



QUICK RESPONSE REPORT

Enough is Enough: Social Capital in Post-Katrina New Orleans A Study of Neighborhoods Affected by the 2007 Tornadoes

Liesel Ashley Ritchie

The Evaluation Center
Western Michigan University
Kalamazoo, Michigan

Duane A. Gill

Social Science Research Center
Mississippi State University
Mississippi State, Mississippi

The views expressed in the report are those of the authors and not necessarily those of the Natural Hazards Center or the University of Colorado.

Introduction

On February 12–13, 2007, a series of F-2 and F-1 tornadoes tore through New Orleans. According to information provided by the National Weather Service, the first tornado—an F-2—touched down in the Westwego area, crossed over the Mississippi River and then struck the Carrollton area as an F-1 tornado. The system then moved into the Gentilly area, again strengthening to a magnitude of F-2. An elderly Gentilly resident died when the Federal Emergency Management Agency (FEMA) trailer she was living in was tossed by the storm into her newly renovated home. Still reeling from the myriad, unresolved impacts of Hurricanes Katrina and Rita, these neighborhoods suffered varying degrees of damage and trauma from these tornadoes.

The purpose of this study was threefold:

1. Examine neighborhood responses to the tornadoes by applying a social capital framework.
2. Compare residents' experiences with the tornadoes with their experiences during and after Hurricane Katrina.
3. Inform disaster research and improve our conceptual framework on relationships between social capital and disasters.

Theoretical Framework

The concept of social capital offers an approach to framing the phenomena of community and community relations in a variety of contexts. Putnam (2000) defines social capital as “connections among individuals—social networks and the norms of reciprocity and trustworthiness that arise from them” (19). Schuller, Baron, and Field (2000) refer to social capital as “social networks, the reciprocities that arise from them, and *the value of these for achieving mutual goals*” (1; emphasis added). Broadly, social capital is a micro-, meso-, and macro-level phenomenon facilitating actions of individuals and groups within social structures, as well as attainment of individual and collective goals.

An expanding body of research literature highlights the value of social capital for community development, community well-being, and community health (e.g., Coleman 1990, 1988; Putnam 1993, 2000; Stone 2001). Arguably, the overall well-being of a given community depends on the extent to which social capital exists in that community. That is, the more social capital in a community—exhibited as trust, fellowship, associations, connections, networks, social intercourse, good will, sympathy, and norms of reciprocity—the “healthier” the community. Flora et al. (1997) suggest “social capital may enable collective community action... [that is] not possible where networks, norms of reciprocity, and trust are lacking” (626). According to Putnam (2000), social capital “greases the wheels that allow commu-

unities to advance smoothly” (288). In sum, social capital facilitates effective use and creation of physical, natural, financial, and human capital by maintaining flow of information, thereby enhancing a community’s capacity to collectively pursue opportunities or resist threats.¹

Social Capital in Disaster Research

Findings of previous research on disasters illuminate the potential of social capital theory and related measures to contribute to our knowledge about short- and long-term social impacts of disasters (Ritchie 2004; Ritchie and Gill 2005, 2007). Although similar concepts—such as a therapeutic (altruistic) community and social support—appear in disaster studies dating back several decades (e.g., see Barton 1969; Drabek and Key 1984; Fritz 1961; Perry 1984; Quarantelli and Dynes 1976, 1977), references to social capital have only recently emerged in published research in this arena (e.g., see Gill 2007a; Ladd et al. 2007; Ritchie et al. 2006).² Many elements of social capital are implicitly or explicitly incorporated in studies of human-caused events such as the Buffalo Creek flood (West Virginia, 1972), toxic contamination in Legler (Jackson Township, New Jersey, 1971-80) and the *Exxon Valdez* oil spill (Prince William Sound, Alaska, 1989). Moreover, several quantitative measures employed in these studies are similar or identical to those used in social capital research.

There is ongoing debate among disaster researchers on the merit and value of distinguishing technological from natural disasters. The focus of this argument is the extent to which events triggered by natural occurrences or defined as “acts of God” evoke substantially different social responses and

disruptions than events triggered by human error or technological failure. Comparisons between the two often examine five characteristics: etiology, physical damage characteristics, disaster phases, community impacts, and individual impacts (Gill and Picou 1998; also see Gill 2007a). Given the critical “real-life” implications of these issues, there seems to be little value in reifying any differences into rigid distinctions. Rather, it is useful to consider disasters—natural and technological—on a continuum, with

overlapping qualities, characteristics, and social impacts (Gill and Ritchie 2006).

The etiology of a technological disaster, with the triggering event a result of human error (as opposed to a disaster deemed purely an “act of God”), creates a situation in which blame may be assigned. In turn, this generates a loss of trust in “the system” and contributes to disruption in ontological security—particularly among survivors (see Kroll-Smith and Couch 1993b; Ritchie 2004). Based on an extensive body of research, we know that communities impacted by technological disasters experience diminished trust; disruptions in fellowship,

associations, and networks; diminished feelings of good will and sympathy; and violations of norms of reciprocity (e.g., see Arata et al. 2000; Edelstein [1988] 2004; Erikson 1976, 1994; Gill and Picou 2001; Gleser et al. 1981; Picou and Gill 1997; Picou et al. 1992; Ritchie 2004). Furthermore, we contend that individual stress and collective trauma, lifestyle and lifescape change, a corrosive community, secondary trauma, and issues related to recreancy³ influence the availability of social capital in communities where a technological disaster has occurred (Ritchie 2004; Ritchie and Gill 2007).

Fundamentally, social impacts associated with human-caused disasters disrupt social dynamics at



micro-, meso-, and macro-levels, which may inhibit a community's opportunities and ability to maintain and foster social capital. For example, when social interactions are not positive (as in a corrosive community milieu) or are decreased (as a consequence of lifestyle changes), opportunities to engage in norms of reciprocity and develop trust are diminished. Lifescape changes may influence trust and beliefs about generalized reciprocity, potentially affecting beliefs about an individual's or group's ability to affect their futures. This can generate additional stress and further impede positive social interactions.

Regardless of whether a disaster is considered natural or a result of human or technological failure, the implications for more broadly employing the concept of social capital in disaster research are apparent. First, how does the presence of social capital support community preparation, response, and recovery from disasters? For example, what role can social capital play in enhancing community resilience in the aftermath of a disaster? If, as research indicates, a therapeutic (rather than corrosive) community emerges following natural disasters (e.g., see Barton 1969; Drabek and Key 1984; Fritz 1961; Perry 1984; Quarantelli and Dynes 1976, 1977) and communities economically experience an "amplified rebound," do communities also experience an "amplified rebound" in social capital? If so, how long does such a surge endure and what policy implications are evident? If there is little or no difference between social impacts of natural and technological disasters, we would anticipate minimal differences in levels of social capital in respective communities exposed to these collective traumas.

A second consideration is also relevant: How do disasters *affect* social capital? In particular, if human-caused or technological disasters tend to generate negative social impacts, as empirical research suggests (e.g., see Arata et al. 2000; Edelstein [1988] 2004; Erikson 1976, 1994; Gill and Picou 2001; Gleser et al. 1981; Picou and Gill 1997; Picou et al. 1992; Ritchie and Gill 2007), do these disasters have similar negative effects on social capital? Ritchie

(2004) found evidence of a spiral of social capital loss in a community affected by the 1989 *Exxon Valdez* oil spill, and many of the aforementioned technological disaster studies suggest negative impacts on social capital resulted from the disaster. It is not clear, however, if types and levels of social capital are impacted

Figure 1. Revised Continuum of Deliberateness for Traumatic Events



differently by disasters. It is also unclear if natural disasters have similar effects on social capital, although some research suggests that social capital may be enhanced by natural disasters.

