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We Will Rise No Matter What': Community Perspectives of Disaster Resilience Following Hurricanes Irma and Maria In Puerto Rico

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'We will rise no matter what': community perspectives of disaster resilience following Hurricanes Irma and Maria in Puerto Rico

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ABSTRACT

Category 4 Hurricane Maria made landfall in Puerto Rico on 20 September 2017 and ploughed across the territory with sustained winds of 155 mph. Just two weeks earlier, category 5 Hurricane Irma had struck the island already damaging critical infrastructure making Hurricane Maria even more devasting. The hurricanes caused catastrophic damage, resulting in the largest and longest response to a domestic disaster in the history of the United States. This paper explores the recovery process in Puerto Rico using a community resilience lens. The study examines narratives, the media environment, trusted sources, and information preferences following the crisis. Community workshops, interviews, and focus groups reveal indicators of resilience in Puerto Rico alongside areas for improvement. Theoretical contributions discuss the role of identity, sense of place, and the impact of culture on community resilience. Practical contributions touch on messaging, acknowledging infrastructure vulnerabilities, and the importance of strengthening community relationships.

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On 20 September 2017, category 4 Hurricane Maria made landfall in the southeastern part of Puerto Rico as it plowed across the territory with sustained winds of 155 mph. Maria arrived only two weeks after the eye of category 5 storm Hurricane Irma passed north of the island, leaving about two-thirds of Puerto Rico's population without power and one-third without clean water (Scott, 2018). The hurricanes severely damaged public buildings, commercial businesses, residential homes, cellular sites, and transportation systems. The catastrophic damage resulted in a humanitarian crisis in which 2975 residents lost their lives (George Washington University [GWU], 2018). An estimated 130,000 people left Puerto Rico after the hurricanes (Sutter, 2018).

The resulting government response became the largest federal response to a domestic disaster in the history of the United States (U.S. Federal Emergency Management Agency

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[FEMA], 2018). Due to an active hurricane season and a stretched federal budget, Puerto Rican officials experienced challenges procuring aid from other states, and Puerto Rico's geographical distance from the contiguous United States complicated matters (Government of Puerto Rico [GPR], 2018). During the devastation, Puerto Rican residents struggled to access adequate medical care, many lost their jobs, schools were closed, and they lived in damaged homes or shelters while access to electricity, food, water, and other necessities remained scarce.

Several years following the hurricanes, the recovery is far from complete. In August 2018, Puerto Rican officials submitted a congressionally mandated strategic plan describing desired investments totaling $139 billion dollars to ensure the future of Puerto Rico (GPR, 2018). As of December 2021, Puerto Rico received over $22 billion dollars with nearly $77 billion dollars allocated to date (Central Office for Recovery, Reconstruction, and Resiliency, 2021). Estimations for Puerto Rico's complete recovery range anywhere from a couple of years to well over a decade (GPR, 2018).

This paper explores the community resilience in Puerto Rico during the recovery phase as related to perceptions of communication from community leaders and residents following Hurricanes Irma and Maria. Findings from community workshops, focus groups, and interviews are used to draw conclusions about the state of Puerto Rico. This work was completed prior to additional disasters affecting Puerto Rico, including earthquakes and Coronavirus (COVID-19).

Community resilience and disasters

Norris et al. (2008) define community resilience as 'a process linking a set of adaptive capacities to a positive trajectory of functioning and adaption in constituent populations after a disturbance' (p. 131). Following a disaster, communities experience some transient dysfunction; while the disaster impacts diminish for most people over time, some communities may be chronically impaired (Norris et al., 2008). Imperiale and Vanclay (2016) state, 'disasters provide dramatic situations in which affected local communities reveal extraordinary capacities to re-imagine and re-design their structures and processes to survive' (p. 206). Resilient communities are those whose members can either return to pre-disaster levels of functioning or ultimately exceed previous levels of functioning by establishing 'new trajectories' (Fois & Forino, 2014, p. 735). A resilient community can ultimately move forward following a disaster (Houston et al., 2015).

Cutter et al. (2014) argue certain communities exhibit some pre-disaster antecedent conditions, including housing/infrastructure and economic capital, and community vulnerabilities (e.g. economic and physical), which may predict the likelihood communities will experience resilience following a crisis. Spialek and Houston instead (2019) argue 'disaster communication processes can exert a stronger influence on community resilience perceptions than do even the individual sociodemographic characteristics of community members' (p. 14). Rather than position community resilience as an inherent characteristic of the community, 'communities that the media or individuals characterize as resilient are collectivities that interact successfully to adapt to changing circumstances, situating resilience not as a community characteristic but as an interactional process and strategy' (Buzzanell & Houston, 2018, p. 3). Therefore, communication scholars position

the interaction and communicative processes between community members as the central component of community resilience rather than economic or physical attributes of the community.

Buzzanell and Houston (2018) state 'resilience operates as a process embedded or situated in everyday life at ordinary moments of loss as well as at extraordinary and profound disruptions caused by war, disaster, death, and mass violence' (p. 2). Buzzanell (2018) argues resilience is often caused by a trigger point resulting in a disruption (i.e. a disaster event). Trigger points can vary in their permanence (e.g. the reversibility of the event), frequency, and their predictability. Buzzanell (2010) contends 'human resilience is constituted in and through communicative processes that enhance people's abilities to create new normalcies' and 'the construction of resilience is a collaborative exchange' from individuals at varying levels of a community (p. 9). She reasons resilience is experienced in stages, including creating a new normal through communicative discourse, affirming identity anchors, maintaining community networks, employing alternative logics, and downplaying negative emotions while focusing more on positive ones.

