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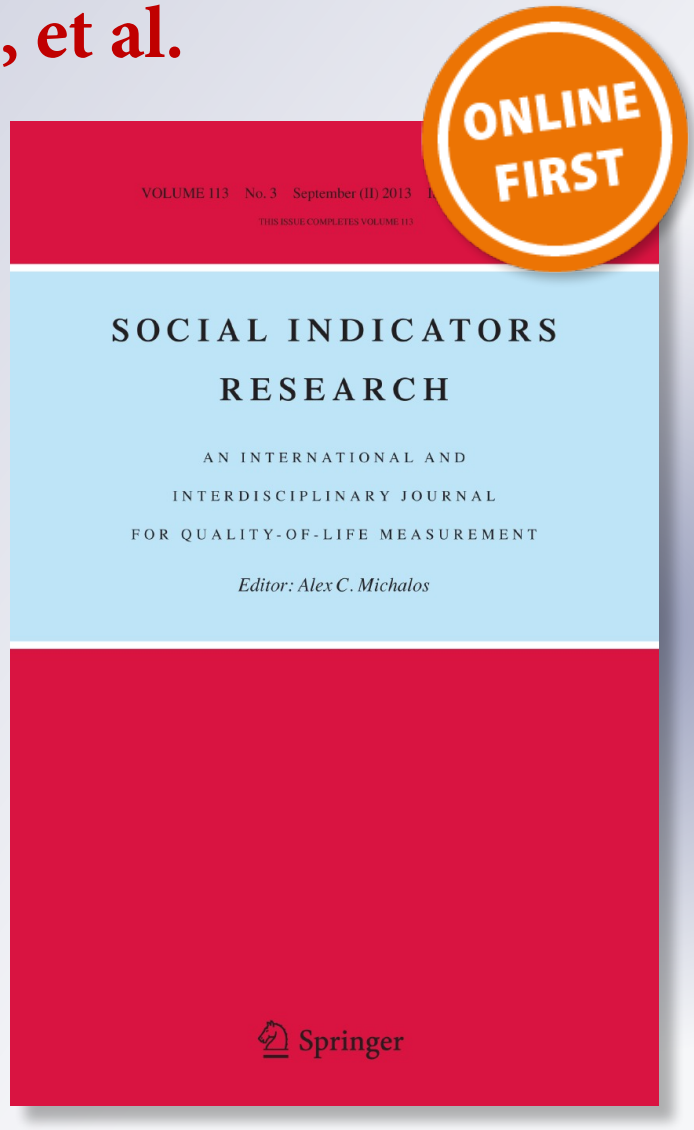

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Getting Active in the Gulf: Environmental Attitudes and Action Following Two Mississippi Coastal Disasters

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Abstract The current study examined the impact of the Gulf Oil Spill and Hurricane Katrina, environmental attitudes, and environmental action among residents of the Mississippi Gulf Coast. The authors sought to determine if disaster impact, worry about the environment, or connection to nature was associated with environmental action following the oil spill and in general. We hypothesized that disaster impact and environmental attitudes would be significantly associated with environmental action. Surveys were administered to 1,108 individuals receiving mental health services in connection with the Gulf Oil Spill. Results indicated that disaster impact was correlated with environmental worry, connection to nature, and action. Additionally, environmental worry and connection to nature were significantly associated with action, as were the effects of Hurricane Katrina to a lesser degree. This study supplements the existing literature by examining environmental attitudes, disaster impact, and their association with environmental action following two disasters.

The data for the present study were collected through a contract between Dr. Schulenberg and the Mississippi Department of Mental Health. The Mississippi Department of Mental Health funded mental health organizations through a grant program made possible by funding from BP, p.l.c. Dr. Schulenberg was hired to evaluate the clinical services, training, and outreach provided by the organizations funded under this grant. Dr. Schulenberg served as principal investigator under this contract. Miss Walters, Mr. Drescher, Mrs. Baczwaski, Miss Aiena, and Miss Darden served as research assistants under this contract. Dr. Johnson served as a consultant in multicultural and environmental psychology under this contract. Dr. Buchanan consulted on the current paper.

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1 Introduction

In August 2005, Hurricane Katrina decimated the Gulf Coast of the United States. It is considered one of the worst natural disasters in U.S. history (Hirschel and Schulenberg 2009). Although Katrina impacted the coasts of multiple Gulf states (Alabama, Florida, Louisiana, Mississippi, and Texas), the direct devastation caused by the hurricane itself was greatest on the Mississippi coast. Two hundred thirty-eight people were declared dead, 67 missing, and there was a reported $125 billion in damages (Sun Herald Editorial 2005). In addition, the hurricane left in its devastation severe negative mental and physical health effects for the residents of the Mississippi Gulf Coast (Hirschel and Schulenberg 2009; Lee et al. 2009; Schulenberg et al. in press; Wang et al. 2007).

