Location Matters? A Comparison of Placement Conditions for Hurricane Evacuees in Houston and Louisiana

Alexander Lu
Department of Sociology
Indiana University
and
Joachim Singelmann
Departments of Sociology and Agricultural Economics and Agribusiness
Louisiana State University

Email: ajlu@indiana.edu

In the late summer of 2005, hurricanes Katrina and Rita inflicted overwhelming destruction causing residents in affected areas to evacuate and relocate to Houston and various parts of Louisiana. The purpose of this study is to examine how the residential environment and FEMA intervention have affected stress levels experienced by evacuees. Our research questions are: Are there socioeconomic and demographic differences between evacuees sent to Houston and those housed in FEMA trailer parks? How have hurricane evacuees experienced stress differently in Houston and Louisiana? And what factors affect levels of stress? The analysis uses survey data collected from 682 evacuees residing in Houston and various FEMA parks in Louisiana. Our findings highlight the importance of proper planning for evacuations after natural disasters such as hurricanes, including a better understanding of the environment at the place of destination for the evacuees. While evacuation from one’s home causes unavoidable stress, the manner by which evacuations are executed have much to do with the magnitude of stress.

Key words: anxiety, community, disaster, FEMA, Hurricane Katrina, Hurricane Rita, social integration, social support, stress, trailer park

Introduction

Hurricane Katrina was one of the worst natural disasters in the United States. Katrina hit the Gulf coasts of Louisiana and Mississippi on August 29, 2005. It killed over 1,800 people, wiped small towns in Southern Louisiana off the map, and made over 75 percent
of housing stock in New Orleans uninhabitable (Leadership Conference on Civil Rights Education Fund 2006). Less than a month later, Hurricane Rita struck on September 24. Although many of the states along the Gulf coast were impacted by Hurricane Katrina, Louisiana experienced the devastation of both hurricanes. The destruction of New Orleans is matched in the United States only by the Galveston, TX hurricane in 1900 that caused about 8,000 fatalities and destroyed the city to such extent that it was never able to regain its pre-hurricane importance as a major Gulf port (Knabb, Rhome, and Brown 2005). Rita was less intense than Katrina, but Rita’s eye was broader and caused widespread damage over a greater area, specifically east of the Texas-Louisiana border. Evacuees from Katrina who took refuge within Rita’s path of devastation suffered additional distress when Rita hit and were forced to find new shelters.

The magnitude of destruction caused by the two hurricanes has made rebuilding a daunting task. From the national down to the local levels, government failure caused many evacuees to remain displaced in areas such as Baton Rouge and Houston. These failures turned the natural disaster into a social disaster. Some of the evacuees have found housing, but many in Louisiana continue to live in Federal Emergency Management Agency (FEMA) trailer parks. Located in isolated areas, many of the trailer parks have no stores within walking distance or forms of public transportation available. Unlike Louisiana evacuees, those in Houston were placed in hotels, many of whom were later relocated to apartments. Not only do the living quarters of the Louisiana and Houston evacuees drastically differ, but the environment in which they are situated also diverge—rural versus urban. Living in temporary housing for over a year, sometimes after being relocated multiple times, has drastically affected the Louisiana and Houston hurricane evacuees both physically and psychologically.

To what extent has the psychological stress of the hurricane evacuees manifested? What are the factors affecting evacuees’ levels of anxiety? The purpose of this paper is to analyze the level and determinants of anxiety experienced by evacuees still living in temporary housing, almost two years after the hurricanes. Our objectives are (1) to identify and compare socioeconomic and demographic differences between evacuees residing in Houston and Louisiana; (2) to compare anxiety levels of hurricane evacuees to more general populations; (3) to examine if and to what extent the typical factors influencing anxiety remain under the special circumstances of disasters such as hurricanes; (4) to identify factors specific to the evacuation process and residential environment that mitigate or exacerbate anxiety; and (5) to examine how Louisiana and Houston residents might have experienced stress differently. Using our analysis, we aim to gain knowledge that can help lower the incidence of stressors contributing to the prevalence of anxiety in populations exposed to emergency situations such as hurricanes.
Community Disaster Recovery

According to Lindell, Prater and Perry (2006), disaster recovery refers to the phase of the emergency management cycle that occurs in the time between stabilization of the incident and the community’s recovery from the disaster’s impact. Disaster recovery can have social dimensions that require emotion-focused strategies to cope with losses of affective support from significant others. As put by Lindell et al. (2006:314): “Perhaps the most distinctive, but unfortunately elusive, aspect of disaster recovery is the restoration of disrupted community social routines and economic activities.” This requires gaining insight from the disaster experience but also restoring both individuals’ psychological stability and their patterns of interaction among various levels within the community (Lindell et al. 2006:315). Although most victims recover relatively quickly from the stress of disasters, those who suffer the greatest losses of material resources and social networks are likely to experience the most psychological distress.

The Stress Process and Anxiety

Stress refers to any environmental, social, or internal demand requiring the individual to readjust his or her behavior patterns (Holmes and Rahe 1967). Stress reactions are the states of physiological or emotional arousal that usually, but not inevitably, result from perceptions of stress. Arising largely from and influenced by varying structures in which individuals are embedded, the social stress process consists of three major conceptual components: the sources, mediators, and manifestations of stress (Pearlin et al. 1981; Pearlin 1989, 1999).

Sources of Stress: Life Events and Social Statuses. As one important form of stressor, stressful life events are the acute changes in one’s life, which require significant adjustments in behavior in a relatively short timeframe (Thoits 1995). Because stressful events and life circumstances are grounded in the structural context of people’s lives, exposure to stress varies substantially according to contemporaneous and developmental conditions of life (Pearlin 1989). Higher levels of psychological problems such as distress are associated with exposure to intense and ostensibly stressful life events (Dohrenwend 2000; Feskanich et al. 2002; Thoits 1995; Turner and Lloyd 1999).

