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Support and barriers in long-term recovery after Hurricane Sandy: improvisation as a communicative process of resilience

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ABSTRACT

This study examines the long-term recovery and resilience processes of households on the New Jersey coast after Hurricane Sandy. Based on theoretical frameworks of community ecology, communication ecology, and the Communication Theory of Resilience, we analyzed focus group interviews and timeline data to examine the sources and forms of support and barrier and provide a detailed account of the ways in which individuals engaged with support and barrier sources. Results show that resilience was enacted through the process of mobilizing and improvising networks of informal and institutional ties, sometimes joining them, to access resources. Communicative processes were central to improvisation, and ineffective communication and coordination constituted a majority of barriers in accessing social support for recovery. Results also detail how processes varied temporally. This study contributes to the literature on resilience as a communicative process, with improvisation at its core, that is enacted through interacting informal, institutional, and physical systems in communities.

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Disaster resilience; improvisation; social support; communication ecology; Communication Theory of Resilience

Throughout the past several decades, losses stemming from disasters have been steadily increasing in the U.S. and around the world. Since 1980, losses from extreme weather events in the U.S. have amounted to over \$1.6 trillion (NOAA National Centers for Environmental Information, 2019). Globally, disaster events and losses have grown since the 1950s (Pielke Jr, 2006), and human exposure to hazards is expected to continue to increase (Bouwer et al., 2007). Given the frequency and magnitude of natural disasters, resilience is becoming increasingly important.

Dueling definitions position resilience as a trait or a response to adversity (Harms et al., 2018). While literature has traditionally examined how the characteristics of individuals, households, and communities implicate recovery and resilience (e.g. Elliott et al., 2010), studies have increasingly addressed the ways in which people mobilize and utilize resources to stay resilient (Casagrande et al., 2015; Wickes et al., 2015). In that regard, resilience can be loosely defined as 'the *process* of reintegrating from disruptions in life'

(Richardson, 2002, p. 309, emphasis added). Furthering this emphasis, recent studies in communication theorize that resilience is a communicative process involving collectives interacting to cope with and adapt to changing circumstances (Buzzanell & Houston, 2018; Houston, 2018). With examinations of interactions and tensions at multiple, intersecting levels (e.g. individual, community, state, and national; Buzzanell, 2018a), organizational communication scholars are uniquely positioned to contribute to resilience theories and practices.

We extend emerging theorizing on the processual nature of resilience. A key emphasis of this study is examining how households affected by natural disasters improvise resources by activating connections with entities across multiple levels. The discussions of improvisation are informed by social support and networks literature regarding how ties are activated to gain social resources in response to nonroutine events (Hurlbert et al., 2000; Pescosolido, 1992); systems literature regarding the decision-making and coordination for producing novel and creative actions and providing unplanned-for responses in extreme events (e.g. Mendonça & Wallace, 2004); and resilience literature regarding the capacity to reactivate and reconfigure nodes and ties (Janssen et al., 2006) and to invent solutions without sufficient resources (Coutu, 2002). This approach, rooted in improvisation, contrasts early theorizing of resilience which emphasized protective factors that are relatively static properties of individuals, groups, or situations (e.g. Masten, 2009).

Recovery and resilience processes are situated in complex environments where social systems (i.e. humans, institutions, and connections among them) interact with physical systems (i.e. infrastructure, technology, and other engineered components of communities). Increasing efforts are made to jointly consider the built and the natural environments with the social and economic environments in developing indicators of community resilience (Beccari, 2016). Yet, due to the broad scope of these studies, the social aspects of resilience have largely been assessed based on indicators from secondary sources. The current study suggests that examining disaster resilience of social systems as embedded within physical systems (and vice versa) through dialogue with impacted communities can help our understanding of resilience.