Only 5 years after experiencing the destruction caused by Hurricane Katrina, the Mississippi Gulf Coast experienced another major disaster of historical proportions. On April 20, 2010, the Transocean Deepwater Horizon oil platform exploded, spilling over two hundred million gallons of oil and two hundred thousand tons of methane into the Gulf of Mexico (Oceana 2012). One year after the spill, more than 82,000 birds, 6,000 sea turtles, 25,900 marine mammals, and countless fish, invertebrates, plants, and terrestrial animals had been harmed (Center for Biological Diversity 2011). In addition, new oil sheens have recently been discovered around the remaining wreckage, bringing increased fears about ongoing destruction and the long-term implications of a disaster of this kind (Dermansky 2013). While much remains unknown about the long-term ecological impacts of the oil spill, it is indisputable that the physical environment of the Gulf Coast is fragile. The same can be said about the coastal communities as they continue to struggle with economic (job) loss and geographical displacement, both of which serve as risk factors for psychological disorders (Arata et al. 2000; Fullilove 1996; Sabucedo et al. 2009) and further compound the negative mental health impact of these two disasters (Drescher et al. 2012; Grattan et al. 2011; Hirschel and Schulenberg 2009).

The aforementioned research shows that disasters may have a significant negative impact on the mental health of survivors. There is also evidence to suggest that some individuals are more at risk than others for experiencing the negative effects of a disaster

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(Benight et al. 1999; Santucci 2012). It has been suggested that those that experience the worst effects are individuals with poorer coping skills (or coping skills that are over extended) or individuals that are less resilient (or have less ability to "bounce back"; Freedy et al. 1994; Zakour 2012). As such, it may be more likely that these vulnerable individuals will seek mental health services following a disaster. Research has shown that rates of individuals seeking services post-disaster range from 9 % to 73 %, with rates typically increasing over time following the disaster (Boscarino et al. 2004; Rodriguez and Kohn 2008; Stuber et al. 2006; van der Velden et al. 2007; Wang et al. 2007). These findings suggest that individuals seeking mental health treatment may be a population of particular interest following a disaster, especially after an extended time period.

Due to the nature of living on the coast and the increasing frequency of extreme weather events driven by global climate change (Helmer and Hilhorst 2006), it is inevitable that the Gulf Coast of Mississippi (and other coastal communities) will face the devastating effects of another natural disaster, such as a hurricane. In addition, with the world's increasing reliance on fossil fuels and the risks involved with harvesting these resources, the United States has already experienced three oil spills (the Santa Barbara spill of 1969, the Exxon Valdez spill of 1989, and the Gulf Oil Spill most recently) and it is realistic to expect that other "spills" of historical significance will occur (Freudenburg and Gramling 2011). Therefore, the Mississippi Gulf Coast provides an initial context for the examination of how the experience of multiple disasters can affect individuals' attitudes and behaviors related to the environment.

After disasters like Hurricane Katrina and the Gulf Oil Spill, there is often considerable variability in survivors' resulting resources, exposure to the disaster's effects, and responses to the disaster (Dyson 2006; Santucci 2012; Zakour 2012). With regard to disaster response, environmental psychologist Deborah Du Nann Winter speculated that an environmental disaster like the Gulf Oil Spill could serve as a motivating factor for engagement in environmental action (Koger 2010). Indeed, more than 100,000 volunteers (local and from other areas), as part of a number of organizations (e.g., the National Wildlife Federation, the National Audubon Society, the Greater New Orleans Foundation, the Sierra Club), were involved in beach clean-up following the Gulf Oil Spill (National Institute of Environmental Health Sciences 2012; Sams 2010). Environmental action on an individual level can include behaviors such as beach or garbage clean-up, recycling, driving a hybrid vehicle, or even writing letters to politicians and policy-makers on behalf of the environment (Böhm and Pfister 2000). Though the impact that one individual has on the environment is small, the effect of collective action can be monumental.

In addition to the positive effects on the environment, environmental action can have positive effects on the individual engaging in the action. Environmental action following a disaster can serve a positive role by helping an individual develop problem solving skills, social connections, self-efficacy, and a sense of purpose (Böhm and Pfister 2000). Although a disaster can often serve as a catalyst for environmental action, there are other factors that also influence an individual's propensity to action. Among the most potentially influential factors are actual impact of the disaster and environmental attitudes, specifically worry about the environment and connection to nature (Chawla and Cushing 2007; Der-Karabetian et al. 1996; Finger 1994; Mayer and Frantz 2004; Nisbet et al. 2009).

1.1 Disaster Impact

Little research has been done exploring the effects that disaster impact has on responsible environmental action. Nevertheless, casual observation suggests a link between

experiencing a disaster and engagement in environmental action. In response to the Santa Barbara oil spill of 1969, many Santa Barbara community members committed themselves to speaking out against coastal oil drilling and permissive government regulation of the oil industry. Individuals from the community formed a grassroots organization named Get Oil Out (GOO) and started a petition that acquired over 100,000 signatures demanding the government to prohibit offshore drilling. Members of GOO, which included local news and media, faculty members at the University of California-Santa Barbara, and other community members, worked to disseminate information about the oil spill and its effects that was ultimately far reaching. As a result of thousands of voices being heard, the Santa Barbara spill became a catalyst of the environmental movement (Clarke and Hemphill 2002).

