

## Perspectives on Adaptive Capacity to Climate Change in Hazardous Environments: Insights from Broward County, Florida

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(Manuscript received 5 September 2017, in final form 14 February 2018)

### ABSTRACT

Particular social factors can limit or promote adaptive capacity and resilience in hazardous environments. Understanding these factors is essential for developing planning tools for risk reduction and response. In this qualitative study, focus groups are used to learn about homeowners' experiences with a disturbance event, as well as their perceptions and expectations regarding local climate adaptation. The analysis provides insights about how risk perceptions, insurance practices, and social networks may influence individuals' willingness and ability to cope with a disaster. Potential social limits to adaptation among participants included inaccurate risk perceptions based on experiences and feelings of helplessness, and a lack of political trust at the state level. Existing social resources that may be more formally leveraged to enhance adaptive capacity include knowledge reserves of long-term residents, strong "bonding capital," and trust in local, nonelected government employees. The study concludes that social dimensions of adaptation, including individuals' values, beliefs, and social norms, can have a powerful influence on the effectiveness of local adaptation planning in the face of hazards and global environmental change.

### 1. Introduction

Natural hazards are the result of a complex interaction of physical and human forces that are either amplified or ameliorated by various social, economic, and political influences (see, e.g., [Mulilis and Duval 1995](#); [Oliver-Smith 1996](#); [Quarantelli 1997](#); [Wisner et al. 2004](#); [Hartman and Squires 2006](#); [Montz et al. 2017](#)). As such, addressing the social and cultural aspects of hazards, in addition to technical and physical elements, is imperative for risk reduction during all phases of a disaster from mitigation and preparedness to response and recovery ([Nakagawa and Shaw 2004](#); [Heyd and Brooks 2009](#); [Aida et al. 2013](#)).

The modern disaster paradigm defines a disaster not by the source of physical damage but rather by the coping patterns, inputs, and outputs of social systems ([Birkmann 2006](#); [Perry 2007](#)). For example, research supports that cooperation and trust between governments and civil

society promotes the legitimacy and sustainability of climate adaptation strategies ([Adger 2003](#)). Moreover, [Fleming et al. \(2014\)](#) posit that social norms, networks, attitudes, and reciprocity of individuals in a community can be key factors in both economic and social recovery following a disaster event. When studying the social dimensions of hazards, then, investigating how a community has dealt with the various phases of a discrete disaster can provide valuable lessons for continuous, large-scale disasters. For example, compared to climate change, hurricanes occur at much smaller spatial and temporal scales. However, impacts to climate-related extremes, like hurricanes, can "reveal significant vulnerability and exposure of some ecosystems and many human systems to current climate variability" ([IPCC 2014a](#), p. 7).

Our research draws from the theoretical works of [Adger et al. \(2009\)](#) and [Abramson et al. \(2015\)](#), using focus groups to assess qualitatively the following questions: 1) How can climate adaptation and disaster resilience be constrained by individual and social characteristics, such as trust and risk perception? 2) What community and social

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resources can promote individual and/or community adaptive capacity? While specific results are limited to our study sample, this work adds to the body of knowledge about disaster resilience by contextualizing theories about the value of social resources and applying them to a study of a geographic location that is particularly hurricane-prone. In doing so, this study aims to bridge the gap between theoretical understandings of adaptive capacity and the lived realities of those who have experienced disaster events. While previous research has investigated levels of preparedness during the 2004 and 2005 hurricane seasons in Florida (Baker 2011), the qualitative study of social variables (such as perceived and expected risk, and previous disaster experience) to understand *why* people make particular choices in hazard scenarios remains less explored. This type of information is essential for disaster managers and other authorities to promote decision-making practices that integrate lived experiences to more effectively reduce risks, and to improve theories about adaptive capacity and disaster response.

## 2. Background and theoretical framework

### a. Adaptive capacity

Adaptation comprises two components, adaptive capacity and adaptive action (Pelling 2011). Adaptive capacity has been defined as “the ability of systems, institutions, humans and other organisms to adjust to potential damage, to take advantage of opportunities, or to respond to consequences” (IPCC 2014b, p. 118). Building adaptive capacity can both reduce vulnerability and enhance a system’s overall resilience while also considering the diversity and distribution of resources and facilitating the visioning of multiple futures to address uncertainty (Brown 2011). The relationship between adaptive capacity and action is iterative: capacity drives action, which can either promote or inhibit future adaptive capacity (Pelling and Zaidi 2013). Along with the concept of resilience, adaptive capacity is a central concept in discussions about natural hazards, including climate change.