To explore these issues, our study addresses the following research questions:

- To what extent do communities experience positive and negative changes in social capital in the aftermath of a disaster?
- How is social capital related to disaster impacts (e.g., psychosocial stress)?

The tornadoes that struck New Orleans in February 2007 offered a unique opportunity to examine these research questions. With regard to social capital and differences between natural and human-caused disasters, evidence suggests that many New Orleans residents view the Katrina disaster as having several human causes (e.g., see Gill 2007a; Ritchie et al. 2006). The triggering event for Katrina was natural, but the collapse of the levees and resulting flood, inadequate evacuation of socially vulnerable populations, and mismanaged government response to the situation are considered to be instances of recklessness. The tornadoes that struck the city 18 months later were more appropriately viewed as having natural causes. Thus, we had an opportunity to examine social capital in areas that had experienced various elements of both types within a relatively short timeframe.

Methodology

After initial telephone/e-mail inquiries and discussions with local residents, we determined there was sufficient interest and need to study the February storms. Regional and local cultural events (e.g., Mardi Gras, spring break) affected availability of flights and accommodations in New Orleans, thus we conducted our fieldwork one month after the tornadoes. In the interim, we reviewed media coverage and researched neighborhoods impacted by the tornadoes. This provided a foundation for our fieldwork and provided a basis for developing a draft survey instrument.

We decided to use a drop-off-and-mail-back approach to data collection. First we developed a self-administered survey designed to collect information on the following: tornado storm experiences, resource losses and gains, social capital, psychological stress, Katrina experiences, and demographic characteristics. The survey included four open-ended questions that provided opportunities for respondents to elaborate on their experiences. The instrument was reviewed by colleagues and we conducted a pre-test with a small sample of local residents before it was finalized and printed.⁴ Next, we assembled 200 packets consisting of a cover letter, the survey, and a postage-paid business-reply envelope.

Using a map obtained from the City of New Orleans' Geographic Information Systems Department, we drove through the areas and mapped blocks that were in the path of the storm system (see Figure 2). Given time constraints, we concentrated our drop-off-and-mail-back efforts in Carrollton and Gentilly. We selected these two areas because they were particularly hard hit by the tornadoes. Jefferson Parish officials later provided a list of Westwego addresses where buildings had sustained damage from the tornadoes. This list included 108 residential street addresses that we employed to conduct a mail survey using the same survey instrument. A single mailing to these addresses was sent on April 9, 2007.

We began our data collection in the Gentilly area where the one tornado-related death occurred. Physical damage from the tornado was difficult to discern in Gentilly because most of the area still had major flood damage from Katrina. The actual number of dwellings damaged by the tornado was relatively small compared to Carrollton and Westwego. During our first visit, we realized it was feasible to conduct a census of residences in the impact area—most streets had very few houses that were occupied

in the aftermath of Katrina—about 80 percent of occupied dwellings were FEMA trailers.

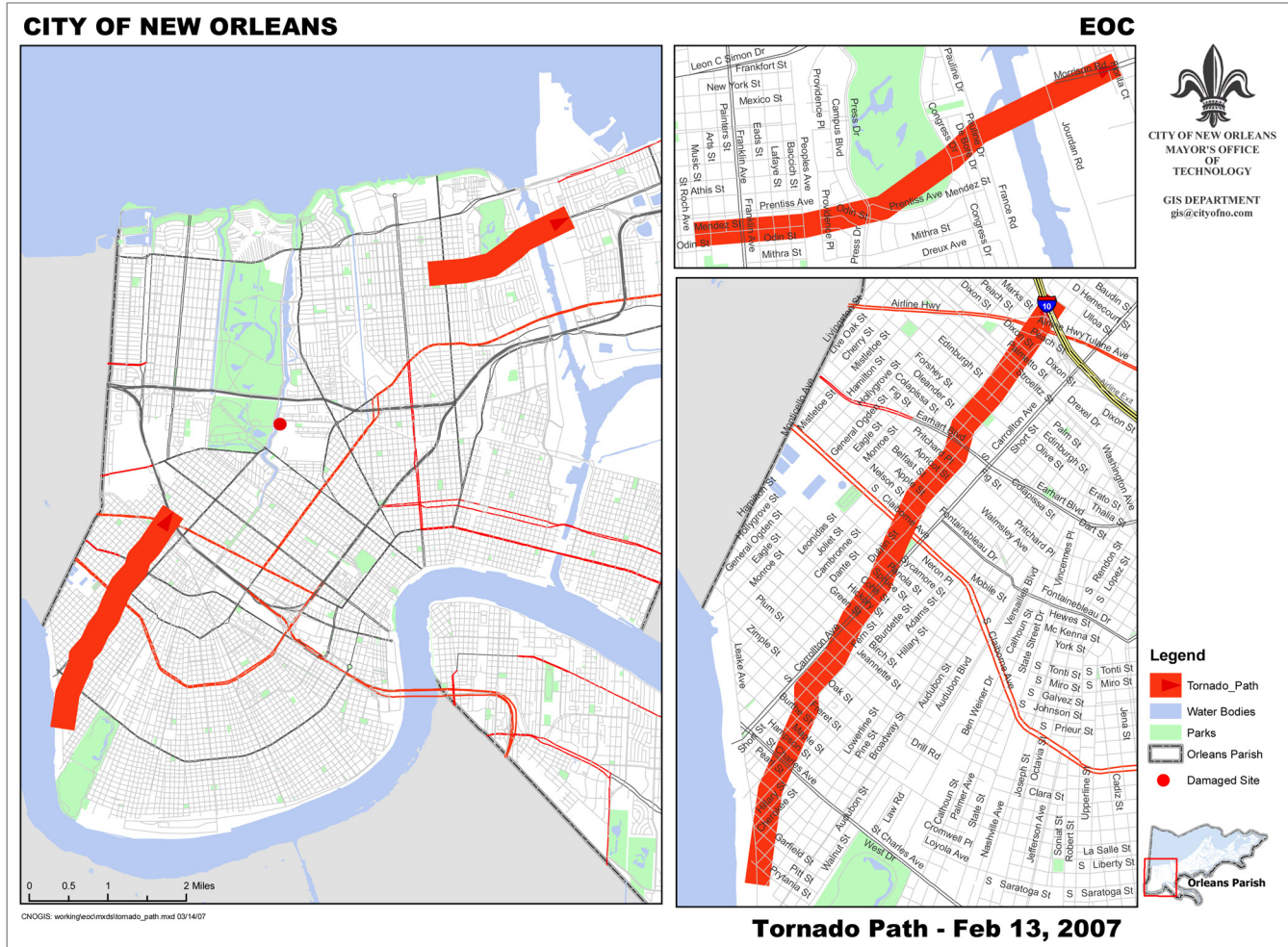
We attempted to make direct contact (i.e., introduce ourselves and provide verbal information about the study) with someone residing at each occupied dwelling. We made up to three attempts at each location over several days at different times of day and were able to make direct contact with 95 residents. We left another five survey packets at dwellings that appeared to be occupied but where no one was home when we were in the neighborhood. Many of our direct contacts provided anecdotal information that we recorded in our field notes. Only three people with whom we spoke declined to participate—primarily because of unpleasant memories associated with filling out forms for insurance claims and other post-Katrina assistance.

