of the following section.

Poverty

Income is a critical variable in determining who is most impacted by a natural disaster. Poverty can be defined as deprivation of elements that determine quality of life. Most notably this includes food, water, clothes, and shelter, but it can also include certain opportunities, such as the opportunity to obtain an education, receive health care, or obtain information (Silver 1994; Simmel 1965; Teller-Elsberg et al. 2006; Townsend 1979). Even though this definition may seem clear, many scholars and activists criticize the way in which poverty is defined and measured (Adams and Adams 2001; Blank and Ruggles 1994; Citro and Michael 1996; Frank 2006; Harms 1995). Although there is no single mutually agreed upon definition of poverty, there is one thing that is universally accepted – poverty can affect individual people or groups of people and is a worldwide phenomenon. In the United States, approximately 12-15% of the

population lives below the poverty line at any point in time with approximately 40% falling below the poverty line at any point in a ten year window (Zweig 2004). According to Bradley et al. (2003) and Kenworthy (1999), the United States has very high absolute and relative rates of poverty in comparison with other developed countries. In fact, in 2006, the United States had the highest child poverty rate in the entire developed world with nearly 20% of people under 18 years of age living in poverty (Allegretto 2006; U.S. Census Bureau 2007).

Individuals who live in poverty are more likely to experience physical and mental health problems, as well as psychosocial stress, making it even more difficult for them to get out of their financial situation (Duncan and Brooks-Gunn 1997; Moreno and Warah 2007; Patel and Kleinman 2003). Additionally, studies have shown that individuals living in poverty in developed countries are more likely to suffer from social isolation and higher rates of suicide than individuals not living in poverty in these same countries. Globally, one-third of deaths are due to poverty-related causes resulting in over 270 million casualties since 1990 and people living in poverty are more likely to have a shorter lifespan than those who do not live in poverty (Thibos, Lavin-Loucks, and Martin 2007). The vast majority of these deaths are among women and children. Additionally, children who live in poverty are more likely to suffer from impaired cognitive development (Duncan and Brooks-Gunn 1997) and are more likely to remain in poverty as adults (Thibos, Lavin-Loucks, and Martin 2007).

Furthermore, individuals who reside in areas that are affected by high levels of poverty are more likely to witness or become victims of assault or homicide. Unfortunately, children are often affected by this violence. For instance, in one survey, Atkins et al. (1996) found that 67% of kids from inner cities claim to have witnessed a serious assault, while 33% claim to have witnessed a murder. The authors also found that 51% of fifth grade students in New Orleans,

which had a median household income of \$27,133 at the time of the study, were victims of violence. This level was much lower in cities with higher median incomes.

High levels of poverty increase vulnerability (Atkins et al. 1996; World Bank 2007), which will be examined in greater detail shortly. People who live in poverty are more vulnerable in general, but are particularly vulnerable to natural disasters. Poorer people are less likely to know about the threat of a disaster and are less likely to have a place to evacuate to or a method of transportation to get them out of the path of danger. It is also critical to note that women suffer from poverty more than men, making women less likely to own a car or have a driver's license. "There is evidence to demonstrate that because of the weaker and conditional basis of their entitlements, women are generally more vulnerable to poverty and once poor, have fewer options in terms of escape. Gender discrimination in the household and the market can result in the unequal distribution of resources leading to women experiencing a greater severity of poverty than men" (BRIDGE 2001, 6). Therefore, it is critical to examine more extensively the correlation between poverty and sex.

The Feminization of Poverty

Looking more precisely at the concept, in the 1970s, the feminization of poverty became a nationwide issue. The term was coined in 1970 by Diana Pearce who noted that women's poverty was increasing relative to that of men's. In the United States, for instance, there was a decline in poverty rates among male-headed households, while the rate among female-headed households was rising. Additionally, Pearce argued that the poverty experienced by men and women was different and that different solutions would be required in order to solve the problem. Throughout her research, Pearce (1978) focused on the proportion of poor people who were female. Other scholars, such as England (1992, 2001) and McLanahan, Casper, and

Sorensen (1995), take a different route focusing instead on the ratio of women's poverty rates to that of their male counterparts. Regardless of which method is utilized the general results are the same – women are disproportionately represented among the poor.

In a 2007 study, McLanahan and Kelly found that while poverty rates dipped significantly in the 1950s and 1960s, there have been small changes since then. Thibos, Lavin-Loucks, and Martin (2007) note that poverty levels rose for Americans, in general, due to a decrease in jobs in the manufacturing sector that were available mostly to men. Therefore, intermittently it appeared as though women's relative poverty levels had improved. Additionally, compared to the 1950s and 1960s, women's poverty rates appeared to decline even in female-headed households (Bianchi 1999). England (1997) has attributed the decline in the feminization of poverty to relative wage increases, the increasing proportion of women entering the paid labor force, and decreasing wages of men in the blue collar sector. Despite this, Fitzpatrick and Gomez (1997) note that women are still caught in the “trap” of poverty.

Additionally, McLanahan and Kelly (2007) argue that a very important trend is easily masked in their data – after 1970 older Americans were experiencing falling poverty rates, while younger Americans were experiencing increasing poverty rates. According to the authors, in 1950, young women had the second to lowest poverty rate, but by 1996 they had the highest rate. Due to these and similar trends, scholars have started to investigate differences in the causes of the feminization of poverty. While there are many reasons for this phenomenon, some of which may be working in conjunction with each other, several key causes have been outlined to help explain the emergence of a feminized poverty – changes in the family or household structure and social life, changes in the economy and changes in family benefits.

In terms of changes in the family or social life, women and men have begun to marry later than they did in the 1950s and preceding decades (Bianchi 1999; McLanahan, Casper, and Sorensen 1995). This has led to less household income, since women and men are more likely to rely solely on their own income, as opposed to joint income. Additionally, throughout the years, divorce has become more accessible and acceptable, resulting in more individuals getting divorced and voluntarily ending their marriages than in the past (Castro Martin, Sweet, and Bumpass 1989; Gouldbourne 2001). In 2005, there were nearly four million, or approximately 38%, more divorced women than men (U.S. Census Bureau 2005). The later age of marriage, as well as the rising rates of divorce, has resulted in more women being single for longer periods of time making them self-reliant in terms of finances. Since women tend to make less money than men, this automatically places them at a higher risk of being poor (Bianchi 1999; Hu 1999).

Furthermore, child support is a large financial issue for divorced women. Henderson (1993) notes that despite state laws that aid women in collecting child support payments that are due to them, there is over \$4.6 billion in defaulted payments. Only 25% of white custodial mothers and 16% of black custodial mothers receive full child support payments (U.S. Census Bureau 2005). Even more devastating, one third of custodial mothers do not receive any child support, while less than half of those who do have child support arrangements in place receive full payment (U.S. Census Bureau 2005).

Additionally, more children were being born outside of marriage in 1996 compared to 1960 (McLanahan and Kelly 2007). The combination of high divorce rates and the increasing number of children being born outside of marriage resulted in more children being raised by single mothers (Garfinkel, Hochschild and McLanahan 1997). Being a single parent has had a much greater impact on women's poverty rates than it has had on men's. A final change in the

family that is worth noting concerns life expectancy. Since women live longer than men, they are more likely to be poor because their lower income throughout their working years has to be used for a longer period of time as retirement income (Bianchi 1999).

Changes in the economy have also played an important role in contributing to the feminization of poverty. “Changes in family composition reflect changes in the needs of the family – the denominator of the poverty function. There have also been important changes in men’s and women earnings and income experiences – the numerator of the poverty function – during this period” (McLanahan and Kelly 2007). There are two popular perspectives in the literature regarding the economic forces that help create the feminization of poverty – economic restructuring and the gender perspective.

According to the economic restructuring argument, changes in the national economy created concentrations of poverty, as well as lasting inequality in the labor market and income, particularly for women (Thibos, Lavin-Loucks, and Martin 2007). This has been accompanied by a shift from a manufacturing-based economy to a knowledge-based economy where high levels of skill and education are critical, thus putting women at an even greater disadvantage (Dabelko and Sheak 1992). As of 2004, only 14% of custodial mothers in the United States had a college degree or higher levels of education (U.S. Census Bureau 2005). According to the gender perspective argument, it is critical to take into account not only general economic changes that are occurring, but also to take into account the characteristics of the market that impacts women directly as primary caregivers (and primary wage earners in female-headed households), such as rising healthcare costs, as well as to account for the amount of discrimination that women face once they have entered the job market (Dabelko and Sheak 1992).

More women are active members of the labor force than ever before. In the 1950s, approximately 30% of married women with children worked outside of the home; by the 1990s this number had reached approximately 75% (McLanahan and Kelly 2007). Although women's employment increased from the 1950s through the 1990s, it is worthwhile to note that the largest increase took place in the 1970s and 1980s. While women have substantially increased their participation in the labor force over the last several decades (Bianchi and Spain 1996; Blau 1998; Spain and Bianchi 1996; Wetzel 1995), they still deal with unequal wages. While the most educated women experienced higher wage increases than men (though still earning less money), women with lower or no education experienced wage decreases relative to men's (Wetzel 1995).

One of the main reasons behind the pay inequality between men and women is childbearing or childrearing. Women frequently reduce their hours in the paid labor force while their children are young, which can result in not only less money, but also less experience and less seniority when they return to work full-time (Christopher et al. 2002). Additionally, part-time work can also result in decreased ability to save for a child's future, gain benefits, or save for retirement (Ehrenreich 2000). A second major reason behind the pay inequality between men and women is sex segregation in the labor market (Thibos, Lavin-Loucks, and Martin 2007). Women are more frequently employed in "pink collar" occupations that require less skill and have lower prestige, resulting in lower pay, while men are more frequently employed in "blue collar" jobs that pay more, despite the fact that educational requirements are roughly the same (England 1992). Tiarniyu and Mitchell (2001) argue that sex segregation continues to be visible in labor market dynamics.

Finally, changes in public benefits have also played a large role in the feminization of poverty. Cutbacks in social welfare programs to the poor have had a detrimental impact on

women, particularly single mothers. Thibos, Lavin-Loucks, and Martin (2007) argue that social programs, as well as income transfers, that were designed to help individuals out of poverty were less effective for women than they were for men. Oftentimes, the debate concerning social welfare programs is politicized and divided on ideological lines. For instance, conservatives would likely argue that high quantities of available welfare benefits to women would increase their risk of poverty. Murray (1984) notes that welfare could fuel the growth of single mother families by encouraging poor women to leave bad marriages, have more children, or keep children conceived out of wedlock. However, as Haaga and Moffitt (1997) note, the empirical evidence of this is quite small. McLanahan and Kelly (2007) argue that this should not be surprising due to the plethora of literature pointing to the various demographic trends mentioned above that increase the likelihood of women being victims of poverty. Furthermore, these trends have been occurring at all levels to women of all social classes, some of whom would have never relied on welfare to begin with.

Barber Conable, Jr., former President of the World Bank, has said of the problem of the feminization of poverty, “Women do two thirds of the world’s work... yet they earn only one tenth of the world’s income and own less than one percent of the world’s property. They are among the poorest of the world’s poor” (World Bank 1986). Although this is a worldwide phenomenon that is by no means unique to the United States, the U.S. has continued to lag behind other industrialized nations in terms of creating social policies that would help lower levels of poverty for women and children. An international study of eight industrialized countries¹ conducted in the mid-1990s demonstrated that the United States had the largest gender poverty gap of all of the nations with women’s poverty rates 38% higher than men’s (Christopher et al. 2002). In terms of public policy, Duncan and Brooks-Gunn (1997), as well as

¹ Australia, Canada, France, Germany, Netherlands, Sweden, the United Kingdom, and the United States

Thibos, Lavin-Loucks, and Martin (2007), argue that “Stories of female poverty survivors point to overwhelming failure – not of the individual spirit, but of social programs, welfare reform, and laws to protect women and their children” (Thibos, Lavin-Loucks, and Martin 2007, 18).

As can be seen from this brief review of the literature, the feminization of poverty is a large-scale problem that is representative of far more than a lack of income or a large amount of financial need. In fact, Thibos, Lavin-Loucks, and Martin (2007) argue that the feminization of poverty reaches well beyond the economic domain and into the core of the individual and family domain. Additionally, Fukuda-Parr (1999) argues that although the term “feminization” would appear to imply that only women are affected, this is not the case with large quantities of children being equally affected. Many scholars are now considering the implications of the feminization of poverty for public policy noting that educational opportunities must be expanded, wages must be increased so that workers and their families can live on them, and sex segregation and inequitable wages must become unacceptable in the labor force (Baylor 2006; Clark 2004; Cohen and Huffman 2003; Hecker 1998; Schiller 2003). The disproportionately high percentage of poverty experienced by women results in them comprising a large portion of the socially vulnerable population. The following section will specifically examine the relationship between social vulnerability and natural disasters.

Social Vulnerability and Natural Disasters

According to Krishnamurty (2001), in most of the recent natural disasters that have taken place, there has been a human element that either contributes to or exacerbates the disaster and could even potentially lead to its reoccurrence. “Human beings can and in fact do influence – willingly and unwillingly – the degree to which natural disasters harm people, reduce their welfare, and cost their lives...Indeed, it becomes even questionable whether one can talk of

‘natural’ disasters at all” (Neumayer and Plümper 2007, 552-553). Some scholars, such as Mileti (1999) and Enarson (2006), discuss the idea of “disasters by design” whereby a physical hazard itself does not cause catastrophic devastation, but rather ‘disaster’ occurs due to socially constructed vulnerability to a physical hazard. Furthermore, Enarson (2006) notes that disaster sociologists look at physical hazards as inherently social events that reflect human decisions about the organization of social life in the environment. She argues, “The risk of exposure to the effects of disasters is not distributed equally but reflects the fault lines of any society” (Enarson 2006, 1).

Before specifically examining social vulnerability and its effects, it is important to define the concept. According to Cutter et al. (2006), due to the difficulty inherent in measuring and quantifying social vulnerabilities, they are oftentimes overlooked in the hazards and disaster literature. In some ways, social vulnerability is the result of social inequalities – factors that allow particular groups to be more susceptible to harm, which affects their ability to respond, as well as their resilience, following a natural disaster. However, it is more than this. Essentially, social vulnerability involves the availability of health care, places to live, accessibility to goods and services, availability of emergency response personnel, political representation, capital, and general indicators of quality of life (Cutter et al. 2006). Therefore, the most concise definition may be provided by Wisner who defines vulnerability as “The characteristics of a person or group and their situation influencing their capacity to anticipate, cope with, resist and recover from the impact of a natural hazard” (2004, 11). Or, as Neumayer and Plümper state:

“In other words, vulnerability... captures the differential exposure to risks and capacity to cope with risks systematically attributed to people across space and time, which, together with other attributes such as ethnicity or class, are often functions of an individual’s gender, the focus of analysis here” (2007, 552).

According to Cutter, Boruff, and Shirley (2003), in the hazards literature, there are three main tenets of vulnerability. First, the exposure model examined by Anderson (2000), as well as Burton, Kates, and White (1993), takes into account the conditions that make people or places vulnerable to natural disasters. The second model views vulnerability as a social condition that can measure resilience and resistance to disasters within a particular society (Blaikie et al. 1994; Hewitt 1997). The last model, which is examined by scholars such as Cutter, Mitchell, and Scott (2000), as well as Kaspersen, Kaspersen, and Turner (1995), focuses on specific places or regions while integrating potential exposures and societal resilience. Although different scholars may place their focus on one model over another, Cutter, Boruff, and Shirley (2003) note that what is important is the recognition that it is necessary to consider both ‘social’ inequalities and ‘place’ inequalities when examining social vulnerability. Often times, scholars focus only on factors that make particular groups susceptible to harm or slow recovery, while ignoring the place-specific inequalities, such as urbanization, growth rates, economic vitality, and environmental factors to name a few, that make people more vulnerable.

Within the social science community, there is a general consensus concerning some factors that lead to increased social vulnerability. Blaikie et al. (1994), Cutter (2001), Cutter, Boruff, and Shirley (2003), Putnam (2000), and Tierney, Lindell, and Perry (2001) outline some of these key factors, which include lack of access to resources; limited access to representation, as well as political power; lack of social capital, such as social networks; age; beliefs and customs; type of infrastructure; and physical or mental limitation of individuals. While there is a general consensus regarding these basic factors, there is much disagreement concerning which variables should be utilized to represent some of these broader concepts (Cutter, Boruff, and Shirley 2003). In studies conducted in 2001 and 2003 by Cutter, Boruff, and Shirley, as well as

in 2000 and 2002 studies by the Heinz Center for Science, Economics, and the Environment, it was demonstrated that socioeconomic status, gender, race, age, commercial and industrial development, employment loss, and education are some key variables to use when performing studies regarding social vulnerability.

There is widespread agreement in the hazards and disaster literature that poor people are much more likely to be impacted by natural disasters than people that have means. This is partially due to the fact that people that are poor are more likely to live in areas that are susceptible to flooding and other storm-prone areas, as well as have less education and fewer financial resources to overcome this situation (Neumayer and Plümper 2007; Noji 1997, 2000). Fothergill and Peek (2004) demonstrate that this is not only a problem in developing countries, but in developed ones, as well. Furthermore, as demonstrated in an earlier section, there is an overwhelming consensus that poor people are more likely to be female.

According to Enarson (2006), at the time of a natural disaster, women are more likely to live below the poverty line; rely upon government-supported social services; lack inheritance rights or land rights; lack savings, credit, and insurance; be self-employed, a contingent worker, or have a home-based job; be unemployed or work in the informal economy; reside alone; raise children alone; depend on childcare services; depend on public transportation; reside in public housing, rental homes, or mobile homes; have to live with an abusive partner; be responsible for dependents; find themselves subjected to gender norms and male authority in the household regarding use of assets, evacuation and relocation.

The World Health Organization (2007) has provided four key areas of vulnerability for women, which are outlined below. First, resources are less accessible to women. Women are less likely than men to: have a source of transportation; have their own independent source of money;

own their own house; have a job; or have solid social networks. Second, women are affected by the gendered division of labor. Women are: underpaid; more likely to lack healthcare coverage; more likely to be self-employed or unemployed; and more likely to have agriculturally-based jobs. Unfortunately, natural disasters wipe out much of the agricultural job sector, often for long periods of time.

Third, women have less ability to move to another city, state, or country following a natural disaster due to their domestic-based work, as well as their responsibilities of taking care of the elderly and children. These responsibilities often result in women's inability to earn sufficient wages to be able to move. Additionally, due to the availability of medical care and education facilities for the elderly and children, respectively, it is difficult for women to move with their dependents. Fourth, women are disproportionately affected by natural disasters due to their increased vulnerability when their houses are destroyed. More women than men have to go to shelters and they are unable to cook while there. Instead, they have to purchase prepared foods, which further increase their economic burdens making life even more difficult.

Alternatively, women may be moved to another area altogether and become responsible for paying for any expenses that the Federal Emergency Management Agency (FEMA), the Red Cross, and other agencies do not cover. While men are affected by this, as well, they are more likely than women to have the resources to be able to cover these expenses. The economic insecurity experienced by women before disasters oftentimes results in their needing more aid following a disaster (Enarson 2000). Displacement issues are examined more specifically shortly.

Enarson (2000) also argues that relief and reconstruction programs have a gender-bias because they target funds to the male head of household, as well as limit the role that women can play in terms of paid disaster recovery work. In terms of relief, women are frequently marginalized (Pan-American Health Organization 2002). For instance, in Florida, a state that encounters tropical storms, flooding, and hurricanes on an annual basis, only 10 out of 67 counties had a female emergency management director (Wilson 1999; Wraith 1997). Florida is not an exceptional case. Bradshaw (2004) and Enarson (2000) found that in the majority of countries worldwide, relief efforts are nearly unanimously controlled and operated by men, which results in less sensitivity to women's needs and experiences. Single women (with or without children) may be excluded when this is the case.

Disaster managers note that women are less likely to have 'key assets' for survival of and recovery from a natural disaster which includes transportation, time, information, health and safety, social support, and a diverse income (Enarson 2006; Fothergill 2004). Using New Orleans as an example, Liu and Plyer (2007) found that two years after Hurricane Katrina, only about half of some public services including public transportation, childcare, libraries, and schools were operating at their original capacity. Additionally, only two-thirds of licensed hospitals were operating. The situation for hospitals and childcare facilities had not changed much by the third anniversary of Katrina (Liu and Holmes 2008). Furthermore, only seven additional buses had been put into service, while there was an increase of 40% more riders.

In disaster areas, in general, and in New Orleans, in particular, it is necessary to focus not only on physical rebuilding, such as restoration of wetlands, stronger infrastructure, and the like, but also on reducing social vulnerability, which involves improving the quality of life through recreating socially constructed roles in a more equitable fashion. Enarson argues, "Gender

inequality is a significant contributing factor in the social construction of risk” (2000, 2). After a disaster and throughout the recovery period, the roles of women and men can change and evolve over time. As a result, the post-crisis phase allows for a window of opportunity to promote social justice, redress inequalities, and reduce vulnerabilities (Krishnamurty 2001). It is important to note that men and women are both affected by natural disasters and that they have different needs during and after a natural disaster (Krishnamurty 2001). Additionally, it is necessary to keep in mind that men and women are not two homogenous groups and that within each group some people are affected differently than others.

Casualties Resulting from Natural Disasters

In the period from 1990-1999, out of 600,000 fatalities related to disasters (both natural and technological), natural disasters accounted for approximately 86% of the casualties (World Health Organization 2002). Windstorms and floods affected the most people. Vulnerable groups, such as women, children, and the elderly, were more likely to suffer in natural disasters, particularly floods (Ferris 2008; Shodell 2006). For instance, 1.5 times more women than men died in the Kobe earthquake in 1995 (Neumayer and Plümper 2007; UNEP 2004). According to Neumayer and Plümper (2007), there are three main causes for gender differences in casualty rates resulting from a natural disaster. First, there are biological and physical differences that may disadvantage women, which will be examined in Chapter Four. Second, as examined throughout this chapter, social norms may lead to different behaviors in the sexes that can leave women more vulnerable in the face of a natural disaster. Third, also examined in this chapter, disasters can lead to diminished resources, as well as a breakdown in the social order, resulting in disadvantages for women.

In countries with low levels of economic development and low quality governing institutions, as well as high levels of inequality, the death toll after a natural disaster is higher than in countries not experiencing these same conditions (Anbarci, Escaleras, and Register 2005; Kahn 2005). Neumayer and Plümper (2007) argue that although natural disasters kill more women than men (especially in large-scale disasters), the number of casualties is frequently dependent on the socioeconomic status of women in the affected area. In areas where women have a higher status, men and women make up roughly an equal number of casualties. However, when women have a lower status, they are not only more likely to die as a direct impact of a natural disaster, but also more likely than men to die at an early age as an indirect result of a natural disaster. For instance, globally for every male adult that drowns in a flood, three to four women will drown (Aguilar 2008). Neumayer and Plümper conclude, “These results corroborate a vulnerability approach to natural disasters since the more adverse impact of disasters on female compared to male life expectancy is clearly contingent on the extent of socially constructed vulnerability and there is nothing natural in the gendered impact of disasters on life expectancy” (2007, 552).

In terms of New Orleans, directly after Hurricane Katrina made landfall Seager (2005) suggested that there was anecdotal evidence that the individuals who were trapped in New Orleans and more likely to die were predominantly black women and children. More specifically, she argued that since women made up the majority of those left behind, they would be the most likely to die as a result of the hurricane. However, data from the State of Louisiana’s Department of Health and Hospitals shows that women and men died in approximately equal numbers as a direct result of Hurricane Katrina, while victims were disproportionately African American and elderly. Neumayer and Plümper (2007), however, argue that there may be

differences in fatalities between men and women resulting from indirect consequences or taking place in the aftermath of Hurricane Katrina.

Conclusion

This chapter examined the concept of social vulnerability in the context of natural disasters. As can be seen, while some parts of a natural disaster can be viewed as “natural” or even expected, many other aspects can be categorized as “unnatural” affecting specific populations more than others. The purpose of the Chapter Three chapter is to examine the city of New Orleans and its population in the context of social vulnerability. The rest of the chapters in this project examine how women and men in post-Katrina New Orleans were affected by and recovered from this unnatural disaster. Several areas that Enarson (2000) and other scholars have outlined as critical, such as physical losses, economic impact, psychological symptoms, disaster preparedness, and evacuation behavior, are the main focus. The ‘social’ and ‘place’ inequalities outlined by Cutter, Boruff, and Shirley (2003) are taken into consideration in order to understand the big picture.