Spialek et al. (2016) revealed residents perceived their community to be more resilient when they could converse with neighbors and access media coverage of the disaster event. The greater the amount of disaster communication surrounding a disaster event, the more likely a community would consider itself to be resilient. Further, communication and coordination among community organizations and neighbors following a disaster enables the 'reconstitution of community connections' (Lee et al., 2020, p. 450). Additionally, community members who support others following a disaster often experience enhanced perceptions of relational ties to their communities (Li et al., 2019). Buzzanell (2010) calls for scholars to be more attuned to the role of narrative and storytelling in resilience. Based on her positioning of narrative in resilience, we ask:

RQ1: What types of narratives are shared by residents following the disaster?

Houston et al. (2015) offer a communication-centric framework for reconceptualizing community resilience. Houston et al. (2015) focus on (1) communication systems and resources, including traditional and social media, communication infrastructure, official sources of information (i.e. government entities), and unofficial sources (i.e. citizens and other organizations). Next, attention is given to (2) community relationships (3) and community attributes (i.e. diversity and equality). Finally, the framework includes (4) strategic communication processes, which encompasses four subcategories spanning (a) communication competence (i.e. community planning and community action), (b) disaster and risk processes (i.e. disaster and risk information dissemination, disaster response coordination), (c) community narratives, and (d) communication and economic development (Houston et al., 2015). Similarly, Norris et al. (2008) describe (1) community competence, (2) economic development, (3) information and communication, and (4) social capital as core components of community resilience. Within Norris et al.'s (2008) information and communication category, the authors include subcategories such as (a) narratives, (b) responsible media, (c) skills and infrastructure, and (d) trusted sources of information.

Community resilience is ultimately a collective act that highlights the adaptive nature of the community (Houston, 2018). Additionally, responsible (or irresponsible) media

can heavily shape preparedness, response, outside perceptions, and recovery from disasters (Houston, 2018; Norris et al., 2008). As Houston (2018) and Norris et al. (2008) encourage scholars to consider how individuals access and interact with media and disaster information, we ask:

RQ2: How do media foster community resilience following the disaster?

Finally, Houston (2018) implores scholars to consider the interplay between communication systems, resources, and disaster information use by audiences. Therefore, we ask:

RQ3: Where do individuals impacted by the Hurricanes seek information?

Methods

We collected qualitative data using community workshops, interviews, and focus groups. We employed a master protocol to manage data collection activities. All research activities received Institutional Review Board approval (IRB) (FWA00003425, effective until 22 June 2023, study number 2018-0291) from RAND's Human Subjects' Protection Committee and required informed consent from participants.

For this study, we define the island of Puerto Rico as the focal community. This conceptualization is appropriate given the extensive damage across the island's 78 municipalities (FEMA, 2018). Expecting that some municipalities would experience unique challenges given their location, terrain (e.g. coastal or mountainous), population level, and poverty rates, we collected data from diverse municipalities across the island. In total, we collected data from participants in over 30 municipalities in Puerto Rico. Next, we describe data collection activities, including community workshops, community interviews and focus groups, and subject matter interviews.

Community workshops

In collaboration with the University of Puerto Rico (UPR), we organized two half-day community workshops in San Juan ($n = 29$) and Ponce ($n = 17$) in June 2018. San Juan and Ponce were selected to provide geographic diversity. UPR recruited participants via word-of-mouth and through physical flyers posted throughout San Juan and Ponce. Individuals at least 18 years or older who were in Puerto Rico when the hurricanes made landfall were eligible to participate. The workshops offered an opportunity to obtain community assessments from residents concerning the challenges following Hurricanes Irma and Maria. We conducted the workshops in Spanish, and participants completed the workshop activities in small groups.

UPR facilitators led small group discussions and guided participants through five activities. The activities elicited information important in understanding resilience, including community development, recovery planning, prioritizing resources, and improving communication. For example, one activity asked participants to complete a sample weekly calendar depicting their lives before and after the hurricane. Another activity requested individuals describe their trusted sources of local, national, and international news. Data were collected from completed participant worksheets and from the researchers' summaries of small group discussion notes.

Community interviews and focus groups

Puerto Rican residents

In collaboration with a local nonprofit organization, facilitators conducted 20 resident focus groups ($n = 8$–12 residents per focus group) in April and May of 2018. We conducted each focus group in a different municipality. Simultaneously, we completed interviews with Puerto Rican residents ($n = 31$). Focus group locations (i.e. identifying specific municipalities) were selected to achieve a geographically diverse sample of municipalities throughout Puerto Rico (e.g. a mix of coastal vs. interior, urban vs. rural, lower vs. higher poverty rates, etc.). Deeply rooted in the communities, the local nonprofit used existing networks and contacts to recruit focus group participants. The focus groups and resident interviews explored the experiences of residents, their perceptions of challenges to the recovery, and potential solutions. We conducted focus groups and interviews in Spanish which ranged in length from 60 to 90 minutes. Focus groups and interviews were recorded, translated by certified translators, and transcribed.