Stressful life events are not the only sources of stress, but include constant and difficult situations of daily life termed as chronic stressors (Pearlin 1989; Pearlin and Schooler 1978; Wheaton 1994). According to Thoits (1995), the literature has consistently shown chronic strains to damage physical and mental health. She notes that outcomes of physical health are mostly examined as consequences of chronic unemployment or persistent job strains. For example, Catalano and Dooley (1983) and Kasl and Cobb (1982) showed that unemployment and financial hardship often cause stress.
Sources of stress are mostly social in origin, because experiences of chronic and acute stress and negative life events arise from social roles resulting from stratification by social class, race, gender, and age (Pearlin 1989). According to Grzywacz et al. (2004), the “life stress hypothesis,” which includes differential vulnerability and exposure, has been one of the leading explanations for disparities in health exemplified by socioeconomic status. Frequency of both stressful life events and stress responses are associated with socioeconomic position (Baum, Garofalo, and Yali 1999). Acute and chronic sources of stress have been established as psychosocial risk factors patterned by one’s socioeconomics (Lantz et al. 2005). The relationship between social status and exposure to negative events has not been consistent, but Thoits (1995) confirmed that the literature on stress indicates socially disadvantaged individuals are particularly susceptible or emotionally reactive to stressors. People of lower socioeconomic status, women, the elderly, and unmarried persons (Turner Wheaton, and Lloyd 1995), with levels or intensities of stress comparable to that of their more advantaged counterparts, exhibit higher levels of psychological distress (Cronkite and Moos 1984; Kessler and Cleary 1980; Mirowsky and Ross 1986; McLeod and Kessler 1990; Pearlin and Johnson 1977; Thoits 1982, 1984, 1987; Turner and Noh 1983; Ulbrich, Warheit, and Zimmerman 1989; Wheaton 1982). Some authors explain this disparity as an outcome of occupying social roles within the sociocultural stratification system that are associated with powerlessness, alienation, lack of control, and discrimination (Aneshensel 1992; Mirowsky and Ross 1989; Pearlin 1989). However, socially and economically disadvantaged groups are not generally more vulnerable to all types of stress. When cumulative indices are disaggregated into specific kinds of stressors, different groups appear to be vulnerable to particular subsets of stressors (Thoits 1995). But overall, disadvantaged groups seem to experience greater amounts of stress over their life course (Taylor and Seeman 1999; Thoits 1995).

Some scholars have noted the absence of research on racial differences in stress exposure (Brown et al. 1999; Gary 1991; Williams and Fenton 1994), but the available studies on race and stress are inconclusive (Neff 1983; Ulbrich et al. 1989). Measuring stress exposure using four dimensions of stressful experience—recent life events, chronic stress, lifetime major and potentially traumatic events, and discrimination stress—Turner and Avison (2003) reported that Blacks experienced significantly higher levels of stress than non-Hispanic Whites in every category except traumatic events. Their findings generally indicate that lower socioeconomic position results in higher levels of stress among Blacks. Research on depression has argued that when socioeconomic factors are controlled for, Blacks often show lower levels of depressive symptoms. This argument has not been made in the literature on stress, but a similar situation might prevail in the relationship between being Black and experiencing stress.
Sources and Mediators of Stress: Evacuation Process and Residential Environment. Expanding the idea of stress exposure, Pearlin, Aneshensel, and LeBlanc (1997) developed the concept of stress proliferation to refer to the propensity for stressors to multiply and “spill over” into life domains beyond the original stressor’s occurrence. Stress proliferation happens when the original stressor or “primary stressor” leads to additional primary stressors or creates a stressor in an additional life domain known as a secondary stressor. Primary and secondary stressors operate cumulatively to affect mental health. The immediate effects of a hurricane can be stressful but the resulting aftermaths of a hurricane, such as social dislocation and disorder, can lead to additional sources of stress. The structure of the social environment can induce additional stressors and thwart the use of coping mechanisms to mediate stress.

Social disorganization theory asserts that residential stability enhances social integration and the likelihood of residents knowing each other (Sampson 1988, 1991), while high residential mobility increases the likelihood that neighbors will feel estranged, weakening their ability to collectively act to local issues (Sampson, Raudenbush, and Earls 1997). Increased concentrations of long-term residents might promote an environment where individuals can establish familiar and enduring bonds (Freudenberg 1986). Research has shown that residential stability is positively associated with local friendship ties (Sampson 1988), perceived social cohesion (Aneshensel and Sucoff 1996), and social ties to neighbors (Ross, Reynolds, and Geis 2000). But residential stability could be conducive to feelings of stress if combined with higher levels of structural disadvantage (Anderson 1992; Jargowsky 1997). If residents are socially isolated, residential stability can solidify the negative effects of neighborhood disadvantage by keeping them in bad situations without much hope of escape (South and Crowder 1997; Warner and Pierce 1993). Ross et al. (2000) found residential stability to be associated with higher levels of stress in areas with greater economic disadvantage. Schieman (2005) stated that these ideas frame the “compound isolation” perspective, which predicts higher levels of residential stability will cause a stronger negative association between neighborhood disadvantage and social support.

People might deal with their stress by drawing on social and personal characteristics called coping resources (Pearlin and Schooler 1978). Social support—one kind of coping resource—refers to functions performed by family members, friends, and coworkers for a person (Thoits 1995) that can provide instrumental, informational, and/or emotional assistance (House and Kahn 1985). Emphasizing the significance of social support within the stress process framework, Schieman (2005) showed social support’s distribution across roles and statuses, its absence possibly reducing well-being, and its ability to help individuals avoid or manage stress (Cutrona and Russell 1990; Pearlín et al. 1981). Bonds with significant others moderate the effects of stress by enhancing other personal resources such as confidence, personal control, and self-esteem (Turner and Roszell
Often forming a single core factor, social support can be perceived or received (House and Kahn 1985). Perceived social support has been studied most frequently, in particular the effects of perceived emotional support (Thoits 1995). Although receiving emotional support influences mental health, perceptions or beliefs of the availability of emotional support seem to have a stronger influence than actually receiving (Dunkel-Schetter and Bennett 1990; Wethington and Kessler 1986). Perceived emotional support is associated directly with better mental and physical health and usually buffers damage caused by major life events and chronic strain (Thoits 1995).

Community psychologists emphasize attention to community level structures and processes that promote social integration and perceptions of support (Felton and Shinn 1992; Heller 1989; Maton 1989a, 1989b). In addition to individuals, organizations (e.g. churches or neighborhood associations) might also serve as sources of perceived social support (Felton and Shinn 1992). Social integration is positively associated with mental and physical health, but does not buffer the effects of major stressful life events or chronic strains (Thoits 1995).