Chapter Two

Methodology

There is a paucity of studies on how women and men are affected differently by natural disasters. Yet, the few studies available unmistakably show that natural disasters are indeed gendered. In an attempt to add to that slowly growing literature base, this study utilizes data from public opinion surveys in the city of New Orleans from both before and after Hurricane Katrina made landfall near the city in August 2005.

For nearly two decades, the University of New Orleans Survey Research Center (UNO SRC) has conducted surveys every other year to gauge the quality of life of residents in the area. The goal of these surveys is straightforward. According to the UNO SRC:

“These surveys are designed to provide an ongoing picture of how residents view local government services and the general quality of life. They highlight the problems that are of greatest concern to the voters, as well as areas of satisfaction in their parish. The eighteen-year time series can be used to assess the effects of events, programs, and policies. The series can also inform the public and officials about specific areas of perceived deterioration or improvement” (2004, 2).

However, once Hurricane Katrina made landfall, the direction of the surveys needed to change in order to take into account the new environment in which respondents were living due to the vast amounts of devastation they had encountered. Many of the old questions from the Quality of Life series were no longer appropriate after Hurricane Katrina made landfall and new questions needed to be designed. One of the biggest goals of the study was to create a baseline from which to measure progress and recovery over the upcoming years. According to Howell and Jencik:

“Our specific task at the University of New Orleans was to conduct a Citizen Recovery Survey in an attempt to measure a baseline condition of how people were coping with their new lives. Our goal was to measure what problems citizens found most pressing, their difficulties in everyday life, their mood, and their expectations of government” (2006, 1).

One of the overarching objectives of this dissertation coincides with the original goal of the 2006 Citizen Recovery Survey. Utilizing pre-Katrina data, when appropriate, along with the Citizen Recovery Survey and two other surveys affords the opportunity to measure progress over the past three years. It also helps clarify where differences exist between the sexes and how women and men may be recovering at different rates following Hurricane Katrina. This ultimately allows for the creation of a variety of public policy recommendations.

This chapter presents the methodology. The universe of cases and the data collection methods including the difficulties of locating respondents in a disaster zone is the first topic of discussion. Next, the operationalization and measurement of the dependent, independent, and control variables is examined. Finally, the analytic design is examined in detail, specifically looking at the recoding of a variety of variables, as well as the statistical procedures utilized for the data analysis.

Universe of Cases

As a first step in the research, the universe of cases must be identified and a sampling technique should be established. For this study, the unit of analysis is the individual. Individuals residing in Orleans Parish between 2004 and 2009 are under consideration. These years were chosen because this affords the opportunity to investigate citizens’ perception of life in their city both before and after the most destructive natural disaster in the nation’s history. The number of individuals under consideration in each survey differs from year to year and is briefly outlined in Table 1 below. The number of respondents was lower in the years following Hurricane Katrina

due to budgetary constraints, as well as difficulties in finding respondents, which is examined in more detail below. As a result, the margin of error is slightly larger in the post-Katrina studies.

Table 1
Number of Respondents per Survey by Parish

| Month and Year | Survey Name | Orleans Parish | Standard Error |
|-----------------------|---|-----------------------|-----------------------|
| March-April 2004 | Quality of Life Survey | 400 | +/- 5% |
| March-May 2004 | Southeast Louisiana Evacuation Behavior Study | 400 | +/- 5% |
| March-April 2006 | Citizen Recovery Survey | 204 | +/- 7% |
| March-April 2007 | Keeping People Survey | 302 | +/- 6% |
| March 2009 | Quality of Life Survey | 300 | +/- 6% |

Random Digit Dialing (RDD) was utilized for all of the surveys and quotas were predetermined based on demographic characteristics of the area. Population figures were one of the most difficult things to determine following Hurricane Katrina. Due to the extensive displacement of residents, it was hard to figure out where residents were living and there were no reliable statistics available at the time. As a result, and in consultation with a demographer from Mayor C. Ray Nagin's office, the zip codes with the least amount of flooding were targeted since they were the most likely to be populated. Seven zip codes were believed to contain approximately two-thirds of their original population and these zip codes were used in the 2006 survey, while one more zip code was added in the 2007 survey. Although these were the least damaged areas of the city, these most populated New Orleans zip codes still experienced severe damage and displacement, as 80% of the city was flooded and severe wind damage occurred throughout the city.

Even more challenging than determining what locations to target was the problem of determining general demographic information for the area. The U.S. Census Bureau's demographic information was no longer of use due to the magnitude of displacement. While African Americans normally comprised about 69% of the city's population before Hurricane Katrina, this group was also the most likely to be displaced by the hurricane. As a result, it was impossible to confidently estimate demographic characteristics though a weighting system was created.

Additionally, in post-disaster settings, Area Probability Sampling is oftentimes viewed as the most appropriate sampling technique to use since post-disaster conditions are similar to those normally experienced in the developing world. However, due to budgetary constraints, it was not possible to use this method. Instead, respondents were chosen through RDD. Although the sampling vendor prescreened for disconnected numbers, 68% of the RDD sample resulted in disconnected numbers. Over 6700 RDD numbers were utilized to complete 204 interviews, a 33:1 ratio.

As noted previously, University of New Orleans Survey Research Center data are utilized for this study. The post-Katrina studies under consideration are the 2006 Citizen Recovery Survey, the 2007 Keeping People Survey, and the 2009 Quality of Life Survey. Additionally, the pre-Katrina 2004 Quality of Life Study and the 2004 Southeast Louisiana Evacuation Behavior Study are utilized in order to demonstrate differences before and after Hurricane Katrina when appropriate. Furthermore, this should help determine whether any changes have occurred as conditions have, at a minimum, stabilized to a certain extent from 2005 through 2009. All data were entered into SPSS. Responses that had been coded '8-other' or '9-no response' in the data were dropped. None of the dependent variables had more than 3% missing values and none of

the models omitted more than 10% of respondents due to missing data. After the recoding was completed and the missing data were dropped, the data were transferred to Stata, which was utilized to perform the data analysis.

The Variables: Measurement and Operationalization

As a second step in the research, it is important to discuss the measurement and operationalization of the key variables for this project.² First, the dependent variables are presented followed by an examination of the independent and control variables. The dependent variables in this study represent various aspects of respondents' lives and how they are affected by catastrophic disasters. The operationalization and measurement of the dependent variables are examined on a chapter by chapter basis.

Chapter Three involves a variety of variables concerning respondents' living conditions and actual effects of Hurricane Katrina. The first three variables examine whether an individual was displaced or incurred losses. The first variable (WTHFAMFR) takes into consideration whether the respondent was living with family and friends or if others were living with them. The second variable (LOSEPOSS) examines whether a respondent lost possessions as a direct result of Hurricane Katrina, while the third variable (REPLACE) examines whether a respondent was able to replace these lost possessions. All of these variables are measured with a 'yes' or 'no' response. Finally, there are two variables concerning employment – EMPL and NEWJOB. In these two questions, respondents were asked how they feel about opportunities for employment in their Parish, as well as the likelihood of new jobs and industry entering the Parish. These are both measured by responses of very good, good, fair, poor, or very poor.

The fourth chapter examines psychological factors, with six variables used as indicators of psychological well-being. The first variable involves general satisfaction with life in the city

² Please refer to the Appendix to view the exact questions asked by the interviewers at the UNO SRC.

(GENSAT). Specifically, this is measured by asking respondents how satisfied they are with life in New Orleans – very satisfied, satisfied, or dissatisfied. The operationalization of this variable is difficult. As noted in the literature review, since it is a general satisfaction question, it will mean different things to different people and individuals will weigh a variety of factors differently from each other. However, by utilizing various control variables, the gender differences in life satisfaction should become less ambiguous. Furthermore, the rest of the study examines more specific areas where the meaning of the variables is less difficult to determine. Next, respondents are asked a general question concerning how worried they are about what will happen to them in the next five years (WORRIED), which is measured by responses of very worried, somewhat worried, not too worried, or not worried at all.

The next four variables deal with specific post-disaster psychological symptoms respondents have experienced. Respondents are asked how many days in the past week they: felt sad (SAD), had trouble getting to sleep or staying asleep (SLEEP), had trouble keeping their mind on what they were doing (FOCUS), and felt irritable (IRRITAB). All of the variables were chosen in an effort to represent a broad spectrum of the way people were impacted psychologically by Hurricane Katrina and are a part of the UNO SRC's depression-related variables.

Chapter Five examines reported plans and behaviors and there are six variables. The first variable (LEAVE10#) indicates whether the respondent has evacuated due to the threat of a hurricane in the past ten years and involves a 'yes' or 'no' response. The second variable (HYPEVAC) concerns whether an individual would evacuate if it was recommended by Parish officials and is measured by a response of definitely not evacuate, probably not evacuate, probably evacuate, or definitely evacuate. The third (KATRINA) and fourth (GUSTAV)

variables were used for the first time in the 2009 Quality of Life study and involve whether a respondent evacuated for Hurricane Katrina and Hurricane Gustav³. This information is compared to the 2004 data for the fifth variable (EVLAST), which measured how many people evacuated for Hurricane Georges in 1998. The last variable (EVPLAN) takes into consideration whether an individual has an evacuation plan in place, which is measured with responses of ‘yes’, ‘no’, or ‘not a definite plan’.

Turning to the independent and control variables, the independent variable is gender. Gender can be operationalized as the sex of the respondent, and is therefore measured as male and female. There are also a variety of control variables that are taken into account that were chosen because they were the factors most likely to affect respondents' pre-/post-disaster behavior, losses, and experiences, as discussed in Chapter One. Age refers to the specific numerical age in years of the respondent and has six categories – ages 18-20; 21-34; 35-44; 45-54; 55-64; 65 and older. Race/ethnicity can be defined as self-identification as a member of a particular racial or ethnic group. There are four main categories in the question – white, black, Asian, or Hispanic, though “other” was also an acceptable response. Race was recoded into two different categories – non-black and black individuals. See Chapter 3 for a detailed discussion of the relevance of race in the context of Hurricane Katrina, which helps explain why it is appropriate to distinguish between black and non-black respondents.

The amount of education that respondents have completed ranging from grade school to professional or graduate school is also taken into consideration and is measured in the following way: 0-8 years; 9-11 years; completed high school; some college; college degree; graduate/professional degree. Finally, income can be operationalized as the amount of money a household

³ Hurricane Gustav threatened the Louisiana coast in late August of 2008 but had relatively minimal impact on New Orleans when it made landfall. However, due to uncertainty about where Gustav would ultimately make landfall, the biggest evacuation in New Orleans history occurred

accumulates on an annual basis. Income levels were broken down into seven categories - below \$10,000; \$10,000 to \$25,000; \$26,000 to \$40,000; \$41,000 to \$60,000; \$61,000 to \$80,000; \$81,000 to \$100,000; or over \$100,000.

Analytic Design

This section introduces the models, the survey data used to test each one, and the statistical procedures employed to assess the significance of relationships and the strength thereof. The variables are broken down by chapter. Chapter Three involves respondents' self-reports and there are five dependent variables. The variables WTHFAMFR, LOSEPOSS, and REPLACE are dichotomous and logistical regression⁴ is used. Since all of these variables were specifically related to the actual effects of Hurricane Katrina, none of the questions had been previously asked. Therefore, the 2006 Citizen Recovery Survey is utilized to demonstrate the ways that women and men were initially differentially affected by Hurricane Katrina. Additionally, one question (whether the respondent is living with family and friends or if others are living with them) was asked again after the initial survey in 2006. Therefore, the 2006 Citizen Recovery Survey and the 2007 Keeping People Survey is used to demonstrate any differences between men and women, as well as any changes that may have taken place over time.

The last two variables in Chapter Three concern perceptions about employment, EMPL and NEWJOB. Since there are five values, ordinary least squares regression is used. These two questions have been asked for decades by the UNO SRC. As a result, it is possible to utilize 2004 Quality of Life data to determine how women and men perceived employment opportunities and the likelihood of new jobs and industry entering the parish before Hurricane Katrina occurred. Additionally, the 2007 Keeping People Survey and the 2009 Quality of Life Survey are used to

⁴ Due to the inherent difficulty in interpreting logit coefficients substantively, predicted probabilities are estimated for the statistically significant variables in each chapter in an attempt to provide a more detailed understanding of the impact of the independent variable.

examine perceptions in the years following Hurricane Katrina in order to determine whether gender differences increase after the disaster and then return to pre-disaster levels after a few years. This serves as an interesting measure of recovery.

Chapter Four involves psychological factors consisting of six dependent variables. GENSAT and WORRIED were both recoded. GENSAT was recoded into a dichotomous variable – satisfied or dissatisfied – and WORRIED was also recoded into a dichotomous variable – worried or not worried – for the data analysis. The values are being combined because the differences between ‘satisfied’ and ‘somewhat satisfied’, as well as ‘worried’ and ‘slightly worried,’ are subjective and the dichotomy, rather than the slight nuances, is what is theoretically important. Since both variables have only two categories, logistical regression is used. For GENSAT, data exist from the 2004 Quality of Life Survey, the 2006 Citizen Recovery Survey, and the 2009 Quality of Life Survey, thus these three studies are used, while data for WORRIED exists only in the 2006 Citizen Recovery Survey.

The final four psychological variables deal with symptoms that respondents may have experienced in the past week – sadness, sleeplessness, an inability to focus, and irritability. These variables were recoded into four categories to determine whether respondents were experiencing psychological symptoms zero to one day, two to three days, four to five days, or six to seven days. Since there are four categories, ordered probit is appropriate for these variables. These questions were only asked since Hurricane Katrina made landfall near New Orleans so the 2006 Citizen Recovery Survey, the 2007 Keeping People Survey, and the 2009 Quality of Life Survey are used.

The fifth chapter involves reported plans and behaviors indicated by five dependent variables. The first variable (HYPEVAC) involves ordered categories so ordered probit is

appropriate for this variable. The 2004 Southeast Louisiana Evacuation Behavior Study and the 2009 Quality of Life Study is used. The rest of the variables (LEAVE10#, EVLAST, EVKATRINA, EVGUSTAV, and EVPLAN) involve ‘yes’ or ‘no’ responses. Since they are dichotomous, logistical regression is utilized. The 2004 Southeast Louisiana Evacuation Behavior Study and the 2009 Quality of Life Survey are used.

Since there are many dependent variables and four surveys under consideration, Table 2 lists all of the variables that are being utilized in this dissertation and shows which UNO SRC study(s) they have appeared in.

Table 2
List of Variables, by Study

| VARIABLE NAME | QOL 2004 | SLEBS 2004 | CRS 2006 | KPS 2007 | QOL 2009 |
|----------------------|----------|------------|----------|----------|----------|
| <i>Dependent</i> | | | | | |
| Employment | X | | | X | |
| New Jobs | X | | | X | |
| Living with Others | | | X | X | |
| Lost Possessions | | | X | | |
| Replaced Possessions | | | X | | |
| General Satisfaction | X | | | X | |
| Worried | | | X | X | |
| Sad | | | X | X | |
| Sleepless | | | X | X | |
| Unfocused | | | X | X | |
| Irritable | | | X | X | |
| Hypothetical Evac | | X | | | X |
| Evacuation Plan | | X | | | X |
| Evacuated Georges | | | | | X |
| Evacuated Katrina | | | | | X |
| Evacuated Rita | | | | | X |
| Evacuated Gustav | | | | | X |
| <i>Independent</i> | | | | | |
| Gender | X | X | X | X | X |
| Age | X | X | X | X | X |
| Race | X | X | X | X | X |
| Education | X | X | X | X | X |
| Family Income | X | X | X | X | X |

Conclusion

The next three chapters examine a variety of physical and psychological effects that Hurricane Katrina and the disastrous flooding that followed had on residents of New Orleans. They also examine New Orleanians' hurricane-related plans and behaviors. Statistical models of these effects, plans, and behaviors are tested in an effort to explain differences among various groups of people. While the empirical results are somewhat mixed, gender is the most consistently significant factor, thus highlighting the gendered nature of the disaster and its aftermath.

Chapter Three

Personal Loss and Vulnerability

An historically important and culturally vibrant city, New Orleans also is plagued with economic, social, and geographic vulnerabilities. This chapter looks at the demographics of the area, specifically demonstrating how vulnerable much of the New Orleans area population was when Hurricane Katrina made landfall in August 2005. Next, the focus of this chapter shifts to the hurricane itself. Then, the extent of personal loss and displacement resulting from Hurricane Katrina is examined. Finally, perceptions involving the economic and employment situation are examined. Survey data analysis shows that perceived losses and difficulties were greatest among women, blacks, and the elderly.

Demographics

In 2000, New Orleans was the 31st largest city in the United States (U.S. Census Bureau 2000). By 2005, prior to Hurricane Katrina's landfall, there were approximately 1,338,000 people living in the New Orleans metro area.⁵ The city of New Orleans itself was comprised of approximately 454,000 people making up about one-third of the population of the metro area (U.S. Census Bureau 2005c). At that time, the city of New Orleans had a proportion of African Americans that was far larger than the national average of 12% with a population breakdown of approximately 69% black, 28% white, and 2% Asian.

However, despite its size, the city of New Orleans, as well as the state of Louisiana, had been experiencing a population shift for some time. Sastry (2008) notes that the population of New Orleans had been declining for decades prior to Katrina's landfall. For instance, according to the Brookings Institution (2005), prior to 2000, the city had experienced an 18% decrease in

⁵ The Census Bureau defines the New Orleans metro area as seven parishes – Orleans, Jefferson, St. Tammany, St. Bernard, Plaquemines, St. Charles, and St. John the Baptist

population. This trend continued from 2000 to 2005 when another 6% decrease in population took place (U.S. Census Bureau 2005c).

The city of New Orleans has experienced high levels of poverty for decades. In 2004, the city had a much lower median household income (\$31,369) than the national average (\$44,684), while the New Orleans metro area median household income (\$37,246) was closer to but still below the national average (U.S. Census Bureau 2004). Table 3 shows some basic demographic information, particularly in terms of the breakdown of women's median household income in the United States, New Orleans metropolitan area, and the city of New Orleans.

Table 3
Demographics in 2004

| | United States | New Orleans Metro | New Orleans |
|--|---------------|-------------------|-------------|
| Total Population | 285,691,501 | 1,313,694 | 444,515 |
| Number of Women (18 and Older) | 145,908,683 | 687,820 | 237,887 |
| Median Household Income (2004 dollars) | \$44,684 | \$37,246 | \$31,369 |
| Female-Headed Household Median Income | \$31,374 | \$25,978 | \$24,494 |
| Percent Female | 51.1 | 52.4 | 53.5 |
| White Female | 34.3 | 27.2 | 12.9 |
| Black Female | 6.5 | 20.9 | 37.5 |
| Percent Male | 48.9 | 47.6 | 46.5 |
| White Male | 33 | 26.2 | 12.9 |
| Black Male | 5.6 | 17.2 | 30.4 |

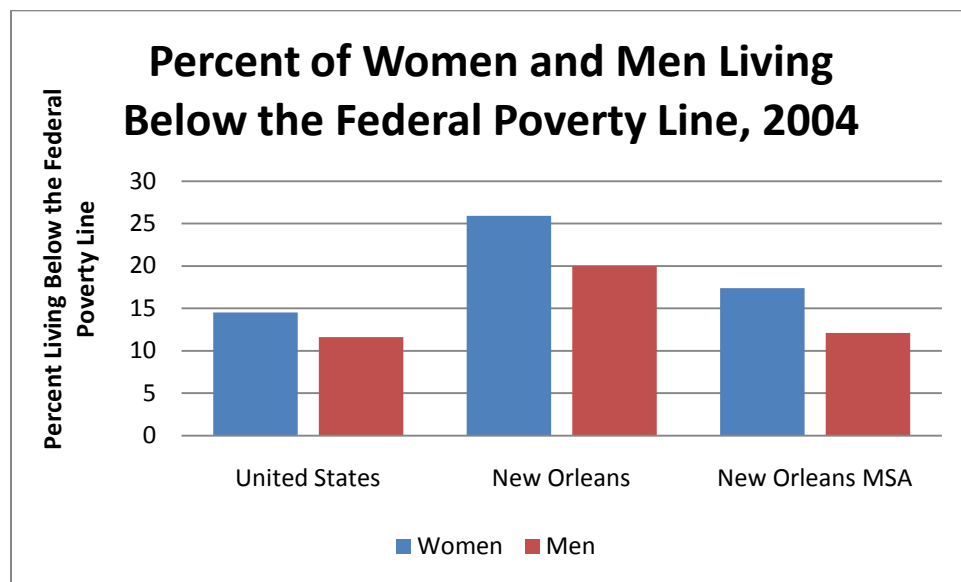
Source: U.S. Census Bureau, American Community Survey, 2004. Compiled by the Institute for Women's Policy Research

The poverty rate among blacks in New Orleans was especially high (approximately 35%), and was the highest among large cities in the United States (U.S. Census Bureau 2000). Additionally, black women in the city who worked full-time, year round made substantially less on average (nearly \$20,000) than white women (nearly \$36,500) in the city. In the New Orleans metro area, there was less of a gap, though still a major difference in the income of black (nearly

\$21,000) and white women (nearly \$29,000). Furthermore, as Sastry (2008) notes, the neighborhoods suffering from extreme poverty prior to Katrina were almost entirely black.

As Figure 1 demonstrates, in 2004, approximately 26% of the women who were residing in New Orleans were living under the poverty line compared to 20% of men (Enarson 2006; Gault et al. 2005). Additionally, approximately 17% of women compared to 12% of men lived below the poverty line in the New Orleans metro area. In the city of New Orleans, these rates were nearly double the national average, while the rates for the metro area were higher than the national average but not nearly as high as in the city.

Figure 1

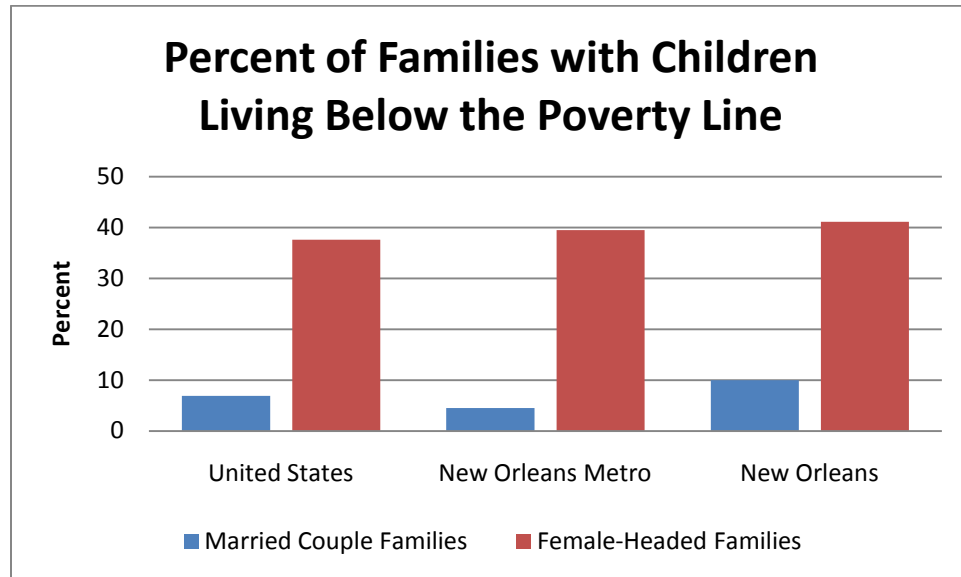


Source: U.S. Census Bureau, American Community Survey, 2004. Compiled by the Institute for Women's Policy Research

Furthermore, Figure 2 shows that approximately 41% of female-headed households with children in New Orleans were below the poverty line, which is roughly comparable to the national average (approximately 38%), but far higher than married couple families living below the poverty line (10%). In the New Orleans metro area, approximately 39% of female-headed

households with children were under the poverty line, compared with only 4.5% of married couple families.