Puerto Rican outmigrants

We conducted two focus groups in Miami, Florida and two focus groups in Orlando, Florida with Puerto Rican outmigrants ($n = 9$ per focus group) in April 2018. We recruited participants by partnering with community and religious leaders and organizations. Adult participants were eligible if they migrated to Florida because of the hurricanes. Outmigration is typically defined as movement between different parts of a country or home territory (e.g. moving from Puerto Rico to the mainland). The outmigrant focus groups examined the challenges of former Puerto Rican residents following their migration to Florida. Including outmigrants ensured that former residents, who may have left due to extreme hardship, were represented. The focus groups were conducted in Spanish and ranged in length from 90 to 120 minutes. Focus groups were recorded, translated by certified translators, and transcribed.

Subject matter expert interviews

We interviewed subject matter experts (SME) ($n = 15$) in government agencies, academic institutions, and private and nonprofit organizations that assist with disaster planning, recovery, or preparedness services. We conducted SME interviews with adult participants from March to June 2018. SMEs did not need to be present on the island during the hurricanes. The SME discussions were guided by community resilience theories and the need to understand current risks, challenges, and needs in Puerto Rican communities. Interviews were conducted in either Spanish or English as per interviewee preference. Interviews were recorded, translated by certified translators, and transcribed.

Data analysis

Community workshops, interviews, and focus groups composed the data set for this study. Each data source was used to answer each proposed research question. All data were analyzed using content analysis and Qualtrics or Dedoose analysis software (Qualtrics, 2019; Dedoose, 2019). Research team members entered the community workshop

data into Qualtrics survey software where descriptive information could be collected from participant worksheets. In total, 46 participants completed worksheet activities during the workshops, and their responses were explored in Qualtrics.

All interview and focus group data were analyzed using Dedoose. We created a codebook to identify instances of community resilience (Norris et al., 2008; Houston et al., 2015). A priori codes derived from Norris et al.'s (2008) framework and Houston et al. (2015) included: (1) narratives, (2) ethical communication, (3) communication and infrastructure, and (4) sources of information (see Table A1 in the appendix for an overview of the full codebook). We relied on Ritchie and Spencer's (1994) framework analysis technique. The framework analysis technique allows for the identification of both a priori issues, or those informed by the original research aims and established literature, along with emergent issues raised by the respondents along the way (Ritchie & Spencer, 1994).

The authors met to discuss the codebook and clarify definitions. We coded a small number of transcripts to establish interrater reliability using the training function in Dedoose. The team tested the code application by calculating a Pooled Cohen's Kappa coefficient and Cohen's Kappa for each code. The team met three times, discussed discrepancies, and established new tests until each coder exceeded a Pooled Cohen's Kappa coefficient of .7 or higher. While there are multiple ways to evaluate the significance of a Cohen's Kappa value, Landis and Koch (1977) suggest a score of .61-.8 is within a range of good agreement. With an acceptable agreement in place, each author coded a subset of the transcripts with one author coding about half of the total interviews and focus groups.

In total, we analyzed 68 transcript files and generated 909 excerpts of text relevant to this study. Fourteen codes (see Table 1) were applied 1397 times in the files. Themes were identified through both repetition and distinctiveness. For example, while we rely on descriptive counts of identified codes to constitute themes, we also recognize counter perspectives, unique opinions, or otherwise noteworthy content could be important for understanding community resilience in the recovery phase following Hurricanes Irma and Maria.

Results

Direct accounts from participants offered a unique perspective on community resilience in Puerto Rico during the spring and summer of 2018. This analysis included community residents, SMEs, individuals on and off the island (i.e. outmigrants), and 30 municipalities spanning interior, exterior, rural, and urban communities.

Narratives

The first research question investigated what narratives, if any, were shared following the disaster. Three prominent themes emerged during analysis, including prospective, retrospective, and Puerto Rican identity narratives. Prospective narratives are defined as stories shared by participants, framing the individual as a survivor, triumphant, and/or rising to a challenge. Retrospective narratives are defined as stories shared by

participants, framing the individual as beaten, downtrodden, or fearful. Identity narratives shared by participants are specifically tied to what it means to be Puerto Rican.

Prospective narratives

Participants shared examples of communities working together after the hurricanes to repair the damage, attend to residents in need (i.e. those with medical conditions, children, and older adults), and survive when assistance from the government and/or emergency responders did not arrive. For example, a resident shared that community members persevered and helped each other. Living near the beach, the resident stated, 'there was a lot of damage' but 'nevertheless, we're ready to fight; ready to battle this and we're pulling through little by little' (Luquillo focus group). Continuing, the participant said those who suffered less helped those who 'had it worse'. Another individual noted the emotional, spiritual, and social crisis was immense, 'but at the same time, like in every other place, the community united. We got together and were able to work and help others' (Maunabo focus group). Another resident stated the community came together to contribute to the emergency response:

> With everything we lived through, we have gotten stronger and with more capacity and training, we could do much more. I understand that in Puerto Rico, there were efforts in the community, and I consider this as something that will repeat itself. We will rise no matter what. (Ponce interview)

We found prospective narratives shared by both Puerto Rican residents and by those on the mainland (e.g. SMEs and outmigrants). Considering the total number of prospective narrative codes applied ($n = 108$), assessing the total number of cases in outmigrant vs. resident stories is about equal ($n = 102$ vs. $n = 6$) after normalizing the proportions of outmigrant vs. resident content (i.e. total number of transcript files). However, we also found prospective narratives to be more prevalent in higher poverty ($n = 50$; 49%), rural ($n = 95$; 93.1%), and interior (i.e. landlocked) municipalities ($n = 65$; 63.7%).