This study utilizes data collected via focus group interviews, combined with participantled timeline construction, with New Jersey coast communities affected by Hurricane Sandy. Superstorm Sandy made landfall on 29 October 2012 near Atlantic City, New Jersey (Blake et al., 2013). Storm surge levels reported near the study sites in Ocean and Monmouth Counties were between 4.5 and 5.5 feet and maximum sustained wind gusts were 68-75 mph. Approximately \$37 million in destruction was caused along the New Jersey shore (State of New Jersey, 2017), with over 346,000 homes damaged state-wide (New Jersey Department of Environmental Protection, 2015). Various support and barrier sources and types were extracted, and qualitative coding of data was used for a detailed account of the processes by which households experienced support and barrier over time.

Theoretical approaches to resilience in natural disasters

Social support in disaster recovery

Recovery from natural disasters is dependent on various interrelated variables. For example, permanent housing is important because it allows households to carry out normal activities and establish routines; however, establishing housing can be delayed by other elements of recovery (Peacock et al., 2007). Consequently, analyses of disaster recovery should consider the responses and (inter)actions of numerous entities. Entities at various levels present support and barrier to households in multiple and intersecting ways. Sources of support or barrier are entities households are connected to (e.g. people, organizations, governments, and natural or built environments, like mold and trailers) that facilitate or hinder recovery through their existence or actions; support or barrier ties are constituted by the wide-ranging outcomes of the entities' existence and action (e.g. financial burden, emotional encouragement, and physical help).

Social support is an important asset for recovery and is predicted by both the personal characteristics and needs of affected individuals (Kaniasty & Norris, 1995). Norris et al. (2008) examined three kinds of social support after disaster: tangible, emotional, and informational support. In addition, it is important to distinguish mobilized support, which addresses how individuals extract resources embedded in their network, from accessible support (Pena-López & Sánchez-Santos, 2017). Mobilization of social support becomes challenging since existing activities and systems are disrupted due to physical damages as well as evacuation and relocation (Solomon, 2014). While the different types and predictors of social support have been examined in various disaster contexts (e.g. Jones et al., 2011), limited knowledge exists on the ways in which multiple types of support intersect (Lee et al., 2019), and less on how support and barriers coexist within the larger social and physical environments. The current study provides analysis of how support and barriers impacted the processes of resilience, and how the changes and disruptions led to improvised forms of communicating and connecting to resources.

Community ecology and systems perspectives

Resilience literature has progressively expanded initial conceptualizations of protective factors as individual and relational resources to incorporate community and environmental resources (e.g. Ungar & Liebenberg, 2011). Evolutionary and ecological theories (e.g. Monge et al., 2008) are useful for explicating how individuals' actions are situated within community resources and the larger environment. The concepts of buffering (e.g. Astley, 1985; Miner et al., 1990) and cross-level influences (Brass et al., 2004) are particularly relevant. In changing environments, community members engage in improvisation and coordination of resources to buffer insufficiencies. For example, organizations attempt to enhance relational benefits by forming and expanding networks to acquire resources (Astley, 1985). These networks exist at multiple levels encompassing individuals, organizations, and the broader environment, sometimes exerting influences across levels (Brass et al., 2004).

The role of local communities and residents is increasingly emphasized in disaster resilience (Cutter et al., 2013). Individuals' resilience is influenced by social relationships (Afifi, 2018); and community resilience relies on interconnections among multiple constituents including individuals, households, organizations, and governments (Houston, 2018). Natural disaster survivors experience multiplying uncertainties in a storm's immediate aftermath, turning to their communities when coping (Afifi et al., 2014). In uncertainty, limitations in existing systems are revealed, yielding efforts to draw resources from a wider scope of actors and knowledge (Comfort, 2005).

From systems perspectives, how 'sleeping' connections become activated or mobilized in disaster situations is of interest (Janssen et al., 2006). Ideas of adapting and improvising in these arguments lead to the conceptualization of communities as networks, or 'loosely coupled' systems, that enable flexible responses to changing circumstances (Norris et al., 2008, p. 138). Social resilience, coalesced with the physical resilience of infrastructures and systems, is important for buffering the impact of natural disasters (Adger et al., 2005). Communication, as 'a system of interdependent relationships that influence individual and collective crisis responses' (Ford et al., 2016, p. 317), becomes a crucial component in resilience.