### b. Social limits to adaptation

Studies frequently highlight ecological, physical, economic, and technological variables as factors limiting adaptation (Adger 2003). However, lesser explored social limits to adaptation are equally or more important than the technical and physical considerations (Mullis et al. 2001; Tobin and Montz 2004; Haque and Etkin 2007; Torres and Alsharif 2017). Based on their interdisciplinary review of the extensive, existing scholarship about

the sociocultural character of adaptation, Adger et al. (2009) propose (among other things) that individuals, and the societies they comprise, act based on social and cultural norms and values. This idea echoes the principles of Mullis and Duval’s (1995) person-relative-to-event (PrE) model showing that people’s disaster preparedness is linked more closely to personal circumstances (e.g., sense of responsibility and access to sufficient resources) than to the potential magnitude of a disturbance. Hence, individuals’ beliefs, preferences, self-efficacy, and sense of control combine with risk perceptions, past experiences, norms, and values to determine individual and societal limits to adaptation (Adger et al. 2009). Yet, such socially constructed limits to adaptation are not fixed, and can often be overcome once they are identified (Adger et al. 2009).

### c. Resilience activation framework

Abramson et al. (2015) further explore how limits to adaptation can be overcome with their resilience activation framework (RAF). The RAF is intended to improve access to social resources, thereby promoting positive adaptation (Abramson et al. 2015). Such access to resources can be essential in disaster preparation and adaptation since a person is more likely to “engage in problem-focused coping” (Mullis and Duval 1995, p. 1321) if they perceive their resources to be sufficient (Mullis and Duval 1995). While the RAF emphasizes mental and behavioral health for individuals exposed to risk, this study expands its application beyond mental health to encompass the concept of resilience as it is used in disaster and climate change research. In these fields, resilience has been defined as “the capacity of social, economic and environmental systems to cope with a hazardous event or trend or disturbance, responding or reorganizing in ways that maintain their essential function, identity and structure, while also maintaining the capacity for adaptation, learning and transformation” (IPCC 2014b, p. 127). Despite the different outcomes emphasized, the RAF remains highly relevant to this study due to its focus on the interplay between community and individual resilience attributes to access or engage social resources (Fig. 1).

## 3. Methods

To understand what characteristics influence adaptation policy and adaptive capacity in Broward County, Florida, 22 homeowners from the cities of Dania Beach, Hollywood, and Fort Lauderdale participated in a series of semistructured focus groups. The study was approved by the University of South Florida’s Institutional Review Board (CR2\_Pro00021425). Dania

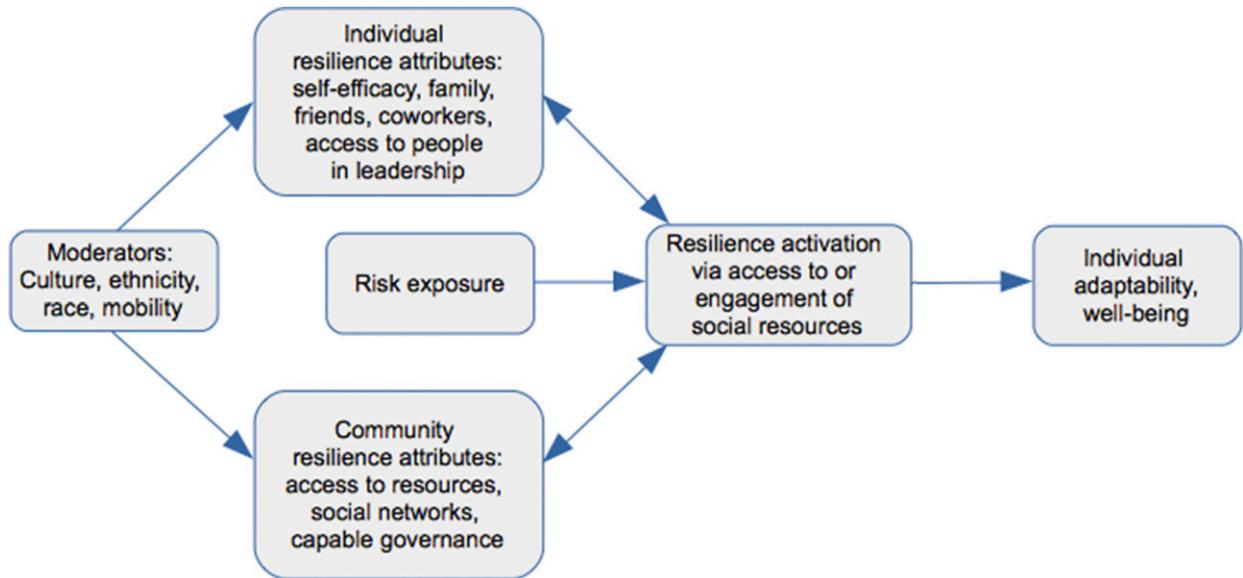


FIG. 1. Modified resilience activation framework. Conceptual model adapted from Abramson et al. (2015, p. 45).

Beach, Hollywood, and Fort Lauderdale are adjacent cities in Broward's southernmost coastal region, and were among some of the hardest hit when Hurricane Wilma struck in 2005 (Fig. 2). Although the hurricane made landfall as a category 2 storm, it was the fifth costliest hurricane to strike the United States at the time (Torres and Alsharif 2016).