**Manifestations of Stress: Anxiety.** Experiencing a variety of stressors can result in undesirable mental health outcomes such as anxiety. Drentea (2000:439) defines anxiety as, “a state of psychological discomfort characterized by feeling tense, worried, anxious, and restless.” According to the DSM-IV, generalized anxiety disorder is diagnosed when a person experiences anxiety because of a number of events or activities, more days than not, for a period of 6 months (American Psychiatric Association 1994:432). Anxiety is more prevalent among the young, minorities, and women (Barnett and Baruch 1987; Blazer et al. 1991; Mirowsky and Ross 1989, 1995). People who are unmarried, have low income, or work in the service sector more commonly experience anxiety (Blazer et al. 1991). Individuals with anxiety have worse health on average and are more likely to seek treatment from a mental health service (Blazer et al. 1991).

**Stress and Disasters.** Does experiencing a hurricane cause a significant amount of stress? Although disasters can cause a wide range of negative psychosocial responses such as anxiety, depression, and grief (Bolin 1985; Gerrity and Flynn 1997; Houts et al. 1988; Perry and Lindell 1978), in most instances, these responses are mild and transitory. Gerrity and Flynn described this as the result of “normal people, responding normally, to a very abnormal situation” (1997:108). If their usual social support networks remain largely intact, most disaster victims do not require psychiatric treatment (Lindell and Prater 2003). Certain types of people, however, might require special attention and active outreach including children, feeble elderly, those with preexisting mental illness, racial and ethnic minorities, and families of people who died in the disaster. Edwards (1998) emphasized the capability to manage among families with sufficient income, housing, and insurance prior to the disaster (Bolin 1986), but mentions that people who have unsuccessfully dealt with previous stressful events are more vulnerable to stress and...
maladaptive coping with disasters (Cohen 1992; Myers 1989). Disasters do not occur in a vacuum; thus, the effects resulting from the aftermath (e.g. dislocation) must be considered in explaining mental health outcomes. Scholars (cf. Quarantelli 1987) have argued for a greater relevance of systemic factors to understand disasters rather than restricting the analyses to purely social psychological ones. Edwards (1998) proposed an ecological framework to approach disaster research that integrates (1) the internal responses to events and experiences at the individual level and (2) the interaction of families with other social systems. Following up on her suggestions, we consider characteristics of the respondents in addition to factors specific to the FEMA residential environment influenced by government and community management to explain stress among the hurricane evacuees.

Based on the preceding discussion, we test the following expectations regarding anxiety: (1) FEMA trailer-park residents show higher levels of anxiety than do hurricane victims evacuated to Houston; (2) “general” correlates of anxiety are also applicable to explain anxiety for hurricane evacuees; (3) hurricane-specific factors explain a greater amount of variance in anxiety than a “general” model; and (4) situational factors of the new “neighborhood” (trailer parks or apartment complexes) are major determinants of anxiety for hurricane evacuees. We test those expectations by first performing a series of means tests to assess socioeconomic, demographic, and experiential differences between the Houston and Louisiana populations. We then estimate three nested regression models to explain anxiety among persons dislocated by Hurricanes Katrina and Rita.

Method

Sample

Our data consists of a combination of two surveys, one of evacuees residing in Houston and another of evacuees in various locations in southern Louisiana. Below we describe the recruitment and sampling of respondents from each location.

Houston Residents. Data on evacuees residing in Houston consist of three cross-sections taken in early September 2005, late October through early November 2005, and July 2006. Evacuees interviewed in September 2005 resided in evacuation shelters. Respondents from the October-November 2005 wave were interviewed in motels and apartments. The July 2006 wave of the study, conducted from July 11-21, took place in apartment complexes. We use the data collected in the July 2006 wave for our analysis (See Wilson and Stein, 2006, for greater detail).

For the July 2006 wave, a team member arranged facilities in apartments and recruited participants. This team member had extensive experience working with Katrina evacuees, previously conducting focus groups and recruitment activities with evacuees of Katrina. A convenience sample method was used to solicit volunteers because a
systematic random sample was considered impossible given the diversity of conditions and size of each apartment complex. The team member obtained a list of apartment complexes that housed evacuees and focused on the largest concentrations of evacuees in different areas of Houston. Flyers were posted announcing the times and location of the study. After the initial few participated, additional people arrived. Surveys were conducted in apartment complex “common” rooms, individual apartments, and church meeting rooms.

**Louisiana Residents.** Data on evacuees residing in Louisiana were drawn from the Louisiana Trailer Park Survey (LTPS). The LTPS took place from February to April 2007 in ten different trailer and mobile home parks in five Louisiana communities and their surrounding areas: Baton Rouge, Lafayette, Lake Charles, River Road, and Port Sulphur (see Schafer and Singelmann, 2007, for greater detail about the survey sites). A total of 321 interviews were conducted at ten FEMA parks within these five locations. In three locations with sufficiently large trailer parks (Lake Charles, Port Sulphur, and River Road), all interviews were completed within a single large trailer park. Three parks in Baton Rouge and four parks in Lafayette were surveyed in order to obtain a sufficient number of interviews for those locations. The five survey areas cover the spread of parks from New Orleans to Lake Charles; they were chosen for their concentration and/or the size of the trailer parks according to information provided by the Louisiana Recovery Authority and can be viewed as being representative of the types of trailer parks to which hurricane victims were evacuated. Slightly more interviews took place in commercial trailer parks (194) than FEMA-managed parks (127).

In seven of the ten trailer parks, the interviewers conducted a census in which they systematically knocked on every door in the park. This strategy was necessary in order to obtain enough respondents within the short time frame required by funding agencies. In three FEMA parks, all needed surveys were completed without having to knock on every door. In these cases, a quota sampling strategy was used to disperse pairs of interviewers to different sections of the park. First, the geographical boundaries were identified; attempts were then made to gather an equal number of surveys from each section, quadrant, or row; thus, no areas of these FEMA parks were systematically omitted. In an attempt to obtain the broadest possible sample and minimize systematic exclusion of park residents, all surveys were conducted in the late afternoon/early evening (5:00pm – 8:00pm), or on weekends. We believe the practical and substantive benefits of face-to-face interviews outweigh the drawbacks of nonrandom sampling, for they opened up the possibility of discovering new, policy-relevant information or affirming the importance of victims’ experiences and stories (Bromet and Havenaar 2006).