It is apparent from this example that individuals are prone to action after a disaster; however, researchers seek to determine *how* a disaster of this kind leads an individual to action. It has been theorized that experiences like natural disasters or witnessing environmental degradation may lead one to become more environmentally sensitive (i.e., experience empathy for the environment; Finger 1994; Hungerford and Volk 1990; Sia et al. 1985), and research shows that many individuals describe witnessing the destruction of their immediate environment as a significant "nature experience" (Finger 1994). These attitudes and experiences are, in turn, associated with environmental action (Chawla and Cushing 2007; Hungerford and Volk 1990). Research of this type suggests that an individual's attitudes related to the environment may play an important role in their proclivity to action.

1.2 Environmental Worry

Environmental worry is an example of an environmental attitude that has the potential to influence related action. Although uncontrollable worry can become maladaptive, worry also serves important adaptive functions. According to Barlow (2002), worry motivates people to prepare to cope with threats. Similarly, Stern (2000) purports, in his well-supported value-belief-norm (VBN) theory of environmentalism, that personal norms to engage in environmental action are activated by the belief that something he/she values is being threatened. For example, if a fisherman is worried that his livelihood could be damaged by a disaster like an oil spill, this theory suggests that the fisherman will engage in action that could help prevent an oil spill (e.g., writing letters to politicians requesting that off-shore drilling be prohibited).

Empirical studies have provided preliminary support for a connection between environmental worry and action. In one study, students who were more emotionally reactive (i.e., worried, bothered, frightened, angered, frustrated) to environmental hazards engaged in more environmental action and indicated a greater commitment to future action (Der-Karabetian et al. 1996). Environmental worry has also shown to be associated with pro-environmental behaviors such as recycling (Ojala 2008). Even more convincing, research has provided evidence linking hypothetical disaster occurrence to hypothetical action through way of environmental worry. In a German community sample, Böhm and Pfister (2000) had individuals read scenarios depicting various disasters. They found that prospective emotions (e.g., fear and worry) mediated the relationship between the perceived cause of disasters and behavioral tendencies to prevent further damage. Specifically, Böhm and Pfister found that an environmental risk or hazard with potential negative ramifications (that elicits emotions such as worry) could produce certain types of action tendencies, such as helpful and preventative behaviors. This suggests that a disaster such as the Gulf Oil

Spill could elicit worry from the individuals affected and influence their engagement in environmental action. Further research is needed to solidify the relationship between these variables.

1.3 Connection to Nature

Another environmental attitude that has shown to be related to action is an individual's connection to nature. Connection to nature has been defined as "the extent to which an individual includes nature within his/her cognitive representation of self" (Schultz 2002, p. 67). Alternatively, Mayer and Frantz (2004) defined connection to nature as "individuals' experiential sense of oneness with the natural world" (p. 504). A variety of experiences have been found to increase connection to nature, such as spending time in natural environments (Schultz and Tabanico 2007) and brief workshops aimed at increasing a sense of ecological self (Bragg 1996). More recently, Duffy and Verges (2010) found that changes in environmental conditions could also influence connection to nature. For example, individuals display a stronger connection during days with less precipitation and during the spring and autumn seasons (Duffy and Verges 2010).

Many theorists have suggested that connection to nature may be associated with environmentally responsible behavior (Fisher 2002; Naess 1973; Roszak et al. 1995) and recent empirical research has provided preliminary support for this relationship (Guiney and Oberhauser 2009; Maiteny 2002; Mayer and Frantz 2004; Nisbet et al. 2009). Nisbet et al. (2009) found that connection to nature was positively correlated with more engagement in pro-environmental behavior and Guiney and Oberhauser (2009) observed that connection was high in conservation volunteers. Still, the need remains for research that examines these constructs in relation to disaster impact.

1.4 Current Study

The current study supplements the existing literature by advancing the understanding of how disaster impact and environmental attitudes contribute to an individual's engagement in environmental action. Previous research suggests a link between environmental attitudes and action; however, no known research has examined these relations following a disaster and considering the potential influences and impact of multiple disasters. The current study examined the effects of Hurricane Katrina and the Gulf Oil Spill and environmental attitudes and their relation to environmental action. Research that examines the effects of disaster is becoming increasingly important due to global climate change (Helmer and Hilhorst 2006) and increased reliance on fossil fuels (Freudenburg and Gramling 2011). Data were collected from individuals who were affected by the Gulf Oil Spill (and likely by Hurricane Katrina) and who were seeking mental health services on the Mississippi Gulf Coast. This research is particularly relevant given that a significant percentage of individuals experience emotional distress following disasters (Green 1994; Hamblen et al. 2012; Rubonis and Bickman 1991) and given that the likelihood of seeking mental health services after a disaster increases over time (Rodriguez and Kohn 2008).

2 Research Questions and Hypotheses

The current study sought to answer three questions: (1) Are environmental worry, connection to nature, and environmental action related in a clinical sample following a

disaster? (2) Were those more greatly impacted by the Gulf Oil Spill (specifically in the areas of job loss or residence relocation) more likely to have higher levels of worry, connection to nature, and/or engage in more environmental action? (3) Does perceived impact of two disasters and/or people's attitudes regarding the environment significantly affect an individual's propensity to engage in environmental action? Based on previous literature, we expected that environmental worry, connection to nature, and environmental action would be significantly related. Secondly, we expected that those more greatly affected by the disaster in terms of job loss and residence relocation would experience higher levels of worry, connection to nature, and engage in more environmental action (although there is little to no existing literature in this area). Finally, we expected that the impact of both disasters separately, as well as worry about the environment and connection to nature, would significantly affect an individual's engagement in environmental action.

