Responding to flood risk in Louisiana: the roles of place attachment, emotions, and location

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Abstract
Drawing from protection motivation theory (PMT), we examined how place attachment and negative emotions, alongside threat and coping appraisals, personal experiences, and demographic characteristics, relate to behavioral intentions to mitigate exposure to flood risks in southern Louisiana. We administered a statewide, representative telephone survey to 807 Louisiana residents, oversampling residents living in southern and coastal parishes particularly vulnerable to flood risk. While the results showed no difference depending on participants’ location in the state, there were strong effects of coping appraisals on individuals’ intentions to mitigate their exposure to flood risk, consistent with prior PMT findings. The addition of place attachment to standard PMT variables revealed a nuanced relationship with behavioral intentions. Results show that participants’ place attachment decreased the effects of threat and coping appraisals on some behavioral intentions, such as moving out of the state, while posing no significant effect of threat and coping appraisals on other intentions, such as supporting flood risk mitigation policies. Feeling negative emotions increased the likelihood of participants’ indicating a willingness to move or elevate their home, among other actions. While this study supports the consistency of threat and coping appraisals to predict discrete behavioral intentions, the results also provide insight that may be critical for risk communication initiatives in Louisiana. Namely, individuals with high levels of place attachment may be less willing to leave their community but more willing to engage in behaviors that enhance community resilience, although the more negative emotions they feel, the more willing they may be to take more drastic measures.

Keywords Risk communication · Protection motivation theory · Flood risk · Coastal land loss · Louisiana · Climate change

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1 Introduction

With nearly 42% of the population, U.S. coastal areas could experience cumulative climate-driven damages as high as $3.6 trillion by 2100, compared to $820 billion where cost-effective adaptation measures are implemented (U.S. Global Change Research Program 2018). Louisiana is among the first places in the world to feel the drastic and ongoing effects of climate change in the vulnerability of its environmental, social, and economic systems. Risks of flooding and coastal land loss are pervasive in southern Louisiana (Coastal Protection and Restoration Authority [CPRA] 2017). Effects from hurricanes, climate change, control of the Mississippi River, and other human activities have contributed to the elimination of at least 1,800 square miles of marshland over the last 80 years (Couvillion et al. 2017). The current rate of land loss across southern portions of state equates approximately to one U.S. football field every 30–100 min (Couvillion et al. 2017), and much of coastal Louisiana includes environmentally critical marshlands that may be eliminated by the end of this century due to rising sea levels (Törnqvist et al. 2020).

Although exposed to risks of flooding and land loss, the coastline of southern Louisiana supports robust economic activities that include oil or natural gas drilling, commercial fishing, shipping through ports of the Mississippi River waterways and tourism in New Orleans and other coastal communities (CPRA 2017). Many of the bayous that are prone to frequent floods are also sociohistorical sites of significance where numerous Native Americans have lived for hundreds of years and continue to endure today—often withstanding the tenuous and fluctuating boundaries between land and water (Kniffen et al. 1994). Other coastal communities have also forged cultural ties and family histories to these precarious lands that are currently home to nearly half of Louisiana’s population, approximately two million people (CPRA 2017).

While state and federal infrastructure projects may mitigate land loss and flood risk in the coming years (CPRA 2017), many residents in flood-prone areas may have to take precautionary actions to avoid ongoing damage to personal property or the permanent loss of land. These actions will inevitably vary along a continuum of difficulty and cost to execute. For example, moving to a new place in the state will place considerable burdens on residents that arguably exceed other mitigating behaviors such as voting for certain policies or paying increased taxes to support local resilience initiatives. In turn, questions about the antecedents of these (and similar) distinct behavioral intentions to mitigate flood risk exposure could inform communication efforts and policies in the coming years as these behaviors may be necessary to protect residents in certain areas of southern Louisiana.

This study examined factors that influence Louisiana residents’ behavioral intentions to mitigate flood risk in the years to come by drawing from protection motivation theory (PMT), place attachment, and negative emotions about flood risks. We surveyed Louisiana residents living across the state, ensuring adequate representation from flood-prone parishes, to examine the effects of threat and coping appraisals on behavioral intentions to take specific precautionary actions. We also investigated how individuals’ attachments to the lands and negative emotions about flood risks influenced their responses, as well as personal experiences and demographics, including participants’ location in the state.

PMT is well established in the social science literature for its consistent ability to predict behaviors (or intentions) based on threat assessments in various risk contexts, such as flooding (Bamberg et al. 2017; Bubeck et al. 2012, 2013; Kellens et al. 2013; Keshavarz & Karami 2016; Poussin et al. 2014; Rainear & Christensen 2017). In particular, the PMT concepts of threat and coping appraisals have emerged as consistent predictors of behaviors
or intentions in flood risk contexts across the USA, Europe, and even the Middle East (Bubeck et al. 2012, 2013; Keshavarz & Karami 2016). Central to PMT are threat and coping appraisals that affect behaviors or intentions. On the one hand, threat appraisals generally involve perceived vulnerability to the risk and the perceived severity of its consequences. On the other hand, coping appraisals involve the perceived self-efficacy of certain risk-reducing behaviors (also sometimes discussed as perceived difficulty, e.g., Poussin et al. 2014), perceived response efficacy of the behavior (i.e., its effectiveness), and the perceived response costs of the action at hand (Bubeck et al. 2012).

Additionally, measures of personal hazard experience have also offered insight into behavioral actions or intentions both within and outside the domain of PMT. Studies on the relationship between experience and behavior (or intentions) have found a consistent and slightly positive relationship across hazard contexts such as floods (Osberghaus 2017; Visconti & Zeckhauser 2015), hurricanes (Morss et al. 2018), or the impacts of climate change more generally (Bergquist et al. 2019).

Studies on the relationship between emotions and behaviors (or intentions) to avoid flood risks remain emergent, particularly in the context of PMT. Yet, some research suggests negative emotions may affect individuals’ threat appraisals of potential flood impacts. In their meta-analysis of PMT studies on flood risk behaviors, Bamberg et al. (2017) found that negative emotions about flood risks affect individuals’ threat appraisals and, in turn, their behaviors (or intentions) to avoid flood impacts. Nonetheless, it remains unclear how emotions might affect coping appraisals or whether such intuitive judgments affect threat appraisals consistently across discrete behavioral intentions.

This study focused on the role of negative emotions and place attachment in the relationships that have been consistently predicted by PMT. As we discuss below, place attachment may play a critical role in motivating or deterring people to take certain risk avoidance behaviors (such as moving), yet, the role of place attachment remains considerably understudied.