Of those who answered the door, two-thirds participated in the survey. An eligible person, the one to whom the trailer was assigned, was present for the interview in ninety percent of the cases where someone answered the door. Out of those who answered the
door, 26 percent refused to participate. To increase the willingness to participate in the study, respondents were given a $20 gift card.

We recognize the lag between the two surveys: The Houston data used for our analysis were collected in July 2006, whereas the Louisiana trailer-park survey was carried out seven to nine months later. This time difference could have two effects: the greater immediacy of the hurricanes for the Houston respondents could result in a higher level of anxiety for them. On the other hand, remaining in trailers 7-9 months longer could increase anxiety levels for the Louisiana respondents. Given the previous research findings that the effects of depression and anxiety lingered for two years and more after a major disaster (cf. Griefer et al. 2005), we believe that the time difference between the two samples does not corrupt our results.

**Dependent Variable**

*Anxiety level* is our dependent variable. To measure hurricane evacuees’ psychological response to stress, we use an anxiety scale from the Brief Symptom Inventory (Derogatis 2000). Our anxiety scale is based on yes/no responses to five items and ranges from 0-5. Using the same items as Hill, Ross, and Angel (2005), respondents were asked to indicate whether they have been distressed or bothered by: 1) feeling suddenly scared for no good reason, 2) feeling fearful, 3) feeling tense or keyed up, 4) spells of terror or panic, and 5) feeling so restless they could not sit still.

**Independent Variables**

*Life Events and Social Statuses: General Model.* *Currently employed full-time* is a dichotomous variable indicating whether the respondent holds full-time employment at the time of the survey. Responses are coded “1” if currently employed full-time and “0” if not. We expect individuals who are currently employed full-time to have lower anxiety. Hurricanes Katrina and Rita impacted all of the evacuees. Because the devastation of Katrina was more severe, we include a dichotomous variable called *Katrina* to examine whether Katrina victims experience higher anxiety levels than those hit by Rita. Katrina victims are coded as “1” and Rita victims as “0.”

We examine several demographic variables to measure the effects of the differential exposure and vulnerability of social statuses on anxiety. *Educational attainment* is dichotomized as high school or less = 0, more than high school = 1, based on educational attainment’s skewed distribution. Previous research leads us to expect people with higher educational attainment to have lower levels of anxiety than respondents who have a high school education or less. We examine respondents’ *income* because poorer people are at greater risk of stress than individuals more well off. We expect respondents with higher income to have less anxiety. Income is a dichotomous variable, where 1 = above $15,000 and 0 = less than $15,000.
The variable female measures how gender affects anxiety, which is coded as 1 = female, 0 = male. Age is measured in years. Marital status is dichotomized as 1 = single, divorced, or widowed, 0 = married or cohabiting. Based on the aforementioned discussion, we expect single, divorced, or widowed respondents to have higher levels of anxiety than their married or cohabiting counterparts. Race is a dichotomous variable, with 1 = Black, 0 = non-Black. Previous research indicates that Blacks experience higher levels of stress. With the state of current race relations, few people have close friends across racial groups. Because of this, Blacks can be expected to feel, and objectively be, more isolated than Whites. Thus, being Black should be positively associated with levels of anxiety.

Evacuation Process and Residential Environment: Hurricane Model. Loss of full time employment is a dichotomous variable that indicates if the respondent’s full-time employment status changed after the hurricanes. The response is coded as “1” if the respondent was previously employed full-time and is no longer working, and “0” if the respondent does not meet this qualification. Given the challenges to maintaining and finding full-time employment in the wake of dislocation and the stress caused by not having full-time employment, we expect respondents who no longer have a full-time job to have higher levels of anxiety. We analyze the number of places the respondent has lived since the hurricanes to examine the effects of residential stability on anxiety. Number of places lived since the hurricanes ranges from 1 to 15. We expect people who have lived in more places to have higher levels of anxiety.

We assess the mediating effects of social support and social integration on levels of anxiety by measuring respondents’ sense of belonging and level of involvement. Sense of belonging because of neighbors is a dichotomous variable with “1” indicating that the respondent reported a sense of belonging and “0” if they did not. We predict those who report a sense of belong to have lower levels of anxiety. Obstacles to involvement is a three-item index, ranging from 0 to 3, this variable measures the difficulty respondents reported of getting involved in the community. The three responses are: “feeling unwelcomed,” “don’t know where to begin to get involved,” and “can’t make a difference.” Index values of “0” indicate that respondents perceived no difficulty getting involved, while a value of “3” indicates perception of difficulty for all three items.

To examine how living in a FEMA trailer park in Louisiana affects levels of anxiety in comparison to an apartment in Houston, we include the variable living in a Louisiana trailer (1 = if they do, 0 = if they do not). This variable measures the physical conditions of the two types of housing net of management influence. Although we are unable to disentangle the effects of residing in Louisiana versus living in a trailer, we predict that the experience of living in a trailer park will increase anxiety.

Analyses
We begin our analysis with a series of means tests to determine any socioeconomic, demographic, and experiential differences between the evacuees in Houston and Louisiana. We are interested in the composition of these two groups and how that might affect anxiety levels.

We use OLS regression to estimate the effects of factors specific to the evacuation process and conditions in the places evacuees were housed on anxiety levels among evacuees in Houston and Louisiana. We estimate three models to examine how these variables affect evacuees’ anxiety levels in comparison to typical factors that influence anxiety among general populations. The first of the regression models includes factors that were previously found to affect anxiety in general populations. We then develop a model specific to the hurricanes that distinguishes between factors relating to social dislocation as a result of the two hurricanes, and situational factors involving the residential environment that address the conditions in the locations where the evacuees were housed. We construct our third model by combining the first two to analyze the relative effects of the evacuation process and residential environment on anxiety versus those of the factors making up the general model. We also explored possible interaction effects among variables from the general and hurricane models, such as sense of belonging and the different social statuses (sex, age, marital status, race). We did not include the interaction variables in the model because they lacked statistical significance and indicated high multicollinearity; thus, they would contribute nothing to our analysis. Although hurricanes are not subject to policy interventions, the manner in which people are evacuated and where they are housed during and after the evacuation can be evaluated and changed according to best practices and effects on stress and anxiety.