Homeowners (including condominium unit owners) were selected as the target population rather than renters since they were assumed to be more willing and able to invest in adaptive actions to cope with potential future disturbances (Mulilis et al. 2000). Additionally, homeowners were assumed to provide an accessible pool of eligible participants, especially since this study sought longer-term residents with a history of hurricane experience who lived in Broward at least since the time Wilma struck in 2005.

To recruit homeowners for focus groups, "gatekeepers" from city and county governments were reached via e-mail or phone to provide contact information for civic groups or other local organizations whose members might be eligible and willing to participate. Similarly, homeowner association presidents were also contacted via publicly available information and asked to reach out to members, and advertisements were also posted in print and online in local news outlets including the *Sun-Sentinel* and *New Times Broward*.

Five 1- to 2-h focus groups were conducted in late July and early August 2015. Two focus groups, one in the morning and one in the afternoon, were scheduled for each city to create opportunities to meet different homeowners' availabilities and convenience. Homeowners

could attend a focus group in whichever city they preferred, yet most chose to participate in the one located in their city of residence. Only one focus group was held in Dania Beach, due to the low response rate there. With 14 participants, Hollywood had the highest participation rate. Twenty-two homeowners participated in all, with seven participants in the largest group, and three in the smallest.

Focus groups were advantageous for collection of qualitative data because they allowed direct and immediate interaction with respondents and promoted exchange and debate among the participants (Stewart et al. 2007; Gomez and Jones 2010). Since Hurricane Wilma occurred nearly 10 years prior to the focus groups, such active discussion was intended to help reignite memories about the event.

A semistructured questionnaire was utilized to elicit information about postdisaster recovery and redevelopment, climate and sea level rise, perceptions of adaptations on a personal scale, and awareness of adaptation efforts across various levels of governance, including mitigation and preparation phases of disaster planning (Fig. 3). Focus groups were video and audio recorded with consent, and then transcribed for analysis.

Transcripts of the focus groups were uploaded into a qualitative analysis software program, MAXQDA, for initial exploratory analysis. Then, transcripts were examined in detail by a single coder, highlighting substantive statements from participants. Content was considered substantive if it comprised a coherent statement relevant to the research agenda, as opposed to tangential conversation, requests to repeat a question, and so on. After reading and highlighting transcripts,

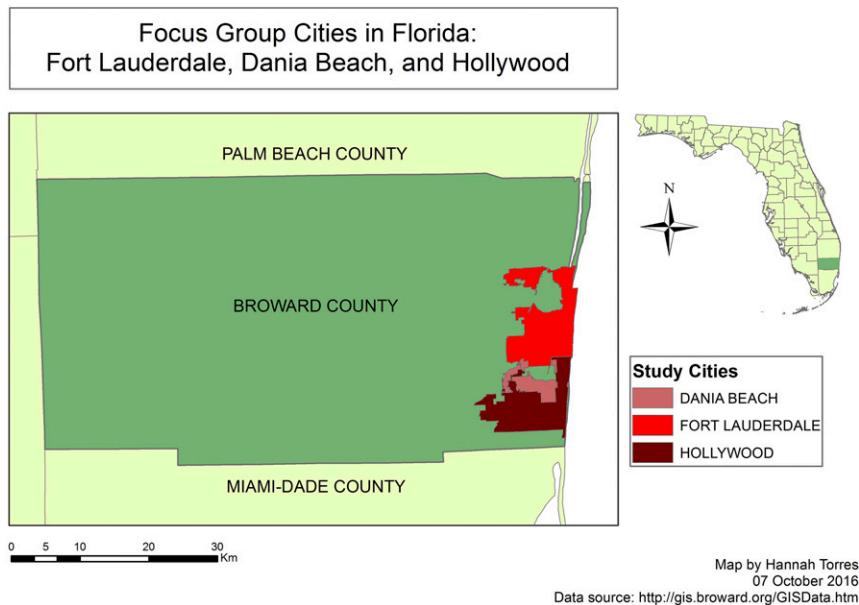


FIG. 2. Focus group study area. Participants included homeowners from Fort Lauderdale, Dania Beach, and Hollywood.

they were reread and segments were categorized into themes created using Mayring's (2000) step model of inductive category development.