Figure 2



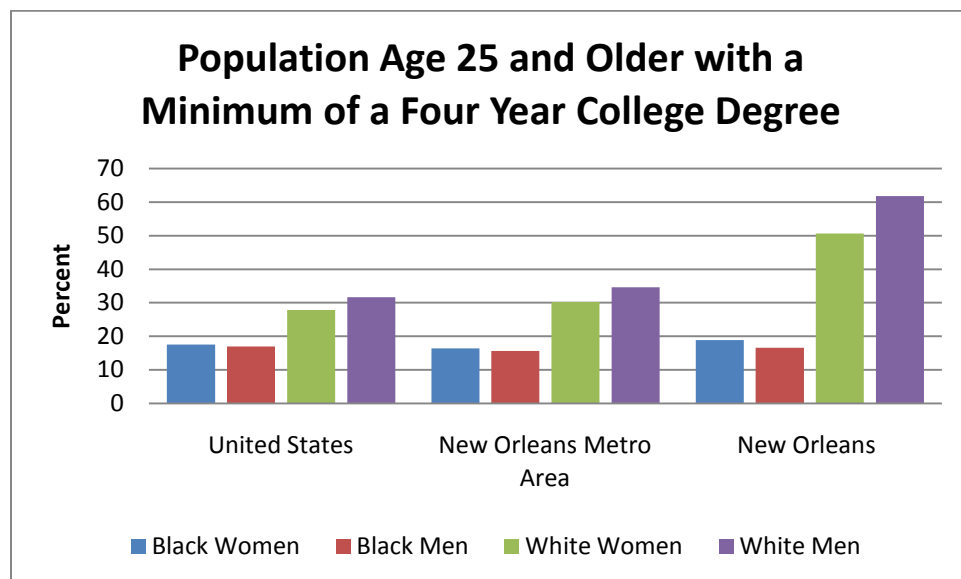
Source: U.S. Census Bureau, American Community Survey, 2004. Compiled by the Institute for Women's Policy Research

It is worth noting that in the state of Louisiana, in general, approximately 35% of African American women live below the poverty line, a larger percentage than anywhere else in the entire nation (Gault et al. 2005). While women throughout the United States are more likely to be poor, earn lower wages, and lack healthcare coverage, this is a bigger problem in the South. Gault et al. (2005) note that women in the South are more likely than women in the rest of the United States to be African-American and face both racial and gender discrimination as primary caregivers in single-parent families.

In terms of education, Gault et al. describe the city of New Orleans as a “large and vibrant urban area” that has “always attracted young college-educated workers” (2005, 18). However, for residents from the area, New Orleans has continuously provided one of the worst school systems in the country (Hill and Hannaway 2006). Additionally, only approximately 66%

of blacks in New Orleans had a high school degree compared to approximately 89% of whites (Sastry 2008). Figure 3 shows that in 2005, the percentage of black women in the New Orleans area with a college education was higher than across the nation, but despite this, there were still far fewer black women (approximately 19%) with a college education than white women (approximately 51%) and white men (approximately 62%) (Gault et al. 2005). The percentages were still noteworthy, yet not as large in the New Orleans metro area where approximately 16% of black women, 30% of white women, and 35% of white men had a college education.

Figure 3



Source: U.S. Census Bureau, American Community Survey, 2004. Compiled by the Institute for Women's Policy Research

Gault et al. (2005) argue that the large differences in the levels of education between black and white women results in differences in the type of job these women hold. For instance, in New Orleans, approximately 27% of black women compared to 66% of white women worked in managerial and professional positions. This pattern was similar in the New Orleans metro area where approximately 29% of black women compared to 46% of white women worked in managerial and professional positions.

As can be seen from this brief review of information, many individuals residing in the city of New Orleans could be considered socially vulnerable. This is particularly the case for women and blacks. As Chapter 1 demonstrated, socially vulnerable populations are typically most affected by large scale catastrophes, such as natural disasters. The next section briefly examines Hurricane Katrina as a first step in understanding how the vulnerable populations in the New Orleans area were affected by the storm.

Hurricane Katrina

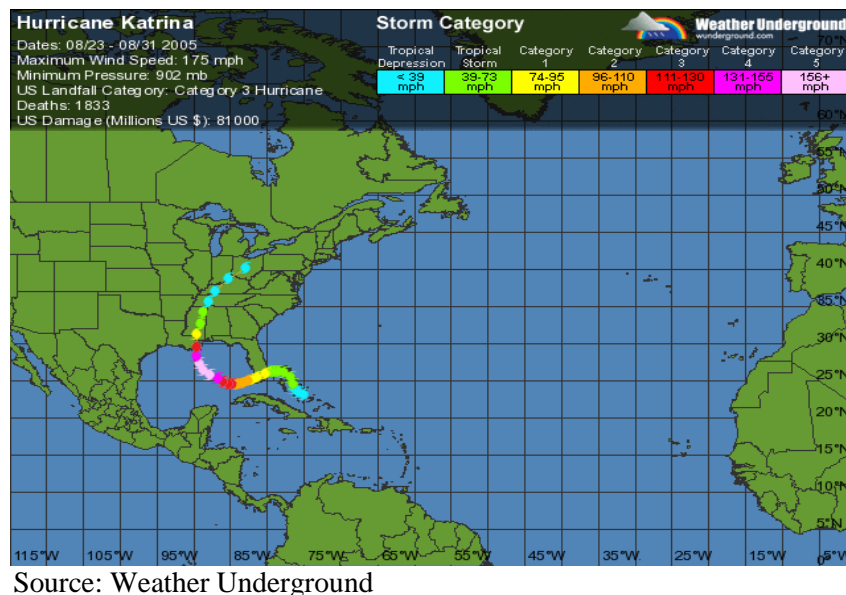
On August 23, 2005, the National Hurricane Center announced the formation of Tropical Depression Twelve in the Southeastern Bahamas. The next day the tropical depression was upgraded to tropical storm status. By August 25, the storm had become a Category 1 hurricane making landfall in Deerfield Beach, Florida. While passing over the state of Florida, the hurricane continued to strengthen by feeding off the warm waters of the coasts of Florida, as well as the Everglades. The hurricane entered the Gulf of Mexico on August 26 as a Category 2 storm. At that point, the National Hurricane Center predicted that Hurricane Katrina would make landfall in either Mississippi or Louisiana. As a result, Louisiana Governor Kathleen Blanco (D) issued Proclamation No. 48 KBB 2005, declaring a state of emergency for the state of Louisiana. The next day, on August 27, Mississippi Governor Haley Barbour (R) followed suit. Additionally, New Orleans Mayor C. Ray Nagin (D) issued a voluntary evacuation of the city. Furthermore, Governor Blanco sent a letter to President George W. Bush declaring a federal emergency for the state of Louisiana.

From August 25 through August 29, Hurricane Katrina continued to gain strength in the Gulf of Mexico, eventually peaking as a Category 5 hurricane on August 28. At that point, Mayor Nagin issued a mandatory evacuation of the city of New Orleans. All flights to and from

the Louis B. Armstrong Airport in New Orleans were suspended. Additionally, the New Orleans Superdome was opened as a “refuge of last resort” for the approximately 150,000 people who did not evacuate (Comfort 2006).⁶ At approximately 6:10am on August 29, 2005, Hurricane Katrina made landfall near New Orleans as a Category 3 hurricane. Illustration 2 depicts the path of the hurricane from start to finish.

Illustration 2

Tracking Map of Hurricane Katrina



What ensued next is almost difficult to imagine. At approximately 2pm on August 29, the 17th Street Canal levee breached. Over the next day, or so, the Industrial Canal and London Avenue Canal levees also breached and there was an additional storm surge through Mississippi River Gulf Outlet (MRGO). These events allowed the waters of Lake Pontchartrain to flow into the city (Comfort 2007). As a result of the water inundating the city, communications systems failed and radio frequencies were overloaded. However, as Horne notes, “The hurricane was the

⁶ This number is approximate. An estimated 60,000 people actually evacuated to the Superdome followed by another 20,000 people who eventually evacuated to the Convention Center, which will be discussed shortly. Thus, approximately 70,000 people remained in other parts of the city while Hurricane Katrina made landfall.

least of it, and the flooding, vastly more devastating than the hurricane, was not the end of it” (2006, 84). On top of the wind damage and flooding, was the outbreak of unstoppable fires. Pictures and video footage of people wading through the water, stranded on rooftops, and packed into the Superdome and the Convention Center dominated news coverage. Unfortunately, over the next 24 hours and beyond, the situation turned much direr.

People were lacking basic necessities like food, water, and clothing. Violence and looting began to take place. Hospitals were being raided for drugs by patients who needed them, as well as by addicts who had run out of supplies (Horne 2006). Additionally, while patients at a private hospital, Tulane University Hospital, were evacuated in a timely fashion by means of its rooftop heliport, patients across the street at the municipally operated Charity Hospital had to fend for themselves during this period (Sternberg 2005). Police were ordered by the mayor to gain control of the city. While some of the police officers acted like heroes, others joined forces with the looters stealing jewelry, sneakers and a variety of non-essential items. Police were even accused of stealing 200 Cadillac Escalades from a car dealership. As chaos continued to take over the city, approximately 20,000 people began to take refuge in the New Orleans Convention Center, which was not staffed and had no evacuation supplies on hand. At about the same time, two more levees failed.

The government response to the disaster was even more troubling. Bickering and finger pointing between Louisiana Governor Kathleen Blanco and New Orleans Mayor Nagin quickly became the focal point of analysts. To many in the American public, the failure of local government to appropriately prepare for Hurricane Katrina fell in line with a lot of existent stereotypes about the inefficiency of local government. However, Dreier (2006) notes that while the city definitely had a role to play in disaster prevention and response, once a disaster of this

magnitude occurs, no city would be able to handle it without the resources that only the federal government can provide. Every step of the response appeared to be marred by chaos. There was a lack of communication between the Bush administration and nearly every other actor – Governor Blanco, Mayor Nagin, FEMA director Michael Brown, as well as others. To complicate matters, instead of immediately responding to the crisis at hand, Bush remained on his month-long vacation. SourceWatch.org (2005) provides two quotes from blogs that sum up the sentiments of many New Orleanians:

"George Bush stayed on vacation. He didn't get back to work. When the worst natural disaster in our nation's history attacked us, George Bush STAYED ON VACATION. Why did the federal government stumble so badly on Monday and Tuesday and Wednesday? Because on Monday and Tuesday and Wednesday, George Bush stayed on vacation in Crawford, Texas. On Monday and Tuesday and Wednesday and Thursday and Friday, vice president Dick Cheney STAYED ON VACATION in Jackson, Wyoming. On Tuesday and Wednesday and Thursday, Sec. of State Condi Rice WENT ON VACATION in New York City and went to a splashy Broadway musical and bought obscenely expensive shoes. She went shopping" (Michael Giltz of *AMERICAblog* – September 5, 2005, emphasis in original).

"No need to explain why the President was golfing on Tuesday, playing guitar with country singers on a Tuesday while New Orleans died. Which would be fine if not for the inconvenient fact that the levees were breached on Monday, discovered on Monday, and confirmed on Monday. Monday was the day the levees broke... There were no calls for national unity, no experts explaining the state of things, no marshaling of buses and boats and helicopters. Our national leaders were absent. Our national pastimes went on. The experts who were on the news did not speak of the levee, the pumps, the flood, the emergency. They spoke of the revenue, the casinos, the oil, the markets" (Izzy of *Unbossed* – September 3, 2005).

Although Bush claimed that it was impossible to predict the devastating effect Hurricane Katrina would have on New Orleans, this turned out to be false. On September 6th, a video recording of a briefing with National Hurricane Center Director Max Mayfield was released to the public. In this briefing, Mayfield warned of the catastrophic effect that Katrina would have when it made landfall in New Orleans. Senator David Vitter, R-La., said the video "makes it perfectly clear once again that this disaster was not out of the blue or unforeseeable. It was not

only predictable, it was actually predicted. That's what made the failures in response — at the local, state and federal level — all the more outrageous" (Ebrahim 2006, 1). According to Dreier,

“As Americans saw on TV, Katrina revealed that when needed most, government was paralyzed. We do not know the magnitude of the Bush administration’s blunders and misjudgments, or their cost in human lives and property damage. What is clear is that its indifference toward New Orleans began long before Katrina struck. It cut the budget for FEMA and the Army Corps of Engineers. It folded FEMA into the Department of Homeland Security, diminishing its role as an emergency planning and relief agency while viewing it as simply another part of the administration’s “war on terror.” It failed to invest adequately in the infrastructure needed to prevent severe hurricane damage in New Orleans and Mississippi. The Bush administration was extremely slow in providing relief after the hurricane struck” (2006, 531-32).

On August 31, the city of New Orleans was declared uninhabitable. According to Comfort, “Lifeline systems – water, communications, transportation, electrical power, sanitary sewers, gas distribution systems – were inoperable throughout the city” (2007, 506). A Public Health Emergency was declared by the Department of Health and Human Services. The approximately 80,000 stranded survivors that were housed in the Superdome and Convention Center were sent to the Houston Astrodome beginning on September 1, but not before television viewers worldwide witnessed their desperate struggle to find food, potable water, and medical care. Hurricane Katrina made visible to the entire world the amount of poverty existent in the city of New Orleans. Horne notes,

“But in truth, what may have seemed startling from a distance came as no great surprise on the ground... From the perspective of black New Orleans, much about America was racist, and so surely a Republican administration elected with scarcely a nod to the black vote it didn’t need was not going to have the interests of a black city like New Orleans at the top of its agenda. Bush and other whites could and did deny it” (2006, 86).

In fact, a *CNN/USA Today* poll found that 60% of blacks compared to only 12% of whites saw race as a determining factor in the federal government’s delayed response to the disaster. During a Katrina telethon only four days after the hurricane made landfall, black rapper Kanye West created a commotion when he unexpectedly proclaimed “George Bush doesn’t care

about black people” (Horne 2006). Later in the telethon, white actor Colin Farrell presented a simple question to the audience: “Would the federal response have been so lethally incompetent if those in need of rescue had been standing on rooftops in the Hamptons?” (Horne 2006, 86).

While President Bush and his administration were attempting to deal with the criticism they were facing about the bungled response, former First Lady Barbara Bush reported on the situation in a radio interview saying, “What I’m hearing, which is sort of scary, is they all want to stay in Texas. Everyone is so overwhelmed by the hospitality. And so many of the people in the arena here, you know, were underprivileged anyway, so this is working very well for them” (*The New York Times* 2005).

By the time it was all over, more than 80% of the city flooded – several feet in most areas – and even houses that took on only inches of water were uninhabitable due to the stagnant water remaining in place for several weeks and the rampant growth of black mold (McCarthy et al. 2006). Due to the substantial flooding that occurred, most residents who evacuated had to wait until at least the end of September to return to the city and assess damages. While many people outside of the area could not grasp the enormity of the situation, Jones De-Weever and others provide some insights:

“In combination with the levees breaking and later Hurricane Rita, the storm did much more than flood one American city – it literally leveled an area the size of Great Britain (Rowley 2006), left more than 1500 people dead (Brown 2007), and caused the displacement of some 1.2 million (El Nasser and Overberg 2005)” (2008, 7).

In the days following the levee breaches, most of the media attention focused on the predominantly black population that had been left behind. However, according to Dyson (2006), a more careful analysis would have noted that the majority of adults left behind in the storm’s wake were actually women, most of whom were black. Additionally, a large number of individuals stranded after the storm were both black and white elderly women (Jones-DeWeever

2008). While media accounts focused largely on the racial disparities, much less attention was paid to gender disparities.

Loss of Possessions and Displacement

Natural disasters result in major changes in an individual's life situation (Cohen and Ahearn 1980). One of the biggest life changes is often the loss of one's home, which can lead to intense feelings of vulnerability and insecurity (Beck and Franke 1996; Laube and Murphy 1985). Oftentimes, displaced individuals have to enter cramped temporary shelters where there are poor sleeping arrangements, few restrooms, and no areas to cook (Beck and Franke 1996). Furthermore, the loss of a home can frequently lead to the loss of community and social networks, as well as loss of employment and income (Beck and Franke 1996). According to Cohen and Ahearn (1980), Erikson (1974), and Wallace (1957), relocation and displacement result in severe psychological symptoms, which Cohen and Ahearn (1980) refer to as "a second disaster". Furthermore, according to Fried (1963), displacement and relocation lead to long-term emotional symptoms, such as anger, distress, feelings of helplessness, and grief. Psychological elements will be examined in more detail in Chapter Four.

People that are displaced by a flood sometimes lose family members and friends or are separated from each other. They also frequently lose their possessions and experience depression and trauma-related symptoms as a result (Ferris 2008). Additionally, flood victims typically lose all of their important paperwork and documents, which can limit their access to public service (Kalin 2005) or result in it taking years to receive compensation (Ferris 2008). Individuals in vulnerable groups are more likely to be victims of forced relocation or have issues of property restitution (Ferris 2008). According to the World Health Organization (2006), women and children are the most likely to be displaced as a result of a natural disaster making up

approximately 75% of displaced persons. Furthermore, women typically have to take on the responsibility of “managing” their family’s relocation (World Health Organization 2006), a topic that will be explored in more detail in Chapter Five.

Hurricane Katrina damaged nearly 2 million housing units throughout the Gulf Region (Oxfam 2006). Louisiana suffered four times the amount of housing damage of Mississippi where Katrina made landfall (Louisiana Recovery Authority 2007). The city of New Orleans itself had approximately 142,000 housing units that suffered severe damage or were destroyed (Greater New Orleans Community Data Center 2007a). As of 2008, approximately 70,000 houses in New Orleans still remained vacant (Brookings Institution and the Greater New Orleans Community Data Center 2009). Additionally, following Hurricane Katrina, rental prices in the city increased by about 46% from their pre-Katrina value (Greater New Orleans Community Data Center 2007a). Between 2007 and 2008, rent prices continued to increase by approximately 4%, up 52% compared to pre-Katrina costs (Brookings Institution and the Greater New Orleans Community Data Center 2009).

Additionally, the city’s public housing units are undergoing demolition or have already been demolished (Jones-DeWeever 2008). On December 20, 2007, the New Orleans City Council voted unanimously in support of a United States Department of Housing and Urban Development plan to demolish 4500 public housing units and replace them with mixed-income housing, setting aside roughly 750 units for low-income residents. Due to the limited availability and incredibly high cost of housing in the city, residents of New Orleans, particularly women, have been forced to move in with relatives, friends, and acquaintances (Jones-DeWeever 2008).

The United States Census Bureau’s American Community Survey was one of the first dependable estimates of the post-Katrina population in New Orleans. According to figures

produced in January 2006, approximately 1.245 million evacuees age sixteen and older were still dislocated from their homes in the Gulf region. In the New Orleans metro area, the population size decreased by approximately 40% in December 2005 compared to January 2005. Nearly a year after Katrina's landfall, it was estimated that nearly half a million people were still displaced (U.S. Census Bureau 2006).

By January 1, 2006, there were approximately 158,000 residents living in New Orleans, which was about one-third of its pre-Katrina population. The numbers have steadily increased since that time.⁷ For instance, by mid-2006, there were approximately 223,000 people (half the pre-Katrina population) and by late 2008, there were approximately 311,000-320,000 residents (approximately 70% of the pre-Katrina population) (Brookings Institution and the Greater New Orleans Community Data Center 2008; Scallan 2009; U.S. Census Bureau 2007). Interestingly, there was little population growth in the first six months of 2008, which was followed by a nearly two percent increase in the last six months (Brookings Institution and the Greater New Orleans Community Data Center 2009). Thus, by December 2008, the city of New Orleans had reclaimed approximately 74% of its pre-Katrina population numbers. Although the city had reclaimed nearly three-quarters of its pre-Katrina population, four of the seven parishes⁸ in the New Orleans metropolitan area had lost residents since 2007⁹ (Scallan 2009).

The city of New Orleans is comprised of 73 neighborhoods, which make up 13 planning districts as seen in Illustration 3. According to the 2009 *New Orleans Index* survey, approximately 52% of individuals residing in New Orleans live in the five least flooded planning

⁷ Exact population figures are difficult to determine and currently available numbers serves as estimates. It is incredibly difficult to determine population figures in a post-disaster environment and numbers often differ depending on the source.

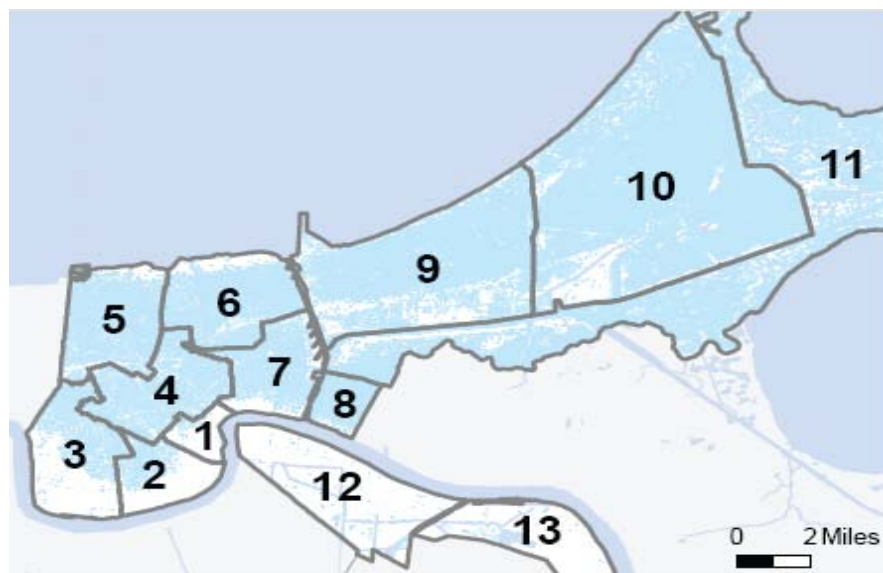
⁸ The four Parishes that experienced a decrease in population were Jefferson, St. Charles, St. John the Baptist, and Plaquemines

⁹ It is worth noting that these four Parishes are considering challenging these estimates. In 2007, Orleans, Jefferson, and St. Bernard Parishes challenged their population estimates and all were successful in their attempts. Population estimates are important to these areas because higher population estimates yield higher levels of federal grant money

districts in the city (1-3 and 12-13 in Figure 6) (Brookings Institution and the Greater New Orleans Community Data Center 2009). This is a large percentage change from 2000 when only 39% of residents lived in these areas.

Illustration 3

Extent of Flooding by Planning Districts



| District | Neighborhood Names |
|----------|---|
| 1 | Central Business District, French Quarter |
| 2 | Central City, East Riverside, Garden District, Irish Channel, Lower Garden District, Milan, St. Thomas, Touro |
| 3 | Audubon, Black Pearl, Broadmoor, Dixon, East Carrollton, Fontainebleau, Freret, Hollygrove, Leonidas, Uptown, West Riverside |
| 4 | Bayou St. John, BW Cooper, Fairgrounds, Gert Town, Iberville, Mid-City, St. Bernard Area, Seventh Ward, Tremé/Lafitte, Tulane/Gravier |
| 5 | City Park, Lakeshore/Lake Vista, Lakeview, Lakewood, Navarre, West End |
| 6 | Dillard, Filmore, Gentilly Terrace, Gentilly Woods, Lake Terrace & Lake Oaks, Milneburg, Pontchartrain Park, St. Anthony |
| 7 | Bywater, Desire Area, Desire Development, Florida Area, Florida Development, Marigny, St. Claude, St. Roch |
| 8 | Holy Cross, Lower 9th Ward |
| 9 | Little Woods, Pines Village, Plum Orchard, Read Boulevard East, Read Boulevard West, West Lake Forest |
| 10 | Village de L'Est |
| 11 | Lake Catherine, Viavant/Venetian Isles |
| 12 | Algiers Point, Behrman, Fischer, McDonogh, Old Aurora, US Naval Support Area, Tall Timbers/ Brechtel, Whitney |
| 13 | English Turn |

Source: Brookings Institution and the Greater New Orleans Community Data Center 2009

Additionally, the demographics of the city changed substantially following Hurricane Katrina with citizens more likely to be white, earn higher incomes, and own their own homes than the citizens prior to Katrina's landfall (Gault et al. 2005). Low-income (i.e. below the

median) families in New Orleans had lower homeownership rates (41%) than high-income (i.e. above the median) families (56%) (Sastry 2008). Furthermore, lower income individuals and families were less likely to return and the proportion of families with income below the poverty line dropped from 26% to approximately 8% immediately following Hurricane Katrina. Gault et al. found that one of the most notable changes was among female-headed households, which they claim “especially disappeared” (2005, 3). According to Jones-DeWeever (2008), the number of female-headed households dropped by approximately 45,000 after Katrina, while the usage of food stamps by this group quadrupled.