In Carrollton, there was significant damage to homes and property, but no reported injuries. This neighborhood was more densely populated than Gentilly, so we developed a sampling strategy in which surveys were dropped at every fourth home that appeared to be inhabited. Almost every house appeared to be occupied, and there very few FEMA trailers. Time constraints prevented us from making multiple contact attempts, thus our direct contact rate in Carrollton was 39 out of 102 locations. As in Gentilly, we kept field notes on our conversations with direct contacts.

Within approximately three weeks, we received 63 completed surveys from Gentilly and Carrollton for an initial response rate of 31.2 percent in these two neighborhoods. Using street addresses recorded during our field work, we sent follow-up postcard reminders to 139 households.⁵ These reminders yielded an additional eight completed surveys for a response rate of 35 percent in the areas where we had direct contact with residents.

Ultimately, we received 95 completed surveys for a total response rate of 31.8 percent. Response rates varied by neighborhood (see Table 1). The lowest response rate was in Westwego, where we conducted the mail survey. Of the 108 street addresses we received for Westwego, 14 proved to be invalid, leaving 94 surveys presumably delivered. Of these, 24 were completed and returned. The highest response rate was in the Carrollton neighborhood, where 41 of 102 surveys were completed. Our efforts to make personal contact with residents in Gentilly resulted in a completion of 30 out of 100 surveys.⁶

Figure 2. Map of the Path of the February 2007 Tornadoes



Disclaimer Notice: "This is not a survey-quality product. The information is derived from the City of New Orleans Enterprise GIS Database. The City of New Orleans does not assume any liability for damages arising from errors, omissions, or use of this information. End users of the data are advised to be aware of the positional accuracy, data collection dates, compilation methods, and cartographic format (as described in the accompanying metadata), and are advised to utilize these data appropriately." Use of these data for any reason other than for informational purposes is NOT recommended, and the liabilities of such usage are the sole responsibility of the entity using or redistributing the data.

Findings

The three neighborhoods affected by the tornadoes were distinct from each other. Westwego, a predominately white, working-class neighborhood, is in a part of the city known as the West Bank. Although this area experienced winds and rains from Katrina and Rita, it was spared the flooding that devastated parts of New Orleans east of the Mississippi River. Carrollton is an upper-middle class, predominately white neighborhood that was largely spared the devastating floods associated with Katrina. Gentilly, a predominately African American working-class neighborhood, experienced heavy flooding from Katrina—some buildings were submerged below 10 feet of floodwater—and only a small percentage of neighborhood residents had returned.

Our analysis examines these three neighborhoods by describing sociodemographic characteristics, tornado experiences, psychological stress, social capital, and general opinions about post-Katrina recovery. We tested for neighborhood differences on these indicators using a Mann-Whitney U test for the nonparametric samples. Finally, we conduct a limited correlation analysis to explore possible linkages between social capital and other disaster variables.

Sociodemographic Characteristics

The sociodemographic data reported by respondents reflect what we would expect to see given how locals characterize each of the three neighborhoods (see Table 2). Generally, the most apparent differences emerged when comparing Gentilly respondents with those from Carrollton and Westwego. In Gentilly, respondents tended

to be African American (85.2%) with a mean age of almost 62—about 10 years older than those from Carrollton and Westwego. With respect to annual household income, figures were similar in Gentilly and Westwego where one-quarter of respondents indicated incomes less than \$15,000 and an additional 28.6 percent and 40 percent, respectively, reported incomes in the \$15,000 to \$34,999 category. Incomes in Carrollton were considerably higher, with 58 percent indicating more than \$75,000 a year. Slightly more than one-fifth (21.1%) of those from Carrollton reported annual household incomes of more than \$150,000. Carrollton respondents had more formal

Table 1. Response Rates for New Orleans Neighborhoods Affected by February 2007 Tornadoes

Neighborhood	Number of Surveys Delivered	Number of Personal Contacts	Number of Completed Surveys Returned	Response Rate
Gentilly	100	95	30	30.0%
Carrollton	102	39	41	40.2%
Westwego	94	N/A	24	25.5%
Total	296	134	95	32.1%

education than those from Westwego and Gentilly, with almost three-quarters (74.4%) of Carrollton residents having obtained undergraduate or graduate degrees (23.1% and 51.3%, respectively).

Notably, a substantial number of respondents (an average of 80%) across all three neighborhoods

reported they owned their place of residence. A closer examination of extant data would be necessary to determine the extent to which this is representative of pre-Katrina sociodemographics in these areas and whether homeowners were more likely to (a) respond to our survey and (b) have returned to their homes—particularly in Gentilly where flood damage was so extensive. On average, those from Gentilly had spent a greater portion of their lives in New Orleans (56.6 years) than Carrollton and Westwego respondents (29.2 years and 34.3 years, respectively). For the total sample, the average number of years respondents had been living in their current residence was 14.7 years.

Storm Experiences

Most respondents (94%) were in their homes when the tornado struck (see Table 3). The percentage was slightly lower in Westwego, where some respondents (17.3%) reported being at work or out of town that night. About three-fourths (71%) of all respondents were with family

Table 2. Sociodemographic Characteristics of New Orleans Neighborhoods Affected by February 2007 Tornadoes

Demographic Characteristic	Gentilly	Carrollton	Westwego	Total Sample
Age (mean years)	61.7	50.7	50.0	53.8
New Orleans Resident (mean years)	56.6	29.2	34.3	39.2
Current Residence (mean years)	18.1	12.8	14.1	14.7
New Orleans Homeplace (ratio) ^a	.9	.5	.7	.7
Current Residence Homeplace (ratio) ^b	.3	.2	.3	.2
Household Size (mean)	2.3	2.7	2.5	2.5
Dependent Children (mean)	.6	.6	.4	.5
Gender (percent)				
Male	50.0	43.9	30.4	42.6
Female	50.0	56.1	69.6	57.4
Race/Ethnicity (percent)				
White	14.8	80.5	90.9	63.3
African American	85.2	14.6	9.1	34.4
Other	0.0	4.9	0.0	2.2
Marital Status (percent)				
Not Married	64.0	37.5	52.2	49.5
Married/Live with a Partner	36.0	62.5	47.8	50.5
Income (percent)				
Less than \$15,000	25.0	10.5	25.0	18.6
\$15,000 to \$34,999	28.6	7.9	40.0	22.1
\$35,000 to \$49,999	21.4	13.2	15.0	16.3
\$50,000 to \$74,999	14.3	10.5	10.0	11.6
\$75,000 to \$99,999	3.6	15.8	5.0	9.3
\$100,000 to \$149,999	7.1	21.1	5.0	12.8
Over \$150,000	0.0	21.1	0.0	9.3
Education (percent)				
Less than H.S.	20.7	5.1	13.0	12.1
H.S. Graduate	6.9	2.6	30.4	11.0
Some College	41.4	15.4	34.8	28.6
Associate Degree	6.9	2.6	4.3	4.4
College Degree	20.7	23.1	13.0	19.7
Graduate Degree	3.4	51.3	4.3	24.2
Resident Status (percent)				
Owner	82.1	80.0	74.0	79.1
Non-Owner	17.9	20.0	26.0	20.9

^a Years in New Orleans divided by age

^b Years in current place of residence divided by age

or friends during the storm. In Gentilly, however, more than 40 percent of the respondents reported they were alone. Storm perceptions were measured on a 10-point scale that examined severity (1 = not at all severe; 10 = extremely severe), level of fear (1= no fear whatsoever; 10 = uncontrollable fear), and level of safety (1 = perfectly safe; 10 = life threatening danger). These storm perceptions were generally consistent across all neighborhoods, with most respondents reporting high levels of storm severity (mean = 8.0), fear (mean = 6.8), and concern for safety (mean = 7.0).

