



HHS Public Access

Author manuscript

Environ Sociol. Author manuscript; available in PMC 2018 August 16.

Published in final edited form as:

Environ Sociol. 2017 ; 3(4): 348–358. doi:10.1080/23251042.2017.1330115.

Transformative Environmental Threats: Behavioral and Attitudinal Change Five Years after the Deepwater Horizon Oil Spill

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Abstract

Does experiencing an environmental disaster have the transformative power to change people's attitudes, behaviors, and political actions? Do these effects persist in the longer term? And what elements of environmental disasters are most effective at spurring change? Using survey data collected in two affected coastal counties around the five-year anniversary of the Deepwater Horizon oil spill, we find that many residents reported mobilizing effects from the disaster: over two-thirds of respondents participated in political activities, about half engaged in environmentally-friendly lifestyle changes, and about half of the respondents reported more concern for the environment. We also investigate whether certain grievances are more or less powerful in their transformative consequences, and differentiate damages caused by perceived economic losses, social corrosion, physical health effects, ecological degradation, and emotional reactions. Interestingly, the strongest predictor of political, behavioral, or attitudinal changes was whether residents were affected emotionally by the oil spill, like feeling angry or distressed. Surprisingly, perceived economic losses had few effects, with the exception of becoming more opposed to offshore drilling. These results suggest that environmental threats can motivate political, lifestyle, or attitudinal changes and that certain elements of the experience may have more mobilizing power than others.

Keywords

BP oil spill; environment; mobilization; disasters; emotions

Introduction

What motivates personal environmental actions and attitudinal change? Scholars have pondered this question for decades, proposing various theories of environmental attitudes and behaviors to explain the lack of popular consensus around many of our most pressing environmental problems. For example, climate change is predicted to have devastating global consequences; yet a recent U.S. survey found climate change to be second to last in a

list of twenty national priorities (Pew Research Center 2014). Basic elements of climate change, like invisible greenhouse gases are commonly seen as “geographically and temporally distant for most Americans,” making it more challenging to communicate to the public (Weber and Stern 2011: 317). Inherent in this logic is the idea that if people could feel and experience the effects of climate change immediately, they would care more or be motivated to press for action on the topic (Spence et al. 2011). But does personally experiencing the effects of an environmental threat lead to a change beyond believing in climate change, such as altering worldviews or serving as a spark for environmental activism? And if so, what experiential elements of an environmental disaster are more powerful at provoking action or sustained attitudinal change?

To answer these questions, we look to the worst environmental disaster in U.S. history—the 2010 Deepwater Horizon oil spill (DWHOS). Specifically, we collected survey data from residents of two counties along the eastern Gulf Coast at the spill’s five-year anniversary in 2015. Among major environmental disasters affecting large U.S. populations, the 2010 Deepwater Horizon oil spill is without comparison in scale (National Commission 2011), economic losses (Larino 2016) and response efforts (USCG 2010). The blowout released some 4.9 million barrels of oil that contaminated over 68,000 square miles of ocean and 1,000 miles of coastline. The social and mental health consequences in the immediate wake of the spill were significant, with elevated levels of depression, anxiety, and stress observed across the Gulf region (Cope et al. 2013; Gill et al. 2012; Grattan et al. 2011). Furthermore, the social disruption caused by the uncertain scope of the spill and the contested response and recovery efforts resulted in community corrosion and conflict that reshaped patterns of social interactions (Mayer et al. 2015). Likewise, support for greater environmental protection for the Gulf against additional offshore drilling increased immediately after the spill, along with some concerns about broader environmental threats (Hamilton, Safford, and Ulrich 2012).

The DWHOS could be considered as a focusing event around the environmental politics of balancing the need for energy extraction with protecting fragile environments like the Gulf of Mexico (Birkland 1998). From an initial explosion that killed 11 men to an underwater live video feed that allowed millions to watch oil gush out of the uncapped wellhead for almost three months, the oil spill had the potential to polarize the public’s opinions on the safety of and need for continued offshore oil drilling. Studies in social movement literature have demonstrated the power of such sudden events to motivate political action (Jasper 1997), and indeed there was a national uptake in environmental donations following the spill (Farrell 2014). But what about sustained changes? By conducting a survey five years after the oil spill, we are able to think beyond the immediate effects caused by the shock of the oil spill and assess whether any of these effects persist in the longer term. And by targeting residents of the Gulf Coast, we are able to see whether people who are the most affected by a disaster either a) change their attitudes or behaviors or b) return to their prior routines and beliefs after the raw experience of the disaster fades. Our findings suggest the former—that personally experiencing an environmental crisis can have transformative consequences on attitudes and behaviors. It would appear that disasters do not just disrupt lives; they disrupt worldviews.