2 Literature review

2.1 Place attachment

Though previous PMT work has established significant support for the role of coping and threat appraisals on behavioral intentions, a potential complicating factor that has yet to be explored within the PMT literature is the role of place and context, particularly the concept of place attachment. As effects of climate change like coastal land loss and sea level rise reshape familiar landscapes, the influence of place-based factors on how residents perceive and respond to environmental risks has received increasing attention. Scholars have defined place attachment as an emotional bond between individuals or groups and their environment, catalyzed by the social and physical characteristics of the location (Brown & Perkins 1992; Hummon 1992; Shumaker & Taylor 1983; Twigger-Ross & Uzzell 1996). These characteristics may include the meanings individuals associate with places and satisfaction they derive from them (Stedman 2002) as well as other aspects of people—place bonding such as emotions, knowledge, beliefs, and behaviors (Low & Altman 1992) and the memories that accrue within a setting (Marcus 1992). Bonds with meaningful places can be both positive and negative, reflecting an evolving range of experiences, identities and relationships (Manzo 2005); they can also be critical to emotional well-being and
identity, leading to a potential loss of identity and stability when those bonds are disrupted by environmental risks (Brown & Perkins 1992).

While PMT literature has not addressed the role of place attachment, research on place and risk has investigated the relationship between place attachment, risk perception, and behavioral intentions to mitigate environmental risk exposure. However, this literature has presented an unclear picture thus far, with at times conflicting results. Some scholars have found that heightened attachment led to increased perceptions of risk (Bird et al. 2011; Zhang et al. 2014), or that a stronger sense of place led to increased concern (Gallina & Williams 2014; Stain et al. 2011). Place attachment has also been shown to be positively related in some cases to pro-environmental behaviors (Collins 2008; Kaltenborn 1998; Silver & Grek-Martin 2015; Zhang et al. 2014). On the other hand, others have found tendencies of place attachment to diminish risk perceptions (Armaş 2006; Billig 2006; Bonaiuto et al. 1996; Dallago et al. 2009; Donovan et al. 2012; Marcu et al. 2011; Wareham-Fowler & Fowler 2010) or intentions to mitigate risk exposure (De Dominicis et al. 2015; Marcu et al. 2011; Wareham-Fowler & Fowler 2010), and even to negatively moderate the relationship between risk perception and preventative behavior in objectively high risk areas (De Dominicis et al. 2015). A negative relationship with mitigation behaviors has been particularly evident for behaviors in the form of relocation and evacuation (Billig 2006; Bird et al. 2011; Boon 2014; Donovan et al. 2012; Kick et al. 2011; Lavigne et al. 2008; Paton et al. 2008; Pirta et al. 2014; Willox et al. 2012).

In a review of this literature, Bonaiuto et al. (2016) argue that place attachment is most frequently related to stronger awareness of environmental risks but diminished motivation to adopt coping behaviors. While place attachment might motivate individuals to care for their environments, it seems also to deter responses to threats that require certain avoidance strategies, such as physical or permanent relocation, while heightening willingness to return to the site at risk (Chamlee-Wright & Storr 2009; Mishra et al. 2010; Pirta et al. 2014).

Understanding the influence of place attachment on behavioral intentions as it differs between relocation and other coping behaviors is of particular relevance for the case of flood risk and coastal land loss, where managed retreat may be “one of the few policy options available for coastal communities facing long-term risks” (Alexander et al. 2012, p. 409). In this context, research has also demonstrated a nuanced relationship between place and different coping responses. Boon (2014) found that while a strong sense of place promoted resilience during flood recovery, it also diminished desire to relocate. In another post-flood investigation, higher place attachment led to increased concern about future flooding, but also increased likelihood of staying in place to rebuild (Haney, 2018). And though attachment to a home at risk leads to reluctance to leave, levels of attachment to sites of evacuation may also play a role; a recent study found that evacuation site attachment increased intentions to evacuate (Ariccio et al. 2020).

One notable example of the relationship between place attachment and relocation is from Chamlee-Wright and Storr (2009), who examined senses of place among New Orleans residents who chose either to return to the city or permanently relocate following Hurricane Katrina in 2005. Specifically, the authors interviewed individuals who evacuated the most severely impacted neighborhood during the hurricane (Ninth Ward) and compared place attachments of those who returned and those who moved permanently to nearby Houston, Texas. Residents who expressed high degrees of place attachment were also generally those who returned to the Ninth Ward—primarily due to the perception of New Orleans and the Ninth Ward as culturally and physically unique, and in turn, not replicable in other cities such as Houston. Further work on place and risk in New Orleans and
southern Louisiana has demonstrated similar sentiments among residents; Bessette et al. (2017) noted that residents of New Orleans viewed climate risk management through the lens of preserving the city’s unique culture, traditions, and history. Turning southwest to communities along the Louisiana coast, Burley et al. (2007) finds that a deep attachment to the coastal landscape is heightened and made constantly salient by the ongoing slow disaster of coastal land loss. Residents of Grand Isle and southern Terrebonne Parish saw land loss as a part of daily life and characterized their attachment to the land through the lens of both uniqueness and frailty (Burley et al. 2007).

The lack of understanding of the role of place attachment is troublesome from a public safety standpoint, given the need to consider the sociocultural and emotional characteristics individuals may ascribe to high-risk areas like the historical bayous across southern Louisiana. Place attachment could affect assessments of threat and coping appraisals or how these relate to behavioral intentions to mitigate risk exposure. Such an interaction could also diminish the potency of risk communication initiatives designed to preserve public safety in light of high-risk events. The current research on the relationship of place attachment, risk perception, and risk coping behaviors suggests a nuanced relationship with threat appraisals and behavioral intentions based on the nature of different behaviors. Since place attachment may diminish intentions to relocate but enhance intentions to engage in other protective behaviors, it is difficult to hypothesize how this construct may relate to discrete flood risk mitigation behaviors that range from supporting new flood-related policies or initiatives to relocating to non-flood prone areas. Additionally, while recent studies have found that place attachment may moderate (e.g., diminish) the relationship between risk perception and behavioral intentions to mitigate risk exposure, we have found no work that examines how place attachment might moderate the relationship between threat and coping appraisals and behavioral intentions within the context of PMT.

Of additional note throughout this study is our reference to flood mitigation behaviors that we consider more “disruptive” than others, which is based on the concept of disruption in the place attachment literature (for overviews, see Brown & Perkins 1992; Lewicka 2011). Put simply, disruptive behaviors are the physical risk mitigation actions that could disturb peoples’ affective bonds to the communities in which they reside. In this work, disruptive behaviors include (1) moving to a new place in the state, (2) moving out of the state, or (3) elevating or floodproofing one’s home or business. To note, this qualification of disruptive behaviors serves more as a suggestion to help interpret the results below rather than an explicit distinction we measured in the survey.