In terms of damages, less than 10 percent of our respondents reported physical injuries to themselves or family/friends. Respondents from Carrollton (92.7%) and Westwego (95.8%) were more likely to report damage to their homes than were residents from Gentilly (66.7%), but many Gentilly residents had not completely repaired their homes from damage caused by Hurricane Katrina. Almost one-fourth of Carrollton respondents were unable to live in their tornado-damaged homes immediately after the storms.

Psychological Stress

We used five indicators of psychological stress: (1) the stress subscale from the Depression Anxiety Stress Scales (DASS₂₁); (2) the DASS21 depression subscale; (3) the intrusive stress subscale from the Impact of Event Scale (IES); (4) a Katrina “flashback” scale; and (5) an insurance claims stress scale. Scale reliability coefficients and sample means are presented in Table 4. The first three are standardized measures and we constructed the last two to focus on Katrina-related issues.

The DASS₂₁ consists of three self-report scales that measure depression, anxiety, and stress.⁷ Respondents use a four-point frequency scale to indicate the extent they have experienced each

Table 3. Storm Experiences of New Orleans Neighborhoods Affected by February 2007 Tornadoes

Experience	Gentilly	Carrollton	Westwego	Total Sample
Location when tornado struck (percent)				
Residence	93.3	100.0 ^a	83.3	93.7
Location not struck by tornado	6.7	0.0	16.7	6.3
Who were you with? (percent)				
Alone	41.4	22.0	20.8	27.6
Family/Friends	58.6	78.0	75.0	71.3
Others	0.0	0.0	4.2	1.1
Storm severity perceptions:				
Mean scale score	8.0	7.8	8.3	8.0
1 = not at all severe				
10 = extremely severe				
Storm fear perceptions:				
Mean scale score	6.1	6.5	8.1 ^{b,c}	6.8
1 = no fear				
10 = uncontrollable fear				
Storm safety perceptions:				
Mean scale score	6.1	7.5	7.4	7.0
1 = felt perfectly safe				
10 = life threatening danger				
Physical Injuries				
Self (percent yes)	6.7	10.0	4.2	7.5
Family/Friends (percent yes)	3.4	9.8	4.3	6.5
Housing damage (percent)				
No damage	33.3 ^{d,e}	7.3	4.2	14.7
Minor damage	40.0	43.9	54.2	45.3
Major damage	26.7	48.7	41.7	40.0
Percent unable to live in tornado-damaged home	13.3	24.4	4.2 ^f	15.8

^a Statistically significant difference between Westwego and Carrollton (p=.007)

^b Statistically significant difference between Westwego and Carrollton (p=.010)

^c Statistically significant difference between Westwego and Gentilly (p=.012)

^d Statistically significant difference between Westwego and Gentilly (p=.028)

^e Statistically significant difference between Carrollton and Gentilly (p=.008)

^f Statistically significant difference between Westwego and Carrollton (p=.037)

statement over the past seven days (0 = not at all; 1 = some of the time; 2 = a good part of the time; 3 = most of the time). We used 14 items of the DASS₂₁ that provide measures of stress and depression. Both scales have a range of 0 to 21.

Results from our sample indicated a high level of reliability for both scales (stress scale alpha = .89 and depression scale alpha = .88). The sample mean for the DASS₂₁ stress scale was 7.4, with Westwego reporting the highest mean (9.0). The sample mean for the DASS21 depression scale was 5.1. Westwego again reported the highest mean (6.9). No significant differences for the DASS₂₁ scales were observed among the neighborhood samples.

The IES is designed to measure event-specific stress (Horowitz 1974; Horowitz, Milner, and Alvarez 1979). The intrusive stress subscale is premised on observations that highly stressful events tend to produce high levels of recurring, unintended-

Table 4. Psychological Stress in New Orleans Neighborhoods Affected by February 2007 Tornadoes

Stress Measure	Gentilly Mean	Carrollton Mean	Westwego Mean	Total Sample Mean
DASS21 Stress Scale Alpha = .89 Range = 0-21	7.2	6.7	9.0	7.4
DASS21 Depression Scale Alpha = .88 Range = 0-21	5.1	4.1	6.9	5.1
IES Intrusive Subscale Alpha = .92 Range = 0-35	12.5	11.1	15.0	12.5
Katrina Flashback Scale Alpha = .85 Range = 4-20	10.5	9.7	11.7	10.5
Insurance Claims Stress Scale Alpha = .91 Range = 4-20	14.3	13.0	13.5	13.6

ed, distressing feelings and thoughts (e.g., “I had dreams about it”; “I thought about it when I didn’t mean to”; “pictures about it popped into my mind”). The subscale consists of seven items with responses coded on a four-point scale (not at all = 0, rarely = 1, sometimes = 3, often = 5) and has a range of 0 to 35.

Our data revealed an alpha of .92 for the intrusive stress subscale of the IES. The mean intrusive stress level for the entire sample was 12.5, with Westwego reporting a mean of 15.0. However, no significant differences were observed between the neighborhoods. The intrusive stress mean was comparable to findings from previous disaster studies, including those of Hurricane Katrina. For example, Gill, Ladd, and Marszalek (2007) observed intrusive stress subscale means of 14.3 for students from three New Orleans universities three months after Katrina triggered flooding in New Orleans. Likewise, Gill (2007b) reported intrusive stress subscale means ranging from 11.0 to 20.3 among Alaska Natives and commercial fishermen affected by the *Exxon Valdez* oil spill during different time periods from 1989 to 2006. Horowitz (1986) examined clinical patients experiencing bereavement from the death of a parent and observed an intrusive stress subscale means of 21.6 three to six weeks after the death and 13.8 six months after the death. Five to seven weeks after the 2007 New Orleans tornadoes, intrusive stress in the three neighborhoods was similar to these other cases.

We developed a Katrina flashback scale designed to assess to what extent the tornadoes rekindled stressful experiences from Katrina. This consisted of four items: (1) The tornadoes brought back

repeated, disturbing memories, thoughts, or images of Hurricane Katrina; (2) The tornadoes triggered repeated, disturbing dreams of Hurricane Katrina; (3) The tornadoes caused me to feel as if Hurricane Katrina were happening again (as if you were reliving it); and (4) How stressed are you now compared to before Hurricane Katrina? Each item was scaled from 1 (not at all) to 5 (extremely).

Our Katrina flashback scale had a range of 4-20 and a reliability alpha of .85. The total sample mean was 10.5, indicating that the tornadoes had a moderate effect on rekindling unpleasant memories of Hurricane Katrina. No statistically significant differences between neighborhoods were evident for this scale.