From Oil Spill to Action

Oil spills have a long history of inciting activism and environmental concern in the United States (Dunlap and Mertig 1991; Freudenberg and Gramling 1994; Molotch 1970; Small 1991). In 1969, oil erupted from Union Oil's offshore oil drilling platform in the Santa Barbara Channel, resulting in rallies on the beach, hundreds of letters in protest mailed to newspapers, and a petition with 110,000 signatures sent to President Nixon (Molotch 1970). When twenty years later the Exxon Valdez oil tanker struck a reef, once again public outcry was pitched and sharp (Small 1991). The DWHOS, larger than these two predecessor oil spills, generated similar outrage as the public watched the underwater well spew oil, uncapped, for 87 days (Farrell 2014). The high visibility of such oil spills helps to rouse support and group mobilization around policy issues (Birkland 1998).

Given this history of environmental activism following spills, we might expect the DWHOS to have mobilized civic engagement and political action in the immediate aftermath of the spill. Indeed, using nationally representative data, Farrell (2014) found a spike in donations and volunteering toward environmental causes following the DWHOS, although these effects were short-lived and had returned to prior levels one year later. Did the same pattern occur at the local level along the Gulf Coast or did the spill create a deeper and lasting mobilization in favor of the environment for those who were most affected?

A second arena of action can be found in modified personal behaviors and routines. While some environmental problems do need governmental intervention, people can also engage in personal behaviors to bring about positive environmental change—such as shopping for organic, sustainably-grown foods, reducing personal energy and water usage, and using greener forms of transportation. A variety of factors can influence these pro-environmental behaviors, including the attitudes people hold and their personal habits and routines (Stern 2000). Early rationalist models predicting the determinants of pro-environmental behaviors identified an important gap between the positive influence of direct experiences of environmental problems affecting attitudes versus their actual ability to shape specific behaviors (Kollmus and Agyeman 2002). Focusing on the need to improve pro-environmental behaviors, the literature on environmental concern has shifted to address the potential social and psychological limiters of those desired behaviors (Stern 2000). As such, less recent attention has been paid to the nuances of potential direct experiences in directly influencing environmental concern and action.

A final route of transformative change falls in the arena of attitudes and values. Many theories of environmental concern have looked to the concept of values in the shaping of personal beliefs and norms related to individual behaviors (Dietz et al. 1998; Inglehart 1990; Schwartz 1994; Stern et al. 1999; Stern and Dietz 1994). Research on environmental attitudes has long differentiated between the influence of direct and indirect experiences of environmental problems in motivating personal environmental concern. With major environmental threats like climate change beginning to have immediate and tangible effects on large segments of the population across the globe, understanding how personally experiencing an environmental threat changes levels of concern, or even potentially motivates political action, is increasingly important (Hamilton, Safford, and Ulrich 2012; Milnes and Haney 2017).

The sheer scale of the Deepwater Horizon oil spill, with its widespread and varied effects, permits us to identify and parse out different mechanisms through which the oil spill could bring about the aforementioned political, behavioral, and attitudinal transformations. Specifically, we examine the effects of personal and collective experiences across five potential types of negative experiences: *economic losses*, *erosion of social cohesion*, *physical health effects*, *ecological degradation*, and *emotional reactions*. By assessing different dimensions of experiencing the oil spill, we can begin to understand what types of experiences might motivate change.

Grievances over *economic losses* have a long history of promoting activism, from the food riots and tax riots of peasants in Europe several hundred years ago (Tilly 1976) to a loss of manufacturing jobs contributing to patriot social movement activity in the 1990s (Van Dyke and Soule 2002). Indeed, economic losses caused by the DWHOS have been strong predictors of mental health problems across the Gulf (Gill et al. 2012; Grattan et al. 2011). Likewise, technological disasters such as the DWHOS also produce collective effects whereby community solidarity is attenuated and the social isolation caused by confusion and uncertainty leads to the *erosion of social cohesion* and trust in others (Arata et al. 2000; Erikson 1994; Freudenburg 1997; Picou and Gill 2000). A dearth of clear scientific evidence about the *physical health effects* from exposure, and confusing or contradictory advice from experts and institutions, can exacerbate existing uncertainties about the harm (Auyero and Swistun 2008). These environmentally-induced health concerns, in turn, can fuel local activism and environmental health social movements (Brown 2007). The immediate and long-term consequences of the spill for *ecological degradation* are further potential motivators for increases in political activism and personal behavioral and attitudinal changes (Dunlap and Mertig 1991; Freudenburg and Gramling 1994; Johnson and Frickel 2011; Molotch 1970; Small 1991).