3 Method

3.1 Participants

Participants were 1,108 adults who were receiving mental health services at facilities along the Gulf Coast of Mississippi between March 2011 and May 2012. Participants in the current study were part of a larger grant-funded project that provided clinical services to Mississippi Gulf Coast residents who were affected by the Gulf Oil Spill[1] (see Aiena et al. 2013; Drescher et al. 2012; Drescher et al. in press). While these related but separate investigations access the same data set, each study addresses unique questions in a systematic fashion.

Participants were 55 % female ($n = 609$) with ages ranging from 18 to 79 (M age = 38.65, $SD = 12.72$). Sixty-nine percent ($n = 765$) of the sample endorsed a White/Non-Hispanic ethnicity, 21 % ($n = 236$) endorsed a Black/African American ethnicity, and less than 1 % ($n = 79$) reported another ethnicity or chose not to answer the question ($n = 28$). With regard to education, 21.6 % ($n = 240$) did not complete high school, 31 % ($n = 343$) had a high school diploma/GED, 36.8 % ($n = 408$) completed some college or had an associate's degree, 7.5 % ($n = 83$) had a bachelor's degree, and 1.8 % ($n = 20$) had a master's degree or higher. Sixty-seven percent ($n = 737$) of participants reported an annual household income less than $15,000, as compared to the national average of 13 % of households with an income less than $15,000 (U.S. Census Bureau 2009).

3.2 Measures

3.2.1 Inclusion of Nature in Self

The Inclusion of Nature in Self scale (INS; Schultz 2001) is a single-item, graphical measure that was developed to evaluate the degree to which a person includes nature within his or her cognitive representation of self. The INS is composed of seven sets of two overlapping circles labeled "self" and "nature." The participant is instructed to circle the

[1] This research was funded in part through a contract between the corresponding author and the Mississippi Department of Mental Health (MS DMH), who in turn received funds from BP, plc. While this research received external funding, the conclusions and findings herein do not necessarily reflect the views of BP or the state of Mississippi.

set that best describes his or her relationship, or interconnectedness, with the natural environment. The more the circles overlap, the more a person feels interconnected to nature. The scales are labeled 1–7, with 1 symbolizing no connection to nature and 7 symbolizing complete connection with nature.

Schultz (2001) found that INS scores correlated significantly with the Biospheric concern ($r = .31$, $p < 0.01$) and Altruistic concern ($r = .18$, $p < 0.05$) subscales of the Environmental Motives Scale (Schultz 2000), supporting the scale's convergent validity. The INS also correlated with implicit measures of connection to nature (Schultz et al. 2004) and demonstrated good to excellent test–retest reliability at 4-weeks (Schultz et al. 2004).

3.2.2 Impact of Hurricane Katrina

In order to ascertain how or if participants were affected by Hurricane Katrina, participants were asked to select any of seven possible domains that were negatively impacted by the hurricane. The seven domains included family members' job, family members' industry, family's finances, housing, emotional health/well-being, social relationships, and physical health. The number of negatively affected areas was then summed, resulting in a score of 0 (no reported negative effects) to 7 (negative effects reported in all listed domains), with higher scores representing more life domains that were negatively affected by the hurricane.

3.2.3 Impact of the Gulf Oil Spill

Participants responded to four questions that were designed to assess the perceived impact of the Gulf Oil Spill. The questions pertained to the individual's physical health, emotional health/well-being, social relationships, and financial situation, and utilized a 7-point Likert-type scale that ranged from 1 (greatly worsened) to 7 (greatly improved). If a participant selected a 3 or lower on any of the questions it was determined that they were negatively impacted, with a selection of 5 or above indicating a positive impact.

Given the inherent limits of single-item scales (e.g., ambiguous meaning of scores, limited information, low responsiveness; Martinez-Martin 2010) and to simplify analyses and subsequent interpretations, a composite average of the six items measured via a 7-point Likert-type scale (the four life domain questions, effect on one's industry, and effect on one's job stress) was computed. Possible scaled scores ranged from 1 to 7, with lower scores indicating a greater negative impact of the spill. An average of 4 represented no effect of the spill, while averages above 4 represented a generally positive effect of the spill. Because there was a large amount of participants who did not complete every item within this question set (e.g., unemployed individuals often skipped the questions about job stress effect on industry), an average was only computed for individuals responding to two or more questions. Among participants answering all six questions ($n = 454$), the Cronbach's α for this composite score was 0.87, indicating very good internal consistency of scores (DeVellis 2012).

Additionally, two items measuring distinct outcomes associated with the spill were used to assess the full impact of the disaster. The items were, "Did the Gulf Oil Spill cause you to lose your job?" and "Did the Gulf Oil Spill cause you to have to change your place of residence?" These items were included because they represent an outcome that likely has broad effects on the participants' overall life and because these were distinct outcomes that could be reliably reported by participants.