Finally, we developed an insurance claims stress scale designed to measure the extent to which respondents found dealing with insurance claims associated with Hurricane Katrina stressful. Research on the *Exxon Valdez* oil spill found being involved in litigation was a significant stressor for many residents of communities affected by the spill (Picou, Marshall, and Gill 2004; see also Ritchie 2004). Given accounts of insurance claims disputes (e.g., see Vaughn 2007), we wanted to obtain an indication of the extent to which insurance-related issues were generating stress among tornado victims. Our scale consisted of four statements measured on a Likert-type scale (strongly agree = 5 to strongly disagree = 1): (1) The insurance claims process has caused me to have unpleasant memories of the event; (2) I have spent too much time with the insurance claims process (e.g., filling out paperwork, making phone calls, attending meetings); (3) The insurance claims process continues to be a source of stress to me and my family; and (4) The insurance claims process is taking too long. The scale had a range of 4-20 and a reliability alpha of .91. The mean scale score for the total sample was 13.6 indicating a moderate level of stress associated with the insurance claims process. No significant differences were observed between neighborhoods.

General Attitudes about Disasters and Recovery

Respondents were asked to provide opinions regarding how their family, their neighborhood, and the New Orleans were recovering from Hurricane Katrina, as well as the likelihood that they would

move away from the city within the next two years. In addition, they were asked to indicate the extent to which they viewed Hurricane Katrina and the tornadoes as natural or technological disasters (see Table 5).

First, respondents were asked to use a 10-point scale (1= not at all, 10 = completely) to indicate the extent to which their family and neighborhood had recovered from Katrina. The overall mean for family recovery (6.6) indicated that most respondents believed their families were well on the way to recovery. Gentilly respondents, however, were significantly different from the other two neighborhoods in that they believed family recovery from Katrina was

progressing much more slowly. The overall mean for neighborhood recovery was 6.2, indicating a general feeling that neighborhood recovery after Katrina was more than half way to full recovery. Gentilly residents expressed significantly lower levels of neighborhood recovery (mean = 3.7). This was consistent with our qualitative observations of the neighborhood.

Respondents were asked to indicate if the City of New Orleans: (1) had already recovered from Katrina; (2) will recover in 5 years; (3) will recover in 10 years; (4) will recover in 20 years; (5) will recover in 50 years; or (6) will never fully recover. As indicated in Table 8, a large majority of respondents (91.5%)

believe recovery will take ten years or more and more than one-third of all respondents (36.2%) think the city will never fully recover from the Katrina disaster. No significant differences were observed between neighborhoods.

Respondents were asked to indicate the likelihood of their leaving the city within the next two years. One out of three respondents in our survey thought it was somewhat or very likely they would move from the city within the next two years. There were no significant differences observed between neighborhoods. Our results are comparable to a survey of residents from Orleans and Jefferson Parishes conducted in the fall of 2006 and again in March 2007. This study found that 33 percent in 2006 and 30 percent in 2007 thought it somewhat likely or very likely they would move from the city within two years (Howell 2007).

Indicators of Social Capital

Several indicators of social capital were included in the survey. Two were embedded in a section that measured resource loss and gain, and six were

Table 5. Attitudes about Disaster Recovery in New Orleans Neighborhoods Affected by February 2007 Tornadoes

	Gentilly	Carrollton	Westwego	Total Sample
Extent family had begun to recover from Katrina (mean) Range = 1-10 (1=not at all; 10=completely)	4.7 ^{a,b}	7.5	7.8	6.6
Extent neighborhood had begun to recover from Katrina (mean) Range = 1-10 (1=not at all; 10=completely)	3.7 ^{c,d}	7.3	7.6	6.2
City of New Orleans recovery from Hurricane Katrina (percent)				
Already recovered	0.0	0.0	4.3	1.1
Will recover in 5 years	6.7	9.8	4.3	7.4
Will recover in 10 years	36.7	29.3	30.4	31.9
Will recover in 20 years	30.0	19.5	17.4	22.3
Will recover in 50 years	0.0	0.0	4.3	1.1
Will never fully recover	26.7	41.5	39.1	36.2
Likelihood of moving from New Orleans within next two years (percent)				
Not very likely	75.0	74.3	55.0	69.9
Somewhat likely	14.3	8.6	5.0	9.6
Very likely	10.7	17.1	40.0	20.5
Tornadoes increased likelihood of moving (percent)				
Not at all	64.3	57.5	54.5	58.9
A little	14.3	15.0	22.7	16.7
Some	10.7	17.5	4.5	12.2
A great deal	10.7	10.0	18.2	12.2
Tornadoes as a Natural Event or Human/Technological Failure (mean) Range = 1-10 (1=natural; 10=human/technological)	2.3 ^e	1.3	2.3 ^f	1.9
Katrina as a Natural Event or Human/Technological Failure (mean) Range = 1-10 (1=natural; 10=human/technological)	8.8 ^{g,h}	7.7	6.7	7.8

^a Statistically significant difference between Gentilly and Carrollton (p=.000)

^b Statistically significant difference between Gentilly and Westwego (p=.000)

^c Statistically significant difference between Gentilly and Carrollton (p=.000)

^d Statistically significant difference between Gentilly and Westwego (p=.000)

^e Statistically significant difference between Gentilly and Carrollton (p=.018)

^f Statistically significant difference between Carrollton and Westwego (p=.016)

^g Statistically significant difference between Gentilly and Carrollton (p=.017)

^h Statistically significant difference between Gentilly and Westwego (p=.005)

Table 6. Post-Katrina Social Capital in New Orleans Neighborhoods Affected by February 2007 Tornadoes

Social Capital Indicator	Gentilly Mean	Carrollton Mean	Westwego Mean	Total Sample Mean
Social Network Trust Scale Alpha = .75 Range = 2-8	2.8	2.5	2.8	2.7
Civic Organization Trust Scale Alpha = .77 Range = 2-8	3.9	4.2	3.9	4.0
Response Agency Trust Scale Alpha = .87 Range = 6-24	19.4 ^a	19.8	16.2 ^b	18.7

^a Statistically significant difference between Gentilly and Westwego (p=.021)

^b Statistically significant difference between Carrollton and Westwego (p=.011)

embedded in questions about trust after Katrina and after the tornadoes.

Post-Katrina Trust

Trust is a basic component of social capital and we wanted to explore levels of trust after Katrina and how trust might have changed after the tornadoes. First, we developed a list of agencies, organizations, and other entities involved in disaster response. We asked respondents, “based upon your experiences with Hurricane Katrina what is your level of trust in the following?” Response categories were not at all (=4), only a little (=3), some (=2), a great deal (=1). We conducted an exploratory factor analysis and identified three factors that we used to create scales for social network trust, civic organization trust, and response agency trust.

Our social network trust scale consisted of two items—family members and friends—and had a range of 2-8 and a reliability alpha of .75 (see Table 6). The mean for the total sample was 2.8, which indicated a great deal of trust in social networks existed among respondents after Katrina. Civic organization trust consisted of two items: religious organizations and community/civic organizations. The scale range was 2-8 and reliability alpha was .77. The mean (4.0) indicated some to a great deal of trust in civic organizations existed after Katrina. No significant differences were observed between the three neighborhoods.