Lastly, we consider how the oil spill affected peoples' *emotional reactions*. While studies of emotions have been on the rise, "they have not yet deeply transformed sociological theory in a general way, nor have they reshaped many subfields of the discipline" (Calhoun 2001: 45). Studying the emotional consequences of environmental threats contributes to an important concept studied less often in environmental sociology, and one that has promise for informing theories of behavioral and attitudinal change. There are reasons to suspect emotions play an important role in choices and actions regarding the environment. For example, individuals may seek to avoid negative emotional reactions and interpersonal conflicts by refusing to accept the reality of environmental problems like global climate change (Norgaard 2011). People living in communities suffering from environmental illness may respond with emotions like anger, grief and fear (Jacobson 2016). Disaster victims often may direct feelings of injustice and anger toward responsible parties who could have prevented the hazard or who fail to adequately respond to it (Erikson 1994; Freudenburg 1997). In turn, social movement scholars have found emotions to be important in fueling political activities (Goodwin, Jasper and Polletta 2001), an outcome of interest to this study. Scholars of movement emotions argue that movement tasks from recruitment and participation to garnering public support "depend on activists' capacity to elicit, manage, and transform people's emotions" (Polletta and Amenta 2001: 310). Specifically, anger and moral outrage can encourage people to participate in or seek out political action (Jasper

1997). Thus, feelings of anger, an emotion oft-invoked by human-caused disasters, could be key to encouraging and sustaining political activities in response to environmental threats.

METHODS, MEASURES AND ANALYSIS

To mark the five-year anniversary of the Deepwater Horizon oil spill and to capture respondents' perceptions around the time just preceding the economically-vital summer season (April 1 through May 15, 2015), we conducted our telephone survey of 351 residents in two counties: Baldwin County, Alabama and Franklin County, Florida. These two counties were chosen to overlap our larger multisite ethnography of recovery from the oil spill and to represent coastal regions that experienced declines in tourism or the fishing industry after the oil spill. While many studies have looked at the immediate effects of the oil spill closest to its epicenter near coastal Louisiana (Cope et al. 2013; Gill et al. 2012), this project specifically looks at Florida and Alabama to ascertain the full extent of the spill's long-term effects by comparing areas with heavy to moderate oiling (Baldwin County) to those with little to no oiling (Franklin County). Several survey items were adapted, with permission, from Hamilton, Safford, and Ulrich's (2012) survey of coastal regions in Louisiana and Florida administered after the spill in 2010.

Our five-year anniversary survey, implemented by the University of Florida Survey Research Center, used a random digit dialing cell phone sample to attempt to reach full-time coastal residents of Baldwin and Franklin counties. A total of 7,126 numbers were attempted, with a majority of calls not reaching people due to disconnected or nonworking numbers, and no answer or answering machines (4,299 numbers). Of those who answered, 161 said they were busy or unavailable, 1,786 refused, and 529 were ineligible¹. The remaining 351 respondents answered basic demographic questions, attitudinal questions about the economy, environment, and recovery, as well as action-oriented questions about their reactions to the spill. Our response rate, at 6%, is comparatively low, reflecting the emerging challenges of trying to reach cell phones for survey research, such as a higher number of nonworking numbers compared to landlines as well as lower contact rates—largely due to the standard availability of Caller ID technology on modern cellular phones that reduces the likelihood of having someone answer a call from a “Survey Research Center.”²

Descriptive statistics for variables used in the analysis can be found in Table 1. Given our low response rate, we investigated for nonresponse bias in our sample through comparisons to U.S. Census data for the two counties. In comparing the demographic data provided in Table 1, our mean age of 50 is fairly close to the median age of both Baldwin and Franklin Counties, 42. Our other demographic variables match more closely with average means from the 2015 American Community Survey for Baldwin and Franklin counties combined: percentage male (53.6% vs. 49.4%), percentage White (87.9% vs. 86.2%), and marital status being married (59.9% vs. 53.6%). Our sample did include more of those with a college degree however, (37.9% vs. 28.2%). However, with our sample containing large numbers of

¹Ineligibilities included being under 18, being mentally/physically unable to take the survey, being an organization or business, or not speaking English. Also, cell phone numbers are an imperfect indicator of where people reside and anyone who did not live in the targeted zip codes were excluded.

²Response rate calculated using guidelines provided by the American Association of Public Opinion Research.

those in the fishing industry (34%) we do not believe that we are experiencing nonresponse bias towards more blue-collar workers without a college degree.

Measures

To assess political action, we asked respondents what actions they had taken in response to the 2010 BP Deepwater Horizon oil spill and created an index that summed the following acts: signed a petition or wrote a letter; boycotted BP; attended a protest or rally; attended a community meeting; voted in a way that was influenced by the BP oil spill; joined a community group; and recruited others to engage in civic activity (index range 0–7; Cronbach's $\alpha = 0.80$). A majority of respondents participated in political action in response to the oil spill—with 69% engaging in one or more political activity, and about half falling between one and three activities. In the heated aftermath of the spill, community gatherings to share information about the spread of the spill, cleanup activities, and response efforts such as the regularly contested claims processes were fairly common, which is represented in our data as the most common political action taken by the survey respondents (55%). Yet the other activities, such as assigning a petition or writing a letter (29%), boycotting BP (28%), recruiting others into civic activities (26%), voting (24%), joining a community group (17%) and attending a protest or rally (15%) are also well represented.