Communication ecology and Communication Theory of Resilience

Many models of resilience center on communication (Houston et al., 2015; Norris et al., 2008). Communication and coordination among system components are critical in postdisaster situations where existing practices are disrupted, both in terms of technical infrastructure and organizational capacity to meet demands (e.g. Comfort & Haase, 2006). Recently, disaster communication ecology perspective has offered a framework to understand how community members and organizations actively facilitate connections to important communication resources to achieve specific goals (Houston et al., 2015; Spialek & Houston, 2018). Individuals utilize a range of formal and informal communication resources to gain understanding or information in everyday lives (Broad et al., 2013). These may include micro-level interpersonal communication and meso-level organizational resources as well as mediated forms of communication. In disaster situations, unique forms of communication ecologies can emerge, which combine both routine and new modes of communication (Perreault et al., 2014).

Buzzanell's (2010) Communication Theory of Resilience (CTR) positions resilience as collaborative, relational, and processual. Resilience, in this context, does not reside within an individual, rather it is a dynamic process that unfolds over time (Buzzanell, 2010). The communicative constitution of resilience assumes that individuals and organizations can grow during times of disruption, transforming past experiences of loss into more inclusive, sustainable futures (Buzzanell, 2018a). Maintaining and using communication networks are key processes of resilience, where individuals seek support and resources via connections with others (Buzzanell, 2010, 2018b).

Individuals who have psychological strength, high income, and access to informal social support, and are members of communities with substantial social order, are more likely to positively recover from disaster (Abramson et al., 2010). Recently, the role of micro-level communicative activities involving family, friends, and neighbors in disaster management has been illuminated (Spialek & Houston, 2018). Notably, social relationships greatly influence an individuals' ability to reintegrate after disruption (see Afifi, 2018). Families, a specific type of social relationship, are interdependent systems that can demonstrate resilience themselves, as well as foster the development of resilience within individual family members (Theiss, 2018).

Not simply a group of resilient individuals or families, a resilient community is one where the individuals and collectives work together to enable the reintegration of the whole after a disruption (Houston, 2018). Community recovery is constituted through interactions among interdependent entities. For example, the likelihood of household recovery from natural disaster coincides with the return of local businesses (Xiao & Van Zandt, 2012). In response to escalating losses, communities and governments are striving to identify measures that will reduce fatalities and economic losses as well as develop strategies for improving disaster response and recovery, especially related to messaging (FEMA, 2018).

In sum, disaster communication ecology and the CTR suggest varying forms of communication that might be utilized and activated after disasters in individuals' and communities' pursuit of resilience. Building upon these theoretical perspectives, this study seeks to answer the following questions:

RQ1: How did households engage with multiple types of support and barrier from various sources in informal, institutional, and physical systems after Hurricane Sandy?

RQ2: How did communicative connections enable and constrain resilience processes in the long-term recovery of households after Hurricane Sandy?

Method

Data and context

Over three days in May 2017, six data collections were conducted in three New Jersey communities impacted by Superstorm Sandy: Seaside Heights (G1 & G2), Manahawkin (G3 & G4), and Hazlet (G5 & G6). When the data were collected, almost all participants were in the reconstruction phase of the recovery process, defined by activities aimed at rebuilding homes and replacing damaged or lost property (Kates et al., 2006). Depending on circumstances, such as magnitude of damage, socio-demographic characteristics of communities and households, and aid and resources available (Fussell, 2015), the recovery process can extend months, years, and decades following the disaster (Kates et al., 2006). Most participants were still rebuilding their home, making it possible to document their recovery experiences during the previous five years and gather information about their expected recovery trajectories.

The recruitment process involved several stages. First, the research team established local contacts at the Salvation Army, Ocean County Long-Term Recovery Group, and Saint Bernard's Project New Jersey. Each organization provided support for residents throughout their long-term recovery. Local contacts advertised the research opportunity and assigned participants to one of six focus group sessions. Interviews produced approximately 11.5 total hours of audio (M = 116 min). Participants were compensated \$40 for their time.