2.2 Demographics

Risk issues, impacts, and behavioral intentions to mitigate risk exposure may not necessarily be independent of demographic characteristics, particularly individuals’ residential locations that may expose them to more or less probability of flood risk. While place attachment may motivate individuals to remain in high-risk areas or return to them following a flood event (e.g., Chamlee-Wright & Storr 2009), little is known about how certain demographic variables in this context could affect distinct behavioral intentions to mitigate flood risk exposure. Louisiana is diverse in terms of its educational and racial backgrounds, political leanings, and industry affiliations (e.g., oil/natural gas, commercial fishing) that could affect behavioral intentions. Additionally, physical proximity to risk is generally associated with risk perception (Gotham et al. 2018; O’Neill et al. 2016; Rana et al. 2020).
Place attachment is also predicted by certain sociodemographic factors, including length of residence; those who have lived in an area over the long-term tend to be more invested and more strongly attached (Bonaiuto et al. 1999; Brown & Raymond 2007; Lewicka 2005; McCool & Martin 1994). Length of residence has been shown to have some direct influence on flood risk awareness; in a study of flood risk in the UK, Burningham et al. (2008) found that those who had lived at their present property for more than a year were more likely to be aware of their risk. Others have found that length of residence was positively related to adoption of household hurricane mitigation efforts (Peacock 2003), though Gotham et al. (2018) suggest that for residents in New Orleans increased length of residence was associated with lower levels of perceived risk. Even so, little is known about the role of people’s risk exposure and other demographic variables and their behavioral intentions to mitigate such exposure in the context of PMT.

Given the literature discussed above, we advance the following research questions:

RQ1: To what extent does place attachment affect the relationship between participants’ threat appraisal and their behavioral intentions to mitigate flood risk exposure?

RQ2: To what extent does place attachment affect the relationship between participants’ coping appraisal and their behavioral intentions to mitigate flood risk exposure?

We also pose the following questions about the role of negative emotions in key PMT relationships:

RQ3: To what extent do negative emotions about flood impacts affect the relationship between participants’ threat appraisal and their behavioral intentions to mitigate flood risk exposure?

RQ4: To what extent do negative emotions about flood impacts affect the relationship between participants’ coping appraisal and their behavioral intentions to mitigate flood risk exposure?

Finally, we pose a question about the role of demographic characteristics:

RQ5: To what extent do demographic characteristics affect distinct behavioral intentions to mitigate exposure to flood risk?

3 Methods

Survey responses were collected via telephone between February and March of 2020. The average length of the interviews was just over 16 min, and the cooperation rate was 25 percent. We completed 807 interviews; however, due to missing demographic data, we removed 65 cases, for a final sample of 745 participants used in the analysis. To ensure that we had strong representation from coastal and flood-prone areas, we used a stratified random sample approach that purposefully oversampled in the southern parishes of (1) St. Bernard/Plaquemines \( n = 189 \), (2) Orleans/Jefferson \( n = 188 \), and (3) Tangipahoa/St. Tammany \( n = 181 \), in addition to participants across the rest of the state \( n = 187 \). For the analysis below, we coded dummy coded the three parishes against the rest of the samples as follows: 1 = St. Bernard/Plaquemines, 0 = all others; 1 = Orleans/Jefferson, 0 = all others; and 1 = Tangipahoa/St. Tammany, 0 all others. We
did not create a variable for participants in the “rest of the state” given their lack of concentration to one specific area. As discussed in the note of Fig. 1, we tested whether differences would manifest based on participants’ location in particular parishes compared to living in coastal (i.e., south of Baton Rouge) versus non-coastal (i.e., north of Baton Rouge) areas. We found that changes in such groupings did not yield means significantly different from the parish-specific groupings noted above.

Fig. 1 Areas Sampled. **Note** The circle located in the center of the map denotes Baton Rouge. Most participants from the rest of the state lived perpendicular to or north (and usually west) of Baton Rouge. Some participants provided zip codes indicating residency in areas southwest of Baton Rouge; however, means comparisons of data grouped as coastal (i.e., south of Baton Rouge) versus non-coastal (i.e., north of Baton Rouge) did not yield results significantly different from the parish-specific groupings noted above.
comparisons that were significantly different from each other, which led us to test for effects based on one’s location in a particular parish. Figure 1 visualizes the sampled areas.

### 3.1 Behavioral intentions

We measured behavioral intentions by asking six discrete actions residents could take to mitigate flood risk exposure, using a four-point scale (1 = very unlikely; 4 = very likely): *Over the next 10 years, what is the likelihood you will do the following things to avoid the risk of flooding in your community?* Actions included residents’ preference to (1) move to a new place in the state ($M=1.88, SD=0.94$), (2) move out of the state ($M=1.82, SD=0.96$), (3) support projects that reduce flood risks ($M=3.34, SD=0.77$), (4) pay additional taxes for coastal restoration and protection ($M=2.61, SD=0.96$), (5) elevate or floodproof one’s home ($M=2.43, SD=1.09$), and (6) support legislation to stop climate change ($M=2.76, SD=1.08$).

### 3.2 Threat appraisal

We measured threat appraisal using a four-point scale (1 = very unlikely; 4 = very likely) as a latent construct comprised of five distinct prompts (randomly ordered): *If flooding were to occur in your community, how likely do you think that it would cause significant damage or loss to [your place of employment]/[your personal finances]/[the way you like to live your life]/[Louisiana’s economy]/[your friends or family] ($\alpha=0.80, M=3.09, SD=0.74$).

Consistent with previous PMT studies, we also measured perceived probability of flood risks using a four-point scale (1 = very unlikely; 4 = very likely) for the following prompt: *How likely do you think that your community will experience flooding that will cause significant damage or loss this year?* ($M=2.51, SD=0.94$).

### 3.3 Coping appraisal

Coping appraisal in the context of PMT usually involves measures of perceived self-efficacy of mitigating actions, response efficacy, and perceived response costs of the action(s) in question. Due to space limitations in the survey, we only examined participants’ perceived self-efficacy in relation to the six behavioral intentions noted above, using a five-point scale (1 = very hard; 5 = very easy): *Over the next 10 years, how easy or hard would it be to do the following things to avoid the risk of flooding in your community?* Actions included (1) move to a new place in the state ($M=2.26, SD=1.25$), (2) move out of the state ($M=2.19, SD=1.33$), (3) support projects that reduce flood risks ($M=3.95, SD=1.07$), (4) pay additional taxes for coastal restoration and protection ($M=2.89, SD=1.3$), (5) elevate or floodproof one’s home ($M=2.47, SD=1.32$), and (6) support legislation to stop climate change ($M=3.39, SD=1.37$).