Retrospective narratives

While some narratives invoke descriptions of communities coming together to rebuild, other stories capture the raw emotions of those who lost family members, homes, jobs, and the sense of familiarity of everyday life they knew before. Residents described the aftermath of the hurricanes as 'chaos', 'colorless', and full of 'suffering' (Yabucoa, Barranquitas, and Naranjito focus groups). Participants explained that basic necessities were unavailable on the island. For example, a resident in Yubucoa shared that a friend who did not prepare was 'crying because she had no food for her, her husband, or for a neighbor that was pregnant and bedridden' (focus group). Another participant said 'we were really beaten, really down. You think it and you don't want say it – thank God the priest isn't here – you say, "'Why is God doing this to me? What happened? What have we done?'" (Maricao focus group). Although residents lived through hurricanes in the past, nothing prepared them for the devastation of Hurricanes Irma and Maria. A participant whose home was damaged stated:

> We always expected one to hit, but to experience it the way we did was a really disastrous experience emotionally, physically, in every way … I was in despair, and I have my mother who's 90 years old, so going through that situation with her was really shocking. That

> situation made me want to move and leave Puerto Rico because I wasn't prepared, and I'm still not prepared to deal with something that big again … It was an experience I didn't expect to happen. (Utuado focus group)

In total, we found 107 instances of retrospective stories yielding a nearly equal number of prospective and retrospective narratives in the data. Retrospective narratives were most often shared by Puerto Rican residents ($n = 104$) when compared to those on the mainland (e.g. SMEs and outmigrants) ($n = 3$) through Dedoose's normalization function. Retrospective narratives were less prevalent in urban municipalities ($n = 8$; 7.7%) and those with low poverty rates ($n = 21$; 20.2%). Alternatively, interior and coastal municipalities accounted for a relatively balanced number of retrospective stories ($n = 44$; 42.3% and $n = 60$; 57.7% respectively).

Narratives of Puerto Rican identity

Many participants highlighted the spirit and pride of Puerto Rico residents and focused on experiences tied to Puerto Rico or what it means to be Puerto Rican. One individual noted Puerto Ricans are 'hardworking' and 'proud', because 'we want things to be our own and we're not people expecting handouts moving forward' (Florida focus group). Another former resident claimed the hurricanes helped them imagine how Puerto Rico could improve:

> It made me think in a way much more open in the possibility of growth and change and it made me expand to new levels that if Maria had not come and I had continued doing what I was doing, I would have never thought about it my life. I am very happy that Maria spanked us like she did, it is really sad what happened in many aspects, but I am happy in personal terms of opportunity and growth that I think we as Puerto Ricans have as a result of this Hurricane. (Florida focus group)

In the Lares focus group, another resident said, 'I believe that there has been a successful recovery, but it has been [because of] the personal character of the individuals or community'.

Beyond discussions of Puerto Rican pride, some participants also described stories of colonialism and neglect. Expressing frustration with the response, one participant said 'we pay for FEMA too. We're the place that pays the most taxes for FEMA when it comes to states and the colonies. They don't want to say colony, but we're a colony' (Orocovis focus group). Another participant discussed what they hoped would happen with the information they provided to the Rio Grande focus group:

> [I hope that others] remember that Puerto Rico is an island that belongs to the United States, and if they help other states, then this state deserves the same help. We are not an exception. There are people in need here. We are people who have lived here for years. We work and contribute to the U.S. We contribute to this island, and just as we contribute to the U.S., when these events happen, the U.S. should also remember that we are here and have needs.

A different focus group participant in Cayey also shared how others outside Puerto Rico may view it as a paradise or a 'democratic window of the Caribbean', but there are 'horrendous basic needs, where we still have peasants that live in shacks, where we have extreme poverty that wasn't seen by anybody'. Residents expressed frustrations as they reflected on the difficult relationship with the continental United States, a relationship

defined by colonialism and a collective sense of abandonment by the federal government when assistance was most needed.

Overall, we found 38 code occurrences of identity narratives. Identity narratives were most often shared by Puerto Rican outmigrants when viewing the data through Dedoose's normalization function. Identity narratives were more prevalent in rural municipalities ($n = 34$; 94.4%) and those with a high poverty rate ($n = 16$; 44.4%). Alternatively, interior and coastal municipalities accounted for a relatively balanced number of identity stories ($n = 17$; 47.2% and $n = 19$; 52.8% respectively).

Perceptions of media practices

The second research question considered how media fostered community resilience following the hurricanes. Three subthemes emerged concerning perceptions of ethical media practices, questionable media practices, and issues related to the communication infrastructure.

Perceptions of ethical media

Participants acknowledged that media ($n = 32$), prior to infrastructure damage, effectively communicated the severity of the impending hurricanes. For example, before the hurricanes made landfall, a focus group participant claimed news outlets and television stations 'were alarming everyone' (Luquillo focus group). Another individual described how Puerto Rican Governor Ricardo Rosselló Nevares instructed residents on television to 'prepare, because what is coming is strong' (Yubacou focus group). The participant claimed, 'he said we must prepare because this one will be strong'. Participants shared that they received instructions related to hurricane preparation, including the importance of storing water and food, installing hurricane panels (i.e. to secure windows), remaining indoors during the hurricane, and anticipating electricity and diesel shortages (Barranquitas focus group, Utuado interview, Naranjito interview, San Juan interview, Aguas Buenas interview). After the hurricanes, communication became more difficult. However, participants noted that some municipalities relied on a speaker system and 'physical communication system in which [they] visit person to person' (Yauco interview).