The focus groups included 28 participants from 26 impacted households. Impacted households included those that sustained significant damage during Superstorm Sandy and required outside assistance to restore the home. In the two instances where co-habiting couples participated in the same session, their comments were combined to represent the experiences of their household. Three to six participants attended each of the six focus groups. Participants are identified by their focus group number (e.g. Pseudonym, G#).

Data collection entailed two parts; the first was accomplished as a group and the second was completed as individuals. The first part included the discussions among the participants and moderators during the focus group interview. The focus group interviews began with participant introductions and general descriptions of their experiences from the time Sandy made landfall until the day of the focus group session. Their individual comments often addressed damages they and their household incurred, their current situations, and significant moments or themes in their recovery journey.

Then, participants collectively generated a list of facilitators (i.e. support) and barriers to recovery. The focus group moderators described that, for this study, recovery referred to 'households returning to and getting back to normal.' Considering the time period between Sandy making landfall and when they were back in their home on a permanent basis, participants were asked to list and describe household-level and community-level factors that influenced their ability to recover. Specifically, participants were posed two questions: (a) What factors helped your household to return and get back to normal? and (b) What factors hindered your household from returning and getting back to normal? As needed, probing questions were asked to gain clarification about the mentioned factors or to help expand the discussion into other dimensions of recovery (e.g. physical infrastructure, social services, and secondary hazards). Each participant could contribute to the list of barriers and facilitators and describe how these factors enabled or hindered their household's recovery. Discussion continued until the group collectively felt they had generated an exhaustive list.

When the focus group interviews concluded, the second part of the data collection began. Participants were informed that the remaining tasks - creating a timeline and completing a survey - would be done on their own. Each individual created timeline visual data (see Figure 1). The purpose was to collect information about the sequence and timing of recovery events and gather data about when each individual participant experienced facilitators and barriers to recovery. First, participants indicated on their timeline: (a) when

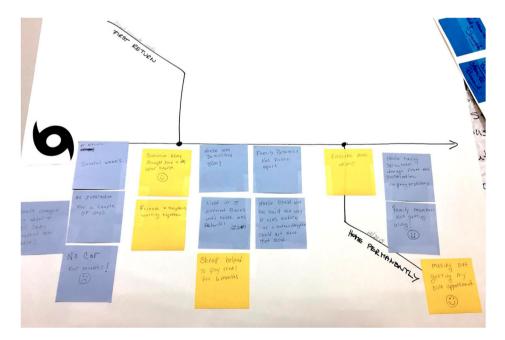


Figure 1. Example of timeline visual data.

they initially returned home, (b) when they returned home permanently, and (c) when they felt they were fully recovered. Second, participants listed in chronological order the various support (yellow) or barrier (blue) sources they encountered during each time period, partly resembling a network maps approach (i.e. participant-aided sociograms; McCarty et al., 2007). This approach aids participants' recall and retrieval of their social environment, especially when combined with interviews.

Each individual also completed a short survey of demographic and disaster-related information. Participants ranged in age from 39 to 79 (M = 58.1, SD = 15.8). All but five were female. Twenty-four respondents were White and four did not provide their race. On average, participants lived 33.5 years (SD = 16.9) on the New Jersey coast. Most reported household income of \$30,000 to \$59,000 (10 respondents) or \$60,000 to \$99,999 (eight respondents). Four respondents reported less than \$30,000 and two reported \$100,000 to \$149,999. Respondents checked which of the following five types of damage they received from Hurricane Sandy: wind or roof damage, storm surge, freshwater flooding, water damage not from flood or surge, and trees down or other damage to property. On average, respondents indicated experiencing 2.31 types of damage (SD = 1.32).

Coding

Focus group interview and timeline visual data were coded together to derive sources of support and barrier for each household. To begin identifying instances of support and barrier, the first three authors studied the data and met to discuss recurring sources (e.g. family, friends, neighbors, coworkers, employers, religious groups, physical entities, local governments, and national governments) and pertinent types (e.g. financial, material, emotional, information, physical, and time) of support and barrier. These preliminary conversations informed the primary-cycle coding (Tracy, 2013), where the second and third authors jointly combed through the first transcript, coding instances where sources of support or barrier were mentioned. Since the study focuses on both social and physical systems, all human and nonhuman entities were listed, and then the type of support or barrier was recorded for each household. The second and third author developed a codebook and compared their evaluations of the data, adjusting code definitions or adding new codes, throughout coding the first transcript and beyond (Charmaz, 2006; Glaser & Strauss, 1967).