Sastry (2008) notes that little is now known about the whereabouts of permanently displaced New Orleans area residents. Initially data were available mostly from United States Postal Service change of address forms, as well as FEMA aid registration. Tizon and Smith’s (2005) analysis of these data suggested that approximately 15% of evacuees relocated to cities outside of Louisiana. The vast majority of evacuees resettled in the suburbs of New Orleans, as well as in Baton Rouge, Houston, Atlanta, and Dallas (Sastry 2008).

Theoretical Expectations Involving Losses and Displacement

Both women and men were affected by Hurricane Katrina and had to deal with lost possessions and displacement issues. It is hypothesized, however, that women were more likely than men to lose possessions, and out of those who lost possessions, men would be more likely than women to replace them. Additionally, it is hypothesized that women were more likely than men to be living with family and friends or have others living with them. Men are more likely to have the resources, such as money and education, necessary to transform their living situations and return to pre-disaster normalcy. Additionally, women are more likely to depend on healthcare and childcare systems, as well as public transportation systems, to be working to

capacity. When this is not the case, women are more likely to remain displaced and living with others. In 2006, only approximately 17% of buses were running, making it even more difficult for female residents to return. Jones-DeWeever notes:

“Even though the women of the Gulf Coast were among the poorest in the nation before Katrina hit, they were able to make it due to the tight bonds of family and friends that helped each other get by, even in the worst of times. In New Orleans especially, it wasn’t unusual for grandma to live in the house next door, auntie to live across the street, sister to live two doors down, and so forth. With family all around you, there was always a house to go to if you were running low on food, or if you needed someone to watch your children while you went to work, or if you just needed someone to talk to. With these critically important networks gone, those who have come back have done so in relative isolation, and now find life much more difficult than it ever was before” (2008, 18).

The hypotheses concerning loss of possessions and displacement are as follows:

H1: There will be gender disparities in physical losses between men and women directly following a natural disaster with women being more likely to experience losses.

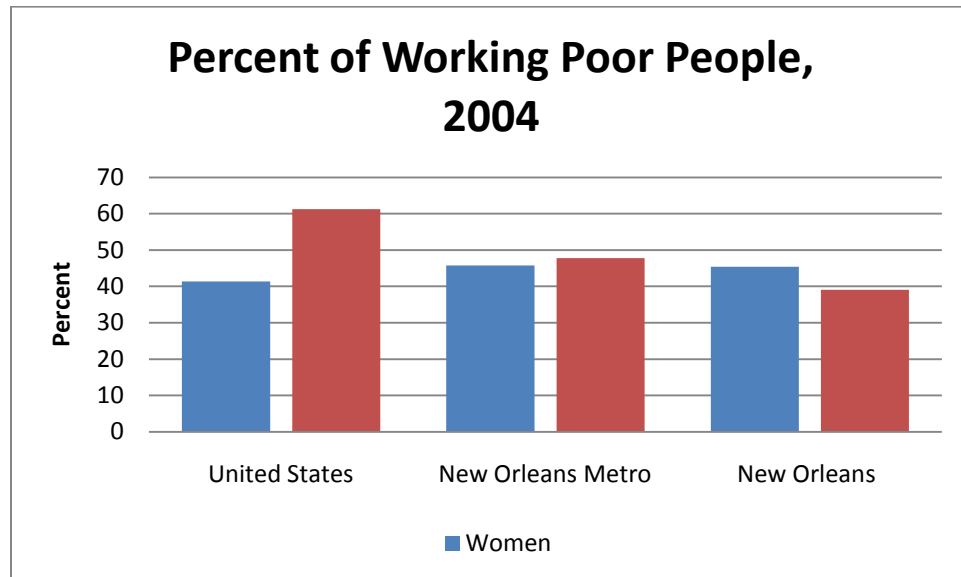
H2: Men will be more likely than women to be able to replace lost possessions. While women and men will both suffer a loss of possessions as a result of the hurricane, men will be more likely than women to replace these belongings.

H3: Women will be more likely than men to be living with friends and family or have others living with them following a natural disaster. Therefore, women will be more likely than men to be living with others or have others living with them following Hurricane Katrina.

Jobs and the Economy Following Hurricane Katrina

One of the largest causes of poverty in the United States is low-wage jobs. As Gault et al. note, “Many of the poor are working poor” (2005, 5). Additionally, more than 90% of working people who average low earnings over a period of 15 years are women (Rose and Hartman 2004). As Figure 4 shows, men in the city of New Orleans, as well as the metro area, comprised a smaller percentage of the working poor than in the nation as a whole. However, women in both the city of New Orleans and the surrounding metro area were slightly more likely to be poor compared to the national average of employed women.

Figure 4



Source: U.S. Census Bureau, American Community Survey, 2004. Compiled by the Institute for Women's Policy Research

There were also racial and gender differences in unemployment in the New Orleans area. In 2004, the national unemployment rate was approximately 7% for both men and women. In the New Orleans metro area, the unemployment rate was approximately 8%. But, in the city of New Orleans the unemployment rate was much higher, at approximately 11% for women and 12% for men (U.S. Census Bureau 2004). Additionally, while the unemployment rate was approximately 6% for white women in the city, black women experienced unemployment rates of nearly 14%. Furthermore, the unemployment rate for black men in the city was even higher than that of black women at nearly 18% (U.S. Census Bureau 2004).

The job market in New Orleans changed significantly as a result of Hurricane Katrina. For instance, Liu, Fellowes, and Mabanta (2006) found that in the New Orleans metro area, approximately 190,000 jobs were lost following the hurricane. The healthcare and education sectors suffered the largest percentage declines. Additionally, according to Liu and Plyer (2007), two years after Hurricane Katrina, the New Orleans metro area continued to lose employers and

there was no significant growth in the size of the labor force from the previous year.

Furthermore, the authors found that the unemployment rate continued to increase since 2005.

Liu and Holmes (2008) also found that few new jobs were added between the second and third years of recovery. The authors argue that New Orleans has had a diminished ability to attract workers due to high rental rates, which three years after the storm were still approximately 50% higher than before the storm (Liu and Holmes 2008). By November 2008, the New Orleans metro area labor force grew by approximately 3%, while the unemployment rate continued to climb from roughly 3% to 5% (Brookings Institution and the Greater New Orleans Community Data Center 2009). While the rest of the nation has experienced a 1% decrease in jobs, the New Orleans metro area has experienced a 1% increase.

Gendered differences in job losses occurred as a result of Hurricane Katrina. According to the Census Bureau's *American Community Survey*, prior to Hurricane Katrina women were more likely than men to be employed in the workforce in the New Orleans metro area. After the hurricane, however, men were more likely than women to be employed. For instance, in 2004, women comprised approximately 56% of the labor force in New Orleans, but by February 2007, women made up only 46% of the labor force. Additionally, for the median full-time, year-round worker, men's earnings increased by approximately \$3000 following Katrina, while women's earnings decreased by approximately \$1500 (Sastry 2008). While the job market has steadily improved in the years following Hurricane Katrina, the industries in which women are most likely to be employed continue to suffer the most – accommodations and food service, healthcare and social assistance, and educational services (Jones-DeWeever 2008; Louisiana Recovery Authority 2007). According to Sastry, "The economic consequences of Hurricane Katrina are likely to be enormous and lasting" (2008, 6).

Furthermore, the gendered division of labor frequently puts women at an increased risk of being vulnerable during a natural disaster (Enarson 2006). Research that took place after natural disasters in Bangladesh, Brazil, the Caribbean, and Miami unmasked a phenomenon now referred to as “male flight” in which men abandoned women, as well as their families, leaving the devastated area and taking relief aid money with them (World Health Organization 2002). This post-disaster “male flight” leaves women even more vulnerable as sole earners for their families in very difficult conditions.

Theoretical Expectations Regarding Jobs and the Economy

Women are more likely than men to be unemployed after a natural disaster (Jones 2005) and women often have a more difficult time recovering than men in the post-disaster environment due to lower wages, sector-specific employment, and family care responsibilities (Anderson 1994; Blaikie et al. 1994; Cutter 1996; Enarson and Morrow 1998; Enarson and Scanlon 1999; Fothergill 1996; Hewitt 1997; Morrow and Phillips 1999; Peacock, Gladwin, and Morrow 2000; and Peacock, Morrow and Gladwin 2000). Since the literature has demonstrated that women are more likely to be unemployed after a natural disaster and more likely to have a difficult time recovering economically, it is hypothesized that women will be less optimistic than men about employment opportunities, as well as about the likelihood of new jobs becoming available to them in the post-disaster environment.

H4: Women will be less optimistic than men, in general, about employment opportunities following a natural disaster. Prior to the disaster, women's and men's levels of optimism will not be significantly different. Therefore, women in Orleans Parish will be less optimistic than men about employment opportunities in 2007 following Hurricane Katrina.

H5: Women will be less optimistic than men, in general, about the likelihood of new jobs and industry entering their region following a natural disaster. Prior to the disaster, women's and men's levels of optimism will not be significantly different. Therefore,

women in Orleans Parish will be less optimistic than men about the likelihood of new jobs and industry entering the area in 2007 following Hurricane Katrina.

Analysis and Results

Five hypotheses in this chapter suggest that women suffered more losses of home, possessions, and job prospects than did men in the wake of Hurricane Katrina. Empirical results, however, generally do not support the hypotheses. The sole exception is the gender gap in ability to replace lost possessions, with women having a harder time replacing their losses. The bivariate and multivariate results will be discussed throughout this section.

The first two hypotheses dealt with whether respondents lost possessions, and if so, whether they were able to replace most of these possessions. In terms of loss of possessions, gender was not statistically significant in the bivariate analysis and Table 4 shows that gender was not statistically significant in the multivariate analysis either. The only significant variable was race with black individuals more likely than whites to report losing possessions. Since gender was not significant, there is no support for H1. Women in New Orleans were not more likely than men to lose possessions as a result of Hurricane Katrina.

The results were different in terms of respondents' ability to replace possessions. The bivariate analysis indicated that women were less likely than men to have been able to replace their lost possessions. Table 5 demonstrates that gender remained statistically significant in the multivariate analysis. Following Hurricane Katrina, women had a 65% chance of replacing their lost possessions when all other independent variables were held at their mean compared to men, who had an 83% chance of replacing their lost possessions. Since men were more likely than women to replace their lost possessions, H2 was supported.

Table 4

Lost Possessions 2006

| Loss06 | Coefficient | Standard Error |
|-----------------|--------------------|-----------------------|
| Gender (female) | .155 | .242 |
| Age | -.139 | .117 |
| Race (black) | 1.28*** | .398 |
| Education | -.100 | .145 |
| Income | .010 | .072 |
| Constant | .866 | .942 |

*p < .05, **p < .01, ***p < .001

Logistic Regression

N = 201; Pseudo R² = .080

Table 5

Replaced Possessions 2006

| Replace06 | Coefficient | Standard Error |
|------------------|--------------------|-----------------------|
| Gender (female) | -1.050* | .483 |
| Age | -.159 | .174 |
| Race (black) | -.846 | .566 |
| Education | .090 | .217 |
| Income | -.021 | .113 |
| Constant | 2.446 | 1.436 |

*p < .05, **p < .01, ***p < .001

Logistic Regression

N = 115; Pseudo R² = .109

Turning to displacement issues, the third hypothesis dealt with whether individuals were forced to move out of their own residence and live with friends or family or whether friends and family were displaced from their residences and living with the respondent. Gender was not statistically significant in the bivariate or multivariate analysis. Table 6 shows that age and race both obtained statistical significance in 2006. Blacks were more likely than whites and younger people were more likely than older citizens to report living with others or to have others living with them.

Table 6
Living with Others 2006

| Others06 | Coefficient | Standard Error |
|-----------------|--------------------|-----------------------|
| Gender (female) | -.056 | .309 |
| Age | -.518*** | .137 |
| Race (black) | 1.734*** | .438 |
| Education | .265 | .182 |
| Income | .029 | .092 |
| Constant | -.855 | 1.080 |

*p < .05, **p < .01, ***p < .001

Logistic Regression

N = 198; Pseudo R² = .163

Table 7 shows that by 2007, age was the only statistically significant variable with younger people to be more likely than older people to be living with others or have others living with them. Since women were not more likely than men to be living with friends and family or have others living with them following a natural disaster, H3 was not supported. Instead, age is consistently a more important determining factor of whether a respondent was living with others or had others living with them as a result of the disaster.

Table 7
Living with Others 2007

| Others07 | Coefficient | Standard Error |
|-----------------|--------------------|-----------------------|
| Gender (female) | -.058 | .288 |
| Age | -.406*** | .102 |
| Race (black) | .038 | .335 |
| Education | -.134 | .125 |
| Income | -.036 | .066 |
| Constant | 1.274 | .819 |

*p < .05, **p < .01, ***p < .001

Logistic Regression

N = 302; Pseudo R² = .057

There were two hypotheses involving jobs and the economy. The first hypothesis involves who will be less optimistic about employment opportunities in the Parish. As Table 8 shows, in 2004, the only variable achieving statistical significance is education with the least educated citizens feeling more optimistic about employment opportunities than citizens with higher levels of education. Gender was not statistically significant in the bivariate or multivariate analysis.

Table 8
Employment Opportunities 2004

| Employ04 | Coefficient | Standard Error |
|-----------------|--------------------|-----------------------|
| Gender (female) | .019 | .171 |
| Age | .045 | .058 |
| Race (black) | -.070 | .091 |
| Education | -.137* | .067 |
| Income | .049 | .036 |
| Constant | 2.066 | .394 |

*p < .05, **p < .01, ***p < .001
Ordinary Least Squares Regression
N = 385; Adjusted R² = .044

Table 9 shows that by 2007, age, race, and education were all statistically significant. The most highly educated individuals were still the least likely to feel optimistic about employment opportunities. Additionally, older citizens and whites were more optimistic than the younger generation, and blacks about employment opportunities entering the Parish. Gender, however, remained insignificant. Since women were not less optimistic than men about employment opportunities in the Parish, H4 was not supported.

Table 9

Employment Opportunities 2007

| Emplo07 | Coefficient | Standard Error |
|-----------------|--------------------|-----------------------|
| Gender (female) | -.196 | .200 |
| Age | .234*** | .072 |
| Race (black) | -.711*** | .215 |
| Education | -.297*** | .088 |
| Income | .075 | .049 |
| Constant | 3.889 | .516 |

*p < .05, **p < .01, ***p < .001

Ordinary Least Squares Regression

N = 302; Adjusted R² = .104

The second hypothesis involves whether women will be less optimistic than men about the likelihood of new jobs and industry entering the Parish. As Table 10 shows, in 2004, age and education achieved statistical significance with less educated and older individuals feeling more optimistic about the likelihood of new jobs and industry entering the parish than younger and more educated respondents. Gender was not significant. Table 11 shows that by 2007, only education remained statistically significant with the least educated individuals remaining the most optimistic about the potential for new jobs and industry to enter the parish. Gender remained insignificant in the bivariate and multivariate results. Therefore, H5 was also not supported.

Table 10

Likelihood of New Jobs Entering Orleans Parish 2004

| Newjob04 | Coefficient | Standard Error |
|-----------------|--------------------|-----------------------|
| Gender (female) | -.351 | .187 |
| Age | .239*** | .063 |
| Race (black) | .032 | .100 |
| Education | -.231** | .073 |
| Income | .006 | .040 |
| Constant | 2.161 | .431 |

*p < .05, **p < .01, ***p < .001

Ordinary Least Squares Regression

N = 385; Pseudo R² = .065

Table 11

Likelihood of New Jobs Entering Orleans Parish 2007

| Newjob07 | Coefficient | Standard Error |
|-----------------|--------------------|-----------------------|
| Gender (female) | -.136 | .215 |
| Age | .043 | .078 |
| Race (black) | .357 | .249 |
| Education | -.995** | .107 |
| Income | .068 | .056 |
| Constant | 4.213 | .633 |

*p < .05, **p < .01, ***p < .001
Ordinary Least Squares Regression
N = 302; Adjusted R² = .075

According to Dreier (2006), there was an exodus of jobs (from 339,953 to 279,056) from New Orleans that began in the 1980s and culminated in 2000 when the city was left with only one Fortune 500 company remaining (Entergy Energy Corporation). However, tourism – a low-wage industry – continued to flourish.

Conclusion

Hurricane Katrina was the most devastating natural disaster in United States history. The hurricane struck an historical city with a lively and diverse culture, but a socially vulnerable population. It was hypothesized that gender would play a large role in determining who suffered the greatest losses in the wake of this disaster, but men's advantage was evident only in the case of replacing lost possessions. Other variables, such as race, education, age, and income proved to be more important determinants than gender. Race was reported in the expected direction with blacks having a more difficult time. Blacks were more likely than whites to have lost possessions, be living with others, and feel pessimistic about employment opportunities in the city.

Individuals with lower levels of education were more likely than individuals with higher levels of education to report feelings of optimism regarding employment opportunities, as well as the chance of new jobs and industries entering the area. While it seems counterintuitive for the least educated to be the most optimistic, this is not necessarily the case. The low-wage tourism industry continued to be the most important industry in the city. Additionally, after Hurricane Katrina, fast food restaurants were offering higher hourly wages than prior to the hurricane, as well as signing bonuses. Furthermore, with much of the city needing to be rebuilt, construction positions increased exponentially. At the same time, many professional and managerial positions were lost.

Table 12 sums up the results of this chapter and shows that gender was only significant in determining who was most likely to have the opportunity to replace their lost possessions. As hypothesized, women reported significantly greater difficulties in replacing what they had lost.

Table 12
Support for Hypothesis by Year

| Hypothesis Number | 2004 | 2006 | 2007 |
|------------------------------|------|------|------|
| H1: Physical Losses | | No | |
| H2: Replaced Belongings | | Yes | |
| H3: Living with Others | | No | No |
| H4: Employment Opportunities | No | | No |
| H5: New Jobs and Industry | No | | No |

While this chapter examined losses, actual effects of the disaster, and respondent perceptions, the next chapter examines the psychological aspects of dealing with a natural disaster. Although gender, for the most part, is not significantly related to loss, displacement, and

perceived job opportunities after Katrina, we will see in the next chapter that gender is more consistently relevant when dealing with the psychological effects of disaster.

Chapter Four

Biological and Psychological Differences between the Sexes

For decades, scholars from various fields including psychology, biology, anthropology, sociology, women's studies, and political science have been studying differences between men and women. Through this research, various physical and psychological differences between the sexes have been discovered. However, there have been many long debates regarding these differences, as well as the extent and causes of these differences. It is important to examine some of these key differences between men and women in order to provide a deeper understanding of how the sexes could potentially be impacted differentially by natural disasters. It is also necessary to examine the extent to which even these differences may have a sociological basis. These topics are the focus of this chapter. Then, the hypotheses related to psychological factors are examined in detail and a discussion of the statistical results is presented.

Biological Differences between the Sexes

When scholars discuss “sex” differences, they are referring to biological or physiological characteristics that are different between males and females. Differences can typically be broken down into five key types – reproductive, hormonal, physical, psychological, and behavioral – which, as is demonstrated throughout this chapter, overlap and interact in many ways. Key physical or physiological differences between men and women have been found. Some differences begin at development. For instance, the right side of the brain typically develops faster in girls, which results in better vocabulary and reading abilities, as well as better memory. The left side of the brain typically develops faster in boys, which results in better perceptual skills, problem solving, and visual-spatial-logical skills (Baron-Cohen 1999; The Relationship Institute 2008).

Once developed, one of the biggest disparities is in size. Men are typically 10-15% larger and 30% stronger than women mostly due to a greater ability to form muscles as a result of higher levels of testosterone, as well as more muscle tissue mass (Booth, Shelley, and Mazur 1989; Marano 2003; Mazur and Booth 1998). Men also produce more red blood cells due to the amount of testosterone in their body, making it easier for men to breathe more oxygen allowing them to be physically active for longer periods of time with less effort than for women. Additionally, women throughout the world live longer than men, though this gap is decreasing in most developed countries due to the increasing numbers of women who consume alcohol and smoke cigarettes (Buer 2006; Marano 2003; Santrock 2007). In terms of natural disasters, women lack some of the physical strength, as well as the heart and lung capacities of men, potentially making it harder for women to endure difficult conditions, such as swimming and walking in high temperatures for long periods of time.

Psychological Differences between the Sexes

Just as there are physical differences between the sexes, psychological differences exist, as well. Many of these involve problem-solving, thought patterns, memory capability, and sensitivity. While overall rates of mental illness are similar for men and women, men are more likely to suffer from alcoholism, drug abuse, dysthymia, and antisocial personality disorder (Goldstein et al. 1998; Ingraham and Wender 1992; Leckman et al. 1983; WHO.org 2008). Furthermore, men are nearly three times more likely than women to commit suicide (Royal College of Psychiatrics). Women, on the other hand, are more likely than men to suffer from unipolar depression, generalized anxiety, panic disorders, eating disorders and Post-Traumatic Stress Disorder (PTSD) (Burke et al. 1990; Dunivin 2001). While less likely to commit suicide than their male counterparts, women are more likely to attempt suicide than men. Additionally,

women are more likely than men to suffer from “reactive depression”, or depression that occurs as a result of difficult or traumatic events (Karp and Frank 1995), which is critical to take into consideration when a natural disaster occurs.

Even though differences between the sexes have been discovered, scholars are still unclear about how much of the population is affected by mental illness. For instance, studies find anywhere between 8-20% of women with clinical unipolar depression (Kessler et al. 1993; Weissman et al. 1991). Despite this, scholars recognize that the true percentage of people suffering from mental illness is likely much higher and that these numbers are low due to a lack of reporting. Moreover, Kendler et al. (1993) has asserted that the environment in which one lives can influence how mood disorders, such as depression, are expressed. Furthermore, Meyer and Deitsch (1996) note that with each passing generation there is a greater susceptibility to depression. The authors argue that this is not only due to depression being easier to recognize as time has passed, but also due to increased levels of stress associated with modern life.

Additionally, only a handful of studies (for instance, see Angst and Dobler-Mikola 1984 or Romanoski et al. 1992) have failed to find higher rates of mood disorders in women compared to men. While Faied (1998) and Saunders and Roy (1999) found no differences between the sexes on depression scores, Saunders and Roy (1999) note that the results of both studies may not be generalizable because they utilized non-clinical and highly educated populations. Fennig and Pelteir (1994) argue that women are more likely than men to suffer from depression even when studies utilize various definitions of depression and include a variety of intense and less intense symptoms when creating that definition. Furthermore, Blazer, Steffens, and Busse (1994) and Klerman and Weissman (1993) find that women of different social classes, cultures, and

ethnic groups exhibit mood disorders at higher rates than men, which provides evidence that these results are probably not artifactual.

Additionally, Blehar and Oren (1999, 2008) argue that it is critical to examine mental illness, as well as comorbidity of mental illness, from a gendered perspective. The authors argue that if mood disorders are a result of biological factors, then differences in the comorbid conditions being expressed, such as PTSD versus alcoholism, may be the result of socialized differences. Many causes of mental illness and mood disorders have been studied in the literature and have resulted in a variety of biological psychiatry models. These include HPA axis overactivity, serotonin, thyroid, and genetic models. According to the HPA axis overactivity model, stress-induced HPA, as well as hormonal imbalances, can create depression (Young et al. 1995). The serotonin model asserts that a lack of serotonin in the brain results in depression in women and violence and irritability in men (Arango et al. 1990; Lepage and Steiner 1991; Wurtmann 1993). The thyroid dysfunction model claims that mood disorders, such as depression, are a result of a malfunctioning thyroid (Bauer and Whybrow 2001). Finally, the genetic factors model assumes that mood disorders are inherited (Kendler et al. 1993; McMahon et al. 1995; Mendlewicz, Fieve, and Stallone 1973).

Despite the prevalence of the biological psychiatry models, Blehar and Oren (1999, 2008), as well as Klerman and Weissman (1989, 1993), McGrath et al. (1990), and Nolen-Hoeksema (1990) assert that environmental models with social factor explanations provide the best explanation when trying to understand mood disorders. In particular, mood disorders in women may be the result of childhood socialization, as well as childhood sexual abuse - a common occurrence among women (Briere and Runtz 1990; Notman 1995). However, Blehar and Oren (1999, 2008) note that the correlation between early abuse and depression needs more

research. Despite this, the authors note that other early childhood socialization factors are often implicated, such as findings indicating that different expectations for children based on their sex can have a major impact later in life. For instance, Ruble et al. (1993) found that stereotypical gender socialization results in girls not feeling as though they are in control and able to master things, while placing greater emphasis on external evaluations making them more vulnerable to mood disorders. This brings the focus to the importance of socialization and gender differences.