3.2.4 Environmental Worry

Participants' level of environmental worry was assessed via three questions: (1) "To what extent do you worry about the environmental impact of the spill?", (2) "To what extent do you worry about another environmental disaster occurring?", and (3) "To what extent do you worry about the health of the environment in general?". These questions utilized a 5-point Likert-type scale that ranged from 1 (not at all) to 5 (very much). Participants selecting any response option other than "not at all" were considered to be experiencing some level of environmental worry.

As with questions assessing the impact of the Gulf Oil Spill, the three environmental worry questions were combined into an average composite score. Possible values ranged from 1 to 5, with higher scores representing higher levels of environmental worry. A participant had to answer at least two of the three environmental worry questions to have their score computed. For participants who completed all three items ($n = 1{,}047$), the Cronbach's α was 0.89, suggesting very good internal consistency reliability for this composite score (DeVellis 2012).

3.2.5 Environmental Action

To assess environmental action associated with the Gulf Oil Spill and in general, participants answered two questions that pertained to their current level of involvement (approximately 1–2 years after the Gulf Oil Spill): (1) "To what extent are you involved in environmental organizations or actions related to the Gulf Oil Spill, such as beach clean-up, recovery/restoration efforts, education, or advocacy?" and (2) "To what extent are you involved in other environmental organizations or actions?" These questions utilized a 5-point Likert-type scale that ranged from 1 (not at all) to 5 (very much). Participants who answered with a 2 or above (any response other than "not at all") were considered to be involved in some form of environmental action.

Similar to the questions assessing the impact of the Gulf Oil Spill and environmental worry, the two environmental action questions were combined into an average composite score. Possible values ranged from 1 to 5, with higher scores representing higher levels of environmental action. A participant had to answer both environmental action questions to have their score computed. For participants who completed both items ($n = 1{,}049$), the Cronbach's α was 0.78, suggesting respectable internal consistency reliability for this score (DeVellis 2012).

3.3 Procedures

Data collection for the current study was part of a larger project conducted by The University of Mississippi, the Mississippi Department of Mental Health (MS DMH), and 19 mental health organizations on the Gulf Coast of Mississippi. BP granted funds to the state mental health departments of the Gulf Oil Spill-affected states in order to address the psychological impact of the spill. In Mississippi, the MS DMH used these funds to support 19 mental health organizations providing services on the Mississippi Gulf Coast. This grant supported various clinical services, as well as mental health training and outreach efforts. In addition, the corresponding author was hired by the MS DMH (as part of the grant) to evaluate the impact of the spill on Mississippi Gulf Coast residents seeking mental health services. Of the 19 mental health agencies, 10 provided direct therapeutic services (e.g., psychotherapy, medication management) and provided data used in the current study. This

group of organizations included two state-funded mental health centers, one school-based counseling service, five private counseling centers, one women's shelter, and one in-patient mental health hospital. Clients receiving mental health services through these organizations were requested by the staff at each facility to voluntarily complete a battery of questionnaires, which included the aforementioned measures, and other questions of demographics, culture, and other psychological constructs. Clients filled out the questionnaire battery in either paper-and-pencil format or via computer administration during one of their visits to the mental health site. Participants included short-term clients, long-term clients, and new clients. All participants provided written informed consent to participate. Data were collected from March 2011 through May 2012. Procedures received approval from the Institutional Review Boards of MS DMH and The University of Mississippi.

3.4 Data Analysis

First, we present descriptive statistics on the constructs of interest, followed by a correlation matrix displaying relations between the constructs. Independent *t* tests were then conducted comparing those who did and those who did not experience job loss or relocation as a result of the Gulf Oil Spill on connection to nature, environmental worry, and environmental action. A multiple regression analysis was then conducted in order to examine the relative associations of disaster effects, environmental worry, and connection to nature with environmental action while accounting for the number of independent variables in the analysis. Data were screened for statistical assumptions and outliers for each analysis separately. A few multivariate outliers were found using Mahalanobis distance, but results were not affected by the removal of outliers; therefore these participants were retained in each analysis.

4 Results

4.1 Impact of Hurricane Katrina

Participants reported a wide range of effects related to Hurricane Katrina (Table 1). Ninety percent ($n = 992$) of the sample reported negative impacts of Hurricane Katrina in at least one life domain, while nearly one quarter ($n = 265$, 24 %) reported negative impacts in five or more life domains. On average, participants experienced a negative life effect in 2.76 areas ($SD = 2.06$). Over half the sample reported negative impact on their finances, housing, and emotional health/well-being.