During primary-cycle coding, entities and types of support or barrier were recorded at two levels. First, entities were identified specifically (e.g. Salvation Army, insurance companies, and FEMA) and then categorized broadly (e.g. nonprofit, for-profit, and federal government, respectively). Similarly, for the type of support or barrier, specific descriptions (e.g. held group meetings, underpaid, and made them wait) and broader categories (e.g. information, financial, and time, respectively) were coded. The combination of these four characteristics created one 'line' of data. Additional information was coded in each line, including the geographic scope of the source (i.e. local, state, national, or unspecified) and the timing of the support or barrier (i.e. before initial return, after initial return, after permanent return, or unspecified). After this phase, the first three authors discussed the frequently coded categories from the first transcript and categorized entities into one of 14 types, and support and barrier into one of 11 types. Table 1 summarizes the types of support and barrier with examples of each.

Table 1. Example:	s and proportion	s of support/barri	er ties $(n=2)$	6 households)

	Examples	Proportion of total support cases: Mean % (SD)	Proportion of total barrier cases: Mean % (SD)
Physical	Shelter, manual labor, cleaning, limited access to house	23.5 (16.2)	5.4 (8.6)
Material	Home items, food, supplies, stolen items	17.9 (14.4)	1.3 (2.8)
Financial	Lowered cost, grants, gift cards, underpayment, fraud, tickets, mortgage	24.9 (19.0)	22.6 (15.0)
Security	Permits, ID cards, curfews, protection from looters, raising house, stealing	1.7 (4.6)	6.9 (19.9)
Infrastructure	Transportation, roads, power/electricity, schools, mail service, mold, sand, sanitation	4.6 (7.2)	13.1 (13.3)
Emotional	Sharing experience, listening, counseling, mental support, stress, PTSD, no compassion	4.8 (6.1)	7.3 (9.1)
Information	Knowledge, (mis)communication, (mis)information, meetings, word of mouth, changing direction, legislation	8.7 (10.3)	10.9 (11.8)
Coordination	Organization, intermediaries, no central point, disorganization, administrative errors	5.6 (7.7)	9.6 (8.5)
Paperwork	Handled paperwork, losing paperwork, paperwork errors	1.2 (3.5)	5.7 (6.5)
Time	Waiting, stalled, duration of programs, rolled out too early or late	0.4 (1.8)	14.7 (20.6)
Unspecified	Support or barrier, but unclear how		

Next, the second and third authors coded the second transcript separately. After, they discussed discrepancies with the first author and revised the codebook to reflect nuanced understandings of salient characteristics. The second and third authors each coded two of the remaining four transcripts using the codebook. Afterward, the second author returned to the first transcript to ensure the derived data reflected the updated codebook. The coding process led to a total of 397 unique entities and 656 lines (cases) of support or barrier (315 of support and 341 of barrier). The proportion of each support and barrier type is shown in Table 1. On average, financial, physical, and material were the most frequently mentioned support, while the most frequent barriers were financial, time, and infrastructure.

Analysis

Qualitative methods are common in examining human dimensions of disasters (e.g. Phillips, 2014). Focus groups have been utilized to gather data about disaster experiences (Peek & Fothergill, 2009), enabling the acquisition of rich narratives and diverse perspectives that may not easily be captured otherwise (Phillips, 2014). Qualitative data have also been increasingly used for examining social networks (Herz et al., 2015) to better understand the meanings attached to social ties (Ryan & Mulholland, 2014).