Perceptions of questionable media practices

Fewer examples of perceived instances of questionable media practices were present ($n = 25$), but an overarching concern emerged related to media reports of mortality. For example, one focus group participant from Patillas stated:

> So you announce it, you're so barbaric that you announce it and even put it on TV, but you don't say the names or last names so I'm able to know if they're my people. Well, don't scare me. You're scaring me and you're not giving me the whole information.

Another focus group participant from Cayey claimed the television stations in Puerto Rico 'exaggerate and scare people'. Another participant from Guayama, felt there was an 'excess of sources of information'. This was particularly true when media entities were referencing multiple authorities including the national weather service, the Governor, the police superintendent, and the Emergency Management Office. Another

participant felt even though the Puerto Rican Governor was on television 'every five minutes', another spokesperson would have been more appropriate because 'he [the Governor] is not an expert on hurricanes' (Ponce interview). Whether it was sensationalized reporting or a glut of information, some residents and non-residents were displeased with aspects of the media practices during the hurricanes.

Additionally, participants provided several problematic examples of media inaccuracies ($n = 37$) as information evolved during hurricane reporting. For example, in the past, media frequently reported on hurricanes that redirected or dissipated before reaching Puerto Rico. Relatedly, when a hurricane did reach the island, the damage that it caused was never as bad as initially anticipated. A focus group participant from Maunabo shared 'because there were so many announcements [of hurricanes that didn't arrive], we did like in the children's stories, "here comes the wolf"'. An outmigrant, residing in Florida, said that 'sometimes they say a really strong storm is coming, but when it gets here it's nothing'. Concerning underreporting potential damage, a Guayanilla resident remembered that it wasn't until 'hours before' that media shared that Hurricane Maria would be a category five (focus group). At that point, it was too late to take additional protective actions.

Communication infrastructure

Predictably, participants reported almost triple the number of inadequate infrastructure examples ($n = 129$; 74.1%) compared to examples of 'adequate' infrastructure ($n = 45$; 25.9%). After the hurricanes, residents lost access to most communication channels except for a handful of radio stations. Many residents found the lack of communication to be one of the biggest challenges following the hurricanes. One resident claimed the isolation from information 'caused more problems … on many occasions, like police station antennas, there was no secondary medium other than telephones for people to communicate. They didn't have communication themselves [referring to the police]' (Guayama focus group). Another resident in Lajas still lacked internet access seven months after the hurricanes:

> We realized one thing, that our communication system is very fragile. In a mere 24 hours, we lost everything … There are still people without electricity or water 7 months after the hurricane. In the mountains, some people are still living in this condition. It's horrible. (focus group)

Although it varied geographically, some residents lost their telephone services entirely. Following the hurricanes, the only channels available to coordinate recovery included the radio, emergency responders and/or community leaders with walkie talkies, satellite phones, vehicles equipped with an external speaker, bulletin boards in public areas, or word-of-mouth networks (San Juan and Ponce community workshops). Aside from disrupting emergency response, damaged infrastructure prevented residents from contacting their support networks. As one focus group participant in Loiza shared, 'that's what keeps us strong in those times [referring to friends and family], and I think that was one of the most significant things that happened'. Alternatively, participants discussed some infrastructure components that functioned during the response and recovery phases. One radio station stayed operational and served as a lifeline for residents; the station read notes from individuals that could call in if they were looking for someone (Patillas

focus group, San Juan and Ponce community workshops). WAPA Radio 680 AM, mentioned by name during the focus groups and community workshops, served as an essential connection following the hurricanes.

Discussion surrounding inadequate infrastructure was higher in rural municipalities ($n = 95$; 80.5%) and those with a high poverty rate ($n = 59$; 50%). Coastal municipalities and interior communities both described challenges related to infrastructure about equally ($n = 63$; 53.4% compared to $n = 55$; 46.6%). We observed a cluster of inadequate infrastructure codes in discussions from the Lajas and Las Marias municipalities, which are both interior municipalities located in the southwestern corner of Puerto Rico. Prior to the hurricanes, parts of the island, especially rural areas, had limited access to broadband services. Generally, telecommunications infrastructure is densest surrounding San Juan and the island's coastal areas where the terrain is flat. Puerto Rico's mountainous inland tends to have fewer telecommunication sites.

Trusted sources and information preferences

The final research question asked where individuals impacted by the Hurricanes sought information about recovery efforts. We explored sources of information shared by participants and coded the content as either a 'trusted' or 'distrusted' source. Participants mentioned dozens of information sources, many of them local to specific municipalities.

Sources of trust

Following the hurricanes, faith-based organizations, municipality civic agencies, the Red Cross, and other non-profits aided residents quickly (Yauco interview, Hormigueros interview, Utuado focus group). When the government could not reach municipalities, residents relied on organizations who could access isolated communities despite crippled infrastructures. For example, in Aguas Buenas:

> The Catholic Church, as I was informed, organized themselves and delivered supplies to the elderly. They mobilized along members of the community to visit. Also, I understand that the members in that community were very alert, not only about the water situation but also for any situation or necessity that the elderly might have had. They collected supplies throughout the church and delivered them to the ones who needed them most. (focus group)

An SME noted that working with institutions such as the Catholic church can be helpful because it is easier for existing institutions embedded in communities to help (interview). One participant shared they volunteered with Catholic churches in the Orocovis municipality to provide recovery assistance to residents (Orocovis focus group). Additionally, when there was confusion related to the initial response and people did not know who they could trust (especially with many mainland workers and organizations coming to Puerto Rico), a participant noted that pastors as representatives of their congregations were perceived as trustworthy (Rio Grande focus group), and pastors were not providing aid with the expectation of making a profit for their actions (Orocovis focus group). Residents across municipalities cited pastors and/or priests as essential spokespersons. Another resident from Guayanilla believed non-

profits were critical in the immediate recovery by serving as 'the ones who have really worked. Based on my experience, they were the first ones who went out in the streets' (focus group).