Our response agency trust scale consisted of six items: federal government, state government, local government, local law enforcement, U.S. justice system, and insurance companies. The range for this scale was 6-24 and the alpha was .87.

The mean for the total sample was 18.8, indicating little trust in response agencies. Statistically significant differences were found between Gentilly and Carrollton (p=.001), Gentilly and Westwego (p=.000), and Carrollton and Westwego (p=.030) indicating a high lack of trust in response agencies among residents of Gentilly.

Post-Tornado Trust

Post-tornado trust focused on *changes* in trust. Using the same list developed for Post-Katrina trust, we asked respondents to indicate if their level of trust in each entity had greatly decreased (=5), decreased (=4), remained the same (=3), increased (=2), or greatly increased (=1) since the recent tornadoes. Our exploratory factor analysis yielded similar results to Post-Katrina trust. Specifically, we identified social network trust, civic organization trust, and response agency trust factors consisting of the same items found in Post-Katrina trust.

As shown in Table 7, the overall sample mean for social network trust was 5.2, indicating a general increase in trust after the tornadoes. Likewise, the mean for civic engagement trust (5.4) indicated a general increase in trust. No significant differences were observed between neighborhoods. Trust in response agencies after the tornadoes presented a different story. In Gentilly, the mean of 24.0 indicated a decline in trust after the tornado. Specifically, more than half (52%) of respondents in Gentilly reported decreased trust in at least four of the six response agencies. In contrast, trust in response agencies in Westwego (17.7%) remained relatively the same after the tornadoes. Carrollton residents (20.1%) fell in between the other two neighborhoods with

Table 7. Post-Tornado Social Capital in New Orleans Neighborhoods Affected by February 2007 Tornadoes

Social Capital Indicator	Gentilly Mean	Carrollton Mean	Westwego Mean	Total Sample Mean
Social Network Trust Scale Alpha = .85 Range = 2-10	5.6	5.2	4.7	5.2
Civic Organization Trust Scale Alpha = .88 Range = 2-10	5.7	5.4	5.2	5.4
Response Agency Trust Scale Alpha = .94 Range = 6-30	20.0 ^a	20.1 ^b	17.7 ^c	20.7

^a Statistically significant difference between Westwego and Gentilly (p=.000)

^b Statistically significant difference between Gentilly and Carrollton (p=.001)

^c Statistically significant difference between Westwego and Carrollton (p=.030)

one-third (34.3%) expressing decreased trust in one or more response agencies. These differences among all three neighborhoods were statistically significant.

Resource Loss and Gain

Resource loss and gain items were patterned after Hobfoll's Conservation of Resources stress model (Hobfoll 1989). Respondents were presented with a series of life changes they might have experienced after the tornadoes and asked to indicate if they had experienced high loss (=5), some loss (=4), no change (=3), some gain (=2), or high gain (=1). Items included indicators of close social networks (i.e., good marital/partner relations, family stability, time spent with loved ones, feeling valuable to others) and civic engagement (i.e., time spent participating in informal social gatherings and formal organizations and motivation to participate in informal social gatherings and formal organizations).

As shown in Table 8, our social network scale had a range of 5-25 and a reliability alpha of .78. Our civic engagement scale had a range of 4-20 and an alpha of .90. In both scales, higher scores indicated greater loss. Results indicated that all neighborhoods experienced losses in social networks and civic engagement resources. The total sample means were 13.9 for our social network scale and 12.8 for our civic engagement scale. The only significant difference between neighborhoods were between Gentilly and Carrollton ($p=.050$) on the civic engagement scale.

Correlation Analysis

Our multivariate analyses focused on relationships between social capital and other indicators of disaster (i.e., sociodemograph-

ic characteristics, storm experiences, disaster recovery perceptions, and psychological stress). Table 9 presents our correlation analysis which includes only those variables with significant relationships with a social capital variable. All sociodemographic variables identified in Table 2 were introduced into a correlation matrix, but only five—gender, race, age,

Table 8. Resource Loss and Gain in New Orleans Neighborhoods Affected by February 2007 Tornadoes

Resource Measure	Gentilly Mean	Carrollton Mean	Westwego Mean	Total Sample Mean
Social Network Scale Alpha = .78 Range = 5-25	14.5	13.2	14.4	13.9
Civic Engagement Scale Alpha = .90 Range = 4-20	14.0 ^a	12.3	12.2	12.8

^a Statistically significant difference between Gentilly and Carrollton ($p=.050$)

Table 9. Sociodemographic, Storm Experience, Disaster Recovery, and Psychological Stress Correlates with Post-Katrina Social Capital Variables

	Post-Katrina Trust			Post-Tornado Trust			Resource Loss	
	Social	Civic	Response	Social	Civic	Response	Social	Civic
Socio-Demographic Variables								
Gender								.279*
Race						.329**		
Age	.289**							
Homeplace						.251*		.235*
Dep_Children		-.248*	-.237*					
Storm Experience Variables								
Alone	-.215*			-.231*			-.252*	
Liv_Res				.218*	.238*			
Fear Level		.248*			.212*			
Per_Injury								.223*
Fam_Injury								.255*
Disaster Recovery Variables								
Fam_Recov			-.268*	-.236*		-.357**	-.394**	-.323**
Neigh_Recov						-.331**		-.329**
N.O. Recov			.223*					
Leave N.O					.292**		.262*	.307**
Tornado_cause					.259*			.300**
Psychological Stress Indicators								
DASS Stress	.334**						.298*	.366**
Depress	.351**						.304*	.339**
Intrude								.416**
Flashback								.353**
Insurance Stress			.269*				.310*	

* Correlation is significant at the .05 level (2-tailed)

** Correlation is significant at the .01 level (2-tailed)

Table 10. Sociodemographic, Storm Experience, Social Capital, and Disaster Recovery Attitude Correlates with Psychological Stress Variables

	DASS ₂₁ Stress	DASS ₂₁ Depression	IES Intrusive Stress	Katrina Flashback
Socio-Demographic Variables				
Gender	.247*	.250*	.284**	.216*
H-hold size	.256*		.226**	.262*
Education		-.297*	-.274**	
Income		-.324**		
Age		.237*		
Homeplace		.320**	.218*	.246*
Storm Experience Variables				
Fear	.391**	.339**	.426**	.411**
Safety	.276**	.222*	.213*	.268*
Injured	.257*		.350**	.236*
Family Injured			.213*	
Home		-.225*		-.289**
Social Capital Variables				
COR Civic	.361**	.335**	.405**	.348**
COR Social	.259*	.322*		
Social Trust	.373**	.338**		
Disaster Recovery Variables				
Fam Recovery	-.232*			-.327**
Leave NO	.393**	.341**	.268*	.246*

* Correlation is significant at the .05 level (2-tailed)

** Correlation is significant at the .01 level (2-tailed)

homeplace (years in New Orleans divided by age), and number of dependent children—significantly correlated with any of the eight measures of psychological stress. The most interesting finding is there are few statistically significant relationships between sociodemographic characteristics and our indicators of social capital. Some noteworthy observations are that individuals without dependent children reported significantly less trust in civic organizations and response agencies after Katrina, African-Americans reported significant decreases in response agency trust after the tornadoes, and those with greater attachment to New Orleans (homeplace) experienced significant decreases in response agency trust after the tornadoes and reported higher losses of civic engagement.