Of the 22 participants, 5 were male and 17 were female. A comparison of the demographic traits of the participants in the focus group and census data revealed that 68% of participants self-identified as white, versus

the nearly 39% of white, non-Hispanic residents in Broward, estimated by the U.S. Census for 2015. About 24% self-identified as Hispanic compared to about 28% in the county. Additionally, of the 14 participants who disclosed a household income, about 64% reported \$100,000 or more compared to the county median household income of \$51,574 (Fort Lauderdale, Dania

#### Hurricane Wilma Questions

- What was your most memorable experience during or after Hurricane Wilma? Where were you?
- How did you prepare for the storm?
  - Did you expect the storm to be as intense as it was?
- What kind of damage did you experience or see in your neighborhood afterwards?
- About how long did damage take to repair?
- Were there any opportunities for disaster relief? From whom?
  - Did you participate in any of these opportunities for relief?
  - Who participated in these relief opportunities?
- How well do you think your local government met residents' expectations for recovery after Wilma?
- How well is your local government prepared to keep residents secure if a storm like Wilma came tomorrow?

#### Sea Level Rise Questions

- What concerns you the most regarding the potential effects of sea level rise?
- What are some ways your local government is preparing for the anticipated impacts of sea level rise (including increased storm surge)?
  - In what ways are your local government's actions addressing your concerns?
- How well do you think local government is planning for sea level rise (explain answer)?
- What are you or your neighbors doing to prepare for sea level rise (or thinking about doing)?
- Where can you find resources and information you'd need to take action preparing for sea level rise?
- Who do you think should take the lead in responding to this region's coastal disasters?
- How has Wilma (or another disaster experience) affected how you feel about your local government's ability to keep residents secure against natural hazards?

FIG. 3. Semistructured interview questions.

TABLE 1. Summary of focus group results as they relate to the main research questions. Themes may limit or promote resilience and adaptive capacity, depending on the context. Note: Each point in the “resilience limiting” column poses an opportunity to enhance resilience.

Major themes	Research question 1 (resilience limits)	Research question 2 (resilience strengths)
Risk perception	Past experiences led to incorrect assumptions or expectations about storm intensity. Adaptations adopted from previous disaster experience (e.g., buried power cables to prevent wind-related power outages) would not apply to future events with different characteristics (storm surge, sea level rise). Participants perceived a lack of informational, practical resources about how to take <i>personal</i> action to prepare and adapt for sea level rise.	Past disaster impacts informed future preparations: Participants mentioned importance of having cash on hand based on post-Hurricane Andrew experience when cards could not be used, cash could not be accessed. Hurricane Wilma prompted multiple participants to install storm shutters.
Insurance practices	Insurance practices led to confusion about risk: Ability to opt out of flood insurance may falsely reduce perceived risk. Flood maps (used to determine rates) do not consider projections of sea level rise, so risk is underrepresented. Lack of trust in insurance companies' determination of rates led to lack of political trust.	Insurance increases cited as concern of sea level rise, showing potential for insurance to signal increasing risk.
Social networks	Political trust is lacking at state level; state government is perceived as unwilling to provide resources needed for climate adaptation: Capital's geographic distance from coast lessened urgency. Climate denial among state leaders hindered meaningful discourse. Politicians are perceived as shortsighted. Participants believed lobbyists and developers were prioritized in decision-making.	Participants' political trust was strongest with government actors they interacted with most often (trust with local government). Beyond family and friends, people relied strongly on social networks based on geographic proximity (neighbors) and professional connections (before, during and after). Strong local leaders are considered trustworthy and competent.

Beach, and Hollywood median household incomes for 2013 were estimated at \$49,263, \$41,291, and \$44,582, respectively by [city-data.com](http://city-data.com)). Of the 15 participants who disclosed their age range, 12 (80%) were age 55 or older compared to only about 26% of Broward residents who are 55 and older. Finally, of the 16 participants who disclosed their education level, 87.5% had earned a baccalaureate degree or higher, as compared to 30.2% for the county in 2015.

#### 4. Results and discussion

This study was guided by two primary research questions: 1) How can climate adaptation and disaster resilience be constrained by individual and social characteristics, such as trust and risk perception? 2) What community and social resources can promote individual and/or community adaptive capacity? Qualitative analysis of the focus group data revealed details underlying three recurring themes, which led to both promoting and constraining resilience activation and adaptive capacity, depending on their context (Table 1). First, there were

notable insights about how respondents perceived risks associated with both hurricanes and large-scale environmental change like sea level rise. The second theme emphasized the interplay between risk perceptions and insurance policies. Third, participants shed light on the role of social networks and political trust in the contexts of disaster preparation and recovery.

##### a. Risk perceptions

According to Adger et al. (2009), risk is one of the areas that warrants special attention when investigating the social construction of adaptation limits, because individuals' perceptions of hazards influence their behavioral responses. Risk perceptions can either enhance or limit effective preparation and response, depending on their accuracy (Haynes et al. 2008; Tobin and Montz 2009; Tobin et al. 2011). Prior experience, socioeconomic contexts, individual attributes, and individual well-being are some factors that have been considered in risk perception (Tobin et al. 2011). However, factors affecting risk perception can be difficult to pinpoint, since people often face multiple risks simultaneously,

and background risks can influence their decision-making processes (Ahsan 2014). In addition, such factors as disaster experience, social networks, and culture, among others, can lead to different outcomes serving to either amplify or attenuate risk perception depending on other intervening variables (Jones et al. 2013). The following subsections discuss how participants' perceptions of rapid and slow onset disasters influenced their resilience activation and adaptive actions.