To evaluate personal behaviors related to the environment, we asked respondents about actions they had taken in response to the oil spill and created an index that summed these acts: drove a vehicle less often for environmental reasons; reduced the amount of energy or fuel used at home; and saved or reused water for environmental reasons (index range 0–3). Altogether, about 45% of respondents changed one or more of their personal behaviors. More specifically, 30% of respondents were inspired to reduce energy, 30% saved water, and 16% drove less.

We measured attitudinal change in two arenas: environmental concerns more generally and those related to offshore oil drilling. For the first we asked, “Have your views about other environmental issues such as global warming or protecting wildlife changed as a result of the oil spill?” with the answer choices of caring more about environmental issues as a result of the oil spill, caring less about environmental issues as a result of the oil spill, and environmental views have not changed. The respondents were divided—48% had unchanged views while 49% cared more. The remaining 3% cared less. We collapsed this into a dichotomous variable, coded as 1=care more, 0=unchanged or care less. For the second we asked, “Have your opinions about offshore oil drilling changed as a result of the BP oil spill?” with the answer choices of more in favor of offshore oil drilling, more opposed to offshore oil drilling, and opinions about offshore drilling have not changed. Once again, about half remained unchanged. However, this time 15% were more in favor of oil drilling and 35% were more opposed to oil drilling. Since we are interested in pro-environment attitudinal change, we coded this variable as 1=more opposed to oil drilling, 0=more in favor or unchanged.

As expected, personal political actions, attitudes, and behaviors were somewhat positively correlated with each other, with correlations ranging between .21 and .46. This suggests that while there was a trend where people experienced change in multiple arenas, it did not

happen universally – allowing us to test for different influences of each of our dependent variables.

Independent Variables

The scope and scale of the DWHOS provide a unique opportunity to identify and parse out different mechanisms through which the oil spill could bring about political, behavioral and attitudinal transformations. Here we look at perceived threats across five arenas: economic losses, erosion of social cohesion, physical health effects, ecological degradation, and emotional reactions. We also break these potential areas of harm down by whether they were experienced *personally* as an individual or household and whether they were experienced *collectively* as a perceived community. By assessing different dimensions of the oil spill, we can begin to understand what types of perceived harms pack the most punch when it comes to motivating change.

Multiple questions asked respondents about the possibility of experiencing different effects directly related to the DWHOS. The first set of questions asked respondents to what extent, if at all, the oil spill negatively affected them *personally*, including their immediate families, in the following four ways: 1) economically, such as a loss of income, job or other opportunity; 2) emotionally, such as feeling angry or distressed; 3) socially, such as not connecting as much with friends, family or community members; or 4) physically, such as health-related problems due to the oil or dispersants. Each question had answer choices ranging from 1=not at all to 6=very strongly. The second set of questions asked respondents whether they thought the DWHOS negatively affected their community *collectively* in the following ways: 1) economically, such as an overall loss jobs or income; 2) ecologically, such as harm to the environment, wildlife, or scenic areas; 3) socially, such as a decrease in people caring about or helping each other; or 4) physically, such as health related problems due to the oil or dispersants. Each question's answer choices again ranged from 1=not at all to 6=very strongly.

We included a number of demographic variables that could affect interest in political action, personal behaviors, or environmental attitudes. These were age (in years), years lived in the area, state (0=Alabama, 1=Florida), sex (female=0, male=1), and political affiliation as Democrat or other party, with Republicans as the comparison group. There were also a number of binary demographic variables: White; married; college graduate; full or part-time employment in a fishing industry within the household; and full or part-time employment in a tourism-related industry within the household.³ Lastly, we included two variables to assess satisfaction with response and disaster compensation efforts by BP. The first question asked how the respondent perceived BP response efforts, and the second asked whether the respondent was satisfied with compensation programs run by BP and the Gulf Coast Claims Facility. Both variables were recoded such that 1=negative views and 0=neutral or positive views.

³In initial models we also included income, but this variable was not significant in any model and due to a fair amount of missing data (n=40) was dropped, which did not significantly reduce model fit across outcomes. This was tested using likelihood ratio tests for nested models.

Analyses

Our survey data were analyzed using a series of regression analyses. Ordinary least squares regression was used for the political action dependent variable, Poisson regression was used for the index of personal environmentally-friendly behaviors, and logistic regression was used for the attitudinal variables pertaining to caring more about the environment or opposing offshore oil drilling. Unsurprisingly, there was significant correlation between how respondents viewed the oil spill affecting them personally or their family, and perceptions of how the oil spill.⁴ This is most likely because the severity of the oil spill in any given area will determine the extent of damage for both individuals and the larger community. Given this overlap in harm from the spill, we run separate models on individual effects and community effects. List-wise deletion was used for missing data.