Community workshop participants in San Juan and Ponce provided insight to 'recommended' media sources, with some of the highest endorsed channels and sources including (1) CNN Espanol, (2) WKAQ 580 AM, (3) WAPA Radio 680 AM, (4) Catolica Radio FM, (5) Facebook, and (6) El Nuevo Dia (newspaper). Deborah Martorell, a journalist and meteorologist, was recommended by community workshop participants as a trusted source of information. Finally, we found that many participants referred to their neighbors as trusted sources of information. Neighbors are 'at the end of the day … a part of your family' (Corozal interview). Corresponding to positive narratives shared by participants, neighbors 'helped each other, providing others with basic necessities' (Luquillo focus group). Even though everything looked hopeless at first, another resident remembered the impact of neighbors when they needed help to clear their car from debris. They noted, 'we still have good people, right? We can still count on the community' (Maricao focus group).

Sources of distrust

Residents and non-residents reported overwhelming negative perceptions of local and federal government. One Patillas participant reported, 'the government has failed on many things in terms of … communicating the information'. Locally, a participant recounted meeting with the mayor and she 'never had any results, we only had to wait' (Barranquitas focus group). Another resident in Cayey claimed municipality officials 'forgot about [them]' (focus group) and an individual from Guayama suggested that mayors 'forgot to attend to the emergency' following Hurricane Irma (focus group). Further, a participant in Loiza perceived politicians did not really volunteer in their communities after the disaster, but rather, officials visited the local municipalities to be 'seen' (i.e. making an appearance) during the hurricane response (focus group).

Initially after the hurricanes, one SME shared that at first, there was a 'feeling that the federal government could be relied on', but that shifted with time. One participant noted the federal response was a 'crisis on top of another crisis', residents faced challenges related to filing insurance claims, inequal distributions of emergency money (e.g. $500 dollars), food, and water (Luquillo focus group). Another SME observed that while the federal government suggests community approaches to disaster response are implemented, there are still challenges when it comes to engaging marginalized communities in Puerto Rico (interview). For example, while many contractors performed services in Puerto Rico, 'they were hired by the federal government', often did not speak Spanish, and did not understand local needs (Rio Grande focus group). Given the history of colonial influence of the U.S. federal government, the act of sending relief workers who could not speak Spanish nor understand the needs of Puerto Ricans appeared out of touch and was irritating to residents. Participants also recalled several examples of contract mismanagement (Orocovis focus group, Rio Grande focus group). Participants concluded, 'the least suitable person to send out the message is the government, because no-one believes them anymore' (Orocovis focus group).

Discussion

Several years later, Puerto Rico is still recovering from Hurricanes Irma and Maria. At the time of data collection, participants were reeling from experiencing the life-threatening hurricanes in addition to the stresses accompanied by a challenging recovery. While some residents remain focused on what went wrong, others are ready to rebuild Puerto Rico. Most residents desire an acknowledgment of what happened and the current reality on the ground; they also seek validation that they have suffered in the aftermath of the hurricanes, and in some cases, are still suffering. But throughout many of their narratives, Puerto Ricans revealed they are engaging in community resilience by crafting a 'new normal' through the interactions and efforts to rebuild with their families, neighbors, and fellow Puerto Ricans (Buzzanell, 2010). The ways participants described fellow residents as helpful and trustworthy despite the utter devastation around them supports the arguments of Buzzanell (2010) and Houston (2018) that resilience occurs in the social and communicative processes of a community. As one community member in Loiza said, 'we each have as individuals [a responsibility] not only to lift ourselves up, but to also lift up our community'.

While instances of prospective and retrospective narratives emerged across municipality types, we did find that municipalities with indicators for vulnerability (i.e. high poverty, rural, interior) expressed prospective narratives more frequently than other wealthier, urban, and coastal counterparts. Aligned with this finding, wealthier, urban municipalities expressed fewer retrospective narratives; additionally, participants located in more vulnerable municipalities shared prospective narratives which might suggest budding resilience on the island in places where it might not be most expected. This finding reiterates Buzzanell and Houston's (2018) contention that resilience is comprised of more than economic indicators; resilience is constructed through communicative processes between people. Despite the tragedy, residents are constructing a new normal through their experiences. They are articulating the ways their fellow residents worked to assist others in need. Some even expressed that the assistance from friends, family members, and neighbors enabled them to keep going despite the suffering and loss. Responses from community members and community nonprofits reiterate community resilience is enacted through community relationships, and citizen engagement with community organizations engenders community resilience (Houston et al., 2015).