### 3.4 Personal experience

We measured personal experience with previous flood impacts using a six-point scale (1 = strongly disagree; 6 = strongly agree) and a single-item measure: *I have personally experienced negative effects from flooding in Louisiana* ($M=4.57, SD=1.82$).
3.5 Place attachment

We derived three place attachment items from Stedman (2006) and used a six-point scale to assess agreement (1 = strongly disagree; 6 = strongly agree). Items were randomly ordered and included (1) *I feel that I can really be myself there*, (2) *I miss it when I am away too long*, and (3) *I feel happiest when I am there* (α = 0.75, M = 4.92, SD = 1.07).

3.6 Negative emotions

We assessed negative emotions about flood risks as a latent construct comprised of how frequently participants said they felt fear, anxiety, anger, and worry about flood risks, using a four-point scale (1 = never; 2 = rarely; 3 = sometime; 4 = all the time). Specifically, interviewers asked participants: *When you think about the risks of experiencing flooding in your community, to what extent do you feel the following?* [fearful]/[anxious]/[angry]/[worried] (α = 0.87, M = 2.39, SD = 0.83).

3.7 Demographics

We also considered key demographic variables to assess possible explanations of behavioral motivations and relative effects size. These included race/ethnicity (measured in the survey as 1 = White, non-Hispanic; 2 = Black, non-Hispanic; 3 = Other, non-Hispanic; 4 = Hispanic; 5 = 2 or more races, non-Hispanic and revised for the analysis as 0 = White, non-Hispanic; 1 = All other racial/ethnic identities and backgrounds), educational attainment (1 = 11th grade or less, without graduating; 2 = high school graduate or GED; 3 = some college, associate’s degree, technical or vocational degree; 4 = college graduate; 5 = graduate or professional degree), whether one had children/grandchildren living at home (1 = yes; 2 = no), political leanings (1 = very liberal; 7 = very conservative), industry affiliation with oil or gas (1 = no; 2 = yes), and industry affiliation with commercial fishing (1 = no; 2 = yes), and gender (1 = male; 2 = female).

Descriptive statistics for the demographic variables used in subsequent analyses are detailed in Table 1. Population and gender characteristics are similar to recent (2019) population estimates from U.S. Census data, which suggests our sample adequately represents the broader population in Louisiana.¹

4 Results

In the following section, we first examine and discuss the means scores associated with threat/coping appraisals and behavioral intentions to avoid flood risks. We also discuss bivariate correlation scores between place attachment, negative emotions, and other items in the study. We believe this provides a general overview of participants’ willingness to engage in discrete flood risk mitigation behaviors, and how place attachment and negative emotions (the key variables of this study) relate to threat/coping appraisals, behavioral

¹ A summary of aggregated (2019) Census data for Louisiana may be found at https://www.census.gov/quickfacts/LA
Table 1  Demographic characteristics

| Demographic                          | Value                  | Location | Location | Location | Total (Percent) |
|--------------------------------------|------------------------|----------|----------|----------|-----------------|
|                                      |                        | A        | B        | C        | D               |                |
| Race/ethnicity                       | White, non-Hispanic    | 127 (17%)| 104 (14%)| 150 (20.1%)| 139 (18.7%) | 520 (69.8%)   |
|                                      | Black, non-Hispanic    | 26 (3.5%)| 56 (7.5%)| 14 (1.9%)| 33 (4.4%) | 129 (17.3%)   |
|                                      | Other, non-Hispanic    | 13 (1.7%)| 9 (1.2%) | 8 (1.1%) | 4 (0.5%)  | 34 (4.5%)     |
|                                      | Hispanic               | 12 (1.6%)| 9 (1.2%) | 3 (0.4%) | 5 (0.7%)  | 29 (3.9%)     |
|                                      | 2 + races, non-Hispanic| 11 (1.5%)| 10 (1.3%)| 6 (0.8%) | 6 (0.8%)  | 33 (4.4%)     |
| Gender                               | Male                   | 96 (12.9%)| 95 (12.8%)| 75 (10.1%)| 99 (13.3%) | 365 (49.0%)   |
|                                      | Female                 | 93 (12.5%)| 93 (12.5%)| 106 (14.2%)| 88 (11.8%) | 380 (51.0%)   |
| Education                            | 11th grade or less (without graduating) | 11 (1.5%)| 6 (0.8%) | 6 (0.8%) | 10 (1.3%) | 33 (4.4%)     |
|                                      | High school graduate   | 42 (5.6%)| 38 (5.1%)| 25 (3.4%)| 46 (6.2%) | 151 (20.3%)   |
|                                      | Some college (associate's degree) | 69 (9.3%)| 44 (5.9%)| 67 (9%) | 47 (6.3%) | 227 (30.5%)   |
|                                      | College graduate (BA, BS) | 45 (6%) | 59 (7.9%)| 52 (7%) | 57 (7.7%) | 213 (28.6%)   |
|                                      | Graduate or professional degree (MA, MS, PhD, MD, JD, etc.) | 22 (3%) | 41 (5.5%)| 31 (4.2%)| 27 (3.6%) | 121 (16.2%)   |
| Children/grandchildren at home?      | Yes                    | 74 (9.9%)| 71 (9.5%)| 80 (10.7%)| 56 (7.5%) | 281 (37.7%)   |
|                                      | No                     | 115 (15.4%)| 117 (15.7%)| 101 (13.6%)| 131 (17.6%) | 464 (62.3%)   |
| Political leanings                   | Very liberal           | 9 (1.2%) | 12 (1.6%)| 4 (0.5%) | 8 (1.1%)  | 33 (4.4%)     |
|                                      | Liberal                | 31 (4.2%)| 34 (4.6%)| 14 (1.9%)| 19 (2.6%) | 98 (13.2%)    |
|                                      | Basically independent, but leaning toward liberal | 17 (2.3%)| 26 (3.5%)| 15 (2%) | 16 (2.1%) | 74 (9.9%)     |
|                                      | Independent            | 44 (5.8%)| 36 (4.8%)| 36 (4.8%)| 36 (4.8%) | 152 (20.4%)   |
|                                      | Basically independent, but leaning toward conservative | 28 (3.8%)| 22 (3%) | 30 (4%) | 18 (2.4%) | 98 (13.2%)    |
|                                      | Conservative           | 43 (5.8%)| 42 (5.6%)| 49 (6.6%)| 50 (6.7%) | 184 (24.7%)   |
|                                      | Very conservative      | 17 (2.3%)| 16 (2.1%)| 33 (4.4%)| 40 (5.4%) | 106 (14.2%)   |
| Industry affiliation, oil/gas        | Yes                    | 20 (2.7%)| 18 (2.4%)| 23 (3.1%)| 36 (4.8%) | 97 (13%)      |
|                                      | No                     | 168 (22.6%)| 169 (22.7%)| 158 (21.2%)| 151 (20.3%) | 646 (86.7%)   |
| Industry affiliation, commercial fishing | Yes                  | 37 (5%) | 8 (1.1%) | 9 (1.2%) | 10 (1.3%) | 64 (8.6%)     |
|                                      | No                     | 152 (20.4%)| 180 (24.2%)| 172 (23.1%)| 177 (23.8%) | 681 (91.4%)   |
Table 1 (continued)