Sociological Differences between the Sexes

As noted in the previous chapter, gender differences can be defined as sociologically based differences. For decades, feminists and scholars from a wide variety of fields have been debating whether differences between men and women are biologically or sociologically based, or if differences even exist. Feminists, in particular, have been at the forefront of the equality versus difference debate. For instance, Fausto-Sterling (1992) questions the purported biological differences between the sexes. Simone de Beauvoir (1949), in her seminal book *The Second Sex*, was one of the first to suggest that women are socialized to feel like inferior ‘others’ to the ‘normal’ male sex. Butler (1999) and West and Zimmerman (1987) argue that gender roles are sociologically, not biologically, based. Rhoads (2004) finds a variety of sex-based differences and Brizendine (2007) argues that differences in the make-up of the brain result in functional differences for the sexes. In one of the most influential books of its time, Gilligan (1982) argues that differences between the sexes are quite important. Yet, Tavis (1992) questions whether difference matters and asserts that scholars are finding excuses to perpetuate stereotypes and justify inequalities.

However, according to Neumayer and Plumper (2007), differences are real, particularly in terms of survival. The authors found that men are physiologically better able to withstand a

natural disaster. Women are less likely to survive in strong winds or floods and pregnant women are even more disadvantaged. Additionally, the authors note that men run faster and are able to climb trees and posts with less difficulty than women. However, the authors also note that differences in the ability for individuals to rescue themselves may be at least partially dependent upon learned social skills. For example, according to a study by Oxfam International (2005), in tsunami affected areas of Sri Lanka, swimming and tree climbing are everyday tasks for boys, but are not taught to girls. Therefore, Neumayer and Plumper (2007) argue that it is important to realize that even physiological differences can be based upon deeper sociological differences. Perhaps gender differences are innate to an extent, but are then exaggerated, as well as reinforced by the environment, and ultimately perpetuated by patriarchy and discrimination.

Considering the issue from a socialization or gendered perspective, there are many differences between men and women. In personality tests, women score higher in “agreeableness” (i.e. compassion and cooperation) and “neuroticism” (i.e. anxiety, anger, and depression) (Frederikse et al. 1999; Harasty et al. 1997). When asked whether they prefer thinking or feeling, survey results have varied, but anywhere between 65-75% of women prefer feeling compared to 55-80% of men who prefer thinking (Frederikse et al. 1999; Harasty et al. 1997). Though the percentage differences in these survey results are large, one thing remains the same – a majority of women prefer feeling, while a majority of men prefer thinking.

Additionally, Marano (2003) found that men were more likely to take risks than women. Men are also more aggressive than women (Buss 2005; Dodge, Coie and Lynam 1997; Macoby and Jacklin 1974). For instance, Zeichner et al. (2003) found that men are more likely than women to react in an aggressive way at a quicker pace and Bjorkqvist et al. (1994) discovered that men are more likely to react aggressively in a more physical way. Hines and Saudino (2003)

argue that women prefer verbal and relational aggression, such as social rejection, to physical aggression.

In terms of intelligence, a hotly contested topic between the sexes, overall intelligence rates are similar with some studies showing no measurable differences at all (Bren 2005). However, when intelligence is broken down into specific abilities that averages are unable to take into account, men score higher at tests of spatial and mathematical ability, while women score higher on tests of verbal ability and memory (Hyde 2005; WHO.org 2008). In terms of self-esteem, the self-esteem of men is most often based on their career, while women's self-esteem is more related to their feelings, as well as the quality of their relationships, which may be due to women spending more time as homemakers and mothers (Popcorn and Marigold 2000). Oftentimes, self-esteem and happiness are determined by how an individual feels, in general, about the direction in which they perceive their life to be going.

Theoretical Expectations Regarding Psychological Factors

Now that the literature regarding differences between the sexes, particularly psychological differences, has been reviewed it is possible to examine New Orleans as a case study to see how women and men were affected psychologically by Hurricane Katrina.

Theoretical expectations regarding psychological factors are explored specifically in terms of quality of life, worry about the future, and mental instability, all of which are shown to be important in the literature. The hypotheses derived from the psychological model are explored individually in the subsequent sections.

Quality of Life

The satisfaction with life scale is utilized in survey research to measure cognitive judgments of one's own life. According to Pavot and Diener (1993), the satisfaction with life scale assesses general satisfaction with one's life on the whole and does not examine specific domains, which allows the respondent to incorporate and weight those domains in whatever manner they desire. According to Myers and Diener (1995), happiness and satisfaction with life are not dependent upon age, race, sex, or socioeconomic status, but rather on relationships, culture, personal traits, work experiences, and religiosity. However, according to surveys conducted by the Pew Research Center (2003), overall, women are slightly happier than men with their lives. For instance, in the United States, 64% of men say that they are happy compared to 68% of women.

Additionally, in 24 of 44 countries surveyed by the Pew Research Center (2003), when compared to women men were more optimistic about their future. This is also the case in the United States, though by a close margin – 62% of men and 59% of women are optimistic about their future. At the same time, women in the United States are more likely than men to be concerned about the future of their children thinking that it will be worse than their own. Looking at the specifics, women are more concerned about issues regarding their home and children, as well as education and healthcare issues, while men are more concerned about issues outside of the home, such as work and politics. Men are generally happier with their home life and more optimistic about their children's future. Despite this, Booth and Ours (2008) found that having children in the household does not increase men's sense of satisfaction with life and it only does so for women once children have started school. Additionally, women who have children are much happier if they have a job irrespective of how many hours they work per week.

When natural disasters occur, there is an inverse relationship between worry and quality of life. The amount of worrying that individuals experience following a natural disaster increases substantially, while at the same time their quality of life is diminished. Chou et al. (2004), as well as Wu et al. (2006), examined the quality of life of Taiwanese earthquake survivors in the 1999 Chi-Chi earthquake. Interviews with 405 respondents demonstrated that the biggest indicators of low quality of life were female gender, age, low socioeconomic status, PTSD diagnosis, and physical illness.

In a different study of China, Tan et al. (2004) examined quality of life among survivors of a flood. Their study consisted of over 2000 respondents broken down into three groups – those affected by initial flooding, those affected by flooding as a result of collapsed embankments, and a control group. Both of the groups directly affected by the flooding reported a lower quality of life. The group affected by flooding due to the embankments collapsing, as opposed to the initial flooding, suffered from much lower levels of quality of life. This is interesting when taking New Orleans into consideration where flooding was caused by levees breaching. Beck and Frank (1996) and Horowitz (1976) found that in cases like these survivors of natural disasters deal with denial, as well as intense anger aimed at public officials, rescuers, and insurance companies. Furthermore, Beck and Frank (1996) found that there are some common psychological symptoms found in survivors of natural disasters such as sleep disturbances, memory or concentration problems that can lead to performance issues, depressed moods, and an argumentative style.

Looking more specifically at New Orleans, LaJoie and Sprang (2009) investigated the long-term psychological consequences, as well as the reported quality of life, of respondents affected by Hurricane Katrina. The authors conducted telephone interviews with 102 evacuees

who had gone to Kentucky when Katrina struck New Orleans. Some of the respondents remained in Kentucky, while others had returned to New Orleans. Initial interviews were conducted shortly after the storm and the second round of interviews were conducted one year later. LaJoie and Sprang (2009) found that there were significant long-lasting effects on respondents' well-being. More specifically, they discovered that irrespective of whether individuals remained in Kentucky or returned to New Orleans, they suffered from high levels of anxiety and depression and reported low levels of quality of life. These results were most prominent among female respondents, though individuals who utilized negative coping strategies, such as substance abuse, fared worse irrespective of sex.

Following a natural disaster, quality of life decreases for everyone, while the general amount of worry that individuals experience increases. Although women are generally more satisfied with life than men, in studies conducted after natural disasters, women have reported lower levels of satisfaction with life than men. I hypothesize here that women in New Orleans will be less satisfied with life than men following Hurricane Katrina. The literature also showed that in normal times women are more likely than men to be concerned about their future. Additionally, Chou et al. (2004) and Wu et al. (2006) found female gender to be a significant variable in determining high levels of worry about the future following the 1999 Chi-Chi earthquake. Perhaps women generally report higher satisfaction than men, but at the same time perhaps they worry more about the future, especially in the context of a major disaster. These seemingly contradictory findings could both be linked to the greater tendency for women to emphasize interpersonal connections and the ethic of caring (in Gilligan's terms). Therefore, I hypothesize that women in New Orleans will be more likely than men to report feelings of worry about their future following the hurricane. Both of these hypotheses are strictly about the gender

gap changing in magnitude over time; thus, pre-Katrina (2004) findings about the gender gap are compared to post-Katrina (2007) findings.

H6: Women will be less satisfied with life than men, in general, following a natural disaster. Prior to the disaster, women's and men's satisfaction levels will not be significantly different. Therefore, women in Orleans Parish will be less satisfied with life than men in 2007 following Hurricane Katrina.

H7: Women will be more worried than men about what will happen to them in the next five years after a natural disaster occurs. In 2006 and 2007, women will be more likely than men to report feelings of worry about their future.

Symptoms of Stress Following a Natural Disaster

Scientific studies have found that natural disasters have profound psychological implications for survivors (Cohen and Ahearn 1980; Parad, Resnick, and Parad 1976). The intensity and extent of the psychological impact often depends upon how extensive the destruction was, the duration of the catastrophe, and the number of people who were killed as a result (Fritz 1957). In the post-impact period of a natural disaster, people often have many haunting memories of the disaster and frequently have an almost irrational fear that the event will reoccur (Wolfstein 1975), which can at times make them experience high levels of fear when returning to an area impacted by a natural disaster (Perry and Muschkattel 1984). A study by Shwalb and Shwalb (2006) showed that college students displaced from their educational institution even reported moderate levels of fear after returning to their institution in the months after Katrina. Additionally, during this 'reaction period', most people experience a deep desire to be around others and discuss their feelings regarding the disaster (Cohen and Ahearn 1980; Tyhurst 1951). Furthermore, most people deal with a period of post-traumatic stress and psychological impairment, which will be examined in more detail throughout this section.

Individuals who survive a natural disaster deal with different types of stress over time, which can have a serious effect on one's emotions and behaviors (Cohen and Ahearn 1980).

According to the authors, stress can be caused by four main things: 1) the actual disaster; 2) the inability to deal with daily tasks including interacting with other individuals; 3) memories of the disaster; and 4) on-going physical and social changes in the environment. Leighton (1959) demonstrated that when a community is disorganized as a result of a natural disaster it can have a negative psychological impact on the surrounding community. Building on this, Cohen and Aheran (1980) argue that when institutions, social groups, and community structures are altered and disorganized, individuals can also feel an internal disintegration and feel heavily burdened by their circumstances.

According to Landesman et al. (2005) stress reactions following a natural disaster normally include emotional effects, such as anger, shock, and grief; cognitive effects, such as confusion or poor memory; interpersonal effects, such as alienation, irritability, and withdrawal; and physical effects, such as headaches and insomnia. Raphael (2000) notes that oftentimes individuals experience physical symptoms as a result of their emotional reactions. Some key symptoms are sleep disturbance, fatigue, and relationship or work difficulties. After natural disasters, there is a larger need for healthcare providers to treat neuroses, depression, anxiety, and PTSD. Lillibridge and Sharp (1998) argue that the disruption of social networks is often times more detrimental than sustaining physical injuries. When networks are disrupted women are more likely to experience the above-mentioned symptoms, while men are more likely to experience irritability and anger.

Additionally, according to Raphael (2000), there are three phases of traumatic stress reactions that result from natural disasters – impact, immediate post-disaster, and recovery. In the impact phase, while some people may react differently, most people are able to respond to disaster in a reactive way that helps protect lives. It is not until the immediate post-disaster phase

that most people begin to react to the actual disaster and begin to show various mental health effects, most notably confusion and anxiety. Emotional reactions typically appear next, though these can be delayed depending upon how advanced a recovery effort may be. Emotional reactions typically include depression, dissociation, flashbacks, despair, anger, and grief. In the final stage, the recovery phase, individuals attempt to find a state of equilibrium and normalcy. How long the recovery phase takes is typically dependent upon how vast the devastation is, as well as whether lives and homes were lost (Wilson and Raphael 1993). Additionally, a disillusionment phase may follow once the disaster is no longer the lead news story, support begins to fall through, and bureaucratic constraints are encountered (Raphael 1986). Furthermore, once basic safety feels secured, many people begin to feel as though their existential and psychological needs have not been met, leaving them even more frustrated.

Often times, people develop PTSD as a result of overwhelming stress, such as a natural disaster. The post-traumatic period is marked by anxiety, insomnia, nightmares, and fatigue, as well as digestive upset, resulting from the emotional tensions that people experience (Healy 1969; Perry and Muschkattel 1984; and Tyhurst 1951). Exposure to stressors can sometimes change the way individuals look at life, creating extra distress (USDVA 2007). According to the National Center for PTSD, how long it takes for people to recover depends mostly on what happened to them, how they perceived the events, and the meaning they give to their experience. According to Steinglass and Gerrity (1990), approximately 15-20% of people studied after natural disasters suffer from PTSD. According to Cohen and Ahearn (1980), as well as others (such as Erikson 1974), this period could last throughout an individuals' entire life.

A study of survivors of the Aberfan disaster¹⁰ has demonstrated that recovery – at least from a psychological point of view – differs based on the symptoms individuals experience (Morgan et al. 2003). For instance, the authors found that 33 years after the disaster survivors were no longer demonstrating high levels of anxiety, depression, or substance abuse. They were, however, still demonstrating unusually high levels of PTSD when compared to other individuals of their same age and background. However, Remennick (2002) finds that when compared to other immigrants from the former USSR, immigrants from Chernobyl-affected areas continue to have a much poorer mental disposition, demonstrating higher levels of depression.

Post-disaster stress symptoms, as well as emotional disorders and distress, are typically reported more frequently by women than by men (WHO 2002, 2006). According to the World Health Organization's Department of Gender and Women's Health (2002), women's even larger role as caregivers, as well as the necessity to put family needs over their own, can help explain why women's emotional health declines more than that of men's. Furthermore, studies of disaster victims in the United States have found that women are more likely to suffer from mental health problems, while men are more likely to suffer from substance abuse (Van Willigen 2001). As a result, it is hypothesized that women will be more likely than men to suffer from mental instability following Hurricane Katrina. The hypotheses follow:

H8: Women will be more likely than men to feel depressed following a natural disaster. In post-Katrina New Orleans, women will be more likely than men to report feelings of depression.

H9: Women will be more likely than men to report having difficulty sleeping following a natural disaster. In post-Katrina New Orleans, women will be more likely than men to report experiencing sleeplessness.

¹⁰ The “Aberfan disaster” was a catastrophic landslide that killed hundreds of people in a small village outside of Wales. For decades, excavated mining debris was moved to the side of a mountain overlooking the village. In 1966, a torrential downpour resulted in a landslide. This disaster bears some resemblance to Hurricane Katrina in that concerns regarding safety had been voiced – and, for the most part, ignored – for years.

H10: Women will be more likely than men to have trouble keeping their mind on what they are doing following a natural disaster. In post-Katrina New Orleans, women will be more likely than men to report experiencing an inability to focus.

H11: Men will be more likely than women to experience irritability following a natural disaster. In post-Katrina New Orleans, men will be more likely than women to report feeling irritable.

Analysis and Results

Two hypotheses in this chapter suggest that women were less likely than men to be satisfied with their lives and more likely to be worried about the future following Hurricane Katrina. Additionally, three hypotheses suggest that women were more likely than men to suffer from psychological symptoms (depression, sleeplessness, and an inability to focus), while one hypothesis suggests that men were more likely than women to experience a psychological symptom (irritability). Empirical results follow and show that support for the hypotheses is mixed, partially depending on the year under consideration.

The first hypothesis dealt with general satisfaction with life. The preliminary bivariate analysis did not find gender to be significant in 2004. However, by 2007 that changed, with men less likely to be satisfied with life than women (41% compared to 55%). As the following two tables demonstrate, the results were the same in the multivariate analysis with similar probabilities, as well. Table 13 shows that in 2004, gender was not statistically significant. Therefore, before Hurricane Katrina made landfall, gender was not a significant factor in determining whether individuals were satisfied with their lives.

Table 13

General Satisfaction in 2004

| GenSat04 | Coefficient | Standard Error |
|-----------------|--------------------|-----------------------|
| Gender (female) | .051 | .218 |
| Age | .009 | .074 |
| Race (black) | .182 | .234 |
| Education | -.016 | .087 |
| Income | -.082 | .047 |
| Constant | -.088 | .570 |

Logistic Regression

N = 376; Pseudo R² = .011

This changed by 2007 and, as Table 14 demonstrates, gender was statistically significant at the .01 level after Hurricane Katrina. However, despite gender being statistically significant, there is no support for H8 because the direction of the relationship was different than expected. Women had a 58% chance of reporting satisfaction with their life when all other independent variables were held at their mean. Men, on the other hand, had a 41% probability of feeling satisfied in post-Katrina New Orleans. Therefore, although gender became statistically significant after Hurricane Katrina, women were more likely to report feeling satisfied with life resulting in no support for the hypothesis.

Table 14

General Satisfaction 2007

| GenSat07 | Coefficient | Standard Error |
|-----------------|--------------------|-----------------------|
| Gender (female) | .682** | .242 |
| Age | -.058 | .089 |
| Race (black) | -.194 | .273 |
| Education | .018 | .103 |
| Income | .026 | .053 |
| Constant | -.206 | .699 |

*p < .05, **p < .01, ***p < .001

Logistic Regression

N = 295; Pseudo R² = .026

The literature was inconclusive as to whether women or men were generally more satisfied with life because different several studies resulted in mixed evidence. Thus, it is not surprising that gender was not statistically significant in 2004 prior to Hurricane Katrina's landfall. While it was hypothesized that women would be less satisfied with life after a natural disaster, after analyzing all of the data for this chapter, it is also not surprising that men were the least likely to be satisfied with life by 2007. As the rest of this chapter will show, women were more likely than men to experience psychological symptoms in the months directly following Hurricane Katrina, while men were more likely to experience psychological symptoms approximately one year or more later. If men were more likely than women to experience psychological symptoms in 2007, it makes sense that their general satisfaction with life would be lower.

The second hypothesis dealt with feelings of concern about the future. In 2006, gender was statistically significant at the .05 level in the bivariate analysis and Table 15 shows that it remained significant in the multivariate analysis. Women were more likely than men to report being concerned about the future. In 2007, gender remained significant at the .05 level in the bivariate analysis. Table 16 shows the multivariate results, which indicate that although gender was significant, the direction of the relationship changed by 2007 with men more likely than women to report feelings of concern about the future. Race and age were also significant in 2007. Young people were more likely than older people and white people were more likely than black people to express feelings of worrying about the future.

The direction of the relationship between gender and worries about the future (H7) warrants further discussion. In 2006, women had a 73% probability of reporting feeling worried about the future when all other independent variables were held at their mean compared to men, who had a 59% chance of reporting this same feeling. Therefore, in 2006, H7 is supported. This falls in line with the literature cited earlier that found men to be more optimistic than women

regarding their future. This was true even in a post-natural disaster setting, though compared to the national average both sexes were very concerned about the future. The Pew Research Center (2003) found approximately 38% of men and 41% of women nationally were worried about future. Men in post-Katrina New Orleans were more likely to be concerned about their future than the average man in the U.S., while women in New Orleans were nearly two times more likely than the average woman in the U.S. to be worried about the future.

Table 15
Levels of Worry in 2006

| Worry06 | Coefficient | Standard Error |
|------------------------|--------------------|-----------------------|
| Gender (female) | .628* | .324 |
| Age | -.176 | .119 |
| Race (black) | -.025 | .390 |
| Education | .282 | .156 |
| Income | -.072 | .075 |
| Constant | .193 | .996 |

*p < .05, **p < .01, ***p < .001

Logistic Regression

N = 199; Pseudo R² = .040

Table 16
Levels of Worry in 2007

| GenSat04 | Coefficient | Standard Error |
|------------------------|--------------------|-----------------------|
| Gender (female) | -.533* | .247 |
| Age | -.242** | .095 |
| Race (black) | -.564* | .288 |
| Education | .119 | .111 |
| Income | -.094 | .055 |
| Constant | 1.677 | .761 |

*p < .05, **p < .01, ***p < .001

Logistic Regression

N = 296; Pseudo R² = .043

However, in 2007, when all other independent variables were held at their mean women only had a 47% chance of reporting feeling worried about the future, while men had a 60% chance of reporting this same feeling. Therefore, the relationship reversed itself from 2006 to

2007. In terms of the 2007 data, H7 was not supported. Compared to the national average, women in New Orleans were slightly more likely to report feelings of worry than the average woman in the United States. However, men in New Orleans were considerably more likely than the average man in the U.S. to report concern about the future. This contradicts the previous literature and warrants further attention.

First, as the rest of the chapter demonstrates, men were more likely than women to experience psychological symptoms by 2007. Additionally, men were less likely to report satisfaction with their life by 2007. The combination of these factors may result in men feeling generally more pessimistic and concerned about the future. Additionally, as Cohen and Ahearn (1980) note, individuals who survive a natural disaster deal with different types of stress over time and stress can be exacerbated by on-going physical and social changes in the environment. Due to the vast damage the city of New Orleans incurred, recovery has been a slow process. Raphael (2000) found that emotional reactions can be delayed depending on how advanced the recovery effort is. Furthermore, exposure to stressors can sometimes change the way individuals look at life (USDVA 2007).

Turning to the depression-related variables, it was hypothesized that women would be more likely than men to report feelings of depression, difficulty sleeping, and an inability to retain focus. Men, on the other hand, would be more likely than women to report feelings of irritability. In terms of feelings of sadness, gender was statistically significant in the bivariate results only in 2006. Men were far more likely than women (69% compared to 39%) to experience zero to one day of sadness each week. Additionally, women were more likely than men (24% compared to 10%) to experience sadness six or seven days per week. The multivariate results in Table 17 confirm that in 2006, gender was statistically significant at the .01 level.

Furthermore, women had a 47% chance of reporting feeling sad zero to one day per week with all other independent variables set at their mean, while men had a 62% chance of reporting such infrequent feelings of sadness. Looking at the other end of the spectrum, when the other independent variables were held at their mean, women had a 21% chance of reporting feeling sad six to seven days per week compared to men who had only a 12% chance of reporting feeling sad six to seven days per week. Therefore, H8 was supported in 2006.

Table 17
Levels of Depression in 2006

| Sad06 | Coefficient | Standard Error |
|------------------------|--------------------|-----------------------|
| Gender (female) | .395** | .132 |
| Age | -.023 | .063 |
| Race (black) | .268 | .208 |
| Education | .021 | .083 |
| Income | -.037 | .041 |
| Constant | .222 | .520 |

*p < .05, **p < .01, ***p < .001

Ordered Probit

N = 197; Pseudo R² = .036

These percentages are important to take into consideration because it indicates that women had a 53% chance of experiencing depression two or more days per week, while men had a 38% chance of experiencing depression two or more days per week. Although the literature indicated that women were more likely than men to experience depression even in normal conditions, these post-Katrina probabilities are much higher than the national average; studies indicate that anywhere between 8-20% of women nationwide experience depression.

However, as Table 18 shows, by 2007, gender was no longer a statistically significant variable. This corresponds with the bivariate results. Only age was significant, with younger people reporting more frequent bouts of depression. Thus, by 2007, H8 was no longer supported. In terms of gender, this can be viewed as a positive sign of recovery for women. Additionally,

this coincides with the results of a study conducted by Karp and Frank (1995) which found that women are more likely than men to suffer from ‘reactive depression,’ which, as noted earlier in this chapter, occurs in the months directly following a traumatic event. This may explain why women were more likely to report feelings of depression 7-8 months after Hurricane Katrina’s landfall, but not 19-20 months after the disaster.

Table 18
Levels of Depression in 2007

| Sad07 | Coefficient | Standard Error |
|------------------------|--------------------|-----------------------|
| Gender (female) | -.269 | .145 |
| Age | -.115* | .053 |
| Race (black) | -.047 | .160 |
| Education | -.089 | .061 |
| Income | -.049 | .031 |
| Constant | -.902 | .419 |

*p < .05, **p < .01, ***p < .001

Ordered Probit

N = 300; Pseudo R² = .023

Looking at the next depression-related variable, it was hypothesized that women would be more likely than men to report having difficulties sleeping. Gender was significant in both 2006 and 2007 in the bivariate results. In 2006, men were more likely than women (63% compared to 36%) to experience sleeplessness only zero to one day per week. Women were more likely than men (37% compared to 12%) to experience this symptom six to seven days per week. In 2007, the direction changed. Women were more likely than men (62% compared to 54%) to experience sleeplessness only zero to one day per week. Men were more likely than women (28% compared to 18%) to experience this symptom six to seven days per week.