RESULTS

Turning first to our primary predictors of interest—the personal and collective elements of experiencing the oil spill—we see that emotions have the most pronounced and far-reaching effects on all of our outcome variables (political actions, behavioral changes, and attitudinal changes). Indeed, no other variable in the model performed so consistently across the outcomes. Conversely, experiencing economic losses, either personally or in the community, returned few results; the only significant finding was collective economic losses increasing attitudinal opposition to offshore oil drilling. Deteriorating social ties at the individual level did not have significant effects, but declines in the social fabric of the community did: increasing both political action and concern for the environment. Concerns about personal and community physical health were significant and positive for political action; community health also positively correlated with personal environmental behaviors. Worries about how the spill affected the natural environment was an important factor encouraging changes in personal pro-environmental behaviors, such as driving less or conserving energy, and it was also associated with greater concern about the environment.

Next, looking at each outcome in greater detail, we see different constellations of predictors mattering for each dependent variable. Political activity was more affected by negative experiences with the disaster response processes than the other outcomes, with both perceptions of a poor BP response effort as well as dissatisfaction with the BP compensation process having significant, positive effects on political activity (see Table 2). Neither though, had as strong of an effect as emotions, which had the largest standardized coefficient in the model.⁵ Physical health concerns, at both the personal and collective levels, were positively correlated with political activity, as was a decrease in social relations ($\beta=.122$, $p=.044$). Two demographic variables—employment in tourism and college educated—also had significant positive effects. Overall, these variables explained over a third of the variation in political activities (Model 1: $R^2=.373$; Model 2: $R^2=.356$).⁶

⁴Correlations between individual and community economic effects=.59, individual and community social effects=.56, and individual and community health effects=.74; all significant at $p<.001$.

⁵Note unstandardized coefficients in Table 2. Betas for Emotion=.25; BP Response Poor=.15; Dissatisfaction Compensation=.14.

⁶Using a negative binomial regression for the political activity dependent variable largely yielded the same effects. The only variable to change statistical significance (become significant or lose significance at the .05 level) was age, which gained significance in the negative binomial regression.

The second analysis investigates personal behavior changes in response to the oil spill, such as driving less or conserving water and energy (see Table 3). One significant grievance component is believing that the oil spill degraded the ecological systems of the Gulf of Mexico. The percent change in the incidence rate of adopting pro-environmental behaviors after the oil spill is a 34% increase for each unit increase in whether the respondents believe the oil spill was detrimental to the environment ($\exp[.294] = 1.34$). As with political activity, responding emotionally to the oil spill has positive effects on these behaviors (IRR=1.17, $p=.012$). Concerns about community health problems also were positively correlated with pro-environmental behaviors. Several demographic variables had significant effects, with age and residing in Florida positively affecting environmental behaviors, and being married and living longer in the area negatively affecting the outcome.

The last set of outcomes pertain to attitudinal changes in two areas—environmental concern generally, and opposition to offshore oil drilling more specifically (see Table 4). Once again, emotions have significant, positive effects on whether respondents' views about other environmental issues, such as global warming or protecting wildlife, changed as a result of the oil spill. For each unit increase in emotional reactions to the spill, the odds are 1.60 greater ($\exp[.472] = 1.60$) for pro-environment attitudinal change. At the community level, feeling like the oil spill harmed the environment and believing that there is a decrease in people caring about or helping each other both increased the odds that a respondent cared more about the environment after the oil spill. Being male or white decreased the odds of such pro-environment attitudinal change. For example, whites have 77% less than equal odds compared to non-whites of experiencing positive attitudinal change after the oil spill (OR=.23; $p=.007$).

Despite the fact that general environmental concern and offshore oil drilling both refer to attitudes, a surprisingly different set of predictors emerges for whether people say they were more likely to oppose offshore drilling after the oil spill. Emotional reactions continue to have significant positive effects. But for the first time, we also see significant positive effects from perceived community level economic losses. Also, we see politics emerge for the first time, with the odds of Democrats opposing offshore oil drilling being about three times that of Republicans (Model 3: OR: 3.12; Model 4: OR: 2.67). In turn, the race and sex effects that were so prominent for general environmental concerns lose statistical significance, although men continue to be less likely to oppose offshore drilling, an effect that nears significance in one of the models. It is also worth noting that men were far more likely to be more in favor of offshore drilling in response to the spill; 20% of men felt this way while only 10% of women did. And finally, viewing the BP response as poor emerges as a contributing factor to attitudinal change in opposition of offshore drilling. Respondents critical of BP's actions after the oil spill had double the odds of becoming opposed to offshore oil drilling relative to their more satisfied peers (Model 1: OR: 2.32; Model 2: OR: 2.20).

Finally, we turn to the demographic traits of respondents. Were some people more open to behavioral and attitudinal changes than others? The results do not offer strong support that there is a certain "type" of person that is more likely to become environmentally engaged after experiencing an environmental threat. While some demographic traits were significant

for particular outcomes, none were significant across all the outcomes. Instead we see college education and industry sector mattering for political activity, sex and race mattering for environmental concern, and so on. At the same time, people of all types are being swayed by the effects of the disaster, even if there are relative differences in the amount of change. For example, even though being white and male had significantly negative effects on attitudinal change, a fair number—46% of whites and 43% of males—became more concerned about the environment due to the oil spill. This suggests that there are cross-cutting mobilizing effects of environmental threats.