4.2 Impact of the Gulf Oil Spill

Participants reported substantial negative impacts from the Gulf Oil Spill (Table 1). Reported values on the composite scale of Gulf Oil Spill impact ranged from 1 to 6.67, with a mean score of 3.36 ($SD = 0.88$). The majority of participants ($n = 580$, 52 %) noted a negative impact of the Gulf Oil Spill (i.e., rating it as a 3 or lower) in at least one of the four life domains measured (financial, social, emotional health/well-being, and physical health). Eleven percent ($n = 126$) of the sample reported a negative impact in all four domains. In addition to general impact in these domains, many of the participants reported job loss ($n = 126$, 11 %), change of residence ($n = 86$, 8 %), negative effect on one's

Table 1 Frequency and percentage reporting negative effects by disaster

Life domain	Hurricane Katrina		Gulf Oil Spill	
	Frequency (*n*)	Percentage (%)	Frequency (*n*)	Percentage (%)
Job	499	45	126	11
Job stress	N/A	N/A	207	19
Industry	169	15	237	21
Finances	589	53	399	36
Housing	585	53	86	8
Emotional health/well-being	602	54	423	48
Social relationships	343	41	257	23
Physical health	275	25	262	24

The "job" domain for the Gulf Oil Spill specifically refers to job loss

N/A not applicable

industry (at the time of the spill; $n = 237$, 21 %), and worsened job stress ($n = 207$, 19 %) consequent to the spill. A reported 53.8 % ($n = 596$) of the sample noted at least one impact area from Hurricane Katrina and an average negative impact of the Gulf Oil Spill (i.e., scores <4 on the oil spill composite).

4.3 Environmental Worry

Reported scores on the composite measure of environmental worry ranged from 1 to 5. The mean score on this composite was 3.74 ($SD = 1.27$). The large majority of participants expressed some degree of environmental worry following the Gulf Oil Spill. Eighty-six percent ($n = 952$) expressed environmental worry concerning the Gulf Oil Spill in particular, 81 % ($n = 903$) experienced worry about future environmental disasters, and 85 % ($n = 942$) experienced worry about the environment in general. Almost half of the sample ($n = 524$, 47 %) reported being "very much" worried about the environmental impact of the Gulf Oil Spill. Environmental worry about the Gulf Oil Spill had a mean score of 3.91 ($SD = 1.34$), while mean scores of worry about future environmental disasters and the environment in general were 3.60 ($SD = 1.47$) and 3.72 ($SD = 1.38$), respectively.

4.4 Connection to Nature

Scores on the INS ranged from 1 to 7. The mean INS score was 4.10 ($SD = 1.88$), which was somewhat higher ($M = 3.31$–3.74) than previous studies employing undergraduate students (Schultz et al. 2004; Schultz and Tabanico 2007). One hundred and twelve participants (10 %) reported complete separation from nature (response option 1) while 148 (13 %) reported complete overlap with nature (response option 7).

4.5 Environmental Action

Approximately one-third of participants reported current engagement in environmental action. Scores on the environmental action composite ranged from 1 to 5 with a mean of 1.72 ($SD = 1.06$). Thirty-four percent of respondents ($n = 382$) reported engaging in environmental action related to the Gulf Oil Spill and 31 % ($n = 348$) reported taking part

in environmental action in general. Seven percent of the sample ($n = 77$) was "very much" involved in environmental action related to the Gulf Oil Spill. Average environmental action related to the Gulf Oil Spill was rated at 1.81 ($SD = 1.26$), while environmental action in general had a mean rating of 1.63 ($SD = 1.07$).

4.6 Correlations Between Disaster Impact, Environmental Attitudes, and Action

Correlations between demographic variables and the constructs of interest within this study (Katrina effects, Gulf Oil Spill effects, connection to nature, environmental worry, and environmental action) are presented in Table 2. Given the large sample size, it is more appropriate to rely on the magnitude of the correlations rather than statistical significance of the relations, per se. We employed Cohen's (1992) guidelines to determine the magnitude of the associations ($.10 \leq r < .30$ = small, $.30 \leq r < .50$ = medium, $.50 \leq r$ = large). The strongest observed relations [representing medium effect sizes] occurred between environmental worry and several other constructs: connection to nature ($r = .41$), oil spill effects ($r = -.33$), and Hurricane Katrina effects ($r = .29$; approaching a medium effect size). Hurricane Katrina effects and oil spill effects were also significantly correlated ($r = -.27$). Although the aforementioned correlations were significant, they were not large enough for multicollinearity to be of concern in the multiple regression analysis performed subsequently. Smaller, yet important, correlations were noted between the effects of the oil spill and connection to nature ($r = -.21$), as well as between oil spill effects and environmental action ($r = -.14$). Note that negative correlations with the oil spill effects score indicate that these constructs (i.e., environmental worry, Hurricane Katrina effects, connection to nature, and environmental action) increased as more negative effects from the oil spill were endorsed. Finally, environmental action was related to both connection to nature ($r = .23$) and environmental worry ($r = .24$).