The qualitative data analysis processes were iterative and involved reflecting on emergent themes and existing structures of understanding (Tracy, 2013). The authors conducted open coding of the transcripts (Strauss & Corbin, 1990). Throughout this process, several major themes emerged, like the interdependence of the sources of support and barrier, the multiple types of support and barrier provided by each source, and the role of neighborhoods in recovery. However, a motif interwoven throughout the other themes was improvisation. Improvisation, related to households' experiences

with support and barrier, required additional attention and was examined using constant comparison (Charmaz, 2006). Specifically, after open coding, the authors engaged in selective coding, whereby improvisation was the core category upon which the storyline of the data was based (Strauss & Corbin, 1990). The qualitative analytic process was cyclical and reflexive (Saldaña, 2009), marked by frequent team meetings and revisits to the data.

Results

Following an overview of the primary sources and forms of support and barrier, improvisation is explicated. In particular, processes of improvisation and how improvisation shifted over time are explained to answer RQ1. Then, lack of communication as an impediment in improvisation is described as a primary way that connections constrained resilience to address RQ2.

RQ1 asked how households engaged with multiple types of support and barrier from various sources. A variety of entities produced support and barriers for households recovering from Hurricane Sandy. Entities at multiple levels provided various types of support and barrier. Nonprofits were a predominant source of instrumental and expressive support, along with information support. For-profit, federal government, and state government were also frequent sources of support. Ties that are informal, defined as being rooted in existing personal relationships as opposed to institutional interactions (e.g. family, friends, neighbors, and work-related), were reported in less than 25% of the total support cases, which relates to the process of improvisation presented in the next section. For-profits were the most frequently nominated source of barrier instrumentally. Participants attributed frustration with information most frequently to federal government. Coordination issues were reported as stemming from for-profits, as well as all levels of governments.

Processes of improvisation

The data revealed participants' shared experiences of using and maintaining communication networks to enact resilience. Importantly, participants often described having to create new relationships, or build on existing lines of communication. A key theme of this resilience process was improvising to meet their needs as participants actively navigated the interdependent support and barrier ties.

Leveraging multiple types of ties support was prominent in improvising. For instance, support of one type was activated to mobilize other resources. There were cases in which informal friendship ties facilitated access to material forms of support. One participant recalled:

A friend of mine called me up and she says, 'If you go up to the Pool Avenue, they're giving out gift cards.' So, I went up to get a gift card and that's how I found the Salvation Army [and the case management program [...] You were allowed to go once a week; and there was food; there was clothing; there was toilet paper. (Erica, G6)

Participants with larger number of connections or those able to attend or plug into community meetings may have more easily obtained support without having direct ties to sources.

Another way improvisation occurred was through leveraging personal ties to access support being offered to the community that would have otherwise been unknown. In a sense, participants strung together connections between multiple actors to obtain resources. For example, two participants discussed their mutual acquaintance Carl. About his role, Gloria (G1) said, 'Every single thing was passed on to other people [by Carl]. Yes, that's what they say, you know, you really have to know where to go and what to do.' She elaborated about how they shared what was happening: 'He would let us know if this is something: a new program, call here, give us numbers. We got numbers from Carl. I got numbers from all the other people in the group.' Individuals like Carl were playing a broker role in communicating information from an external source to individuals in the community.

In the wake of the hurricane, improvised ties were created by both support seekers and providers. Households improvising ties seemed to be looking for anyone or anything that could help their recovery, such as buying a utility trailer to use when storage units were unavailable. Improvisation yielded both support and barrier and was patterned in several ways. Improvised ties, at the interpersonal level, were often key sources of support, except for looters. Some support cases were enduring, like church basements operating as information stations, while others lasted only a moment. A particularly poignant reflection illustrates meaningful support stemming from improvised ties between two strangers:

It's about three weeks after the storm and I had gone to the house every day and I am taking out sheetrock and I'm spraying blue agent in the walls and it's a mountain. I think I'll never get to it. So, I go down to the end of the road ... and I'm sitting in the car and I'm looking out at the bay. I'm just in a funk. I hear a lady and look around and she says, 'Would you like a sandwich and a cup of soup?' [...] That was a complete stranger. (Ben, G4)

The improvisation of expressive support is peculiar. A contrast appears to reside between institutional ties (e.g. strangers, churches, and institutions) and informal ties (e.g. family members, friends, and work-related). There were no cases of expressive support from informal ties, but seven cases from nonprofits. Some participants received counseling and support group services through the Salvation Army and other organizations.