| Demographic Value | Location |
|-------------------|----------|
|                   | A        | B        | C        | D        | Total (Percent) |
| Total             | 189 (25.4%) | 188 (25.2%) | 181 (24.3%) | 187 (25.1%) | 745 (100%) |

A St. Bernard or Plaquemines parishes; B Orleans or Jefferson parishes; C Tangipahoa or St. Tammany parishes; and D the rest of the state
intentions, and other key factors. In turn, this overview may be useful for policymakers in southern Louisiana and others seeking to expand on this work in the future.

Next, we examine each research question by drawing on linear regressions with interaction terms for each risk mitigation behavior (Table 4). To avoid issues with multicollinearity, we mean-centered all variables (except demographic characteristics) and ensured bivariate correlations of mean-centered variables did not exceed the recommended exclusionary threshold of 0.70 (Bryman & Cramer, 1994). Variance explained across behavioral intentions ranges from 22 to 45%—an indication of particularly good model fit across behavioral intentions. Across all behavioral intentions, we found four significant interactions for place attachment and three related to negative emotions.

4.1 Overview of threat/coping appraisals and discrete behavioral intentions

Table 2 provides an overview of means for threat/coping appraisals and discrete behavioral intentions. The means show participants’ general belief that flood events could negatively affect their place of employment, personal finances, livelihood, Louisiana’s economy, and their friends and family.

Means for self-efficacy and coping appraisals also show a general divide between actions that may be disruptive (such as moving) compared to less drastic measures (such as supporting legislation to stop climate change). Participants reported potentially disruptive actions as both more difficult and less likely that they would take to avoid flood risks.

Table 3 details bivariate correlations between place attachment, negative emotions, and all other items in the analysis. Of note are the significant and positive relationships between negative emotions and threat appraisals (which are considerably strong, reaching 0.484 for perceived consequences) and negative emotions and all behavioral intentions. Though, negative emotions are negatively related to the perceived efficacy of disruptive behavioral intentions—suggesting that negative emotions may be positively related to intended behaviors but not the understanding that disruptive mitigation behaviors, such as moving, are indeed difficult paths to pursue.

Furthermore, place attachment is negatively related to the disruptive mitigation behaviors move to a new place in the state and move out of the state but positively related to paying additional taxes for coastal restoration and protection—a mitigation effort that would allow individuals to remain at their current location. Also worth noting are the insignificant relationships between place attachment and threat appraisals, suggesting that place attachment may not inhibit risk perception despite its significant relationship with behavioral intentions that would allow one to remain in place.

4.2 Research question one: place attachment and threat appraisals

Place attachment seems to diminish the effects of threat appraisals on disruptive behavioral intentions, particularly the dependent variables move to a new place in the state and move out of the state. Evidence of this emerges for these two dependent variables in Table 4. For move to a new place in the state, perceived consequences shifts from positively predicting the dependent variable ($\beta = 0.12, p < 0.01$) to insignificantly predicting the dependent variable in the place attachment interaction term ($\beta = -0.028, p = ns$). This, of course, makes sense when juxtaposed against the significant and powerful negative effect of place attachment on the dependent variable ($\beta = -0.094, p < 0.01$).
| Variable                                                                 | Prompt                                           | Mean(SD)       |
|------------------------------------------------------------------------|--------------------------------------------------|----------------|
| Perceived consequences \(1 = \text{very unlikely}, 4 = \text{very likely}\) | Your place of employment                        | 2.59(1.17)     |
|                                                                       | Your personal finances                           | 3.03(1.07)     |
|                                                                       | The way you like to live your life                | 3.13(0.98)     |
|                                                                       | Louisiana’s economy                              | 3.42(0.83)     |
|                                                                       | Your friends and family                           | 3.29(0.92)     |
| Perceived self-efficacy of mitigation behaviors \(1 = \text{very hard}, 5 = \text{very easy}\) | Move to a new place in the state.*               | 2.25(1.25)     |
|                                                                       | Move out of the state.*                           | 2.17(1.33)     |
|                                                                       | Support projects that reduce flood risks          | 3.95(1.08)     |
|                                                                       | Pay additional taxes for coastal restoration and protection | 2.91(1.30) |
|                                                                       | Elevate or floodproof my home or business.*      | 2.46(1.31)     |
|                                                                       | Support legislation to stop climate change        | 3.40(1.38)     |
| Behavioral intentions to avoid flood risks \(1 = \text{very unlikely}, 4 = \text{very likely}\) | Move to a new place in the state.*               | 1.88(0.94)     |
|                                                                       | Move out of the state.*                           | 1.81(0.97)     |
|                                                                       | Support projects that reduce flood risks          | 3.35(0.78)     |
|                                                                       | Pay additional taxes for coastal restoration and protection | 2.62(0.96) |
|                                                                       | Elevate or floodproof my home or business.*      | 2.44(1.09)     |
|                                                                       | Support legislation to stop climate change        | 2.78(1.08)     |