The results were similar in the multivariate analysis. Table 19 shows that gender was statistically significant at the .001 level in 2006, and was the only statistically significant variable. Women had a 40% chance of reporting having sleep difficulties zero to one day per

week with all other variables set at their mean, while men had a 59% chance of reporting experiencing this symptom one day per week, if at all. Additionally, when all other independent variables were held at their mean, women had a 30% chance of reporting experiencing sleep difficulties six to seven days per week compared to men who had only a 16% chance of reporting this symptom six to seven days per week. Therefore, H9 was supported in 2006.

Table 19
Difficulties Sleeping in 2006

| Sleep06 | Coefficient | Standard Error |
|------------------------|--------------------|-----------------------|
| Gender (female) | .480*** | .132 |
| Age | -.101 | .063 |
| Race (black) | .077 | .203 |
| Education | -.126 | .078 |
| Income | -.021 | .040 |
| Constant | -.884 | .512 |

*p < .05, **p < .01, ***p < .001

Ordered Probit

N = 200; Pseudo R² = .046

Additionally, Table 20 shows that gender was statistically significant at the .05 level in 2007. Furthermore, the age variable gained statistical significance, with younger respondents more likely than older respondents to report frequent sleep problems. However, looking specifically at gender, the direction of the relationship changed from 2006 to 2007. In 2007, women had a 65% chance of reporting having sleep difficulties zero to one day per week with all other variables set at their mean, while men had a 54% chance of reporting this symptom. Additionally, women had only a 19% chance of reporting having sleep difficulties six to seven days per week compared to men who had a 27% chance of reporting having difficulties sleeping six to seven days per week. Therefore, in 2007, H9 was no longer supported.

This is an interesting finding and warrants further attention. It may indicate that it takes longer for sleep problems to catch up to men. Additionally, increased levels of worry and

decreased satisfaction with life may play a role in men's lack of sleep over time. As with other indicators of high stress, men's reactions appear to be delayed. Furthermore, insomnia is one of the main symptoms of PTSD. Following the Aberfan disaster, levels of PTSD were unusually high even decades later (Morgan et al. 2003). While women's decreased levels of sleeplessness can be viewed as a positive sign of recovery, the increased level of sleeplessness in men is concerning and warrants further study in the future in order to determine whether these levels decrease.

Table 20
Difficulties Sleeping in 2007

| Sleep07 | Coefficient | Standard Error |
|------------------------|--------------------|-----------------------|
| Gender (female) | -.286* | .143 |
| Age | -.122* | .053 |
| Race (black) | -.056 | .163 |
| Education | -.086 | .061 |
| Income | -.011 | .032 |
| Constant | -.893 | .418 |

*p < .05, **p < .01, ***p < .001

Ordered Probit

N = 299; Pseudo R² = .017

Turning to the third depression-related variable, it was hypothesized that women would be more likely than men to report having difficulties staying focused. The bivariate results showed gender to be statistically significant in 2006, but not in 2007. In 2006, men were more likely than women (64% to 52%) to rarely, if ever (i.e. zero to one day per week), experience difficulty concentrating. Additionally, women were more likely than men (25% to 16%) to experience difficulty concentrating nearly every day of the week (i.e. six to seven days). However, as Table 21 and Table 22 show, gender was not statistically significant in the multivariate analysis in 2006 or 2007. In 2006, no variables achieved statistical significance, while age and income were both significant in 2007. Younger and lower income respondents

were more likely than older and higher income respondents to report experiencing difficulties focusing four or more days per week. Since gender was not statistically significant, H10 was not supported in either year.

Table 21
Inability to Focus in 2006

| Focus06 | Coefficient | Standard Error |
|------------------------|--------------------|-----------------------|
| Gender (female) | .226 | .132 |
| Age | -.041 | .065 |
| Race (black) | -.024 | .211 |
| Education | .094 | .086 |
| Income | -.028 | .042 |
| Constant | .461 | .524 |

*p < .05, **p < .01, ***p < .001

Ordered Probit

N = 199; Pseudo R² = .013

Table 22
Inability to Focus in 2007

| Focus07 | Coefficient | Standard Error |
|------------------------|--------------------|-----------------------|
| Gender (female) | -.272 | .148 |
| Age | -.134** | .055 |
| Race (black) | -.010 | .165 |
| Education | -.027 | .063 |
| Income | -.084** | .033 |
| Constant | -.816 | .434 |

*p < .05, **p < .01, ***p < .001

Ordered Probit

N = 300; Pseudo R² = .031

Finally, examining the fourth depression-related variable, it was hypothesized that men would be more likely than women to report experiencing irritability. Gender was statistically significant in the bivariate analysis in both 2006 and 2007. In 2006, men were more likely than women (59% compared to 47%) to experience feelings of irritability zero to one day per week. Women were slightly more likely than men (19% compared to 14%) to experience irritability six to seven days per week. In 2007, women were more likely than men (68% compared to 58%) to

experience feelings of irritability zero to one day per week. Men were slightly more likely than women (16% compared to 11%) to experience irritability six to seven days per week, as hypothesized.

The multivariate results were similar to the bivariate results. Table 23 shows that gender was statistically significant at the .01 level in 2006. Women had a 47% chance of reporting feelings of irritability zero to one day per week with all other independent variables set at their mean, while men had a 61% chance of rarely reporting this symptom. Looking at the other end of the spectrum, women had a 21% chance of reporting feelings of irritability six to seven days per week with all other independent variables set at their mean compared to men who had only a 12% chance of reporting feelings of irritability six to seven days per week. Since this was the opposite direction from that hypothesized, H11 was not supported in 2006. This is an interesting finding because it contradicts previous studies (Arango et al. 1990; Landesman et al 2005; Lepage and Steiner 1991; Lillibridge and Sharp 1998; Wurtmann 1993) that found that men experienced high levels of irritability following a natural disaster. Not only did the majority of men experience minimal, if any, irritability (zero to one day per week), but more women than men reported experiencing frequent irritability (six to seven days per week).

Table 23

Feelings of Irritability in 2006

| Irritab06 | Coefficient | Standard Error |
|------------------------|--------------------|-----------------------|
| Gender (female) | .362** | .147 |
| Age | -.052 | .063 |
| Race (black) | .198 | .204 |
| Education | -.047 | .080 |
| Income | .024 | .039 |
| Constant | .020 | .518 |

*p < .05, **p < .01, ***p < .001

Ordered Probit

N = 201; Pseudo R² = .021

Looking at 2007, Table 24 shows that gender remained statistically significant at the .05 level, while age and income also became significant. As with difficulties concentrating, younger and lower income individuals were more likely than older and higher income individuals to experience frequent irritability. Additionally, in 2007, women had a 71% chance of reporting feelings of irritability zero to one day per week with all other independent variables set at their mean, while men had a 58% chance of reporting this symptom. Looking at the other end of the spectrum, women had an 8% chance of reporting feelings of irritability six to seven days per week compared to men who had a 15% chance of reporting feelings of irritability six to seven days per week. Therefore, by 2007, the direction of the relationship had changed and H11 was supported. However, it is worth noting that the majority of both sexes were experiencing low to moderate levels of irritability during the timeframe studied. As with H9, it may be that it takes longer for some psychological symptoms to catch up with some men. Additionally, irritability may result from a combination of sleeplessness, concern about the future, and lower levels of satisfaction with life, which men were more likely to experience in 2007.

Table 24
Feelings of Irritability in 2007

| Irritab07 | Coefficient | Standard Error |
|------------------------|--------------------|-----------------------|
| Gender (female) | -.351** | .148 |
| Age | -.194*** | .054 |
| Race (black) | .006 | .168 |
| Education | .028 | .063 |
| Income | -.100** | .033 |
| Constant | -.985 | .397 |

*p < .05, **p < .01, ***p < .001

Ordered Probit

N = 300; Pseudo R² = .045

Conclusion

The post-disaster period is difficult for everyone involved. However, different people are affected in unique ways and at different times. When a disaster is particularly devastating to an area involving the mass destruction of houses and communities, it is even more difficult to predict the psychological reactions of those affected. Table 25 outlines the results of the analyses in this chapter, which were mixed in terms of support for the hypotheses about post-disaster gender differences.

There was no significant difference between women and men in their ability to focus and concentrate on what they were attempting to accomplish. Additionally, while men did not experience higher levels of irritability initially following Hurricane Katrina, they did by 2007. Furthermore, while women were more likely to experience sleeplessness and worry directly after the hurricane, men were more likely to experience these symptoms by 2007. Moreover, while gender was not a statistically significant factor in determining quality of life prior to Hurricane Katrina, men were less likely to be satisfied with their lives after the hurricane.

Table 25

Support for Hypothesis by Year

| Hypothesis Number | 2006 | 2007 |
|----------------------------|------|------|
| H6: Life Satisfaction | No | |
| H7: Worry About the Future | Yes | No |
| H8: Depression | Yes | No |
| H9: Sleeplessness | Yes | No |
| H10: Difficulty Focusing | No | No |
| H11: Irritability | No | Yes |

Women, in sum, appear more likely than men to be negatively impacted psychologically in the initial stages of recovery from a Katrina-like natural disaster, while men are more likely to experience these symptoms a year or more later. In 2006, women were more worried about the future, and more prone to depression, sleeplessness, and irritability than were men. In 2007, however, the gender differences in depression disappeared, and men actually reported higher levels of worry, sleeplessness, and irritability than did women. This may be due to gender socialization whereby men are more likely than women to be socialized to think and act quickly, perhaps even heroically, resulting in them attempting to fix things quickly. Women, on the other hand, may be socialized to have more of an emotional initial reaction to what is happening around them. This may help women cope better than men because women have already had the chance to reflect on what has happened around them, while men who were involved in the initial rush of activity probably did not have the opportunity to process the events that occurred. This is an interesting finding in terms of recovery rates and has important policy implications, which will be outlined in detail in Chapter Six.

Chapter Five

Evacuation Behavior

Due to the large number of disasters that have occurred over the span of the past century, scholars in a variety of fields now conduct disaster research. Much of this literature focuses on risk perception and exposure, preparedness and evacuation behavior, warning and communication responses, and recovery processes (Baker 1991; Bateman and Edwards 2002; Beady and Bolin 1986; Drabek 1969; Gladwin and Peacock 1997). Throughout the past several decades the amount of literature on evacuation has continued to increase. In fact, evacuation behavior is now widely recognized as the most thoroughly examined branch of disaster research (Bateman and Edwards 2002).

Despite the increasing amount of disaster and evacuation behavior literature, there are still some noteworthy gaps. For instance, as with the vulnerability literature, one demographic factor has continuously been ignored – gender. In fact, for the most part, disaster studies have taken a gender-neutral position using gender, at most, as a control variable (Bateman and Edwards 2002; Fothergill 1996; Gladwin and Peacock 1997; Nielsen 1990; Stacey and Thorne 1985; Wallace 1989). But, again as with the vulnerability literature, a handful of scholars such as Cutter, Enarson, Fothergill, Gladwin, Morrow, and Peacock are bringing women’s invisibility to the forefront. The following section will outline some of the existent literature on gender and evacuation behavior.

Evacuations and Natural Disasters

Prior to examining evacuation behavior, it is first necessary to define the term ‘evacuation’. According to definition number four in dictionary.com, an evacuation is “the removal of persons or things from an endangered area”. Wolshon notes, “An evacuation is an

extreme response to an extreme threat where the potential for mass loss of life exists” (2002, 5). According to Perry (1979) and Perry et al. (1981), evacuation efforts can be viewed as a type of intervention that attempts to minimize the catastrophic effects that can occur as a result of a natural disaster. The authors argue that three main objectives can be obtained by evacuating threatened populations: 1) protecting property; 2) preventing injury; and 3) sustaining life.

Although all three of these objectives are important, achieving them can be a lofty goal, as not all individuals have the desire to evacuate. A vast literature now exists on what are referred to as “evacuation incentives”. According to Perry et al. (1981) evacuation incentives increase the probability that an individual will evacuate. Key factors include: a working automobile or access to transportation; a previously established household evacuation plan; and evacuation of neighbors. In one of the earliest studies of its kind, Drabek (1969) examined evacuation behavior resulting from the June 16, 1965 flood in the Denver, Colorado metropolitan area. The purpose of this early study on evacuation was to try to identify social processes that cause individuals to evacuate. Drabek found three key processes responsible for assisting individuals in their decision-making process: 1) warnings by authority; 2) warnings by peers; and 3) warnings by the mass media. The results of this study laid the groundwork for other studies in the decades to come.

Just over a decade later, Perry et al. (1980 and 1981) updated Drabek’s work identifying some of the most important influences in determining whether or not an individual decides to evacuate. These reasons are cited in the vast majority of evacuation behavior articles and books produced from the 1980s through the 2000s. While the authors outline a variety of influences, they feel that the following three influences are the most important: 1) the definition of the threat as real; 2) the level of perceived personal risk; and 3) the presence of an adaptive plan. The next

section addresses these three influences and begins to take the role of gender into account as another influential factor.

Evacuation Behavior and Gender

The correlation between various demographic factors and evacuation behavior has been studied for decades with differing results. Interestingly, in his study, Baker (1991) argued that individual variables including demographic ones are not related to evacuation decisions. This contradicts many other studies, which have shown age, gender, race, and socioeconomic status to play an important role in evacuation behavior. For instance, Perry (1985) found that as age increased so too did the likelihood of an individual to evacuate. Gladwin and Peacock (1997), as well as Perry and Mushkatel (1984), found ethnicity and socioeconomic status to be important determining variables. Perry and Mushkatel (1984) argue that individuals from lower socioeconomic backgrounds are the least likely to understand and comply with evacuation warnings, while Gladwin and Peacock (1997) note that these individuals are the least likely to be able to afford to evacuate. Finally, Bateman and Edwards (2002) found gender to be a significant variable in determining evacuation behavior with women more likely to respond to evacuation orders than men.

A variety of studies have shown that women and men have different gender roles in the face of a natural disaster. This is important because according to Mirowsky (1985) and Enarson and Scanlon (1999), it is necessary to take gender dynamics in a marriage into consideration when attempting to understand evacuation decisions. In instances where decisions can affect the entire family, such as evacuating for a hurricane, one spouse can impose their will on the other. Additionally, gender differences in household composition and family obligations can play a large role in determining why women are more likely than men to evacuate (Baker 1991;

Bateman and Edwards 2002; Gladwin and Peacock 1997; Perry 1979). Household size and the presence of young children, elders, or pets are important factors that can influence these decisions (Acker 1990; Bateman and Edwards 2002; Reskin and Padavic 1994). In their studies, Gladwin and Peacock (1997) and Maiolo et al. (1999) found that households with people who have medical or physical conditions are less likely to evacuate.

Two examples of differing gender dynamics are evident from a study conducted by Enarson and Scanlon (1999). First, following Hurricane Andrew in 1992, interviews demonstrated that women were responsible for taking care of their family, getting supplies together, and preparing the house for the hurricane, while men focused on securing outdoor areas of the house. Second, following the Red River Valley Flood in 1997, male and female couples recounted their different roles to researchers. Men were more likely than women to move large items, build earth dikes, move tools and hobby equipment, and help relatives and neighbors in need. Women were more likely than men to pack smaller items including irreplaceable possessions, ‘supervise’ the removal of large items, prepare any children, and provide meals for the family and neighbors.

In the end, Enarson and Scanlon (1999) found that out of the majority of couples in their study, both the male and female played a role in evacuation preparedness and mitigation efforts. As with earlier studies (Cutter and Solecki 1992; Fitzpatrick and Mileti 1990; Flynn, Slovic, and Mertz 1994; Fothergill 1998; Leik, Carter, and Clark 1981; O’Brien and Atchison 1998), the authors found that when the couples disagreed on something, women were more likely than men to take the flood risk more seriously.

“Gender-based conflict arose when couples faced decisions about when or whether to move household goods and furniture up from the basement or out of the house, what possessions were most valued and worth protecting, what and how much to pack for use in temporary living quarters, what alternative arrangements to make for livestock and

pets, who to ask for help – and whose job it was to ask for help. In the busy days and hours before evacuation, women and men often had different priorities” (Enarson and Scanlon 1999, 109).

Women were more likely than men to make the relocation plans and to pack for the relocation. Many families had to relocate for a month or more and ended up having to move in with extended family (Enarson and Scanlon 1999). Couples were likely to report that women were more prepared once they evacuated, while men were less likely to be prepared. In some instances, men left with nothing more than a toothbrush, while women left with supplies and clothes. The authors conclude, “Highly feminized before the flood, domestic labor and childcare in most couples’ homes remained segregated or became more highly feminized during this period” (Enarson and Scanlon 1999, 111). According to Bateman and Edwards, these differences are not innate, but rather the result of socially constructed gender differences. “In short, women are more likely to evacuate for hurricanes because of underlying gender differences in care-giving roles, evacuation preparation, their greater exposure to certain objective risks, and their more acute perception of subjective risk” (Bateman and Edwards 2002, 116). This turns the attention to another important element of the evacuation decision – risk perception.

The Role of Risk in Evacuation Behavior

The role of risk taking and risk aversion has become a major focus in terms of evacuation behavior for the past several decades. According to the World Health Organization’s Department of Gender and Women’s Health (2002), there are gender differences in the perception of hazard risks. Women are more likely to take warning signals into consideration and to accept them (Drabek 1969; Mack and Baker 1961), as well as to personalize these warnings (Flynn 1979; Hodge, Sharp, and Marts 1981). Women are also more likely than their male counterparts to

perceive disasters or threats of a natural disaster as more serious and risky (Cutter and Solecki 1992; Flynn et al. 1994; Leik et al. 1981).

According to Flynn et al. (1994), due to their lack of control and power in society, women have a greater ability to perceive risks, while men are less likely to see themselves at risk since they view themselves as empowered and in control. Bateman and Edwards (2002) argue that women perceive themselves to be at greater risk than men simply because they are at greater risk. The vulnerability factors discussed in previous chapters have made women more vulnerable to natural disasters. Consistent with the previous literature, Bateman and Edwards (2002) find that women are more likely to perceive risk than men. However, they also find that once men perceive risk it has a stronger effect on evacuation.

It is important to take into consideration risk taking and risk aversion patterns because this can play a large role in determining whether an individual listens to officials about the seriousness of an impending disaster, as well as whether the individual will evacuate. For instance, studies by Baker (1991) and Dynes and Tierney (1994) have demonstrated that one of the largest psychological factors determining whether an individual evacuates is how a person perceives the amount of risk involved in the situation. The greater the perceived risk the more likely one is to respond to warning messages (Burby and Wagner 1996; Burnside 2006). In coastal areas that attract tourists, tourists are typically the first to leave since they are the most likely to be risk averse to the impending hurricane. Residents who have experienced previous hurricanes that were either not as catastrophic as governmental officials claimed that they would be or that did not end up making landfall after evacuations had taken place are less likely to evacuate. This has been termed the “crying wolf hypothesis”. Scholars, such as Atwood and Major (1998), Breznitz (1984), Burnside (2006), and Dow and Cutter (1997), have found that

individuals who have continuously witnessed hurricanes miss their area were the most likely to discount evacuation warnings. Men who have previously experienced a natural disaster are the least likely to leave, while women with children are the most likely to leave (Enarson and Scanlon 1999)

Similarly, for decades, other scholars (Davenport 1978; Forrest 1979; Moore 1964) have referred to what is called a “disaster subculture”. In this situation, it is not a matter of failure to accurately perceive the threat of a hurricane; instead, individuals simply refuse to evacuate despite understanding the potential implications of staying. Further complicating this refusal to evacuate are protective actions taken by high-risk communities, such as the addition of flood canals and levees (Burnside 2006; Davenport 1978). Dating back to 1979 Forrest argued that New Orleans residents had developed a disaster subculture due to the large number of threats and storms the city had previously experienced. When Hurricane Katrina made landfall 26 years later little had changed.

As Bateman and Edwards aptly note, “Before an individual ever begins to contemplate evacuating, they must first perceive some degree of personal risk. An individual’s perception of risk requires assessing their proximity to a hazard and the severity of the impending disaster. Such interpretative processes are influenced by social factors, cultural biases, and gender” (2002, 111). Bateman and Edwards (2002), as well as others (Enarson 2006; Fothergill 1996) find that women tend to be more risk averse than men and are more likely to prepare for disasters and take self-protective measures, such as planning evacuations. Fothergill (1996) also finds that women are more likely to express concern about the possible effect of natural disasters on their families. Despite women being more likely to prepare for environmental hazards, they are less likely to receive early warnings (Major 1999). After reviewing the available literature, Enarson and

Scanlon (1999) argued that women frequently report that their desire to evacuate and make other preparations is minimized by the men in their lives or that they feel they lack the power in their family to make decisions for their household.

Evacuation Orders

Another key gender difference found in the literature involves who men and women listen to in terms of evacuation orders. According to Baker (1991), evacuation rates are most likely to be determined by which government officials provide evacuation orders or recommendations. As Burnside notes, “The views and perceptions of public officials by citizens are relevant to evacuation behavior. The degree to which citizens perceive the officials to be credible politically can have a substantial impact on their adherence to critical information about disaster evacuation” (2006, 50). Bateman and Edwards (2002) and Fothergill (1996) find that women are more likely than men to find emergency warnings from local disaster officials to be credible and are more likely to follow them. Men are more likely than women to disregard these evacuation orders.

Social networks play an important role in terms of evacuation behavior (Burnside 2006). While scholars, such as Baker (1991) and Gladwin and Peacock (1997), find that the media is an important source of evacuation information, scholars like Perry (1985) and Sorenson and Mileti (1988) find that the media is just one source of information among many. Studies by both of these authors found that people rely heavily on friends and neighbors when making evacuation decisions. Consistent with an earlier study by Drabek (1969), Enarson and Scanlon (1999) found that social networks were a pivotal means for sharing information about evacuation plans and that these varied by gender. For instance, men were more likely to hear about the flood through

other men and friends in emergency management positions, while women were more likely to garner information from other women, family, neighbors, and women's groups.

According to Fothergill (1996), women are highly likely to receive information about environmental hazards from women's network groups. Other scholars have found similar results. In fact, multiple studies have shown that women are more likely than men to hear about disaster warnings from their friends, neighbors, relatives and coworkers. They then relay the information to the men in their lives (Bateman and Edwards 2002; Drabek 1969; Drabek and Boggs 1968; Turner et al. 1981). Furthermore, women are more likely than men to know when their neighbors plan on evacuating (Gladwin and Peacock 1997). Bateman and Edwards (2002) view these things as a form of evacuation incentives, which was discussed previously.

Evacuation Behavior in New Orleans

Now that the literature regarding evacuation behavior has been reviewed it is possible to examine New Orleans-specific evacuation information. Then, theoretical expectations regarding evacuation behavior are explored specifically in terms of evacuation plans, previous evacuation attempts, and a hypothetical evacuation scenario involving local Parish officials issuing an evacuation order, all of which were divided along gendered lines in the literature.

Evacuating New Orleans

Due to the limited ability to track hurricanes, it is very difficult to make decisions as to whether and when to evacuate. Although there have been vast improvements in hurricane tracking technology over the past several decades, an accurate landfall location is typically not available until a storm is approximately 100 miles away, which translates to approximately 24 hours prior to landfall (Wolshon 2002). Of course, this is not enough time to evacuate most coastal cities, especially when tropical storm conditions including rains and heavy wind are

typically experienced beginning 36 hours prior to landfall. New Orleans is no exception. In fact, it has been estimated that a full evacuation of the New Orleans metropolitan area would take approximately 72 hours (Wolshon 2002).

While evacuation attempts have become increasingly difficult throughout the Southeastern United States, the city of New Orleans remains one of the most vulnerable cities in the entire country (Burnside 2006). One of the major problems cited throughout the literature is the unusually limited number of evacuation routes in the New Orleans area, as well as much of the rest of Southeast Louisiana, due to lakes, bays, rivers, marshes, swamps, and the Gulf of Mexico. Unfortunately, this is a problem that cannot be overcome as the building of further evacuation routes is essentially prohibited due to the existence of these wetlands and waterways. Not only is the building of new roads and overpasses nearly impossible, it would be unaffordable.