Results

Table 1 presents the results from our statistical tests comparing evacuees to Houston and Louisiana. We discuss only the statistically significant variables. Nearly half of the Houston evacuees lost their full-time jobs after the hurricanes in comparison to a third of evacuees in Louisiana. Not surprisingly, 23 percent of Louisiana evacuees were employed full-time after the hurricanes, which is almost double the percentage of those in Houston. Evacuees in Louisiana are slightly less educated than those residing in Houston. Sixty-nine percent of Louisiana evacuees have a high school degree or less in comparison to 65 percent in Houston. Prior to the hurricanes, evacuees to Houston were earning more than Louisiana evacuees on average. Despite having a lower proportion of evacuees with full-time employment, the average current income of Houston respondents is significantly higher than that for evacuees in Louisiana. Louisiana has a higher percentage of evacuees currently earning less than $15,000 than Houston. Compared to their income before the hurricanes, a higher percentage of Houston evacuees (39%)
currently have a lower income than evacuees in Louisiana (35%). Although they are a poorer group, a higher percentage of evacuees in Louisiana (29%) owned their home before the hurricanes than ones in Houston (20%).

Louisiana (62%) has a higher percentage of females than Houston (55%). Houston has more single, divorced, or widowed people than Louisiana (73% to 69%, respectively). Ninety-six percent of the evacuees in Houston are Black, while Blacks constitute three-quarters of the Louisiana sample. Moreover, respondents in Louisiana report their current health to be poorer than those in Houston. Almost half of the evacuees in Louisiana indicate that their health has deteriorated since the hurricanes, whereas about 30 percent in Houston say they are less healthy than before the hurricanes.

Three-quarters of the evacuees in Louisiana were affected by Katrina, but almost all residing in Houston were impacted by it. The Louisiana respondents show higher levels of residential instability, having lived, on average, in 3.4 places since the hurricanes, compared to an average of 2.6 for evacuees to Houston. A higher proportion of Houston evacuees (.77) report feeling a sense of belonging because of their neighbors than Louisiana evacuees (.62). In summary, the present analysis indicates that the socioeconomic and demographic composition of the two populations differs. Louisiana residents are poorer and unhealthier. Evacuees in Louisiana experience greater residential instability and receive less social support than their Houston counterparts.

Table 2 presents descriptive statistics for the combined sample comprising of the Houston and Louisiana respondents. The combined sample of evacuees has a mean anxiety score of 2.13. To express the magnitude of the hurricane evacuees’ level of anxiety, we compare it to the anxiety experienced by respondents from the Welfare, Children, and Families (WCF) survey (Angel et al. 2009). The WCF project is a household-based, stratified random sample of 2,402 poor mothers in low-income neighborhoods in Boston, Chicago, and San Antonio. This project sampled Census blocks with at least 20 percent of the residents below the federal poverty line based on the 1990 Census. Within these neighborhoods, households below 200 percent of the poverty line were sampled. Households below 100 percent of the poverty line were oversampled.

The five items measuring anxiety in the WCF survey were originally constructed as an ordinal scale. We dichotomized those items to construct a scale of anxiety that would be comparable to our own. The WCF sample of disadvantaged women shows a mean anxiety score of .99 on a scale ranging from 0 to 5 points, which is significantly lower than that of the respondents from the combined sample of hurricane evacuees whose score was 2.13 (t=-13.822, p<.001 for a two-tailed test). To be conservative, we treated all magnitudes of the WCF’s anxiety items, from experiencing “a little bit” to “extremely,” as having experienced anxiety. Had we grouped the responses of “a little bit” with “not at all,” the mean anxiety score would have been .34 as opposed to .99,
## Table 1. Comparison of the Houston and Louisiana Samples

<table>
<thead>
<tr>
<th>Variables</th>
<th>Houston</th>
<th></th>
<th>Louisiana</th>
<th></th>
<th>Range</th>
<th>Sig.</th>
<th>Houston</th>
<th></th>
<th>Louisiana</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Full-time employment before hurricanes</td>
<td>.56</td>
<td>.497</td>
<td>.55</td>
<td>.499</td>
<td>0-1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full-time employment after hurricanes</td>
<td>***</td>
<td>.12</td>
<td>.323</td>
<td>.23</td>
<td>.421</td>
<td>0-1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loss of full-time employment</td>
<td>***</td>
<td>.48</td>
<td>.500</td>
<td>.35</td>
<td>.477</td>
<td>0-1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Highest level of education completed</td>
<td>***</td>
<td>2.44</td>
<td>1.523</td>
<td>2.15</td>
<td>1.412</td>
<td>0-5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Highest level is high school or less</td>
<td>*</td>
<td>.65</td>
<td>.478</td>
<td>.69</td>
<td>.463</td>
<td>0-1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Income before hurricanes (in dollars)</td>
<td>***</td>
<td>21415.23</td>
<td>17944.378</td>
<td>17221.34</td>
<td>12842.044</td>
<td>0-87500</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Income after hurricanes (in dollars)</td>
<td>***</td>
<td>13829.94</td>
<td>14558.398</td>
<td>11127.73</td>
<td>8774.257</td>
<td>0-87500</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Previous income is less than $15,000</td>
<td>.43</td>
<td>.496</td>
<td>.53</td>
<td>.500</td>
<td>0-1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current income is less than $15,000</td>
<td>***</td>
<td>.74</td>
<td>.440</td>
<td>.81</td>
<td>.392</td>
<td>0-1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current income lower than pre-hurricane income</td>
<td>*</td>
<td>.39</td>
<td>.489</td>
<td>.35</td>
<td>.478</td>
<td>0-1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Respondent owned home</td>
<td>***</td>
<td>.20</td>
<td>.403</td>
<td>.29</td>
<td>.453</td>
<td>0-1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>***</td>
<td>.55</td>
<td>.498</td>
<td>.62</td>
<td>.486</td>
<td>0-1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>38.98</td>
<td>15.115</td>
<td>42.13</td>
<td>14.524</td>
<td>16-87</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single, divorced, or widowed</td>
<td>*</td>
<td>.73</td>
<td>.444</td>
<td>.69</td>
<td>.463</td>
<td>0-1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>***</td>
<td>.96</td>
<td>.194</td>
<td>.74</td>
<td>.442</td>
<td>0-1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of children living with respondent</td>
<td>1.15</td>
<td>1.501</td>
<td>1.27</td>
<td>1.487</td>
<td>0-8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current health (0=excellent, 4=poor)</td>
<td>*</td>
<td>1.75</td>
<td>1.161</td>
<td>2.11</td>
<td>1.321</td>
<td>0-4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current health worse than pre-hurricane health</td>
<td>***</td>
<td>.29</td>
<td>.454</td>
<td>.48</td>
<td>.500</td>
<td>0-1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Affected by Katrina</td>
<td>***</td>
<td>.96</td>
<td>.189</td>
<td>.77</td>
<td>.424</td>
<td>0-1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td># of places lived since hurricanes</td>
<td>*</td>
<td>2.58</td>
<td>1.604</td>
<td>3.41</td>
<td>1.933</td>
<td>1-15</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sense of belonging- neighbors</td>
<td>***</td>
<td>.77</td>
<td>.421</td>
<td>.62</td>
<td>.485</td>
<td>0-1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obstacles to involvement scale (0=none, 3=high)</td>
<td>2.05</td>
<td>1.081</td>
<td>.92</td>
<td>1.045</td>
<td>0-3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level of anxiety</td>
<td>2.09</td>
<td>1.837</td>
<td>2.16</td>
<td>1.833</td>
<td>0-5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\[N = 361\]  \[N = 321\]