Asterisks denote behaviors we consider disruptive. \(N = 745\)
|                                       | Pearson correlation coefficient $r$ (two-tailed) |
|---------------------------------------|-----------------------------------------------|
|                                       | Place attachment                               | Negative emotions                             |
| Gender                                | 0.024                                         | 0.132**                                       |
| Race/ethnicity                        | $-0.124^{**}$                                 | 0.074*                                        |
| Education                             | $-0.037$                                      | $-0.082^*$                                    |
| Children/grandchildren at home        | 0.011                                         | 0.047                                         |
| Political leanings                    | $0.095^{**}$                                   | $-0.192^{**}$                                 |
| Industry affiliation, oil/gas         | 0.032                                         | $-0.004$                                      |
| Industry affiliation, commercial fishing | 0.027                                          | 0.057                                         |
| St. Bernard or Plaquemines parishes   | 0.05                                          | 0.032                                         |
| Orleans or Jefferson parishes         | 0.03                                          | $0.134^{**}$                                  |
| Tangipahoa or St. Tammany parishes    | $-0.073^*$                                     | $-0.056$                                      |
| Personal experience                   | $-0.006$                                      | $0.277^{**}$                                  |
| Perceived probability                 | $-0.014$                                      | $0.427^{**}$                                  |
| Perceived consequences                | 0.069                                         | $0.484^{**}$                                  |
| Move to a new place in the state      | $-0.164^{**}$                                  | $-0.164^{**}$                                 |
| Perceived self-efficacy of moving to a new place in the state | $-0.158^{**}$                                  | $-0.042$                                      |
| Move out of the state                 | $-0.464^{**}$                                  | $0.128^{**}$                                  |
| Perceived self-efficacy of moving out of the state | $-0.332^{**}$                                  | $-0.074^*$                                    |
| Support projects that reduce flood risks | 0.07                                           | $0.231^{**}$                                  |
| Perceived self-efficacy of supporting projects that reduce flood risks | 0.027                                         | $0.194^{**}$                                  |
| Pay additional taxes for coastal restoration and protection | 0.075*                                        | $0.120^{**}$                                  |
| Perceived self-efficacy of paying additional taxes for coastal restoration and protection | 0.058                                         | 0.034                                         |
| Elevate or floodproof my home or business | 0.025                                         | $0.265^{**}$                                  |
| Perceived self-efficacy of elevating or floodproofing one’s home or business                | 0.04                                          | 0.041                                         |
| Support legislation to stop climate change | $-0.056$                                      | $0.301^{**}$                                  |
| Perceived self-efficacy of supporting legislation to stop climate change | $-0.04$                                        | $0.204^{**}$                                  |
|                              | Place attachment | Negative emotions |
|------------------------------|------------------|-------------------|
| Place attachment             | 1                | 0.014             |
| Negative emotions            | 0.014            | 1                 |

Bold variables are grouped as mitigation behaviors and the perceived efficacy of those behaviors

*Significant at the 0.05 level.

**Significant at the 0.001 level
| Independent variable | β (standardized coefficient) | Move to a new place in the state | Move out of the state | Support projects that reduce flood risks | Pay additional taxes for coastal restoration and protection | Elevate or floodproof my home or business | Support legislation to stop climate change |
|----------------------|-----------------------------|-----------------------------------|-----------------------|------------------------------------------|-----------------------------------------------------|------------------------------------------|------------------------------------------|
| Gender               | −0.038                      | −0.035                            | −0.006                | 0.064*                                   | −0.014                                              | 0.051                                     |
| Race/ethnicity       | 0.134***                    | 0.066*                            | 0.007                 | −0.054                                   | 0.116**                                             | −0.005                                   |
| Education            | −0.006                      | 0.034                             | 0.019                 | 0.008                                    | −0.043                                              | 0.078**                                   |
| Children/Grandchildren at home | 0.059                      | 0.024                             | 0.011                 | −0.003                                   | −0.057                                              | 0.063*                                   |
| Political leanings   | −0.009                      | −0.005                            | −0.106**              | −0.097**                                 | −0.086**                                            | −0.221**                                 |
| Industry affiliation, oil/gas | −0.049                      | −0.033                            | 0.03                   | 0.035                                    | −0.018                                              | −0.057*                                   |
| Industry affiliation, commercial fishing | 0.019                      | −0.033                            | −0.064                 | −0.043                                   | −0.024                                              | −0.002                                   |
| St. Bernard or Plaquemines parishes | 0.007                      | −0.053                            | 0.048                 | −0.018                                   | 0.059                                               | −0.044                                   |
| Orleans or Jefferson parishes | 0.006                      | −0.024                            | 0.041                 | 0.061                                    | 0.022                                               | −0.019                                   |
| Tangipahoa or St. Tammany parishes | 0.058                      | −0.011                            | 0.03                   | −0.003                                   | 0.035                                               | −0.033                                   |
| Personal experience  | 0.058                      | −0.003                            | 0.049                 | −0.048                                   | 0.106**                                             | −0.024                                   |
| Perceived probability | −0.034                      | 0.035                             | −0.02                  | −0.005                                   | 0.049                                               | 0.018                                    |
| Perceived consequences | 0.120**                    | 0.103**                           | 0.133**               | 0.098*                                   | 0.124**                                             | −0.013                                   |
| Perceived self-efficacy of specific mitigation behavior | 0.372**                    | 0.342**                           | 0.36**                | 0.501**                                 | 0.384**                                             | 0.455**                                   |
| Place attachment     | −0.094**                    | −0.321**                          | 0.064*                | 0.038                                    | 0.026                                               | −0.014                                   |
| Negative emotions    | 0.121**                    | 0.111**                           | 0.075                 | 0.043                                    | 0.116**                                             | 0.169**                                   |
| Place attachment X perceived probability | 0.074*                      | −0.005                            | 0.075*                | 0.003                                    | −0.013                                              | −0.011                                   |
Table 4 (continued)

| Independent variable $\beta$ (standardized coefficient) | Move to a new place in the state | Move out of the state | Support projects that reduce flood risks | Pay additional taxes for coastal restoration and protection | Elevate or floodproof my home or business | Support legislation to stop climate change |
|---------------------------------------------------------|---------------------------------|-----------------------|-------------------------------------------|--------------------------------------------------|------------------------------------------|------------------------------------------|
| Place attachment X perceived consequences               | $-0.028$                        | $-0.082^{**}$         | $0.004$                                   | $0.052$                                           | $0.002$                                   | $-0.028$                                 |
| Place attachment X perceived self-efficacy of specific mitigation behavior | $-0.041$                        | $-0.092^{**}$         | $-0.065^{*}$                              | $0.027$                                           | $0.004$                                   | $0.004$                                  |
| Negative emotions X perceived probability                | $-0.024$                        | $-0.06$               | $0.004$                                   | $-0.067^{*}$                                      | $-0.009$                                   | $-0.023$                                 |
| Negative emotions X perceived consequences               | $0.093^{**}$                    | $0.05$                | $0.052$                                   | $-0.039$                                          | $0.046$                                    | $-0.001$                                 |
| Negative emotions X perceived self-efficacy of specific mitigation behavior | $0.051$                         | $0.089^{**}$          | $-0.076^{*}$                              | $-0.020$                                          | $-0.032$                                   | $-0.025$                                 |
| R square (adjusted)                                      | $0.259$ (0.236)                 | $0.392$ (0.374)       | $0.260$ (0.238)                           | $0.345$ (0.325)                                   | $0.316$ (0.295)                           | $0.438$ (0.420)                          |
| R square (adjusted)$\dagger$                             | $0.246$ (0.227)                 | $0.276$ (0.258)       | $0.246$ (0.228)                           | $0.341$ (0.324)                                   | $0.315$ (0.298)                           | $0.436$ (0.422)                          |
| R square (adjusted)$\ddagger$                            | $0.239$ (0.220)                 | $0.374$ (0.359)       | $0.249$ (0.231)                           | $0.337$ (0.320)                                   | $0.305$ (0.287)                           | $0.418$ (0.404)                          |
| ANOVA                                                   | $F(22, 722) = 11.465^{**}$      | $F(22, 722) = 21.166^{**}$ | $F(22, 722) = 11.558^{**}$ | $F(22, 722) = 17.292^{**}$ | $F(22, 722) = 15.165^{**}$ | $F(22, 722) = 25.529^{**}$ |