Likewise, all storm experience variables from Table 3 were placed in a correlation matrix. Being alone when the tornado struck was correlated with less trust in social networks after both Katrina and the tornadoes, as well as high losses of civic engagement. The fact that being alone was correlated while household size was not may indicate general disrup-

tions of family and friendship patterns after Katrina that persisted and existed when the tornadoes struck. Furthermore, not being able to live in one's residence after the tornadoes probably decreased social network and civic organization contacts, which may account for this correlation.

Disaster recovery perceptions also correlated with certain indicators of social capital. Most notably, respondents who reported their family recovery after Katrina was slow were more likely to report less trust in response agencies after Katrina, decreases in social network trust and response agency trust after the tornadoes, and higher losses of social support and civic engagement. Desires to leave New Orleans correlated positively with decreased trust in civic organizations and with losses of social support and civic engagement.

Correlations between psychological stress and social capital indicators found social networks and loss of civic engagement correlated with high levels of psychological stress. Less trust in social networks after Katrina was correlated with stress and depression.

To further explore issues of psychological stress and social capital, we conducted a correlation analysis focusing on four indicators of psychological stress: DASS21 stress, DASS21 depression, IES intrusive stress, and our Katrina flashback scale. Table 10 indicates that most indicators of psychological stress correlated positively with gender, household size, level of fear, perceptions of safety, being injured, desires to leave New Orleans, and social capital variables of loss of social networks and civic engagement.

Summary and Conclusions

The tornadoes that struck parts of New Orleans almost 18 months after the city was devastated by Hurricane Katrina added to the misery experienced by most residents. Apart from one fatality, the tornadoes resulted in few personal injuries but caused major damage to many homes in the three neighborhoods of Westwego, Carrollton, and Gentilly where the tornadoes touched down. These tornadoes

generated high levels of fear and concern for personal safety within these neighborhoods and caused significant levels of psychological stress.

All three neighborhoods experienced an increase of trust in social networks and civic organizations after the tornadoes. This is indicative of a therapeutic community where social bonds strengthen and social capital expands. Loss of trust in response agencies, however, runs counter to therapeutic community expectations. A likely explanation for this decrease is a cumulative effect of Katrina and the tornadoes. More than three-fourths (76%) of our sample expressed a belief that Katrina disaster was at least half caused by human factors. Other observers have noted that the Katrina disaster, particularly in New Orleans, was not a “natural” disaster (e.g., see Hartman and Squires 2006; Jackson 2005; Smith 2005), but rather, a disaster “created by lousy engineering, misplaced priorities and pork-barrel politics” (Grunwald 2007:30).

In contrast, our data indicate that each of the three neighborhoods reported losses in social networks and civic engagement resources following the tornadoes. Specifically, respondents reported high loss or some loss with respect to social networks such as marital / partner relations, family stability, time spent with loved ones, and feeling valuable to others. Negative changes were also found in civic engagement, including decreased participation in formal and informal social activities and organizations, and loss of motivation to participate in these types of activities.

We developed scales to explore post-tornado and post-Katrina trust in social networks, civic organizations, and response agencies. Overall, following the tornadoes, respondents indicated relatively high levels of trust in social networks (e.g., family members and friends) and civic organizations (e.g., religious groups or community organizations). In comparison, there was less trust in response agencies in the aftermath of the tornadoes, with the Gentilly neighborhood expressing significantly less trust than in Carrollton and Westwego. For post-Katrina trust,

Gentilly and Carrollton respondents reported less trust than Westwego respondents across all three indicators—social networks, civic engagement, and response agencies. The most significant differences were observed in Gentilly, where loss of trust was much higher after the tornadoes than after Katrina.

A comparison of findings across all three neighborhoods reveals significant decreases in social capital for the social network and civic organization trust scales following the tornadoes when compared with lack of trust after Katrina. Response agency trust significantly declined in Westwego and Gentilly after the tornadoes, but not in Carrollton. Although our results are possibly an artifact of the tornadoes having occurred more recently, it is also possible—and logical—that diminished trust after the tornadoes is cumulative, reflecting a combination of post-Katrina and post-tornado experiences.

Respondents’ self-reported psychological stress correlated primarily with sociodemographic characteristics, disaster experiences, social capital, and attitudes about disasters and recovery. We found significant relationships between indicators of psychological stress and loss of civic engagement, loss of social networks, loss of trust in social networks following Katrina, and homeplace (the number of years living in New Orleans divided by age). These findings support our contention that losses of social capital after a disaster increase psychological stress.

Our findings lead us to conclude that social capital is an important consideration in disaster research, both as a resource that can diminish negative impacts of disasters and as a resource that can be negatively impacted by a disaster. Negative effects of disaster events on social capital can be cumulative, as demonstrated in this case of a tornado following one of the most devastating events in U.S. history. More research is needed in this area. Specifically, we need to develop more robust measures of social capital and seek to understand how social capital theory can be used to facilitate recovery processes; rebuild trust, associations, and norms of reciprocity; and create more disaster-resilient communities.

Notes

¹ Putnam (2000) also discusses the potential for negative impacts of social capital, citing ethnocentrism and corruption.

² For a theoretical exploration of the role of social capital in disaster response, see Dynes (2002). Also see Perry and Quarantelli (2005) and Tierney (2006).

³ Recreancy is “the failure of experts or specialized organizations to properly execute responsibilities to the broader collective with which they have been implicitly or explicitly entrusted” (Freudenburg 2000, 116).

⁴ The four pretest surveys were included in the total sample because only minor changes were made for the final survey, and our study was exploratory.

⁵ Twenty-six of these were undeliverable using the street addresses we had obtained.

⁶ Given the response rate and small sample sizes for each neighborhood, data presented in this report should be interpreted with caution.

⁷ See DASS₂₁ at <http://www2.psy.unsw.edu.au/groups/dass/over.htm>.