1. In the case of binary variables, proportions are given instead of means
2. Binary variable
3. \[N = 682\]
4. *\(p < .05\); **\(p < .01\); ***\(p < .001\) (two-tailed tests)
showing an even greater difference between the WCF population and the hurricane evacuees. Although the respondents from the WCF survey were primarily poor Black mothers, a population that can be expected to have higher anxiety scores than the general population (Chase-Lansdale et al. 2003), the hurricane evacuees had an anxiety score more than double that of poor Blacks.

### Table 2. Descriptive Statistics for Combined Sample

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>St. Dev.</th>
<th>Min.</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anxiety</td>
<td>2.13</td>
<td>1.834</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>Currently Employed Full-Time</td>
<td>.17</td>
<td>.377</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>More than High School Education</td>
<td>.33</td>
<td>.471</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Income More than $15,000</td>
<td>.23</td>
<td>.419</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Female</td>
<td>.58</td>
<td>.494</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Age</td>
<td>40.49</td>
<td>14.906</td>
<td>16</td>
<td>87</td>
</tr>
<tr>
<td>Single/Divorced/Widowed</td>
<td>.71</td>
<td>.453</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Black</td>
<td>.85</td>
<td>.353</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Katrina</td>
<td>.87</td>
<td>.338</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Loss of Full-Time Employment</td>
<td>.42</td>
<td>.493</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td># of Residences Post-Hurricanes</td>
<td>2.98</td>
<td>1.817</td>
<td>1</td>
<td>15</td>
</tr>
<tr>
<td>Sense of Belonging</td>
<td>.70</td>
<td>.459</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Obstacles to Involvement</td>
<td>1.44</td>
<td>1.200</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Living in LA trailer park</td>
<td>.47</td>
<td>.500</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

1. In the case of binary variables, proportions are given instead of means  
2. Binary variable  
3. N = 682

We present the correlation matrix of our variables in Table 3. None of the bivariate correlations raise any concerns about possible multicollinearity. We further conducted diagnostic of our regression models for multicollinearity; none of the VIF values suggested any problems.

In Table 4, we present results from our three regression models. In the general model, we examine the effects of typical factors affecting stress. The adjusted R² indicates that 6.8 percent of the variation in anxiety levels of the evacuees can be explained by the typical factors discussed in the literature review. Three of the predictor variables are significant: currently employed full-time, female, and age. The impact of each independent variable can be computed by multiplying its unstandardized regression coefficient by a one unit change in that variable (i.e., the change from 0 to 1) and dividing by the range in the dependent variable. Thus, if a respondent was employed full-time at the point of the interview, his or her anxiety score was reduced by approximately 16 percent (-.815/5). Women are expected to have an anxiety score 8 percent (.395/5) higher than men. For age, each ten year increase resulted in a 3 percent (.15/5) increase in
anxiety. The standardized coefficients show that current employment has the strongest effect of the three significant variables.

The hurricane model estimates the effects of the evacuation process and the residential environment on levels of anxiety. This model explains 17.8 percent of the variation in anxiety levels among hurricane evacuees, more than twice the variation explained by the general model. The hurricane model is a superior predictor of anxiety for a population that experienced a major natural and social disaster. All variables in the hurricane model are significant. If an evacuee lost full-time employment since the hurricanes, his or her anxiety increased by 10 percent (.500/5). Ensuring evacuees remain employed full-time can help to mitigate anxiety. Each additional residence evacuees have lived after the hurricanes increases anxiety by 3.5 percent (.175/5). This finding indicates that greater amounts of residential instability positively affect evacuees’ level of anxiety. The variables measuring aspects of the residential environment are particularly important. Having a sense of belonging because of neighbors will decrease anxiety levels by approximately half a point or 10 percent (-.480/5), which highlights the importance of social support within one’s community. For every obstacle to involvement in the community evacuees perceived, their anxiety level increased by more than a half point or 11 percent (.555/5). Comparing the standardized coefficients indicates that the obstacles to involvement variable has the strongest effect on anxiety; it is almost three times greater than the other variables.

This finding indicates that being socially integrated within one’s community can mitigate feelings of anxiety. Living in a Louisiana trailer park, as opposed to an apartment in Houston, increases anxiety levels by more than 9 percent (.471/5). Although we are unable to disaggregate the impact of living in Louisiana versus living in a trailer, we strongly suspect that the accommodations of the trailer, the location of the trailer parks, and the general atmosphere attributable to the trailer environment are responsible for the increases in anxiety levels. We are also unable to disentangle the effects of duration of residence from location and amenity, as we discussed above.