* Significant at the .05 level  
** Significant at the .01 level  
$\dagger$ Model variance with all place attachment variables removed  
$\ddagger$ Model variance with all negative emotions variables removed
A similar but larger version of this effect occurs for move out of the state. On its own, perceived consequences significantly and positively predicts the dependent variable ($\beta = 0.103, p < 0.01$) and place attachment on its own reveals a strong negative effect ($\beta = -0.321, p < 0.01$). Yet, when examined together, the interaction term yields a slightly negative but significant effect on intentions to move out of the state ($\beta = -0.082, p < 0.01$)—suggesting that place attachment may indeed negatively moderate otherwise positive effects of threat appraisals on disruptive behavioral intentions.

Additionally, the interaction term with place attachment and perceived probability significantly and positively predicts intentions to support projects that reduce flood risks. While this effect is small ($\beta = 0.075, p < 0.05$), it suggests threat appraisal and place attachment may collectively motivate people to take non-disruptive risk mitigation behaviors that allow residents to stay in their homes or communities.

### 4.3 Research question two: place attachment and coping appraisals

Somewhat like RQ1, place attachment seems to diminish the effects of coping appraisal on behavioral intentions, particularly for disruptive behaviors. The place attachment/self-efficacy interaction term significantly and negatively predicts move out of the state ($\beta = -0.092, p < 0.01$), which is also notable given the large and opposing effects sizes of these variables on their own in the model ($\beta_{\text{self-efficacy}} = 0.342, p < 0.01$; $\beta_{\text{place attachment}} = -0.321, p < 0.01$). In turn, high levels of place attachment may essentially demotivate or “cancel out” the effects of perceived self-efficacy on disruptive risk mitigation behaviors. Yet, the effects of place attachment are less clear for non-disruptive risk mitigation behaviors: perceived self-efficacy on its own consistently and strongly predicts such behaviors while place attachment (and the associated interaction terms) yield insignificant effects. This suggests that place attachment may not hold any bearing on the relationship between perceived self-efficacy and behavioral motivations when the behavior itself is not disruptive to one’s life.

### 4.4 Research question three: negative emotions and threat appraisal

As independent predictors across the regression models, threat appraisal (specifically perceived consequences) and negative emotions consistently and positively predict disruptive and non-disruptive intentions to avoid flood risks. The effects sizes for these predictors—generally between 0.09 and 0.17 for threat appraisal and negative emotions—are worth noting in relation to the consistent insignificance of the interaction terms across the models. This suggests that (a) threat appraisal and negative emotions about flood risks are more powerful predictors of behavioral intentions on their own and (b) interactions with threat appraisal and negative emotions may even diminish behavioral intentions to avoid flood risks. Thus, in an applied context, messages that heighten threat appraisal and negative emotions concurrently may not motivate risk mitigation behavior as strongly as messages that elicit either threat appraisal or negative emotions.

### 4.5 Research question four: negative emotions and coping appraisal

Negative emotions about flood risk tends to pose insignificant impacts on the otherwise strong relationship between coping appraisal (i.e., perceived self-efficacy) and behavioral intentions.
For move out of the state, negative emotions and coping appraisal do significantly interact ($\beta=0.089$, $p<0.01$), yet the effects size of the interaction term is considerably smaller than the predictive power of perceived self-efficacy and negative emotion considered separately in the model (i.e., $\beta_{\text{self-efficacy}}=0.342$, $p<0.01$; $\beta_{\text{negative emotion}}=0.111$, $p<0.01$). For support projects that reduce flood risks, negative emotions and coping appraisal also significantly interact ($\beta=-0.076$, $p<0.05$) though this effect size is considerably smaller compared to self-efficacy on its own ($\beta=0.36$, $p<0.01$) and the insignificant effect of emotion ($\beta=0.075$, $p=\text{ns}$). For all other dependent variables, negative emotion does not significantly affect the relationship between self-efficacy and behavioral intentions. This is quite notable given the consistent and sizable predictive power of both perceived self-efficacy and negative emotion throughout the models.

4.6 Variance explained as a function of place attachment or negative emotions

Table 4 also details changes in variance explained across the models when all place attachment or negative emotions variables are removed. In general, the removal of these variables does not change the variance explained by more than 2%; however, there is one exception for move out of the state where the place attachment variables (including the interaction terms) explain approximately 12% of the model variance. This suggests place attachment is highly relevant for predicting intentions to engage in this disruptive mitigation behavior.

4.7 Research question five: demographic variables

While we did not examine possible interactions with demographic variables, the effects are worth noting given their insight into relationships that could inform policymakers, stakeholders, and perhaps even messaging campaigns.

The most notable characteristic among the demographic variables is the lack of effect of location on behavioral intentions to avoid flood risks. The four areas sampled for this study provided groups of participants who face acute and frequent flood risks compared to individuals who live north of Baton Rouge and face virtually no risk of flooding in the near-term future. Yet, intentions to engage in various risk mitigation behaviors are not significantly different enough across the areas we sampled to make location, on its own, a significant predictor of behavioral intentions (when accounting for other variables in the model).

Additionally, race/ethnicity was positively related to three of the eight discrete risk mitigation behaviors, including intentions to move to a new place in the state, move out of the state, and elevate or floodproof my home or business. Given the coding of our race/ethnicity variable, positive betas indicate the tendency for non-white racial identities to take these three risk mitigation behaviors.