DISCUSSION

Respondents who reported that the oil spill affected them emotionally, such as feeling angry or distressed, had increased pro-environmental changes across a spectrum of actions: political behaviors, personal routine changes, and attitudes, both generally toward environmental issues and specific to offshore oil drilling. The results for emotional reactions are particularly relevant given that no other trait—nested in the individual or the oil spill—produced such widespread effects. Given recent calls for more research linking emotions to environmental behaviors, our findings suggest that the role of affect in shaping attitudes and actions deserves further consideration. While some environmental sociologists have studied emotions explicitly (see Jacobson 2016; Norgaard 2011), emotion-based explanations of action have received far less attention than their more rational counterparts. This is a common occurrence across sociological studies, with some scholars lamenting that “emotions have led a shadow existence for the last three decades, with no place in the rationalistic, structural, and organizational models that dominate academic political analysis” (Goodwin, Jasper and Polletta 2001: 1). We find that by drawing emotions back into the conversation, we can better understand some of the strongest motivators of personal action and attitudinal change.

Given that economic threats have had mobilizing effects in other cases (Tilly 1976; Van Dyke and Soule 2002), we expected economic losses in particular to influence political activity and environmental concern. Hypothetically, hits to the wallet could change hearts and minds in a way that other appeals cannot. However, evidence for the transformative power of economic losses related to the oil spill was limited. Being in an industry hard hit by the oil spill did produce more political activity. And perceived collective economic losses did lead to increased opposition toward offshore oil drilling, the only other factor besides emotions to do so. But individual level economic losses had no significant effects in any of the models. Instead, it appears concerns about physical health, community cohesion and general anxiety about the oil spill motivated greater change.

Perceptions that the DWHOS negatively affected the environment, such as harm to wildlife or scenic areas, had the strongest effects on environmentally friendly behaviors and general environmental concern. Respondents who viewed greater harm to the environment had increased rates of modifying their personal routines after the spill, like saving energy and water. Respondents who perceived environmental harm were also more likely to state that the oil spill made them care more about other environmental issues, like global warming and

protecting wildlife. This suggests that witnessing damage to the environment does have the potential to encourage people to reevaluate both personal behaviors and beliefs.

Last, we turn to the demographic traits of respondents. One could make the argument that some people are primed for transformation—perhaps due to ideological stances or personal characteristics they are ripe for activism or other forms of change but just have not experienced a personal trigger propelling them into action. If there is such a type, it appears to be outcome dependent, since no demographic trait was significant across all models. To highlight a few traits that did have significant effects, the college-educated were more likely to take political action, married individuals and long-term residents were less likely to make behavioral changes like driving less, and whites and males were more resistant to general environmental attitudinal change. In many ways, the lack of consistent effects for personal traits is the interesting finding. For example, environmental issues tend to be subsumed under the Democratic political platform more often than the Republican one, yet political affiliation is only significant for offshore oil drilling. Thus, the results are striking because they show how pervasive the effects of the grievance were, cutting across different sectors of society to motivate change. Given the scale of a disaster like the Deepwater Horizon oil spill, perhaps this is unsurprising, as it likely affected everyone in some way.

CONCLUSION

The Deepwater Horizon oil spill demonstrated that directly experiencing an environmental threat can percolate through to a variety of action and attitudinal arenas. The survey was administered five years after the oil spill, allowing for longer term effects to appear. This shows promise that complex, long term environmental problems, like climate change, may indeed see a rise in public support and action when people connect their personal or community woes to environmental sources.

The results also indicate that not all felt effects of the disaster are created equal when it comes to mobilizing affected communities. Respondents who perceived the oil spill as moving them emotionally, such as feeling anger or distress, were more likely to engage in activism, choose more environmentally-friendly behaviors, and become more concerned about the environment and offshore drilling. Appeals to the heart, it would seem, have the most sweeping effects. This is a noteworthy finding given that very little research in environmental sociology deals explicitly with emotions (Lockie 2016). Here we show that not only are emotions worth studying, but they can function as a vital link to changes in environmental attitudes, behaviors and political action. It serves as a call for more research into this important line of inquiry. For example, here we asked respondents about whether the oil spill affected them “emotionally, such as feeling angry or distressed” and so inquired about emotions in a more general way. Given the considerable effects of emotions in this study, a next step could be to gain targeted knowledge about specific emotions—such as potential differences stemming from feelings of guilt, anger, sadness, or despair. Researchers could also ask about positive emotional experiences, like happiness or hope, to see if they are connected to outcomes like resiliency.

This research has two main limitations. The first is that it is reliant on respondents' perceptions; we do not measure actual economic losses, social disintegration, health threats or environmental harm wrought by the oil spill. It is possible that respondents are accurately reporting the harm done to their communities, and it is possible that respondents' perceptions are biased by a number of factors that lead them to understate or overstate damages. That we only get at respondents' perceptions of the grievance is not necessarily a drawback; in fact, we think that perceptions of the grievance may be more important than objective costs or losses because it more accurately captures respondents' personal experiences and reactions to an environmental threat. For instance, even though science has demonstrated climate change is occurring, some people have been slow to act because they do not perceive direct effects in their own lives. Here we can observe how a grievance is seen as personally affecting respondents or their larger communities, and then use that to make a direct connection to attitudinal and behavioral changes.