References

- Arata, C.M., J.S. Picou, G.D. Johnson, and T.S. McNally. 2000. Coping with technological Disaster: An application of the conservation of resources model to the Exxon Valdez oil spill. *Journal of Traumatic Stress* 13 (1): 23-39.
- Barton, A. 1969. *Communities in disaster: A sociological analysis of collective stress situations*. Garden City, NJ: Doubleday.
- Coleman, J.S. 1988. Social capital in the creation of human capital. *American Journal of Sociology* 94 (Supplement): S95-S120.
- . 1990. *Foundations of social theory*. Massachusetts: Belknap Press.
- Drabek, T.E. and W.H. Key. 1984. *Conquering disaster: Family recovery and long-term consequences*. New York: Irvington Publishers.
- Dynes, R.R. 2002. The importance of social capital in disaster response. *Preliminary Paper 327*. Newark, DE: University of Delaware Disaster Research Center.
- Edelstein, M. [1988] 2004. *Contaminated communities: The social and psychological impacts of residential toxic exposure*. Boulder, CO: Westview Press.
- Erikson, K.T. 1976. *Everything in its path: Destruction of community in the Buffalo Creek flood*. New York: Simon and Schuster.
- Flora, J.L., J. Sharp, C. Flora, and B. Newlon. 1997. Entrepreneurial social infrastructure and locally initiated economic development strategies in the non-metropolitan United States. *The Sociological Quarterly* 38 (4): 623-45.
- Freudenburg, W.R. 2000. The "risk society" reconsidered: Recreancy, the division of labor, and risks to the social fabric. In *Risk in the modern age: Social theory, science and environmental decision-making*, ed. M.J. Cohen, 107-22. New York: St. Martin's Press, Inc.
- Fritz, C.E. 1961. *Disaster and community therapy*. Washington, D.C.: National Research Council—National Academy of Science.
- Gill, D.A. 2007a. Secondary trauma or secondary disaster? Insights from Hurricane Katrina. *Sociological Spectrum* 27(6): 613-632.
- . 2007b. Technological Disaster, Resource Loss and Long-Term Social Change in a Subarctic Community: Exxon Valdez Oil Spill Impacts on Alaska Natives and Commercial Fishermen in Cordova, Alaska—2001-2006. National Science Foundation award # 0082405. Societal Risk Unit, Social Science Research Center, Mississippi State University.
- Gill, D.A., A.E. Ladd, and J. Marszalek. Forthcoming. College students' experiences with Hurricane Katrina: A comparison between students from Mississippi State University and three New Orleans' universities. *Journal of the Mississippi Academy of Sciences*.
- Gill, D.A. and J.S. Picou. 1998. Technological disaster and chronic community stress. *Society and Natural Resources* 11: 795-815.
- . 2001. The day the water died: The Exxon Valdez disaster and indigenous culture. In *Modern American Disasters*, ed. S. Biel, 277-301. New York: New York University Press.
- Gill, D.A. and L.A. Ritchie. 2006. Community responses to oil spills: Lessons to be learned from technological disaster research. In *The Selendang Ayu oil spill: Lessons learned*, ed. R. Brewer, 77-96. Fairbanks, AK: Alaska Sea Grant College Program.
- Gleser, G.C., B.L. Green, and C. Winget. 1981. *Prolonged psychosocial effects of disaster: A study of Buffalo Creek*. New York: Academic Press.
- Hartman, C. and G. D. Squires, eds. 2006. *There is no such thing as a natural disaster: Race, class, and Hurricane Katrina*. New York: Routledge.

- Hobfoll, S.E. 1989. Conservation of resources: A new attempt at conceptualizing stress. *American Psychologist* 44 (3): 513-24.
- Horowitz, M.J. 1974. Stress response syndromes: Character style and brief psychotherapy. *Archives of General Psychiatry* 31: 768-81.
- . 1986. *Stress response syndromes*. New York: Aronson.
- Horowitz, M. J., N. Milner, and W. Alvarez. 1979. Impact of events scale: A measure of subjective stress. *Psychosomatic Medicine* 41 (3): 209-218.
- Howell, S.E. 2007. Keeping people: The 2007 quality of life survey in Orleans and Jefferson Parishes. Survey Research Center, University of New Orleans. <http://poli.uno.edu/unopoll/index.htm>.
- Jackson, S. 2005. Un/natural disasters, here and there. <http://understandingkatrina.ssrc.org/Jackson>.
- Kroll-Smith, J.S. and S.R. Couch. 1993. Technological hazards: Social responses as traumatic stressors. In *International Handbook of Traumatic Stress Syndromes*, ed. J.P. Wilson and B. Raphael, 79-91. New York: Plenum Press.
- Ladd, A.E., D.A. Gill, and J. Marszalek. 2007. Riders from the storm: Disaster narratives of relocated New Orleans college students in the aftermath of Hurricane Katrina. *Journal of Public Management and Social Policy* 13(2):51-80
- MacGillivray, A. and P. Walker. 2000. Local social capital: Making it work on the ground. In *Social capital: Critical perspectives*, ed. by S. Baron, J. Field and T. Schuller, 197-211. Oxford, England: Oxford University Press.
- Perry, R.W. 1984. *Comprehensive emergency management: Evacuating threatened populations*. Greenwich, CN: JAI Press.
- Perry, R.W. and E.L. Quarantelli, eds. 2005. *What is a disaster? New answers to old questions*. Philadelphia: Xlibris Books.
- Picou, J.S. and D.A. Gill. 1997. Commercial fishers and stress: Psychological impacts of the Exxon Valdez oil spill." In *The Exxon Valdez disaster: Readings on a modern social problem*, ed. J.S. Picou, D.A. Gill, and M. Cohen, 211-36. Dubuque, IA: Kendall-Hunt.
- Picou, J. S., D.A. Gill, C.L. Dyer, and E.W. Curry. 1992. Disruption and stress in an Alaskan fishing community: Initial and continuing impacts of the Exxon Valdez oil spill. *Industrial Crisis Quarterly* 6 (3): 235-57.
- Picou, J. S., B.K. Marshall, and D.A. Gill. 2004. Disaster, litigation and the corrosive community. *Social Forces* 82 (4): 1448-82.
- Putnam, R.D. 1993. The prosperous community: Social capital and public life. *The American Prospect* 4 (13): 11-18.
- . 2000. *Bowling alone: The collapse and revival of American community*. New York: Touchstone.
- Quarantelli, E.L. and R. Dynes. 1976. Community conflict: Its absence and its presence in natural disasters. *Mass Emergencies* 1: 139-152.
- . 1977. Response to social crisis and disaster. *Annual Review of Sociology* 2: 23-49.
- Ritchie, L.A. 2004. *Voices of Cordova: Social capital in the wake of the Exxon Valdez oil spill*. PhD Dissertation, Department of Sociology, Anthropology, and Social Work, Mississippi State University.
- Ritchie, L.A. and D.A. Gill. 2005. *The Selendang Ayu oil spill: A study of the renewable resource community of Unalaska/ Dutch Harbor*. Quick Response Reports 181. Boulder, CO: Natural Hazards Center. <http://www.colorado.edu/hazards/research/qr/qr181/qr181.html>.
- Ritchie, L.A. & Gill, D.A. 2007. Social capital theory as an integrating framework for technological disaster research. *Sociological Spectrum* 27: 1-26.

- Ritchie, L.A., A.E Ladd, Gill, D.A., J. Marzsalek, and C.L.S. Coryn. 2006. Blaming Katrina: Perceptions of the disaster as a na-tech event among Louisiana and Mississippi College Students. Paper presented at the annual meeting of the Mid-South Sociological Society, Lafayette, Louisiana.
- Schuller, T., S. Baron and J. Field. 2000. Social capital: A review and critique. In *Social capital: Critical perspectives*, ed. by S. Baron, J. Field and T. Schuller, 1-38. Oxford: Oxford University Press.
- Smith, N. 2005. *There's no such thing as a natural disaster*. <http://understandingkatrina.ssrc.org/Smith>.
- Stone, W. 2001. *Measuring social capital*. Melbourne, Australia: Australian Institute of Family Studies: Paper Series 24. <http://www.aifs.gov.au/institute/pubs/RP24.pdf>
- Tierney, K. 2006. Social vulnerability: A new paradigm for disaster research. Presented at the Institute for Business and Home Safety annual conference, Orlando.
- Vaughn, A.L. 2007. State Farm not acting as a "good neighbor? *The Sandbar* 6 (1): 1, 4-6.



Natural Hazards Center

Institute of Behavioral Science
University of Colorado at Boulder
482 UCB
Boulder, CO 80309-0482

phone 303.492.6818
fax 303.492.2151

www.colorado.edu/hazards/