The full model combines the general and hurricane models to examine the relative importance of the general model variables and the hurricane-specific variables to explain anxiety for persons who experienced a major disaster such as a hurricane and its dislocation. The full model explains approximately 23 percent of the variation in anxiety levels. Additional education beyond high school gains significance when included in the full model and results in higher anxiety. The obstacles to involvement variable continues to have the strongest effect on anxiety among all the variables when comparing their standardized coefficients. All of the variables that were significant in the hurricane model maintain their significance in the full model, emphasizing their predictive power and the necessity to include them in analyzing post-disaster assessments of stress.
### Table 3. Correlation Matrix

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Anxiety index</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Currently employed full-time</td>
<td>-.209</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>More than high school education</td>
<td>.083</td>
<td>.056</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Income more than $15,000</td>
<td>-.148</td>
<td>.292</td>
<td>.089</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Female</td>
<td>.129</td>
<td>-.081</td>
<td>.092</td>
<td>-.031</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Age</td>
<td>.128</td>
<td>-.093</td>
<td>.136</td>
<td>-.032</td>
<td>-.100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Single/divorced/widowed</td>
<td>.036</td>
<td>-.076</td>
<td>-.044</td>
<td>-.170</td>
<td>-.004</td>
<td>.064</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Black</td>
<td>-.044</td>
<td>-.020</td>
<td>.037</td>
<td>.021</td>
<td>.015</td>
<td>-.128</td>
<td>.027</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Affected by Katrina</td>
<td>-.077</td>
<td>-.134</td>
<td>-.049</td>
<td>-.062</td>
<td>-.120</td>
<td>.020</td>
<td>.015</td>
<td>.165</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Loss of full-time employment</td>
<td>.143</td>
<td>-.402</td>
<td>.079</td>
<td>-.115</td>
<td>.015</td>
<td>-.013</td>
<td>-.026</td>
<td>.159</td>
<td>.043</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Number of residences post-hurricanes</td>
<td>.190</td>
<td>.013</td>
<td>.062</td>
<td>-.075</td>
<td>.066</td>
<td>.078</td>
<td>-.025</td>
<td>-.160</td>
<td>-.121</td>
<td>.063</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Sense of belonging</td>
<td>-.182</td>
<td>.052</td>
<td>.050</td>
<td>.060</td>
<td>-.031</td>
<td>-.029</td>
<td>-.021</td>
<td>.137</td>
<td>.127</td>
<td>.003</td>
<td>-.132</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Obstacles to involvement</td>
<td>.324</td>
<td>-.169</td>
<td>-.051</td>
<td>-.108</td>
<td>-.022</td>
<td>-.137</td>
<td>.042</td>
<td>.095</td>
<td>.108</td>
<td>.091</td>
<td>-.039</td>
<td>-.066</td>
</tr>
<tr>
<td>14</td>
<td>Living in LA trailer park</td>
<td>.009</td>
<td>.146</td>
<td>-.112</td>
<td>-.085</td>
<td>.062</td>
<td>-.203</td>
<td>-.019</td>
<td>-.340</td>
<td>-.269</td>
<td>-.177</td>
<td>.228</td>
<td>-.153</td>
</tr>
</tbody>
</table>
Table 4. Three Models of Anxiety Symptoms: General, Hurricane, and Full Models

<table>
<thead>
<tr>
<th>Variables</th>
<th>Model 1: General</th>
<th>Model 2: Hurricane</th>
<th>Model 3: Full</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>b</td>
<td>Sig.</td>
<td>β (SE)</td>
</tr>
<tr>
<td>Controls</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Currently full-time</td>
<td>-.815</td>
<td>***</td>
<td>-.173</td>
</tr>
<tr>
<td>More than high school</td>
<td>.198</td>
<td></td>
<td>.052</td>
</tr>
<tr>
<td>Income &gt; $15,000</td>
<td>-.328</td>
<td></td>
<td>-.075</td>
</tr>
<tr>
<td>Female</td>
<td>.395</td>
<td>**</td>
<td>.105</td>
</tr>
<tr>
<td>Age</td>
<td>.015</td>
<td>**</td>
<td>.112</td>
</tr>
<tr>
<td>Single/divorced/widowed</td>
<td>.056</td>
<td></td>
<td>.014</td>
</tr>
<tr>
<td>Black</td>
<td>-.132</td>
<td></td>
<td>-.026</td>
</tr>
<tr>
<td>Katrina</td>
<td>-.372</td>
<td></td>
<td>-.073</td>
</tr>
</tbody>
</table>

Evacuation Process

| Loss of full-time job            | .500  | ***  | .135   | .322  | **   | .087   | (.144) |      |        |
| Number of residences post-hurricanes | .175  | ***  | .172   | .142  | ***  | .139   | (.041) |      |        |

Residential Environment

| Sense of Belonging               | -.480 | **   | -.122  | -.410 | **   | -.104  | (.155) |      |        |
| Obstacles to involvement         | .555  | ***  | .361   | .576  | ***  | .373   | (.067) |      |        |
| Living in LA Trailer             | .471  | **   | .128   | .407  | *    | .110   | (.166) |      |        |
| Constant                         | 1.870 | ***  | (.379) | .711  | **   | (.254) | (.175) |      |        |

Adjusted R²                        | .068  |      |        | .178  |      |        | .231   |      |        |

1. *p < .05; **p < .01; ***p < .001 (two-tailed tests)
2. N = 682
Discussion

Our study presents results from an analysis of the determinants of anxiety as a manifestation of stress among Hurricanes Katrina and Rita evacuees residing in Houston apartments and Louisiana trailer parks. The purpose of the study was to determine socioeconomic and demographic differences in the composition of the two populations and to assess the level of anxiety of people who were traumatically dislocated. We further sought to evaluate the applicability of a model examining typical factors influencing anxiety in cases involving special conditions such as hurricanes. The hurricane evacuees surveyed had much higher anxiety scores than even poor Black mothers living in Boston, Chicago, and San Antonio, a demographic group typically having more anxiety than the general population.