Considering a public relations perspective of community resilience (Houston et al., 2015), our results suggest media entities were responsible for disseminating information about the impending hurricanes to residents, but they failed to promote widespread preparation efforts. Participants reported fatigue from previous hurricane reporting and uncertainty as reasons for failing to take the hurricanes seriously. Literature supports the fatigue phenomenon by noting that individuals may ignore warnings if they have previously survived similar events, endured repeated warnings, or simply feel lucky (Cole & Fellows, 2008). Our findings suggest information communicated to residents prior to the hurricanes was insufficient to arouse concern and spur action. Further, participants felt evolving information reports made the situation difficult to comprehend and thereby difficult to act. Unfortunately, media entities may have hindered community resilience efforts, particularly as residents found it challenging to make sense of information.

Another ethical challenge emerged surrounding mortality reporting. Although death and injury are typically highlighted in media reports following disasters (Houston et al., 2012), this was especially traumatizing to Puerto Rican residents with limited communication who were isolated from family and friends. While the media should report data on death and injuries, journalists and other crisis communicators should be careful not to sensationalize content (Houston et al., 2012). There were also discrepancies in the mortality and injury reports across sources. Initial reports suggested less than 100 residents lost their lives, but eventually later reporting adjusted this number to nearly 3000 (GWU, 2018). As public officials on the mainland reacted to this news, some denied GWU's (2018) report, thereby further politicizing the hurricanes. The sensationalized characterizations of the loss of life hampered the recovery efforts and community resilience of Puerto Rico.

Another lingering challenge is the extensive damage to Puerto Rico's infrastructure. After the hurricanes, the entire electrical grid failed and 95% of cellular sites were damaged or destroyed (FEMA, 2018). Houston et al. (2015) and Norris et al. (2008) acknowledge the importance of infrastructure, particularly communication infrastructure, to promote community resilience. While communication services have since been restored, long-term solutions are needed to ensure disruptions in the future are minimized. Without these modernizations, Puerto Rico will remain vulnerable. Additionally, these outlets are vital in the daily interactions of Puerto Ricans. Infrastructure shortcomings impeded recovery operations and the ability of individuals to connect with family and friends, impacting the ability to seek social support and causing emotional harm. The damaged communication infrastructure negatively impacted the interactions among Puerto Ricans and prevented individuals from accessing their communication networks, which Buzzanell (2010) deems necessary for resilience.

Local and federal governments faced mounting perceptions of distrust from residents and outmigrants. Fueled by perceived government corruption and a pervasive belief in the inadequate preparation and response to the hurricanes, participants' skepticism and lack of confidence toward current and future emergency response efforts surfaced as central themes throughout this research. However, participants acknowledge that the government must play a role in responding to future disasters, including improving critical infrastructure, ensuring hospitals and schools remain accessible and operational, communicating the locations and availability of shelters and food distribution centers, and regularly updating Puerto Ricans on the status of tangible recovery objectives.

While trusted messengers like faith-based organizations, municipality civic agencies, the Red Cross, and other non-profits can amplify communication across preparedness, response, and recovery phases, they cannot replace the role of government in disaster response. In answering Houston's (2018) call for a greater understanding of the interplay of government communication in the communication systems and resources and community resilience, messages from government entities should not only provide meaningful information for obtaining resources for those affected by the hurricanes, but residents should be able to trust their government. A continued reticence and skepticism by Puerto Ricans concerning government sources will only further hamper the processes of community resilience. Additional explanation of the role of government communication in this context is discussed below.

Theoretical implications: resilience, identity, and a culture-centered approach

While Puerto Rico is a U.S. territory, it is culturally distinct from the United States. Residents and outmigrants demonstrate a shared understanding of Puerto Rican values. And unlike a hurricane that affects one quadrant of the United States, Irma and Maria devastated the entire island of Puerto Rico. The damage yielded a collective narrative across the island to rebuild and believe in Puerto Rico. Buzzanell (2010) claims in moments of resilience, individuals will often affirm their identity anchors, or the 'relatively enduring cluster of identity discourses upon which individuals and their familial, collegial, and/or community members rely when explaining who they are for themselves and in relation to each other' (p. 4). The role of the Puerto Rican identity anchor in the hurricane recovery phase aligns with Okamoto's (2020) discussion of narrative resilience that 'seeks to integrate tragedy as well as triumph' and 'is rooted in place, is heroic, and honors a pragmatic orientation' (p. 620).

This sense of resilience 'fostered by place' (Okamoto, 2020, p. 622) is evidenced through resident and outmigrant discussions of a strong Puerto Rican identity and cultural pride. Puerto Ricans view themselves as a distinct people with a unique cultural identity (Rivera Ramos, 2001). Key representations of Puerto Rican culture are shaped by Spanish and American colonization. Puerto Rico has been a U.S. territory since 1898, and since then, some residents have pushed to become a U.S. state while others have advocated for an independent Puerto Rico (Corujo, 2020). While the U.S. mainland views Puerto Rico as a commonwealth, 'many Puerto Ricans … say the island is constantly treated as a colony' (Corujo, 2020, para. 10). Especially when discussing the hurricanes, participants recounted details of Puerto Rico's colonial relationship with the United States, and they articulated their disdain for the federal government's response to their plight.

Houston (2018) encourages scholars to better understand community-specific attributes involving inequalities that could impede community resilience. Despite this urging, the experiences of marginalized voices, particularly those of subaltern communities, are often dismissed or erased from the greater discourse (Dutta, 2014). One perspective that can elucidate the experience of disenfranchised communities in resilience discourse is the Culture-Centered Approach (CCA). Kaur-Gill and Dutta (2020) describe the CCA as 'a metatheoretical framework that critiques the imbalances of power, uncovering how structures suppress the agency of those in the margins' (p. 133). Similarly, Mookerjee et al. (2021) claim, 'the nuanced interplay between culture, structure and agency becomes a lens to explore and amplify the voices of marginalized subaltern people, who have been silenced by mainstream discourses and practices' (p. 1429).