4.7 Differences Based on Job Loss and Forced Relocation

We examined differences in connection to nature, environmental worry, and environmental action among individuals who reported losing their jobs as a result of the Gulf Oil Spill ($n = 126$) and those individuals who did not lose their jobs as a result of the spill ($n = 644$). Respondents who were not employed at the time of the Gulf Oil Spill

Table 2 Relations between demographics, disaster effects, environmental attitudes, and action

	Income	Education	Katrina effects	INS	Oil spill effects	Enviro worry	Enviro action
Age	−0.03	0.16**	0.11**	0.03	−0.07*	0.09**	−0.07*
Income	–	0.23**	−0.02	0.00	0.07*	−0.05	0.04
Education		–	0.14**	0.05	−0.06	0.07*	0.05
Katrina effects			–	0.15**	−0.27**	0.29**	0.14**
INS				–	−0.21**	0.41**	0.23**
Oil spill effects					–	−0.33**	−0.14**
Enviro worry						–	0.24**

INS Inclusion of Nature in Self scale, *Enviro* environmental

* $p \leq 0.05$; ** $p \leq 0.01$

Table 3 The Effects of Job loss and Forced Relocation

	Lost job as a result of the spill?				Forced to change place of residence as a result of the spill?			
	Yes		No		Yes		No	
	n	*M* (*SD*)	*n*	*M* (*SD*)	*n*	*M* (*SD*)	*n*	*M* (*SD*)
Environmental worry	124	4.21 (0.99)	636	3.60 (1.32)	84	4.11 (1.12)	879	3.72 (1.30)
Connection to nature	121	4.74 (1.83)	622	3.98 (1.87)	81	4.51 (1.96)	860	4.06 (1.88)
Environmental action	124	2.09 (1.19)	635	1.67 (1.01)	84	2.06 (1.10)	878	1.70 (1.06)

All group differences significant at $p \leq 0.05$ level

($n = 302$) or did not answer this item ($n = 36$) were excluded from the analysis. Because of large differences in sample sizes, we used the corrected t test for unequal variances. Respondents who reported losing their jobs as a result of the Gulf Oil Spill reported higher levels of environmental worry ($t_{(218.90)} = 5.92$, $p < 0.001$, Cohen's $d = 0.48$), connection to nature ($t_{(172.00)} = 4.11$, $p < 0.001$, Cohen's $d = 0.40$), and environmental action ($t_{(159.79)} = 3.69$, $p < 0.001$, Cohen's $d = 0.41$; Table 3). These are small, but significant, effect sizes (Cohen 1988).

We also conducted a similar series of comparisons among those respondents who reported being forced to relocate as a result of the Gulf Oil Spill ($n = 86$) and those respondents who reported that their residence was unaffected by the spill ($n = 885$). Those respondents who reported having to change their place of residence as a result of the Gulf Oil Spill reported higher levels of environmental worry ($t_{(105.68)} = 3.00$, $p = 0.003$, Cohen's $d = 0.30$), connection to nature ($t_{(94.52)} = 1.99$, $p = 0.050$, Cohen's $d = 0.24$), and environmental action ($t_{(98.29)} = 2.85$, $p = 0.005$, Cohen's $d = 0.34$; Table 3). These effects are small in size (Cohen 1988). To examine potential sample size differences, a second analysis of both job loss and relocation effects on environmental worry, connection to nature, and environmental action were performed with a smaller subset of the unaffected group. These analyses showed the same effects with roughly equal effect sizes (job loss: worry $d = 0.60$, connection to nature: $d = 0.40$, action: $d = 0.37$; relocation: worry $d = 0.36$, connection to nature: $d = 0.17$, action: $d = 0.28$) indicating small, consistent effects.

4.8 Contributions of Disaster Impact and Environmental Attitudes on Action

To assess the contributions of disaster impact and environmental attitudes on environmental action, a multiple regression analysis was performed with the Gulf Oil Spill composite, Katrina effects, the environmental worry composite, and the INS as predictor variables. Results indicated that the overall multiple regression model was significant ($F_{(4,\ 1026)} = 22.902$, $p < 0.001$) and that disaster impact and environmental attitudes accounted for 8 % of the variance in engagement in environmental action. When examining these predictors separately (Table 4), environmental worry ($\beta = .145$, $t_{(1026)} = 4.160$, $p < 0.001$, $pr^2 = .056$), connection to nature ($\beta = .146$, $t_{(1026)} = 4.419$, $p < 0.001$, $pr^2 = .050$), and Katrina effects ($\beta = .072$, $t_{(1026)} = 2.259$, $p = 0.024$, $pr^2 = .021$) were significant contributors to environmental action. Gulf Oil Spill effects, however, were not a significant contributor to environmental action when controlling for the effects of these other constructs ($\beta = -.036$, $t_{(1026)} = -1.106$, $p = 0.269$, $pr^2 = .018$). It is important to note that the effect sizes for Hurricane Katrina and the Gulf Oil Spill are roughly similar.

5 Discussion

In 2005, the Mississippi Gulf Coast was devastated by Hurricane Katrina. Five years later, the same area witnessed the physical and economic degradation caused by the Transocean Deepwater Horizon oil spill. Environmental psychologist Deborah Du Nann Winter speculated that disasters such as these could serve as a motivating factor for engagement in environmental action (Koger 2010). Thus, the current study sought to determine if the impact of these disasters contributed significantly to an individual's engagement in environmental action. In addition, the authors sought to elucidate the contribution of environmental attitudes (environmental worry and connection to nature) to environmental action in the aftermath of Hurricane Katrina and the Gulf Oil Spill. These environmental attitudes have shown to be related to action in different populations (Der-Karabetian et al. 1996; Finger 1994; Mayer and Frantz 2004; Nisbet et al. 2009). A mental health treatment-seeking population was sampled in the current study due to the potential negative effects of disaster on mental health (Benight et al. 1999; Grattan et al. 2011; Hirschel and Schulenberg 2009) and the potentially high rate of mental health services utilization following a disaster (Rodriguez and Kohn 2008; van der Velden et al. 2007).