### 1) HURRICANE WILMA RISK PERCEPTIONS

Based on responses from focus groups, most participants underestimated the threat of Hurricane Wilma, whereas in reality the storm wreaked havoc across much of Broward County, damaging homes, leveling vegetation, and leaving many residents without electricity for weeks. Some participants were not concerned because the storm was arriving from the west across land, rather than from the Atlantic Ocean to the east, so they knew storm surge would not be an issue. Others underestimated the storm because, in the words of one participant, "...they never called it more than a one or a tiny little two."

Participants also remarked that they were not adequately notified about the storm, placing accountability on meteorologists' flawed projections and on local officials who did not give notice to evacuate:

"I mean, for Andrew they were evacuating everybody from everywhere, but we didn't even get evacuated. I live right on the coast, too."

"We didn't hear anything. I mean, normally they make the people that are on the beach move when there's a hurricane coming. Nobody told us to move."

Yet, conversations with county officials revealed that evacuations are not typical for west-entering storms of this magnitude because of the reduced risk of storm surge. In this case, participants perceived the risk as less threatening because of their belief someone would have told them to leave if any damage was expected. Just two months before Wilma, many of the same participants had been evacuated from their homes for Hurricane Katrina, which caused relatively little damage in Broward, so they assumed Wilma would be less severe.

For the most part, however, people believed their experiences with previous storms led them to be more prepared than in the past. For example, one respondent commented, "Each hurricane we do something else. After Andrew we made sure we had cash in the house. Before Andrew, cash is not something that occurred to us."

When asked whether they prepared for the storm despite expectations it would be minor, multiple participants

said they had, citing the amount of time they had lived in Florida as an indicator of preparedness:

"I was well prepared for Wilma. I was born and raised in Miami, witnessed Donna, Cleo and Betsy in the 60's... My home is completely boarded up. We had a generator. We had plenty of fuel..."

"We, too, have hurricane shutters, we have gas, and we've lived here for over 40 years so we were prepared."

The implication here was either that more experience with hurricanes amplified perceptions of risk, or that more experience increased knowledge of potential storm impacts and fostered preparedness.

These results are indicative of the indirect relationship between hazard experience and risk perception which, in turn, influence hazard preparedness (Onuma et al. 2017). Importantly, these participants' stories support the idea that experiencing disaster *consequences* would more likely drive future preparedness than simply experiencing a disaster (Onuma et al. 2017). For example, if two people experienced a hurricane but only one experienced long-term power loss as a consequence, *ceteris paribus*, that person would be more likely to enhance their preparedness for future storms.

Despite being personally prepared for the immediate direct impacts of the storm, members in all five focus groups agreed they neither expected nor prepared for the aftermath's extent and time it would take to recover. While two participants had electricity restored to their condominium buildings within just two days, nearly everyone else was out of electricity for weeks, with one participant going without electricity for 26 days. Grocery stores lost power, and had no frozen or refrigerated foods to sell; gas stations had gas, but no way to access it, causing problems even for those who had gas-powered generators in their homes; stoplights were out, and roads were piled with debris, creating what many described as "scary" driving conditions.

One participant thought he was prepared for the aftermath, remarking, "...they say, you know, get three or four days of food, and that long ran out. I didn't know it was going to be... even though we had buried cables I didn't know that whatever feeding our neighborhood was probably out..."

Burying power cables was mentioned multiple times as a suggestion for reducing the risk of extended power loss in the future. One person called it "outrageous" that, unlike Europe, Florida still has above-ground cables, noting that increasing dependence on electronics is amplifying future risks associated with power loss. However, buried cables may provide a false sense of security in some parts of Broward due to the fact that

transmission structures could still be exposed. Adding to the issue of underground power cables, other participants mentioned how sea level rise and high water tables were causing problems for underground wiring.

Conversations about underground power cables provided a poignant example of the challenge of balancing short-term and long-term resiliency needs. The emphasis on buried power cables as a resilience-building solution, even in places already experiencing regular “sunny-day” flood events, reflects futurist research showing people have difficulty imagining (and therefore making rational decisions about) a future beyond 10 years (Tonn and MacGregor 2009).

## 2) SEA LEVEL RISE PERCEPTIONS

Regarding impending climate change and sea level rise, levels of concern ranged from, “I’m really, really not concerned. Not concerned at all. And I’m right on the ocean,” to “Yeah, I think it’s very serious. And I’m very concerned about it.”