Another problem with the evacuation routes in the New Orleans metro area is that with only one exception all of the routes run from east to west. Further complicating this situation is the fact that all of the major routes out of the New Orleans area cross over long sections of water (Wolshon 2002). I-10 crosses Lake Pontchartrain for approximately twelve miles, while sections of U.S. 11, 61, and 90 experience flooding during moderate rain storms. Although the Lake Pontchartrain Causeway is less flood prone than the other routes, it must be closed to traffic once winds exceed 45 miles per hour. All of this leads Laska to note that the evacuation challenge “is the result of the same topography and hydrology responsible for the area’s high level of hurricane risk” (2004, 175).

Wolshon (2002) argues that being surrounded by water and having limited routes out of the city are only half of the problem. He argues that the biggest problem encountered by the city

of New Orleans is the fact that it is mostly below sea level. In fact, while some parts of the city are approximately two feet below sea level, other parts, such as areas near Lake Pontchartrain, are nearly ten feet below sea level (Wolshon 2002). Even though the areas closest to the Mississippi River are approximately one to two feet above sea level, in normal conditions, the water surrounding New Orleans can be as high as 10 to 15 feet above sea level (Wolshon 2002). As a result, and unlike many other cities where residents can evacuate to higher ground, it would be critical to evacuate ALL residents in New Orleans.

A total evacuation of a city is not an easy feat – especially not in a city surrounded by water with a vulnerable population like New Orleans. As a result, a regional evacuation plan has been developed in which local, state, and federal authorities, law-enforcement agencies, and emergency preparedness officials work together in an attempt to evacuate the metropolitan area. According to Wolshon (2002), the evacuation plan takes into account that evacuating only part of the population in the area is practically feasible. Laska (2004) notes that researchers have estimated that prior to a large hurricane entering the New Orleans metro area, approximately 700,000 of an estimated 1.2 million people would evacuate. In other words, approximately 40% of residents will not evacuate. Wolshon (2002) found that approximately 200,000 to 300,000 will not leave because they do not have access to reliable transportation, while at least 100,000 will not evacuate because they are unwilling to leave their homes behind.

Hurricane Ivan ended up serving as a “practice run” for evacuations in the New Orleans metro area and officials estimated that about 600,000 people evacuated due to the threat of Ivan in September 2004. Essentially, this means that an equal number of residents remained behind even in the path of a potentially catastrophic hurricane. According to Laska (2004), two-thirds of the individuals with the means to evacuate who did not evacuate chose this option because they

felt safe in their homes. Many others relied on a cultural tradition of not evacuating or were discouraged by past evacuation experiences that they viewed as negative. This falls in line with the crying wolf hypothesis and the disaster subculture literature reviewed earlier.

Warnings about the “Doomsday Scenario”

In 2002, three years before Hurricane Katrina made landfall, the Institute for Transportation Engineers released the results of a study entitled “Planning for the Evacuation of New Orleans”. One of the main findings was that the existence of the levee system in New Orleans, as well as the lack of a catastrophic hurricane since Hurricane Betsy in 1965, had led to an overwhelmingly high level of complacency among many New Orleanians. However, the report noted that things were beginning to change due to Hurricane Andrew in 1992 and Hurricane Georges in 1998, which both missed New Orleans by 150 miles or less.

Two years after the release of the transportation engineers report, Dr. Shirley Laska of the Center for Hazard Assessment and Response Technology (CHART) wrote an article for the final segment of the “Disasters Waiting to Happen Series.” Written in November 2004, Laska’s article was a hypothetical piece focusing on what would happen if a hurricane struck the city of New Orleans. While writing the article, Hurricane Ivan – a large Category 4 to 5 hurricane – was on a straight path to the city. Although the hurricane ended up missing New Orleans landing east of Mobile Bay, Alabama, what was supposed to be a hypothetical situation ended up showing a lot of weaknesses in the city of New Orleans evacuation plans.

Scholars and other professionals were able to provide a detailed (and retrospectively accurate) account of what would have happened if a hurricane like Ivan actually made landfall in or near New Orleans. For instance, Wolshon (2002) noted that due to the city being located below sea level, storm models demonstrated that a Category 3 hurricane, or higher, could result

in some parts of the city being inundated with 10 to 20 feet of water. Laska (2004) predicted that an approximately 17 foot storm surge would be pushed into Lake Pontchartrain, causing levees between the lake to overtop or breach resulting in the city filling up like a “bowl”. Additionally, she argued that approximately 80% of structures in the flooded areas would be severely damaged. Ultimately, Laska argued that an outdated levee system and the eroding coastline made this doomsday scenario feasible. Wolshon (2002) drew a similar conclusion arguing that the storm models showed that the levees would work “in reverse” during a hurricane – normally tasked with keeping the water out the levees would prevent the water from leaving the city once the storm surge receded.

Laska (2004) noted that following a hypothetical flooding of New Orleans, search and rescue missions would take approximately ten days and individuals that remained in the city would have to be rescued via boat and helicopter. Additionally, she predicted that it would take approximately 9 weeks to pump the water out of New Orleans and that the pumping stations, and sewerage and water systems would be severely damaged. Furthermore, Laska argued that ‘tent cities’ would be put together by the government in order to provide accommodations to all of the displaced residents. In closing, Laska demonstrated the enormity of this ‘potential’ situation by stating:

“Should this disaster become a reality, it would undoubtedly be one of the greatest disasters, if not the greatest, to hit the United States... Survivors would have to endure conditions never before experienced in a North American disaster... Hurricane Ivan had the potential to make the unthinkable a reality. Next time New Orleans may not be so fortunate” (2004, 176).

Regrettably, New Orleans was ultimately not ‘so fortunate’ and this ‘unthinkable’ disaster became a reality during the next hurricane season only 9 months later.

As Chapter Three outlined, Hurricane Katrina was a catastrophic hurricane that devastated New Orleans and the surrounding areas. Laska's (2004) hypotheses regarding the search and rescue missions were eerily accurate. Search and rescue missions were conducted for over a week. Boats and helicopters were utilized to save stranded individuals. Local, state, and federal officials were involved, as was the National Guard and the Coast Guard. The city of New Orleans was inundated with water and filled up like a bowl as predicted. It took nearly an entire month to pump the water out of the city. Sewerage and water systems were severely damaged. The 'tent cities' described by Laska were replaced by FEMA trailers where residents lived for months and even years while repairing their homes.

Theoretical Expectations Regarding Evacuation Behavior

Previous research concluded that women are more likely than men to put together an evacuation plan. Therefore, it is hypothesized that women in New Orleans will be more likely than men to have an evacuation plan in place. The literature also demonstrated that women in the United States are more likely than men to leave an area that is being threatened by a natural disaster. Men are more likely to make the risky decision of staying behind. As a result, it is hypothesized that women in Orleans Parish were more likely than men to evacuate under the threat of a hurricane within the past ten years.

Additionally, previous studies showed that women are more likely to heed the directions of local officials when it comes to evacuation recommendations. Therefore, it is hypothesized that when asked hypothetically if they would leave the area because of the threat of a hurricane if prompted to do so by city officials, women in New Orleans are more likely than men to say they would evacuate. However, while all of these hypotheses fall in line with the literature, they apply only to pre-disaster situations, and not to post-disaster plans or behavior. In other words, while

gender differences are hypothesized to be apparent before Hurricane Katrina, these differences should be minimal – if they exist at all – following the worst natural disaster on United States soil.

H14: Women are more likely than men to have an evacuation plan in place.

H15: In terms of evacuation declarations, women will be more likely than men to evacuate when recommended by local officials. However, after experiencing a major catastrophic disaster, the gender gap will close as large majorities of both women and men will heed the warnings of ‘lower level’ local officials.

H16: In terms of evacuation behavior, women will be more likely than men to evacuate. After experiencing a major catastrophe, however, the gender gap will no longer exist as large majorities of both women and men will evacuate when a disaster threatens their area.

Analysis and Results

Three hypotheses in this chapter suggest that women and men will react differently in the face of a natural disaster prior to experiencing Hurricane Katrina. The empirical results show mixed support of the hypotheses, as outlined throughout this section.

The first hypothesis deals with evacuation plans. Since the literature repeatedly demonstrates that women are more likely than men to create an evacuation plan, it was hypothesized that women in New Orleans would be more likely than men to have a plan in place. This, however, did not turn out to be the case in the bivariate or multivariate analysis. As Table 26 shows, in 2004, the only statistically significant variable was income, with respondents that reported higher incomes being the most likely group to evacuate. This makes sense due to the high expenses associate with evacuation – from gas and hotel fees to paying for food at restaurants (Burnside 2006; Raid, Norris, and Ruback 1999). Since gender was not statistically significant, there is no support for H14 in 2004. This changed by 2009 when the bivariate and

multivariate analysis showed gender to be significant. However, as Table 27 demonstrates, the relationship was not in the predicted direction.

Table 26

Evacuation Plan 2004

| EvPlan2004 | Coefficient | Standard Error |
|-------------------|--------------------|-----------------------|
| Gender (female) | .136 | .144 |
| Age | -.020 | .050 |
| Race (black) | -.050 | .158 |
| Education | -.113 | .070 |
| Income | .092* | .042 |
| Constant | -.041 | .332 |

*p < .05, **p < .01, ***p < .001

Probit

N = 330; Pseudo R² = .014

Table 27

Evacuation Plan 2009

| EvPlan2009 | Coefficient | Standard Error |
|-------------------|--------------------|-----------------------|
| Gender (female) | -.375* | .168 |
| Age | .033 | .053 |
| Race (black) | -.016 | .045 |
| Education | .029 | .065 |
| Income | .066* | .035 |
| Constant | .207 | .420 |

*p < .05, **p < .01, ***p < .001

Probit

N = 291; Pseudo R² = .004

Following Hurricane Katrina, women had a 65% chance of reporting having an evacuation plan in place when all other independent variables were held at their mean compared to men who had a 78% probability. As a result, H14 was not supported in 2004. The Bateman and Edwards (2002) study had found that women are more likely than men to perceive risk, but that once men do perceive risk it has a stronger effect on them. Their findings are supported by the results here, and thus may warrant more careful attention in future research. Income remained

significant in 2009 with higher income respondents being the most likely to report having an evacuation plan.

The next hypothesis dealt with a hypothetical evacuation order. Previous studies have demonstrated that women were more likely than men to heed an evacuation order given by local, lower level officials. Men, on the other hand, typically waited for evacuation orders from national, higher level officials. As a result, it is hypothesized that women in New Orleans would be more likely than men to respond positively to the hypothetical evacuation order from local officials. However, as Table 28 shows, this did not turn out to be the case in 2004 – gender was not statistically significant in the bivariate or multivariate analysis. As a result, H15 was not supported in 2004.

Table 28
Hypothetical Evacuation 2004

| HypEvac04 | Coefficient | Standard Error |
|------------------|--------------------|-----------------------|
| Gender (female) | .207 | .121 |
| Age | -.034 | .041 |
| Race (black) | -.029 | .132 |
| Education | -.023 | .058 |
| Income | .028 | .035 |

*p < .05, **p < .01, ***p < .001

Ordered Probit

N = 332; Pseudo R² = .004

As Table 29 demonstrates, by 2009 income, education, and gender were statistically significant. Respondents with less education and higher levels of income were the most likely to report readiness to evacuate when requested by a local level official. Income was in the expected direction since the literature demonstrated that individuals with the financial means to evacuate were the most likely to do so. Education, however, was not in the expected direction. and was likely the result of social desirability factors. In public opinion research, scholars often find that respondents, especially well-educated respondents, provide “socially desirable” answers when

they know that their true feelings or real response is not the acceptable or majority response. The unexpected direction of the education variable may be the result of social desirability factors at play.

Additionally, the bivariate and multivariate analysis showed gender to be significant. The probability of women hypothetically heeding the evacuation order when all other variables were held at their mean is 57% compared to 48% for men. This is an interesting finding because it seems contradictory when compared to the 2009 data regarding evacuation plans. Men were more likely to have an evacuation plan in place, but women were more likely to report heeding an evacuation order. This may be explained by the nature of the evacuation plan. Respondents were not asked what their plan was – they were merely asked whether they had one. It is possible that the initial evacuation plans involved women and children evacuating first, while men would either stay behind to “ride it out” or evacuate closer to a hurricane’s landfall.

Table 29

Hypothetical Evacuation 2009

| HypEvac09 | Coefficient | Standard Error |
|------------------|--------------------|-----------------------|
| Gender (female) | .283* | .134 |
| Age | .035 | .044 |
| Race (black) | -.006 | .036 |
| Education | -.123* | .054 |
| Income | .065* | .028 |

*p < .05, **p < .01, ***p < .001

Ordered Probit

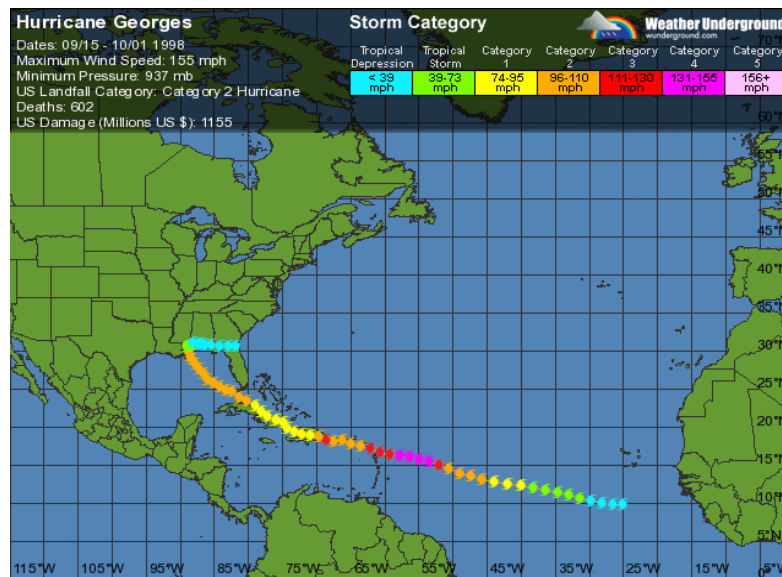
N = 293; Pseudo R² = .019

The final hypothesis dealt with actual evacuation behavior. Prior research showed that women were more likely than men to evacuate in the face of a natural disaster. Perhaps the best way to test this, due to limited data on behavior in the face of real-life disasters, is to compare evacuation rates of respondents before and after Hurricane Katrina. The first hurricane under consideration is Hurricane Georges in 1998, which was originally a Category 4 hurricane. After

threatening New Orleans and the Louisiana coast, the storm eventually made landfall as a Category 2 storm near Biloxi, Mississippi. Illustration 4 shows the track of the storm and is useful in showing how close to New Orleans the hurricane landed.

Illustration 4

Tracking Map of Hurricane Georges



Source: Weather Underground

Table 30 shows that gender and income were statistically significant at the .05 level. Women had a 34% probability of reporting evacuating for Hurricane Georges when all other independent variables were held at their mean compared to men who had a 23% chance. Since women were more likely than men to report evacuating for Hurricane Georges in 1998, H16 has initial support. The next hurricane under consideration is Hurricane Katrina in 2005. The tracking map is shown below in Illustration 5.

Table 30

Evacuated for Hurricane Georges

| Georges09 | Coefficient | Standard Error |
|------------------|--------------------|-----------------------|
| Gender (female) | .354* | .176 |
| Age | -.048 | .058 |
| Race (black) | -.006 | .046 |
| Education | -.008 | .068 |
| Income | .100* | .037 |
| Constant | -.988 | .462 |

*p < .05, **p < .01, ***p < .001

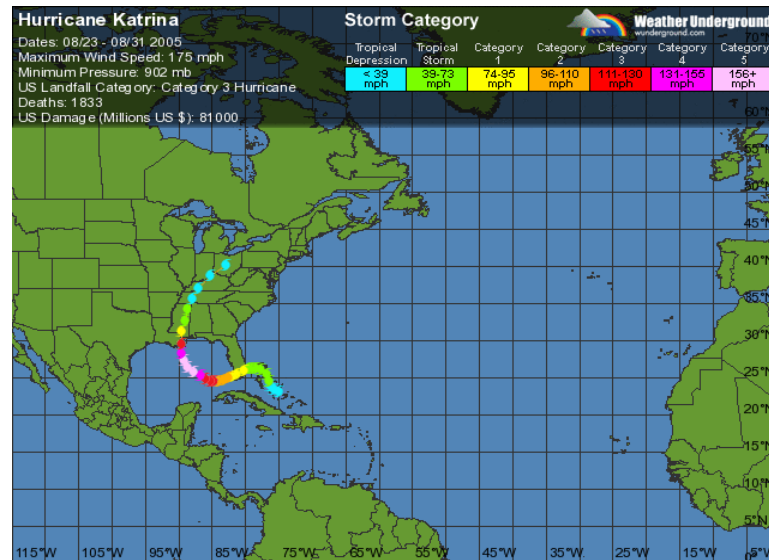
Probit

N = 256

Pseudo R² = .035

Illustration 5

Tracking Map of Hurricane Katrina



Source: Weather Underground

As Table 31 demonstrates, gender was not statistically significant in the bivariate or multivariate analysis. Since gender was not statistically significant, H16 was not supported in this case. The only variable that gained significance was age with older people being more likely than younger people to report having evacuated for Hurricane Katrina. The findings for age and gender are perhaps not too surprising due to the magnitude and intensity of Hurricane Katrina.

Although the evacuation effort was flawed in many ways, Hurricane Katrina remained on a relatively straight path to New Orleans for nearly three days while becoming a stronger hurricane every few hours. As a result, many citizens recognized the potential for a catastrophic outcome and decided to leave irrespective of gender.

Table 31
Evacuated for Hurricane Katrina

| Katrina09 | Coefficient | Standard Error |
|------------------|--------------------|-----------------------|
| Gender (female) | .377 | .242 |
| Age | .155* | .074 |
| Race (black) | -.043 | .056 |
| Education | -.046 | .101 |
| Income | .013 | .050 |
| Constant | .725 | .595 |

*p < .05, **p < .01, ***p < .001

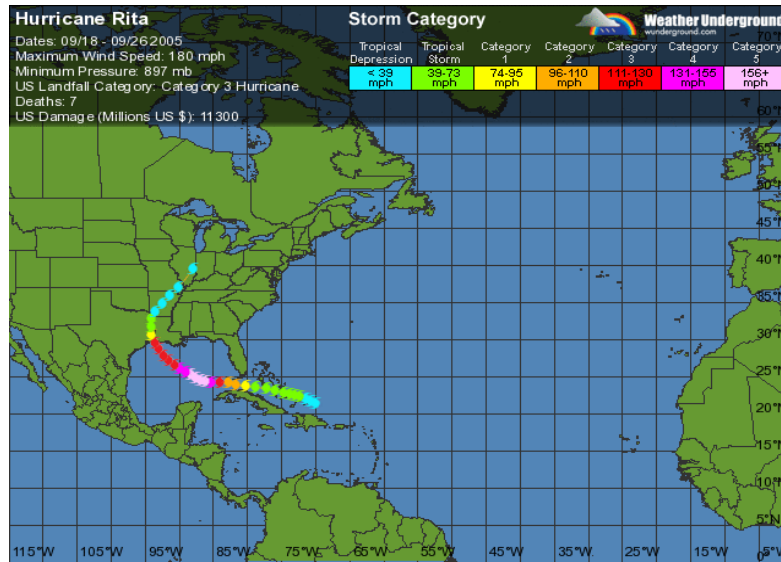
Probit

N = 273; Pseudo R² = .048

Less than one month after Hurricane Katrina devastated the city of New Orleans and the surrounding Gulf coast, the entire region was threatened by another large-scale hurricane. Hurricane Rita ended up making landfall near the border of Louisiana and Texas as shown in Illustration 6 below. Although the hurricane landed west of New Orleans, it still posed a major threat to the already compromised levee system due to the storm surge it created. Though very few New Orleans residents had returned to the city, an evacuation was still necessary for those who remained. Table 32 shows that gender was statistically significant in determining Hurricane Rita's evacuation. Women had a 59% chance of evacuating due to the threat of the hurricane when all other independent variables were held at their mean compared to men who had a 42% chance of evacuating. Since women were more likely to evacuate from Hurricane Rita, H16 was supported in this instance.

Illustration 6

Tracking Map of Hurricane Rita



Source: Weather Underground

Table 32

Evacuated for Hurricane Rita

| Rita09 | Coefficient | Standard Error |
|-----------------|-------------|----------------|
| Gender (female) | .428** | .167 |
| Age | -.058 | .054 |
| Race (black) | -.015 | .044 |
| Education | -.063 | .066 |
| Income | .043 | .035 |
| Constant | .136 | .431 |

*p < .05, **p < .01, ***p < .001

Probit

N = 257; Pseudo R² = .026

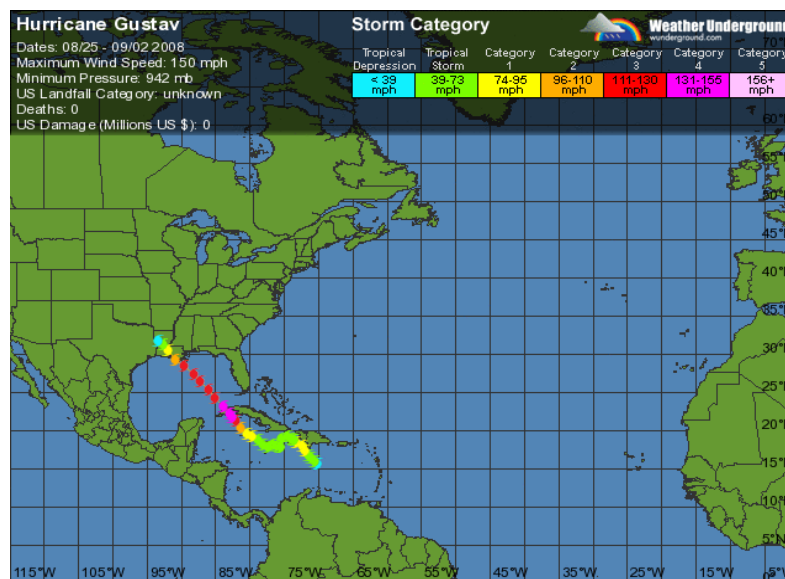
Previous research has shown that men are more likely than women to take risks when faced with the threat of a natural disaster. It also showed that men are more likely than women to want to stay behind to protect their property and to protect other people. This may very well have been the case in post-Hurricane Katrina New Orleans. After seeing what had happened after Hurricane Katrina – from property damage to looting to members of the community being left behind – men may have felt a greater need to stay behind. Additionally, men may have been

more likely than women to have a “survival instinct” – they survived in the post-Katrina environment so they could survive the less menacing Hurricane Rita.

The last hurricane to prompt a mandatory evacuation of the city of New Orleans was Hurricane Gustav in September 2008. In fact, the hurricane resulted in the largest evacuation in United States history. Hurricane Gustav made landfall near Cocodrie, Louisiana as a Category 2 storm, as shown in Illustration 7 below.

Illustration 7

Tracking Map of Hurricane Gustav



Source: Weather Underground

It was hypothesized that women would be more likely than men to evacuate due to the threat of a hurricane, but that after experiencing a major catastrophe the gender gap between the sexes would no longer exist. While many residents were still evacuated as a result of Hurricane Katrina when Hurricane Rita threatened the city, this was the first major hurricane to threaten the New Orleans metro area when the population was nearing pre-Katrina numbers. As a result, it is the best indicator of post-Katrina evacuation behavior available.

As Table 33 shows, gender was not statistically significant in determining who evacuated due to the threat of Hurricane Gustav. The only significant variable was age, with younger people being more likely than older people to evacuate for Hurricane Gustav. Note that this is a reversal of the age effect for Katrina evacuation, when age was positively related to likelihood of evacuation. The reversal in the age effect may have something to do with possible differences in the pre-Katrina and post-Katrina local population. It is possible that many of the older citizens who were more likely to evacuate for Hurricane Katrina were less likely to return to the city after the devastating flood. At the same time, older individuals who did return to New Orleans may have been less inclined to evacuate.

In terms of gender, this is hopefully a positive indicator. As a result of the mass destruction left behind by the catastrophic flooding associated with Hurricane Katrina, as well as the delayed attempts of rescue missions for those left behind, people were more likely to take the mandatory evacuation order seriously than ever before irrespective of sex.