The CCA informs community resilience by highlighting the privileging and prioritizing of community voices in planning, response, and decisions for moving forward. The painful experience of Puerto Rican colonialism exists in stark contrast to the perceptions of Puerto Rican pride and capability. The residents and outmigrants believe Puerto Ricans are strong, and capable of recovery, but they also report having little faith or trust in the U.S. government following the disaster. However, engaging with and listening to the experiences of community members can engender agency with residents (Dutta,

2014), and likely promote resilience at the community level. Dutta (2014) claims listening 'is closely connected with social change' (p. 70); and, he argues 'to the extent that policy and program decisions have already been made, listening becomes a whitewashing strategy to give the perception of openness to communication with the disenfranchised communities' (p. 76). The top-down strategy in which external relief and response organizations make decisions for affected communities, rather than prioritizing and including their voices in decisions, is ineffective to serve marginalized communities (Anthony et al., 2019; Petrun Sayers et al., 2019). However, because listening 'offers an entry point to transformations of oppressive conditions' (Dutta, 2014, p. 69) in communities marred by a history of colonialism, response agencies and organizations must engage with community residents to understand greater structural forces that may also inhibit resilience.

Practical contributions

We offer several lessons for communication professionals. First, message framing surrounding a disaster must be clear and direct without sensationalizing news. Individuals need messages of self-efficacy to obtain resources and assistance following a disaster. Messages should acknowledge community member needs, provide timely information, and acknowledge collective grief and loss. More effective messages from government agencies in the future could help engender the trust of affected residents.

Second, communication practitioners must understand and acknowledge communication infrastructure vulnerabilities. Not only were responders unable to speak the language or understand the community-specific needs of Puerto Ricans, but residents felt emergency responders failed to grasp the challenges facing the island. Based on Dutta's (2014) work, active engagement with community members must occur to provide spaces for transformative communication. Resilience is unlikely without these discursive spaces of transformation. Also, because research suggests communities with strong interpersonal networks and a shared sense of identity are more likely to experience community resilience following a disaster, community leaders should consider orchestrating community gatherings and opportunities for members to provide support to one another (assuming it is safe to do so). Such gatherings could prove beneficial for promoting community cohesion and resilience (Anthony et al., 2020).

Third, concerning the fragile communication system, when communication infrastructure is impaired or underdeveloped, responders must involve community members to assist in disseminating critical information, and practitioners should forge community partnerships before disasters occur (Petrun Sayers et al., 2021). If possible, local media outlets should serve as community linchpins and helpful points of contact, connection, and sharing of information for residents.

Limitations and future directions

While steps were taken to include diverse perspectives and voices, we cannot claim our sample reflects the views of all Puerto Rican residents or outmigrants. Future research could employ different methods, such as a survey using probability-based sampling,

which would provide more generalizable results. Future research could also include the voices of different stakeholder groups such as government officials. We were unable to collect or analyze narratives from official sources (i.e. local and federal officials), but these sources could be exceedingly helpful in better understanding the crisis response. Additionally, this study examined a single period immediately following the hurricanes. Collecting data at various time points would be useful for understanding community resilience over time. Recovery will take years and collecting data at multiple time points would be more meaningful to understand resilience longitudinally.

Conclusion

Although our study highlights the failures in the disaster response following Hurricanes Irma and Maria, we discovered emerging indicators of community resilience in Puerto Rico. Governor Ricardo Rosselló Nevares acknowledged the government experienced shortcomings and vowed to do better in the future (Hernandez et al., 2018). While the hurricanes were unprecedented, more recent disasters, including multiple earthquakes, COVID-19, and the resignation of Governor Rosselló continue to challenge community resilience in Puerto Rico. Although the recovery process will be incremental, communicative interactions among residents, a strong perception of trust among community nonprofit organizations, and a sense of Puerto Rican pride have contributed to the experience of community resilience. This study also revealed areas of potential for resiliency, including the communication infrastructure and building trust with government officials. Overall, our findings are applicable for emergency managers, local, and federal officials involved in ongoing recovery operations, and communication and media scholars interested in solidifying the role of communication in community resilience literature.

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Appendix

Table A1. Codebook.

Parent code	Child codes	Definition
Narratives	Prospective	Stories shared by participants, framing the individual as a survivor, triumphant, and/or rising to the challenge.
	Retrospective	Stories shared by participants, framing the individual as beaten, downtrodden, or fearful.
	Identity	Instances of narrative shared by participants specifically tied to identifying with Puerto Rico or what it means to be Puerto Rican.
Ethical Communication	Questionable media	Cases of unprincipled media practices. Examples might include withholding information, releasing information prematurely, failing to make good on promises, or more.
	Ethical	Cases of principled media practices. Examples might include observations of the media being open, honest, and responsible.
	Inaccurate media	Cases of the media having difficulty reporting, which are not necessarily related to ethics. For example, the media may have reported obsolete information.
Communication Infrastructure	Adequate infrastructure	Physical structure/facilities related to communication are in place to facilitate communication needs.
	Inadequate infrastructure	Physical structure/facilities related to communication are **not** in place to facilitate communication needs.
Sources of Information	Trusted	Having confidence, faith, or belief in a person or organization.
	Distrusted	Lack of confidence, faith, or belief in a person or organization.