Participants cited three main reasons for their own or others’ lack of concern about climate change and sea level rise. First was the assertion that hazard exposure was just a fact of life no matter where you live, so if the risk was not sea level rise, it would be something else. Next, since a major storm had not hit Broward in such a long time, the potential impacts seemed less tangible. Third, impacts were perceived as too far in the future to affect them personally and perhaps too far to impact their grandchildren. While this final reason seems to align with ongoing research into the difficulties of envisioning distant futures, it also reflects the fact that our study sample comprised older participants whose grandchildren were often mentioned to live in non-coastal settings. Hence, in this case, the lived experience of this audience would be important to consider when thinking about how to communicate sea level rise risks most effectively.

When those who were concerned about the impacts of sea level rise were asked if they had considered moving to a new place that was less exposed to sea level rise, many said no (three people mentioned they were moving, though whether that was due to sea level rise was unclear).

“You can’t beat the weather,” one participant said.

“I love where I live . . . and I do want to live there as long as I can,” mentioned a participant from another group.

However, when asked if they were doing anything to begin preparing or adapting to sea level rise, participants mentioned feeling helpless to do anything on their own, reflecting the need for communication about

not only climate change risk, but also resources to act (Mulilis and Duval 1997). Some said they had “no clue” what options existed for flood-proofing homes, and even if they did, it would not matter unless their neighbors acted, too (e.g., capping a seawall). They also believed there were no financial incentives from insurance companies to flood-proof or otherwise retrofit one’s home to reduce risk. Modifications that could reduce insurance rates were perceived as too costly to be worth it.

When participants were asked what aspects of climate change and sea level rise most concerned them, some expressed general concerns, like the disappearance of low-lying island nations and the increased rate at which the Greenland ice sheet is melting. However, most concerns were framed on a personal scale and these included flooding to property, inadequate or poorly implemented building codes, and vulnerability of elderly populations.

People’s concerns about flooding were linked to both potential damage and increasing flood insurance rates. Having lived in New Orleans during Katrina, one participant worried about increasing storm surges, while another said during rain events, floodwaters continue encroaching closer to her home. Two more people were worried about the value of investment properties, with one considering selling some Florida properties and buying property elsewhere to diversify.

A second concern was whether building codes were adequate, considering possible secondary effects of new requirements to reduce flood risks. For example, one person claimed new development was causing increased flooding to her home, since not only the structure but also the surrounding land was being elevated without adequate rainwater containment on the property. Other participants also indicated that new development negatively impacted their neighborhoods by exacerbating the incidence of flooding.

Vulnerable populations were a third concern, especially among those with elderly relatives who might be affected by intensified heat waves or flooding associated with climate change. One person specifically mentioned the need for emergency personnel to access her mother’s apartment, since she cannot take care of her mother alone. Although beyond the scope of this study, future research may explore how these or other personal concerns might be integrated into communication about risks associated with climate change and actions to prepare or adapt.

### *b. Insurance as social practice*

Insurance is one of the institutions that shapes and is shaped by humans’ physical and perceived encounters with climate (Adger et al. 2009). In the face of hurricanes, storm

surge, and sea level rise, flood insurance can be a source of economic resilience for communities, and can supplement governments' disaster relief plans (Lo 2013). According to Lo (2013), social norms are the driving factors guiding people's choice to purchase flood insurance, or to take any adaptive action to enhance resilience.

This finding was mirrored in multiple focus groups wherein participants were actively debating which, if any, optional insurance policies they should keep. When asked what they were doing differently since Hurricane Wilma, one person answered, "...it did make us, after Wilma, to cancel our hurricane insurance because it tripled in price." Then, a second participant responded, "Yeah, we're thinking about that right now." After a discussion about the high cost, and the amount of damage that would need to occur to make paying into a policy economically worth it, the second participant said, "I needed to hear that."

Although insurance was not a topic that was specifically addressed in the questionnaire, nearly every focus group had some discussion about whether it was worthwhile to purchase windstorm and flood insurance if it was not required. Some of the reasons why people were considering canceling insurance policies included: 1) high costs that seemed to exceed the amount of damage they believed was possible; 2) insurance companies' lack of "common sense" and communication regarding policies; and 3) the belief that "FEMA [...] is going to come in anyway."

For some people, however, flood insurance is not optional, and therefore not as much of a reflection of social norms as policies. People in Broward who have mortgages and live in high-risk areas delineated on a FEMA flood map—even if they rarely or never experience flooding—are required to purchase flood insurance through the National Flood Insurance Program (NFIP). An aim of the NFIP is to "alert communities to the danger of flooding" through their varying rates (FEMA 2011). Yet, discussions revealed that using flood insurance rates to alert communities to flood risks can be problematic.

For example, in August 2014, FEMA finalized new flood maps for Broward, removing about 60% of formerly high-risk land parcels from that designation and allowing those homeowners to cancel their flood insurance (Hurtibise 2014). However, their risk exposure had not necessarily changed. In fact, participants generally questioned the logic of using sharp boundaries of FEMA floodplain maps to determine risk, and their mistrust of the methods used to calculate risk could also lessen perceptions of flood risks. One participant pointed out, "There's no consistency at all. Yeah, it's frustrating [...] I have a neighbor down the street. Part of the house is in the flood zone, part of it's not. Go figure."