Findings indicate that the populations of evacuees in Houston and Louisiana differ socioeconomically, demographically, medically, and in terms of post-disaster experience. While anecdotal evidence has sometimes been used to note that evacuees to Houston were poorer than those who made it to Atlanta GA, the Houston-Louisiana FEMA park comparison shows evacuees to Houston to be more educated, having had higher incomes prior to the hurricane, and maintaining their health more than those housed in trailer parks in Louisiana. The regression analysis showed that our hurricane model was more robust than the general model, explaining two and a half times the amount of variance. The full model only increased the explained variance presented in the hurricane model alone by about 30%. Furthermore, all statistically significant variables from the hurricane model maintained their effects in the full model, net of those from the general model.

The most significant correlate of anxiety in the models is sense of obstacles to involvement in the new communities (trailer parks or apartment complexes). This and similar variables are often employed in the study of depressive symptoms. It appears that both depressive symptoms and anxiety are affected by a sense of feeling lost that arises from perceived obstacles to getting involved in the new community and being able to make a contribution to it. We also recognize that we cannot disentangle the effects of living in Louisiana as compared to Houston, living in trailer parks as compared to apartment complexes, and estimating the possible effect of the time lag between the Houston survey and the Louisiana survey.

Results from this study are important for intervention in social programs. Although hurricanes and subsequent evacuations cannot be avoided, specific programs can ameliorate the effects of stress resulting from dislocation and reduce or even prevent substantial increases in levels of anxiety. Clearly, all levels of government failed in providing the help needed in the immediate aftermath of Hurricane Katrina, although more help was provided more quickly after Hurricane Rita. It is possible that the traumatic experience of Hurricane Katrina resulted in a level of anxiety that would not
have been reached with more adequate help, but we have no way of quantitatively estimating that possibility. Managing the number of relocation sites can help evacuees gain stability in an otherwise chaotic period. No one could have foreseen that Hurricane Rita would strike so soon after Hurricane Katrina; persons who fled from the New Orleans area to Lake Charles thus had to find shelter a few weeks later. However, other aspects of the evacuation process could be managed better than they were. One possibility would be a program that makes arrangements with existing trailer parks and sites with infrastructure for FEMA trailers prior to each hurricane season. Programs aimed at facilitating evacuees’ community involvement would buffer some of the stress of dislocation and feelings of loss. Even larger trailer parks had no playgrounds for children, and no public places existed for residents to gather. Providing such amenities, involving evacuees more in the running of the parks, and offering more security would go a long way towards lowering anxiety. For apartment complexes housing a large share of evacuees, organizing community-building events would help giving those residents a sense of belonging to the new location and lower the perceived barriers of getting involved in apartment and community organizations. We further investigated the possibility that private parks’ FEMA-supplied trailers were run differently than parks run by FEMA itself. However, the results show no significant private-FEMA differentials.

This study is an initial step to improve the management of post-evacuation temporary housing. We consider our findings robust enough to recommend policy interventions, despite our inability to include certain variables (e.g. social networks) because they were not included on the survey from which we drew our data. The policies we discussed would greatly help enduring evacuees of disasters cope with the stress of dislocation, thus contribute to their mental health.

Our study makes several theoretical contributions to the stress and disaster literature. First, we apply the social stress process model to a post-disaster context. Although the etiology of the stress process has been well demonstrated under normal circumstances, our results indicate that analyses of stress among disaster-affected populations must include stressors and coping mechanisms specific to the evacuation process and new community. Without inclusion of these variables, the truncated social stress model has severe limitations in explaining mental health outcomes for a population affected by disaster. Second, our results point to the importance of residential stability, social support, and sense of mastery in mitigating stress within communities of disaster evacuees. Although social support is typically sought from significant others and involvement in the community is usually performed in familiar settings, the circumstances caused by disasters require individuals to seek these coping mechanisms from other sources. The differences between the Houston and Louisiana evacuees show that post-disaster communities can do a better job of fulfilling these needs if properly managed, which highlights the potential efficacy of post-disaster leadership in mitigating
stress. Third, we answer the call for a more complex framework that moves beyond purely social-psychological variables by incorporating systemic factors (Edwards 1998; Quarantelli 1987). By including the evacuation process and residential environment variables, we specifically examined factors involving government and community organization and provision in post-disaster assistance.

We also consider how our study contributes to the literature on what we might call a sociology of anxiety, that could be conceptualized in ways paralleling Erikson’s (1994) work on the sociology of trauma. Trauma refers to a violent and acute event that can affect communities in the same respect as individuals (Erikson 1994). Events are not inherently traumatic, but they carry with them traumatic meanings depending on how people react to them. Through this process, trauma converts an event into a state of mind. Erikson differentiates between trauma and stress, defining the latter as a series of events or chronic conditions that erode one’s balance gradually (1994:230). Erikson specifically develops a sociology of trauma, but his framework lends a useful heuristic to discuss anxiety. When a group of people develop stress from a shared experience of an event such as a hurricane, this can spread to an entire community. The Katrina and Rita hurricane evacuees housed in the Louisiana trailer parks and apartments in Houston are an example of such communities, each defined initially by the evacuation process and subsequently by their reactions to the conditions of their respective environments. Following a period of residential instability, these communities of hurricane evacuees associate their post-disaster experience with a lack of belongingness and an inability to become involved, all of which contribute to the deterioration of their mental health. Similar to trauma, the stress experienced in the wake of the hurricanes has transformed Hurricanes Katrina and Rita into an anxiety stricken state of mind.

Acknowledgements

Data on evacuees residing in Houston were derived from a study sponsored by the National Science Foundation (SES 0552439) “SGER: Cooperation among Evacuees in the Aftermath of Hurricane Katrina.” The Louisiana Trailer Park Survey was jointly funded by the Louisiana Department of Labor, the Louisiana Family Recovery Corps, and the Louisiana Recovery Authority.

References


Lantz, Paula M., James S. House, Richard P. Mero, and David R. Williams. 2005. “Stress, Life Events, and Socioeconomic Disparities in Health: Results from the


Resources on the Impact of Exposure to Stress in Two Groups.” *Journal of
Community Psychology* 10:293-311.
------. 1994. “Sampling the Stress Universe.” Pp. 77-114 in *Stress and Mental Health:
Findings, Questions and Directions.” Pp. 253-68 in *Handbook of Black American
Livingston. Westport, CT: Greenwood Press.
out.” Division of Social Sciences. Rice University.