5.1 General Findings and Implications

Almost all participants reported experiencing negative impact related to Hurricane Katrina and a majority of participants reported experiencing negative impact due to the Gulf Oil Spill as well. Reported areas of oil spill impact included job loss and geographical displacement, factors that have shown to have a large impact on mental health outcomes after a disaster (Arata et al. 2000; Fullilove 1996; Sabucedo et al. 2009) and can influence motives for volunteering (Kulik 2006; Rotolo and Wilson 2007; Taniguchi 2006). Eight years after Hurricane Katrina, and approximately 2 years after the Gulf Oil Spill, people living on the Mississippi Gulf Coast continued to report concern related to the spill and worry that another disaster will occur. This is not surprising given the inevitability of future disasters on the coast (Freudenburg and Gramling 2011; Helmer and Hilhorst 2006) and given that disasters can often have long and lasting negative impacts for survivors (Green 1994; Rubonis and Bickman 1991).

At the same time that these negative impacts are being reported, approximately one-third of the sample reported current engagement in environmental action. Civil and social action following a disaster helps individuals develop problem solving skills, social connections, self-efficacy, and a sense of purpose (Böhm and Pfister 2000) and can aid the community in developing strategies that better serve individuals and their environments.

Table 4 The contribution of disaster impact and environmental attitudes on action

Variable	Beta	Standard error of beta	β
Katrina effects*	.037	.016	.072
Gulf Oil Spill effects	−.043	.039	−.036
Environmental worry**	.120	.029	.145
Connection to nature**	.081	.018	.146

β Standardized regression coefficient

* $p < 0.05$; ** $p < 0.001$. Adjusted R^2 for multiple regression analysis = .078

Therefore, a better understanding of factors that can impact action following disasters is vital.

5.2 Environmental Action and Implications

With regard to disaster impact, individuals who perceived themselves to be more affected by the Gulf Oil Spill and Hurricane Katrina were more worried about the environment and felt more connected to nature. These findings provide evidence that experiencing a disaster is associated with an individual's attitudes and views toward the environment. In addition, those who showed greater Gulf Oil Spill impact were more likely to engage in environmental action approximately 1–2 years following the spill, as were those who worried about the environment and were more connected to nature. It is important to note that Gulf Oil Spill effects did not significantly contribute to engagement in environmental action when accounting for environmental attitudes and the effects of Hurricane Katrina.

Although disaster effects appear to be distally related to environmental action, the current study suggests that connection to nature and environmental worry are more strongly associated with environmental action. It is possible that greater connection and worry led to a greater action response among individuals. However, because of the correlational design of this study, it is also possible that greater environmental action led to an increase in connection to nature and environmental worry. This second effect could be driven by greater exposure to the environmental effects of a disaster experienced by those who work to take action (i.e., seeing dead wildlife, seeing tar balls on the beach).

5.3 Limitations and Directions for Research

Despite its novelty and significant findings, the current study is not without limitations. Disaster research is often collected in less than ideal circumstances and one common limitation of other disaster studies (and the current study) is the correlational nature of the analyses. The lack of baseline data in the current study prevents causal inferences from being drawn. However, these data could potentially serve as a comparison for similar studies following other disasters. Future research employing longitudinal or matched-control group designs would be able to provide more information about how disaster impact, environmental attitudes, and environmental action are directionally related. Another limitation of the current study is the mono-methodology of data collection. Although there is no single way to accurately determine to what extent someone has been affected by a disaster, the sole reliance on self-report measures of perceived disaster impact limits the strength of the design. Future disaster research should incorporate multiple methods of assessment (e.g., disaster aid applications, interviews) to provide a more complete account of an individual's disaster impact.

Additionally, the constructs examined in the current study accounted for a relatively small amount of the variance in environmental action. Environmentally responsible behavior is affected by a range of factors including education, contingency management, practical barriers, persuasion, public commitments, goal setting, feedback, social orientation, norms, identity, and other attitudes (Carrico and Riemer 2011; Koger and Winter 2010; Larson et al. 1995; Ludwig et al. 1998; Nigbur et al. 2010; Schmuck and Vlek 2003; Werner and Makela 1998). Similar factors likely affect engagement in environmental action and future studies should include these elements in order to build models that more fully explain individuals' environmental response to disasters.

Meaning in life could also play a significant role in one's propensity to engage in environmental action. Preliminary findings suggest that the perception of meaning in life is associated with positive outcomes following a disaster (Drescher et al. 2012; Steger et al. 2008). In addition, studies suggest a link between meaning in life and environmental worry and connection to nature (Ojala 2005; Pienaar 2011). As such, meaning in life may also contribute to an individual's propensity to engage in environmental action. Studies directly evaluating the link between meaning in life and environmental action are needed.

Additionally, future research should investigate interventions designed to bolster connection to nature in order to directly examine its effect on environmental action. It may also be useful to examine interventions designed to increase environmental worry. However, one must be cautious when increasing worry as high levels of anxiety may negatively affect the learning and performance of behaviors.

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