Moreover, even the latest maps from FEMA, which are used to determine insurance rates and building codes, do not consider projected effects of climate change or sea level rise (Childress and Worth 2016). Hence, risk of sea level rise impacts, such as increased storm surge or high-tide flooding, are surely underrepresented by flood insurance policies.

### c. *Social networks*

As with the purchase of flood insurance, resilience activation and wider adaptation choices are understood as being dependent on how social norms, networks, and interactions shape perceptions of risk (Frank et al. 2011). Bonding social capital is based on family, friendship, and locality, and it is particularly important in helping low-income or vulnerable groups adapt (Hurlbert et al. 2001; Adger 2003; Tobin et al. 2014). Networking capital refers to the weaker, nonfamilial ties between the state and civil society, which are based on trust and reciprocity (Adger 2003). The relevance of each is discussed in the following subsections. Adaptive actions are most likely to occur when high levels of networking social capital occur within a well-functioning government, creating a cross-scale synergy that promotes learning (Adger 2003; Lo 2013). As such, gaining citizens' trust contributes to the optimum performance and stability of a successful political system (Nicholls and Picou 2013). Furthermore, trust and reciprocity of the citizenry is argued to "enhance government performance, reduce corruption, and decrease transaction costs, among others" (Fleming et al. 2014, p. 1484).

#### 1) BONDING CAPITAL

Bonding capital, based on locality, clearly facilitated individuals' capacities to cope with the aftermath of Hurricane Wilma in Broward. These bonds were frequently discussed in the context of people's work, neighborhood, or condominium communities. Below are three quotes exemplifying the sense of community people experienced within these interpersonal networks:

Neighborhood: "The positive part, too, was the community. Like, I had a gas hot water heater so everybody came over to my house to get a shower. And I also had a gas dryer [...] somebody else had a gas stove, so, you know, it all kind of worked out..."

Condominium: "We're a very friendly building [...] Some people were kind enough that they walked up to those people who couldn't come out. There are people that have handicaps and they can't come out. You have to bring them things. We had runners, and that's what they did."

Work: “Weston only went out [of electricity] for a day-and-a-half, so my boss said, ‘Oh, yeah. You’re welcome [to stay at work].’ He stayed there because in Wilton Manors he was a month without power.”

One participant reported that his workplace set up bunkbeds, and provided access to a company gas station and cafeteria after Wilma struck. Another participant, president of her company, leveraged out-of-town locations to bring food, gasoline, roof repair supplies, cash, ice, and charcoal grills to their southern Florida location for employees. The company president admitted that she spent much more time preparing her workplace for a potential hurricane strike than her home, since she felt responsible for others at work.

In multiple cases, focus group participants relied on others who lived nearby to come set up their storm shutters or board up their houses, either because they were out of town or otherwise unable. After the storm, they also reported sharing electricity. Those who had gas generators would run extension cords to neighbors who would take turns plugging in their refrigerators for a couple hours.

People further utilized their social networks after the storm to make necessary repairs. After Wilma, it took years for many people to completely restore their homes, yet some participants were able to leverage some nonfamilial, nearby social network ties to get repairs done more quickly. For example, one person’s neighbor was a roofer, and helped them get new roof tiles, and another was able to forgo dealing with their insurance for roof repairs since a friend had extra tiles. A third person knew trusted contractors through his workplace, and roof repairs were completed in just two months.

After learning of the ways participants relied on friends and family before, during, and after Hurricane Wilma, one might question how those without nearby ties could cope with a disaster. Hence, after Wilma a registry was created to locate vulnerable populations. Although, one participant remembered visiting a 55-and-older community to help deliver supplies after the storm, commented on some potential limitations of the Vulnerable Populations Registry:

“I was surprised. Some people really, really needed to have supplies delivered to them. Not everybody did, but there is a need out there and I’m not sure all of them would register for the [Vulnerable Populations Registry] program or even know about it. So it’s important to know where the pockets of vulnerable people live, and then approach them in a way that they’ll take the stuff. I mean, some people are just proud and it gets tricky, but there were a lot of people in that development area that were isolated.”

Another participant described people’s lack of nearby family and isolated neighborhood situations as “scary” since people could be so vulnerable. She also noted that residents in rental housing are probably most vulnerable since their preparation options are limited. For example, some places do not allow residents to put up plywood or attach accordion shutters to the outside of their windows because “they don’t look aesthetically pleasing.”

## 2) POLITICAL TRUST

Focus groups also revealed insights about networking capital, as indicated by participants’ comments about trust and communication with different levels of government. According to [Nicholls and Picou \(2013\)](#) political trust is distinct from interpersonal trust since it reflects expectations of what government should do and how they should do it.