Liberal (rather than conservative) political leanings significantly predicted several behavioral intentions including those to support projects that reduce flood risks, pay additional taxes for coastal restoration and protection, elevate or floodproof one’s home or business, and support for legislation to stop climate change.
5 Discussion

The results of this work provide formative insight into the roles place attachment and negative emotions may have in PMT. While our data reinforce the existing literature on the predictive power and consistency of key PMT variables across distinct risk mitigation behaviors (c.f., Bamberg et al. 2017), we focused on how place attachment and negative emotions might affect PMT relationships.

Our consideration for moderation effects of place attachment and negative emotions about flood risks reveals distinct behavioral characteristics that explain additional changes in behavioral intentions to mitigate flood risk exposure. While certain forms of perceived risk (in this case, perceived consequences) might normally affect behavioral intentions to mitigate risk exposure, this relationship may be weakened when accounting for peoples’ place attachment and the nature of the behavior at hand. It may be the case that, as posited by previous studies linking place attachment to underestimation of risks (see Bonaiuto et al. 2016 for an overview), feelings of attachment are correlated with feelings of safety, with the threat posed by the risk weighed against the threats of separation and stress from leaving one’s place. In comparison with our results, a prior study by De Dominicis et al. (2015) found a similar moderation effect of place attachment on the relationship between risk perception and risk coping, but only in locations with high levels of objective risk. In contrast, we find no effects of participant location, contradicting previously proposed mechanisms such as place-specific biases and suggesting a need for further exploration into the precise role of location and proximity with respect to place attachment.

As noted in Sect. 4.2, individuals with high place attachment may avoid disruptive mitigation behaviors such as moving to a new place in or out of the state, but they may be motivated to support initiatives that increase the resilience of their communities. This finding supports previous studies on the relationship between place attachment and risk mitigation behaviors that generally find a negative relationship between place attachment and risk mitigation behaviors but a positive relationship between place attachment and pro-environmental behaviors (such as cleaning a beach) that take place when one remains in a place and takes steps to protect it (Bonaiuto et al. 2016). Somewhat similarly, negative emotions may motivate individuals with stronger place attachment to take more disruptive actions than those with weaker place attachment might consider, such as moving to a new place in the state. Previous research has found that emotions are indeed powerful motivators of actions individuals might not otherwise take (for a recent overview, see Bessarabova et al. 2020), and in this context, negative emotions may be necessary for individuals to take actions that require significant life changes.

The effects we found across disruptive and non-disruptive behaviors raise questions about the types of risk mitigation behaviors PMT constructs might predict when accounting for contextually relevant variables or types of behaviors that may be more or less disruptive versus pro-environmental. We encourage future studies to explore this aspect of PMT, particularly for how place attachment might diminish certain safety–critical behaviors in contexts that require otherwise “drastic” mitigation behaviors.

We also stress the need for additional research on the relationship between behavioral motivations to avoid flood risks and individuals’ physical proximity to them. Previous

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2 Additionally, the lack of significant correlations between threat appraisals and place attachment in Table 3 suggest that risk mitigation behaviors may be related to underlying cognitive mechanisms that are distinct from those of threat appraisals.
studies have found a consistent and positive relationship between proximity to hazards and risk perceptions (Gotham et al. 2018; O’Neill et al. 2016; Rana et al. 2020) and the relationship between proximity to hazards and behavioral motivations to avoid them (Koerth et al. 2017). Yet, our findings suggest the relationship between hazard proximity and risk perception may not translate directly to behavioral motivations. Given that participants’ location never predicted behavioral motivations, we suspect that hazard proximity and risk perception may be significantly related to threat/coping appraisals when examined either as a mediating or moderating variable (i.e., both functions seem feasible), which in turn, affect behavioral motivations. Further, factors like place attachment and negative emotions should also be considered.

Finally, it is important to note the limitations of this study. First, due to time constraints in our survey, we did not fully operationalize the coping appraisals construct, which typically includes response efficacy and perceived costs in addition to perceived self-efficacy. While we believe that our measure still offered robust results that confirmed previous PMT relationships, it would have been preferable to have the more robust measure of coping appraisals.

Second, we used a truncated measure of place attachment that drew on only three questions from Stedman’s (2006) work. While we sought to include only the most salient place attachment constructs in the survey due to space limitations, our measurement of the concept is lacking some of the nuance and robustness that Stedman (2006) and others have developed.

Third, our survey offers cross-sectional results that demonstrate relationships and not causality. While we examine and discuss the data in terms of effects, our cross-sectional design should only serve as a starting point on which experimental designs may draw to infer causation.

Finally, while these results may suggest relationships that would apply to other regions where individuals are facing an immediate or growing threat of flood risk due to coastal land loss, climate change, or any number of related factors, we caution against generalizing these results broadly. While we are confident that the results represent the views of individuals living in Louisiana, there may be aspects that are particular to this region, such as its previous experience with natural disasters like Hurricane Katrina, which could decrease the generalizability to other locations. Future research could examine this further. While these limitations are worth noting, we also find that the results contribute to the existing PMT and flood risk literature. Most importantly, we believe that these findings raise new questions about the roles of place attachment, emotion, and location in the theory of PMT.

6 Conclusions

In sum, this work contributes to the robust literature on PMT and the growing work on place attachment, emotion, and geo-specific effects on behavioral motivations in risk research. In addition to its theoretical implications, this study also provides findings that could serve a critical function toward helping policymakers and safety officials develop effective flood mitigation efforts across Louisiana that take into account the different ways people might respond. In particular, risk communication initiatives that use these results to motivate flood risk mitigation behaviors should be mindful of the desired behavior at hand and the potential effects their messages may elicit. Potentially disruptive behaviors such as moving may be especially difficult to motivate across central and southern portions of the
state where cultural histories are robust and resilient (Wall et al. 2014). Yet, these behaviors may become increasingly necessary as coastal land loss continues and vulnerabilities across southern portions of the state rise. On the other hand, less disruptive but still helpful pro-environment behaviors, like supporting taxes or legislation to help mitigate flood risk, may be far more conducive for individuals highly attached to their communities (Bonaiuto et al. 2016). Finally, while eliciting negative emotions could indeed motivate individuals to take drastic risk mitigation actions, we recommend careful consideration for message framing to avoid unintended outcomes or “boomerang” effects (Hart 2014)—in addition to the questionable ethics associated with efforts to elicit negative emotions to encourage potentially disruptive behaviors.

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Declarations

Conflict of interest The authors declare that there is no conflict of interest.

Ethical approval Additionally, because this study involved human participants, we obtained human subjects ethical approval from the sponsoring university’s Institutional Review Board.

Informed consent Finally, all participants in the study provided informed consent.

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