Secondly, while we do administer the survey five years after the spill, our cross-sectional data limits our ability to speak to processes or connections across the variables. Does emotional distress lead to social strains, or vice versa? Do economic worries exacerbate health problems, or is it the reverse? Does taking action strengthen emotional reactions? There are likely to be interesting connections forged across both the factors and outcomes of this study that are better suited for longitudinal panel data. While we asked our respondents the survey questions in terms of cause and effect by referencing if they took actions "in response to the 2010 BP Deepwater Horizon oil spill," we are unable here to track correlative changes over time. Similarly, both attitudinal questions ask if opinions have changed as a result of the BP oil spill. While we acknowledge that there is probably some feedback between our variables, we also believe that it makes sense that the people who saw themselves the hardest hit—economically, emotionally, socially, environmentally and physically—by a threat were the most motivated to take political action, make lifestyle changes, and strengthen or change their opinions about the environment and offshore drilling.

By parsing a large-scale environmental threat into key sectors (economy, environment, emotions, social ties, and health) we were able to identify which components of a grievance were associated with action and attitudinal change. This shows promise that grievances can be dissected into core components to better understand differential effects on outcomes. Such analyses could be applied across a variety of issues and threats to illuminate what ways people are most affected, and transformed, by disruptions and disasters. It also suggests that personal experiences with environmental disasters are a powerful motivator of change and that as global environmental threats intensify, some people will not simply shrug and move on, but engage in real and lasting change.

Acknowledgements

This project was funded by a grant from the National Institute of Environmental Health Sciences (U19ES020683) as part of the Deepwater Horizon Research Consortium.

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Table 1.

Descriptive Statistics for Variables Used in Analysis

Variable	Mean (SD) or %
Works in Fishing Industry	34.19%
Works in Tourism Industry	38.86%
Age	50.37 (16.38)
Sex (1=Male)	53.56%
College Graduate	37.89%
Democrat	28.53%
Republican	39.71%
Independent/Other Politics	31.76%
White	87.93%
Married	59.94%
Years lived in area	28.16 (19.01)
State (1=FL, 0=AL)	71.23%
BP Response to oil spill viewed as Poor	36.05%
Dissatisfied with BP Compensation Process	21.08%
Individual level Economic Effects	4.09 (1.93)
Individual level Emotion Effects	3.79 (1.88)
Individual level Social Effects	2.67 (1.91)
Individual level Health Effects	2.58 (1.90)
Community level Economic Effects	5.04 (1.44)
Community level Environmental Effects	4.32 (1.75)
Community level Social Effects	3.14 (1.90)
Community level Health Effects	3.15 (1.91)
Political Actions Index	1.87 (1.90)
Personal Environmental Behaviors Index	.77 (1.00)
Cares More about the Environment	48.99%
More Opposed to Offshore Drilling	34.82%

Table 2.

OLS Regression Coefficients Predicting Political Action Index

	Model 1: Personal Effects		Model 2: Collective Effects	
Personal Effects from the Spill				
Economically	-0.035	(0.071)		
Emotionally	0.255***	(0.075)		
Socially	0.073	(0.065)		
Physically	0.141*	(0.062)		
Collective Effects from the Spill				
Economically			0.035	(0.092)
Ecologically			0.053	(0.087)
Socially			0.122*	(0.060)
Physically			0.218**	(0.075)
Experiences with Response				
BP Responded Poorly	0.611**	(0.217)	0.787***	(0.220)
Dissatisfied with Compensation	0.639*	(0.255)	0.720**	(0.249)
Employment				
Fishing Industry	0.424 ⁺	(0.234)	0.392 ⁺	(0.232)
Tourism Industry	0.508*	(0.201)	0.601**	(0.200)
Demographics				
Age	0.005	(0.007)	0.011	(0.007)
Sex (Male)	-0.311 ⁺	(0.186)	-0.111	(0.192)
College Graduate	0.709***	(0.202)	0.682**	(0.207)
Democrat Affiliation	0.414 ⁺	(0.228)	0.372	(0.231)
Other Political Affiliation	0.294	(0.225)	0.159	(0.229)
White	0.064	(0.303)	0.349	(0.314)
Married	-0.119	(0.196)	-0.156	(0.196)
Years Residing in Area	-0.008	(0.006)	-0.006	(0.006)
Living in Florida	-0.218	(0.236)	-0.189	(0.247)
Constant	-0.306	(0.547)	-1.201 ⁺	(0.676)
N	289		284	
R ²	.373		.356	

Notes: Standard errors in parentheses. Unstandardized coefficients are presented.