Table 33

Evacuated for Hurricane Gustav

| Gustav09 | Coefficient | Standard Error |
|-----------------|--------------------|-----------------------|
| Gender (female) | .370 | .220 |
| Age | -.252** | .083 |
| Race (black) | .049 | .071 |
| Education | .063 | .084 |
| Income | .087 | .050 |
| Constant | 1.483 | .596 |

*p < .05, **p < .01, ***p < .001

Probit

N = 269; Pseudo R² = .091

Conclusion

The literature indicated that many aspects of evacuation decisions are gendered. The conclusions here suggest that gender and income are the most consistently significant variables. The importance of income should come as no surprise due to the expense involved in evacuating. Furthermore, those with less means are also less likely to learn about an impending disaster. As Table 34 demonstrates, gender appears to have a mixed affect, especially when Hurricane Katrina is taken in to consideration.

Prior to Hurricane Katrina, gender was insignificant for all variables with the exception of evacuation for Hurricane Georges. Women were more likely than men to report having evacuated with Hurricane Georges, which is consistent with the literature. After Hurricane Katrina made landfall near New Orleans, men were more likely than women to report having an evacuation plan in place. However, there were no differences in the hypothetical or actual behavior patterns of men. Women, however, were more likely than men to report that they would follow evacuation orders from local level officials. Women were also more likely than men to evacuate for Hurricane Rita shortly after Hurricane Katrina had made landfall.

Table 34

Support for Hypothesis by Year

| Hypothesis Number | 2004 | 2009 |
|------------------------------|-------------|-------------|
| H14: Evacuation Plan | No | No |
| H15: Hypothetical Evacuation | No | Yes |
| H16: Hurricanes | | Mixed |
| Georges | | Yes |
| Katrina | | No |
| Rita | | Yes |
| Gustav | | No |

Chapter Six

Conclusion

Women and men experience disasters differently, as we have seen, and the differences are both complex and sensitive to the passage of time. The execution of this dissertation adds an important new element to the existent literature. The unique ways in which men and women have been affected by natural disasters have been understudied. According to the World Health Organization (2007), “Advocates have stressed that what is necessary to bring a gender perspective to the study of natural disasters is research and analysis of data disaggregated by sex” and “pilot projects during the reconstruction phase”. This project does specifically that. This project also adds a specific case study – New Orleans following Hurricane Katrina – to the gender and natural disaster literature, which is important due to the lack of availability of this type of information.

It would be helpful for scholars, government officials, governmental agencies, recovery organizations, and other interested individuals to understand the different ways that men and women are affected by natural disasters, as well as the short-term and long-term impacts that disasters may have on their lives. This dissertation has demonstrated a variety of differences between the sexes in terms of perceptions, psychological symptoms, reported behaviors, and actual effects. As a result, “blanket policies” do a great disservice to the men and women who are affected by natural disasters.

Differences must be taken into account from start to finish beginning with mitigation strategies and ending with post-disaster environments. Failure to take differences into account may very well result in disparate rates of recovery for the sexes. This information is necessary for disaster relief assistance agencies and other groups to take into account. If policymakers,

government agencies, recovery organizations and scholars take the issue of social vulnerability seriously, it could lead to policies that take into consideration the unique needs of the sexes – medical, emotional, economic, security, and the like – as well as other vulnerable groups and lead to a nondiscriminatory allocation of resources. As Krishnamurty (2001) notes, the post-natural disaster phase allows for a window of opportunity to promote social justice, redress inequalities, and reduce vulnerabilities. As a result, the roles of women and men can change and evolve as a result of the crisis.

Summary of Noteworthy Findings

Hurricane Katrina was the most devastating natural disaster in United States history. As mentioned in previous chapters, the hurricane struck an historical city with a lively and diverse culture, but a socially vulnerable population. More devastating, however, was the post-Katrina flooding that took place as a result of breached levees and man-made failures. While it was hypothesized that women would be most adversely affected by this disaster, this did not turn out to be the case. Women were more likely than men to be affected in some situations, but not others. However, gender was a key variable in understanding who was most affected by the disaster and when they were most affected. Differences between women and men at different points in time quickly became apparent to many survivors and relief workers, but systematic analyses were lacking. As a result, it is important to focus on both sexes and how they were affected uniquely. Additionally, a variety of other control variables, such as race, education, age, and income proved to be important determinants of who was most affected by Hurricane Katrina, and how. These variables were generally reported in the expected direction with blacks and less educated people having a more difficult time in the wake of the storm than whites and more educated individuals.

Income was perhaps the second most critical variable in determining who was most impacted by a natural disaster. Poorer people are less likely to know about the threat of a disaster and are less likely to have a place to evacuate to or a method of transportation to get them out of the path of danger. As Christopher et al. (2002) demonstrated, the United States lags behind other industrialized nations in terms of social policies aimed at lowering poverty. The United States also has the largest gender poverty gap of any industrialized nation. The economic insecurity that is frequently experienced by women before disasters oftentimes results in their needing more aid following a disaster (Enarson 2000).

In terms of personal losses and vulnerabilities, women reported significantly greater difficulties in replacing the possessions that they had lost when compared to men. The data analysis did not find any other gender differences in the area of loss and vulnerability. Psychologically, however, gender differences were both more persistent and more time-sensitive. Women were more likely than men to experience depression, sleeplessness, irritability, and high levels of worry in the time period directly following Hurricane Katrina. However, by 2007, men were more likely than women to experience these symptoms. Furthermore, by 2007, men were more likely than women to report dissatisfaction with their life. This was a variable that had not achieved statistical significance prior to Hurricane Katrina or in the storm's immediate wake.

Finally, in terms of evacuation behavior, women were more likely than men to report having evacuated for Hurricane Georges in 1998. Gender was not statistically significant for any other aspects of evacuation behavior prior to Hurricane Katrina's landfall. After Hurricane Katrina, however, men were more likely than women to report having an evacuation plan in place. Despite this finding, women were more likely than men to report a willingness to evacuate

if suggested by local officials. In fact, women were more likely than men to evacuate as a result of Hurricane Rita in 2005. Table 35 summarizes these results.

Table 35
General Findings

| Dependent Variable | Findings |
|-----------------------------|---|
| <i>CHAPTER THREE</i> | |
| Employment 04 | |
| Employment 07 | |
| New Jobs 04 | |
| New Jobs 07 | |
| Lost Possessions 06 | |
| Replaced Possessions 06 *♀ | Women were less likely than men to replace possessions |
| Living with Others 06 | |
| Living with Others 07 | |
| <i>CHAPTER FOUR</i> | |
| General Satisfaction 04 | |
| General Satisfaction 07 *♂ | Men less satisfied than women |
| Worried 06 *♀ | Women more likely than men to experience this symptom |
| Worried 07 *♂ | Men more likely than women to experience this symptom |
| Sad 06 *♀ | Women more likely than men to experience this symptom |
| Sad 07 *♂ | Men more likely than women to experience this symptom |
| Sleepless 06 *♀ | Women more likely than men to experience this symptom |
| Sleepless 07 *♂ | Men more likely than women to experience this symptom |
| Unfocused 06 | |
| Unfocused 07 | |
| Irritable 06 *♀ | Women more likely than men to experience this symptom |
| Irritable 07 *♂ | Men more likely than women to experience this symptom |
| <i>CHAPTER FIVE</i> | |
| Evacuation Plan 04 | |
| Evacuation Plan 09 *♂ | Men more likely than women to report having a plan in place |
| Hypothetical Evacuation 04 | |

| | |
|-------------------------------|--|
| Hypothetical Evacuation 09 *♀ | Women more likely than men to report willingness to evacuate |
| Evacuated Georges 09 *♀ | Women more likely than men to report evacuating |
| Evacuated Katrina 09 | |
| Hurricane Rita 09 *♀ | Women more likely than men to report evacuating |
| Evacuated Gustav 09 | |

* Denotes that gender was statistically significant

♀ Denotes that the relationship was in the direction hypothesized

♂ Denotes that the direction of the relationship was contrary to the hypothesis

Public Policy Recommendations

It should be clear by now that it is important to take into account the unique needs of women and men when creating mitigation and recovery strategies. As Eade and Williams note, “No development work can be effective which does not take into account *the relationships between people*. As the relationships between males and females form the basis of human society, the analysis of the implications of these relations must form the basis of development and relief interventions” (1995: 179 – emphasis in original). The remainder of the section outlines some of the key public policy recommendations resulting from this project: ensuring the right for citizens to return; restoring basic services; creating disaster relief programs and policies at the city, state, and national levels; including women and minorities in the planning and rebuilding process; taking women’s issues into account; providing childcare; continuing data collection efforts; and reducing the vulnerability of entire populations by providing safeguards to the community.

Ensuring the Right for Citizens to Return

In order for citizens to be able to return to their homes and apartments, it is critical that insurance agencies, construction companies, and government programs work together in ensuring a speedy process when it comes to the repairing of property. New Orleans residents dealt with a lot of confusion and “red tape” that made it – and has continued to make it – difficult

for individuals to repair their properties. Additionally, when mass destruction occurs, shelters, temporary residences, and federally subsidized housing must be available quickly in order for residents to be able to return and take part in the recovery process. Fischer and Sard (2006) recommend expanding the Department of Housing and Urban Development's Low Income Housing Tax Credit and Section 8 voucher programs to help lower-income individuals to be a part of the rebuilding process. Additionally, in order for some of these individuals to be able to return to their homes, it is important that public housing units are not destroyed prematurely or without probable cause. If these units must be torn down for safety reasons, the development of affordable housing must occur. The same can be said for people of middle class income brackets. These individuals must be able to return to a city where they can afford to live on their salaries. They must be able to afford the costs of rebuilding. These recommendations apply across the board regardless of gender.

Restoring Basic Services

Special attention should be paid to the reconstruction of schools, childcare facilities, and healthcare facilities, as these help provide critical services, as well as some resemblance to normal life resulting in jobs. In terms of childcare facilities, temporary buildings, such as trailers, should be set up. The "shared service model" should be followed in which central networks are established as a control center for billing purposes and placing children. Additionally, the government should offer subsidies for low-income families and single-parent households. In terms of healthcare services, it is necessary for the local government to actively become involved in the recruitment of healthcare providers, as areas affected by natural disasters often experience a mass exodus of these critical workers. It is also crucial to recruit bilingual providers in areas that have a large immigrant population.

While general medical services are necessary, it is also critical to provide emergency mental health services. Perhaps the most important finding throughout this project was the different and time-sensitive experiences of men and women in terms of psychological symptoms. While women were initially more likely than men to experience symptoms of depression, worry, sleeplessness, and irritability, one year later this trend had reversed itself and men were more likely than women to be suffering from these symptoms. Additionally, at that point, men were more likely than women to report a general dissatisfaction with their lives. This may be the most important finding in terms of public policy implications because a lot of times psychological needs are initially ignored. This could impact women's initial progress and recovery. But, as Enarson and Scanlon (1999) note, it is important to train healthcare providers in the unique mental health needs of men. According to the authors, "The social construction of masculinity complicates men's emotional recovery, reduces their access to relief assistance, deters preparedness and mitigation, and may put them at risk personally" (Enarson and Scanlon 1999, 120). Domestic violence and sexual assault counseling should be a top priority since the literature demonstrated that the incidence of these crimes increases markedly in post-disaster environments.

The results in Chapter Four demonstrated that both men and women have psychological needs that differ in terms of the type of services needed, as well as the timing of these services. Initially, healthcare and mental health services should be provided through mobile units when buildings may be uninhabitable or lack electricity. By getting people the psychological help that they need right away, many problems can be averted and recovery may actually go much smoother right away when people are feeling stable and well.

Creating Disaster Relief Programs and Policies at the Local, State, and Federal Level

Not only must disaster relief programs and policies be created at the local, state, and federal level, but they should be updated on a regular basis. While these programs and policies have to consider recovery efforts, a greater focus should be placed on mitigation and avoiding catastrophe all together. After all, as Shodell (2006) notes, communities that are well prepared for hazards may be protected from disasters. Additionally, hazard maps should be created that include a vulnerability analysis that takes into account the unique ways in which men and women are affected by disasters. Furthermore, mitigation and recovery plans must take these gender differences into account. The results in Chapter Five demonstrated some gender differences in the mitigation and evacuation plans of men and women. Staff in disaster agencies should be trained to access and understand the differences that may occur between men and women in post-disaster environments. Additional attention should be paid to disabled and elderly individuals, as well as female heads of household and pregnant or nursing women.

Taking Gender Issues Into Account

The World Health Organization provides seven key questions that should be asked when taking gender into account during disaster assessment:

1. “How are women, men, girls, and boys differently affected by the disaster?”
2. What are the implications for the relief, rehabilitation and reconstruction effort (in terms of needs, access to assistance, and contribution to community efforts)
3. Are there particular vulnerabilities/difficulties that result from the disaster for women, for children, for men?
4. How do gender norms of the community affect aid seeking behavior and/or access to aid?

5. Are women predisposed to have less access to aid/information due to cultural norms affecting mobility in public, illiteracy?
6. Are local women and their associations being actively included in planning and implementation?
7. Are there women and men involved in decision-making and employed as aid workers at all levels?"

Source: World Health Organization (2006): *Gender, Women and Health: Gender and Disaster*

Including Women and Minorities in the Planning and Rebuilding Process

Women must be able to play a role – including a leadership role – in community efforts and in decision-making bodies. It is important to have greater representation and less bias in emergency management positions, as well as to have more women in the field as relief workers. The study cited earlier by Gault et al. (2005) with the Institute for Women's Policy Research demonstrated via firsthand accounts that women felt that they were not being heard and that their needs were not being addressed. As the authors note, "It is easy to overlook that which is not represented" (Gault et al. 2005, 23). Additionally, women need to go out and vote in order to hold politicians of both sexes accountable. Furthermore, female legislators must make their voice heard on recovery and budgeting issues.

Senator Mary Landrieu (D-LA) is a great example. After Hurricane Katrina's landfall, Senator Landrieu spearheaded efforts to rewrite federal disaster laws. She has sponsored and co-sponsored several bills in Congress including the American Recovery and Reinvestment Act in 2009, which established an independent arbitration system between people and FEMA, as well as the Child Safety, Care, and Education Continuity Act of 2010, which assists in the recovery of children by getting them back in school and daycare services. Senator Landrieu also serves as the Chair of the Subcommittee on Disaster Recovery.

In order for these things to occur, educational opportunities and training should be provided for women and minorities before disasters strike. They should also be allowed to be a part of the creation of their own mitigation strategies through community meetings and efforts. Local women's groups should be allowed to take part in the recovery process. Additionally, it is important to provide training in technical trades so that women can become a bigger part of the physical rebuilding process and be involved in lucrative post-disaster businesses. The enforcement of anti-discrimination laws in hiring and pay for women and minorities is also key.

Reducing the Vulnerability of Entire Populations by Providing Safeguards to the Community

Some things must physically be done in order to reduce the vulnerability of a population. For instance, using the city of New Orleans as an example, levees must be built bigger and stronger, while the current structure is reinforced. Drainage systems and pump systems must be in place and these systems should undergo regular maintenance. In general, it is important to build up the infrastructure in the area through the use of tougher building codes and better building materials. One of the most critical things that must be taken into account is the reinforcement and rebuilding of the wetlands. With each passing storm that creates any type of storm surge, the coastal marshes are further deteriorated putting the area at an even greater risk for excessive damage during future hurricanes.

Continuing Data Collection Efforts

It is necessary to continue the data collection efforts that take place after natural disasters occur. In New Orleans, the Current Population Survey, the American Community Survey, the Greater New Orleans Community Data Center Polls, and the University of New Orleans Quality of Life Poll, need to continue to gauge the recovery efforts. More research is needed on factors

that increase disaster vulnerability, as well as on physical and mental health before and after disasters disaggregated by sex. As many of the scholars cited here noted, more case studies and comparative analyses are also necessary following natural disasters.

Limitations

Although the implications of this project are great, it is necessary to note some limitations. First, the number of cases for all of the studies varies, resulting in fewer or greater numbers of people being interviewed in each survey. However, this should not cause too large of a problem since the number of respondents is greater than two hundred in all of the studies. Second, New Orleans residents who were displaced after Hurricane Katrina and still outside the city were not included in these studies. Due to budgetary constraints and logistical difficulties, this is a problem that the UNO SRC was unable to fix. Indeed, nearly five years later, it remains unclear how many New Orleanians have returned, how many are still trying to return, and how many have decided to rebuild their lives elsewhere.

Third, and most important to the study at hand, it is crucial to remember that the survey data for this project are based upon citizens' *perceptions* of their life in the city. An anonymous quote that has gained widespread acceptance in the psychological realm appears relevant here: "Fact is fact, but perceptions are reality." The ways that people perceive their unique reality differ considerably. Another limitation that is critical to take into consideration is that men tend to avoid answering psychological questions in a way that could reveal their vulnerability and perhaps threaten their masculinity (Enarson and Scanlon 1999). Therefore, it is difficult to determine whether women are more depressed, tired, and experiencing concentration problems than men or whether men are simply less likely to answer these questions in the affirmative due to societal gender norms that discourage this. However, some of the more 'feminine' aspects of

the depression index, such as loneliness, were deliberately left out of this study to minimize the effect of this limitation.

A fifth limitation is that data on respondents' marital status and children living in the household were not available in all of the surveys used in this study; hopefully future disaster studies can take them into account. The sixth limitation may very well be the largest: only seven zip codes were utilized in the post-Katrina surveys. As a result, these surveys targeted people in the best conditions. Howell and Jencik note:

“Given that we only interviewed people with land lines concentrated in the populated areas, our sample was biased toward residents in the *best* condition. Having a land line in March 2006 indicated that your house or apartment was not severely damaged. Most of our respondents—80% in New Orleans—were in their pre-Katrina houses. The remainder was displaced, but still living in the area covered by the survey. These were the residents who experienced flooding, with 28% in Orleans reporting that their pre-Katrina house or apartment had flooded. Missing from the survey were current residents who had no phone or who were relying on cell phones only. Thus, our measures of worry, depression, and everyday difficulties were underestimates of the actual conditions” (2006, 4).

In fact, these ‘underestimates’ were likely quite severe, especially when one takes into consideration that approximately 80% of New Orleans flooded and only 28% of respondents reported that their place of residence had flooded. Additionally, residents who were residing in trailers – most of which had been provided by FEMA – did not have landlines and were unable to be contacted. It would be very helpful for future post-disaster studies to combine field research with survey research. Going out into the community to conduct door-to-door interviews with residents in temporary housing units, such as trailers, would provide much needed information.

Despite these minor issues, the benefits far outweigh the limitations. This project provides a new case study to add to the disaster literature. It fills important gaps in knowledge given the limited data of any kind on people's experiences in the wake of disaster. It also provides the gendered analysis that is typically missing in the literature. Furthermore, many of

the studies involving the gendered experience of men and women in the face of and recovery efforts from natural disasters occur overseas. In many of these other countries, women have a different role in their communities than most women have in the United States. Therefore, this projects provides a detailed study of the way that women and men in the United States were affected by a natural disaster and may therefore be more generalizable to other areas in the United States than many of the international studies.

Future Research

In terms of future research, more environmental public policy research must be conducted on natural disasters and evacuation behavior. Since every state is affected by some sort of disaster threat, much more research examining differences between the sexes can be conducted. Research can be expanded to include the way that government and other local agencies create mitigation and evacuation strategies, as well as respond to disasters. Research can also be expanded to the effects of climate change on coastal regions. Since issues like climate change and global warming are still relatively controversial among the general population, the response from government officials and local agencies regarding these matters, as well as general mitigation and recovery recommendations, can play a role in voting behavior and candidate support.

Finally, this dissertation brings up additional research opportunities in terms of projects that examine the way that the media portrays disaster stories. As Seager notes, “The ‘not-noticing’ of the gendered dimensions of this disaster [Hurricane Katrina] by the American media and by the panoply of experts who interpreted the disaster to the public through the media is alarming and warrants attention in itself” (2005, 30). This study takes a significant step toward noticing, and understanding, the “gendered dimensions” of Hurricane Katrina in New Orleans.

Appendix

University of New Orleans Survey Research Center Questions

The following are the University of New Orleans Survey Research Center questions and value responses that were used throughout this dissertation. Five surveys were used: The Quality of Life Survey (2004), The Southeastern Louisiana Evacuation Behavior Study (2004), The Citizen Recovery Survey (2006), The Keeping People Survey 2007), and the Quality of Life Survey (2009). The year during which each question was asked is provided.

1. Did you personally lose possessions as a result of Hurricane Katrina? (2006)
Yes....-1 No....-2 Don't Know....-8 Refused....-9
2. Have any of those possessions been replaced so far? (2006)
Yes....-1 No....-2 Don't Know....-8 Refused....-9
3. Are you living with family and friends or are others living with you? (2006, 2007)
Yes....-1 No....-2 Don't Know....-8 Refused....-9

Now I'd like to ask you two questions about the economy in Orleans Parish. Is each of the following very good, good, fair, poor, or very poor?

4. Opportunities for employment? (QOL 2004, 2007)
Very Good....-5 Good....-4 Fair....-3 Poor....-2 Very Poor....-1
Don't Know....-8 Refused....-9
5. Likelihood of new jobs and industry coming into the parish? (QOL 2004, 2007)
Very Good....-5 Good....-4 Fair....-3 Poor....-2 Very Poor....-1
Don't Know....-8 Refused....-9
6. How satisfied are **YOU** with life in Orleans Parish? Are you very satisfied, satisfied, dissatisfied, or very dissatisfied? (QOL 2004, 2007)
Very Satisfied....-4 Dissatisfied....-2 Don't Know....-8
Satisfied....-3 Very Dissatisfied....-1 Ref./No Response....-9
Recoded as Satisfied 1, Dissatisfied 0 for the analysis.
7. Looking ahead, how worried are you about what will happen to you in the next five years – very worried, somewhat worried, not too worried, or not worried at all? (2006, 2007)
Very worried....-1 Not too worried....-3 Don't Know....-8
Somewhat worried...-2 Not worried at all...-4 Refused....-9
Recoded as Worried 1, Not worried 0 for the analysis.
8. How many **days** (0 to 7) during the past week have you: (2006, 2007)

Felt sad?

Had trouble getting to sleep or staying asleep?

Had trouble keeping your mind on what you were doing?

Felt irritable?

Recoded as Zero to one day 1, Two to three days 2, Four to five days 3, Six to seven days 4 for the analysis.

9. If public officials in Orleans Parish recommended an evacuation because of the threat of a hurricane this year, what would you most likely do: definitely evacuate, probably evacuate, probably not evacuate, or definitely not evacuate? (SLEBS 2004, 2009)

Definitely Not Evacuate....-1 Probably Not Evacuate....-2 Probably Evacuate....-3

Definitely Evacuate....-4 Don't Know....-5

10. Did you leave your home because of the threat created by Hurricane Georges in 1998? (2009)

Yes....-1 No....-2 Evacuated but not sure if it was Georges ...-3

Don't Know....-4 Did not live here then....-5

11. Did you leave your home because of the threat created by Hurricane Katrina in 2005? (2009)

Yes....-1 No....-2 Don't Know....-4 Did not live here then....-5

12. Did you leave your home because of the threat created by Hurricane Gustav in 2008? (2009)

Yes....-1 No....-2 Don't Know....-4 Did not live here then....-5

13. Do you and your family currently have a definite plan for deciding whether to evacuate, where to go, and how to get there if a hurricane threatened? (SLEBS 2004, 2009)

Yes...57-1 No...-2 Not very definite...-3 Don't Know...-4

Each of the following questions appeared in every survey used in this dissertation:

14. What is your age? _____

Recoded as 18-20 1, 21-34 2, 35-44 3, 45-54 4, 55-64 5, 65 and older 6 for the analysis.

15. Your race?

White...69-1 Asian...-3 Refused...-9

Black....-2 Other...-4

Recoded as Black 1, Non-Black 0 for the analysis.

16. As I read some categories of income, please stop me when I get to your TOTAL family income from all sources before taxes last year

Less than \$10,000...76-1 Less than \$60,000....-4 Over \$100,000.....-7

Less than \$20,000.... -2 Less than \$80,000....-5 Don't Know/Refused -9

Less than \$40,000.... -3 Less than \$100,000...-6

17. What is your gender?

Male... -1 Female... -2

Recoded as Male 0, Female 1 for the analysis.

18. How many years of school have you completed?

0-8 Grade.....70-.1

Some College/Tech. School Graduate...-4

9-11 Grade.....-2

Four Year College Degree.....-5

High School Graduate...-3

Post Graduate Degree.....-6

Don't Know....-8

Refused.....-9

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