Based on focus groups, homeowners’ political trust was strongest with government actors they interacted with most often, like workers and staff:

“I do think that the workers themselves go beyond. I mean the firefighters and the local response people in Hollywood have been wonderful whenever I’ve called them [. . .]. They show up in no time at all. So there is a level of community which is absolutely great.”

Focus group members were also generally pleased with local governments for changes being made to reduce impacts of future hurricanes. Many people noticed gas stations, supermarkets, and condominiums equipping themselves with backup generators, and one participant had even toured the county’s hurricane operations center, saying he was “really impressed” and “the county is ready.”

When asked more generally about coastal hazards, including sea level rise, participants commended Broward County for taking a leadership role as a steward for adaptation, while acknowledging certain limitations, like their reliance on cities for implementation and higher levels of government for funding. Yet many homeowners were pleased the Southeast Florida Regional Climate Compact was “leading the nation in trying to be ready [for sea-level rise],” noting, “we’ve got, in Broward County, some really great leaders trying to put into place something that’ll help us out.”

While local staff were perceived as trustworthy, “politicians” were described as shortsighted, “thinking just right now and the next two years of their election cycle.” The most often cited example of shortsightedness was the continued issuance of building permits along high-risk coastal areas. In fact, four out of five focus groups brought up the issue of development in already densely built areas, and one group felt especially strongly that “the

developers own the city.” At least two participants also believed lobbyists’ desire for more, cheaper development was hindering building codes from improving.

As scales of governance increased from county to state, participants’ trust appeared to wane. While people felt that cities’ resources were too limited to take adaptive actions, many people did trust the county to take the lead in responding to coastal hazards because they have seen action taking place at that level. Participants had little faith in the state government, however. Some referred to the governor as being “up there” on the list of climate deniers, mentioning reports his ban on the terms “climate change” and “global warming” in government documents.

There was also a belief the state government in Tallahassee simply did not care about sea level rise because, in the words of one participant, “The state government is in Tallahassee and they’re really not concerned with the beach.”

Two participants in different groups also mentioned Amendment 1 as evidence the state could not be trusted with environmental issues. In November 2014, about 75% of Floridians voted to set aside a third of the tax revenues from real-estate stamps to acquire and restore conservation lands in the Everglades. While many state legislators insist that money is being spent in accordance with the intentions of Amendment 1, some participants felt betrayed:

“...they took that [money], and it was supposed to be this tremendous amount of money to protect land and freshwater. And they just completely ignored the public.”

Hence, local actors, specifically at the county level, appear to have more perceived legitimacy than state actors, according to focus group participants.

## 5. Conclusions

This article set out to demonstrate the importance of integrating specific social contexts and lived experiences into the operationalization of disaster response and resilience theories. The research provides insights from a limited study sample about particular individual and social resources that could limit adaptation or adaptability, and others that could promote adaptive capacity and resilience activation. Twenty-two focus group participants from three coastal cities in Broward County shared their experiences with Hurricane Wilma, as well as their perceptions of local climate adaptation efforts.

Based on focus group discussions, risk perceptions, insurance structures, and social networks were three components that shaped the capacity of participants to deal with community-level hazard impacts. Specific factors within these themes that could limit adaptation in the

study areas included the following: inaccurate risk perceptions based on false assumptions or feelings of helplessness; lack of transparency and inaccurate representations of risk in insurance policies; and lack of political trust at the state level. On the other hand, factors that enhanced individuals’ disaster preparedness and coping ability that could also promote their broader adaptive capacity included knowledge reserves of long-term residents, like their local experiences with hurricanes or climate change; the sense of community in workplaces, condominiums and neighborhoods; and positive perceptions of many nonelected, local government employees.

While these findings are specific to the limited study sample, this research has implications beyond the study area, since it highlights the important role of individuals’ values, knowledge, and lived experience for enabling community adaptation. Our findings also add depth to previous research about the role of social variables in hazard scenarios. By eliciting how different context-specific variables affect people’s willingness or ability to prepare, adapt, or recover, planners and managers can develop more effective strategies to adapt to future disturbances, change, and uncertainty at a community scale. While our research has provided an indication of how certain factors might influence adaptive capacity, further research is necessary to explore how social networks and social capital can be used to enhance individual and collective action to mitigate the increasing risk associated with climate change in southern Florida. Future research should also expand into other cultural contexts to parse out how hazard planning could better reflect individuals’ risk perceptions and decision-making strategies.

*Acknowledgments.* The authors would like to thank the anonymous reviewers and the editor for their constructive comments, which greatly improved the quality of this manuscript. Thanks also to the research participants, as well as Jason Liechty, Dan Murphy, and Lorie Mertens-Black, who helped coordinate focus group venues. This project was partially funded through a research fellowship from the Fred L. and Helen M. Tharp Endowed Scholarship Fund from the University of South Florida.

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