⁺ $p < .10$

* $p < .05$

** $p < .01$

*** $p < .001$.

Two-tailed tests. Adjusted R².

Table 3.

Poisson Regression Predicting Personal Environmental Behaviors Index

	Model 1: Personal Effects		Model 2: Collective Effects	
Personal Effects from the Spill				
Economically	0.051	(0.055)		
Emotionally	0.158 [*]	(0.063)		
Socially	0.060	(0.049)		
Physically	0.062	(0.044)		
Collective Effects from the Spill				
Economically			-0.094	(0.099)
Ecologically			0.294 ^{***}	(0.086)
Socially			0.040	(0.047)
Physically			0.140 [*]	(0.057)
Experiences with Response				
BP Responded Poorly	0.074	(0.158)	0.080	(0.159)
Dissatisfied with Compensation	0.142	(0.177)	0.330 ⁺	(0.176)
Employment				
Fishing Industry	0.272	(0.186)	0.209	(0.185)
Tourism Industry	-0.031	(0.149)	0.034	(0.149)
Demographics				
Age	0.011 [*]	(0.005)	0.019 ^{***}	(0.006)
Sex (Male)	-0.222	(0.145)	-0.077	(0.150)
College Graduate	0.065	(0.154)	-0.053	(0.162)
Democrat Affiliation	0.054	(0.183)	-0.031	(0.186)
Other Political Affiliation	0.230	(0.178)	0.189	(0.180)
White	-0.031	(0.219)	0.179	(0.224)
Married	-0.375 [*]	(0.152)	-0.385 [*]	(0.151)
Years Residing in Area	-0.019 ^{***}	(0.005)	-0.018 ^{***}	(0.005)
Living in Florida	0.217	(0.188)	0.445 [*]	(0.196)
Constant	-1.701 ^{***}	(0.459)	-2.816 ^{***}	(0.604)
N	295		291	
R ²	.132		.155	

Notes: Standard errors in parentheses.

⁺ $p < .10$

^{*} $p < .05$

^{**} $p < .01$

^{***} $p < .001$.

Two-tailed tests. McFadden's R².

Table 4.

Logistic Regression Coefficients Predicting Attitudinal Change

	<u>Care More Environment</u>		<u>Opposition Offshore Drilling</u>	
	Model 1 Personal	Model 2 Collective	Model 3 Personal	Model 4 Collective
Personal Effects from the Spill				
Economically	0.025 (0.109)		-0.162 (0.112)	
Emotionally	0.472 *** (0.116)		0.452 *** (0.125)	
Socially	0.124 (0.100)		0.046 (0.098)	
Physically	0.139 (0.096)		0.102 (0.094)	
Collective Effects from the Spill				
Economically		0.150 (0.169)		0.346 * (0.173)
Ecologically		0.317 * (0.141)		-0.048 (0.132)
Socially		0.401 *** (0.095)		-0.044 (0.093)
Physically		0.055 (0.114)		0.195 † (0.111)
Experiences with Response				
BP Responded Poorly	-0.337 (0.334)	-0.236 (0.349)	0.840 ** (0.324)	0.790 * (0.32)
Dissatisfied with Compensation	-0.064 (0.389)	0.190 (0.387)	-0.128 (0.391)	0.111 (0.374)
Employment				
Fishing Industry	0.111 (0.381)	0.169 (0.387)	0.030 (0.378)	0.278 (0.358)
Tourism Industry	0.124 (0.315)	0.311 (0.321)	0.005 (0.311)	0.208 (0.301)
Demographics				
Age	0.003 (0.011)	0.013 (0.011)	-0.015 (0.011)	-0.003 (0.011)
Sex	-0.873 ** (0.299)	-0.661 * (0.312)	-0.580 † (0.301)	-0.456 (0.299)
College Graduate	-0.197 (0.318)	-0.404 (0.332)	0.284 (0.321)	0.178 (0.316)
Democrat Affiliation	-0.107 (0.364)	-0.179 (0.373)	1.137 ** (0.372)	0.983 ** (0.363)
Other Political Affiliation	0.145 (0.353)	-0.022 (0.372)	0.131 (0.368)	0.176 (0.356)
White	-1.442 ** (0.535)	-1.328 * (0.579)	0.136 (0.465)	0.246 (0.468)
Married	-0.397 (0.305)	-0.501 (0.310)	0.029 (0.310)	-0.151 (0.296)
Years Residing in Area	-0.014 (0.010)	-0.007 (0.010)	-0.018 † (0.010)	-0.019 † (0.010)
Living in Florida	0.479 (0.370)	0.376 (0.392)	0.078 (0.377)	-0.018 (0.378)
Constant	-0.664 (0.860)	-2.497 * (1.145)	-1.608 † (0.861)	-2.861 * (1.130)
N	291	287	286	281
R ²	0.245	0.271	.195	0.154

Notes: Standard errors in parentheses.

† $p < .10$ * $p < .05$ ** $p < .01$ *** $p < .001$.

Two-tailed tests. McFadden's R^2 .

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