While interpersonal-level improvisation was often supportive, participants were quick to acknowledge instances where the institutional improvisation provided not only support but also barriers. Some felt that law enforcement was only superficially helpful and understaffed, while others greatly appreciated the security it offered them and their property. Strict adherence to rules, like curfews and the necessity for identification, created barriers for participants trying to access their homes. One participant even noted that she received a jay-walking ticket for crossing the street while her road was closed. Although participants knew these measures were meant to keep their community safe, some felt law enforcement could be overbearing or impeding at times.

Shifts in improvisation over time

The behaviors and experiences of improvisation shifted over time, which furthers understanding resilience as a process. Patterns endured related to how support and barriers differed before and after participants' initial return home. Data on time points were limited and thus, qualitative insights are drawn mostly from the timelines.

Sources of support before first return were largely from local entities and from family, friends, nonprofit and government organizations. Participants seemed to activate support from existing ties initially and relied more heavily on institutional relief efforts after their initial return home. Entities often acted as sources of support before participants' first return, providing places to stay during and after the storm, assisting with transportation, providing meals and information, and cleaning up damage. Barriers prior to participants' first return were largely governmental and revolved around home access and issuance of community return plans. For example, being unable to return home to see the damage or protect their belongings because of police and National Guard checkpoints or lack of identification or permit caused frustration. After the initial return, the variety of support and barrier sources and types opened up widely.

The function of neighbors and neighborhoods seemed to shift over time. Neighbors were largely cited as sources of support immediately following the hurricane. Participants mentioned sharing their home with neighbors who had no heat or electricity and benefiting from neighbors who offered storage space. One participant assisted her elderly neighbors in evacuating, saying her neighbors are like family. Over time, a notable barrier to the recovery of households was empty neighborhoods which prohibited collective recovery. Ben (G4) said his wife 'is angry that there isn't anybody on the street. It's been four years.' Participants noted that neighbors served as points of comparison, regarding damage and rebuilding. Gloria (G1) said '[their] neighborhood, [their] street, was really weird,' referencing different lifting requirements on houses. There were tensions between neighbors whose impacted home was their primary versus secondary residence. Tension also emerged between survivors who received aid, knew how to work the system, or were informed insurance customers versus those who were not able to secure any or the full amount of aid due to challenges or extenuating circumstances.

Lack of communication as an impediment in improvisation

RQ2 inquired about how communication connections enabled and constrained resilience processes in the long-term recovery of households. Improvisation involves considerable communication across many connections, including actions to locate and obtain resources from organizations. Lack of coordination and communication were frequently mentioned barriers, where individuals were provided information through others' stories but did not have a central point of contact or procedure to follow. Improvised channels of communication often did not work smoothly, with participants discovering previously available resources during the focus group interviews.

A major obstacle to improvisation was federal and nonprofit agencies who were criticized for poor administration, constant change of rules, and inefficient communication channels. Participants also recalled communication challenges they faced while moving through the processes of filing insurance claims, having adjustments, and receiving payments, particularly related to the time it took. Monica (G6) called the representative listed on a check from her insurance company and was told 'that person was not handling [her] file anymore.' They said to her: 'give us your name and phone number and your claim number and we'll get you to the right person and they'll call you in a couple days." She said that a 'week or two would go by. Then you would call again,' and 'this would go on for months.' Another participant added:

When you called the local [Major Insurance Company] or any of your local offices, they would refer to you, 'If this is regarding super storm Sandy, please call the national number of blah blah.' They would turn you away if you walk in their office. They said that they, by law, could not talk to you. (Donna, G6)

A similar challenge was shown in the processes of utility recovery and information access being intertwined. Participants explained they needed an approval letter to prove that their house was inspected, and request utilities be turned on, but were unsure how and from whom they should receive approval. Kristy (G4) explained how confusion and unclear directions got 'trickled down' from the city with 'somebody [who] talks to somebody else that talks to somebody else' and 'by the time you get [documentation], it's two weeks later, so you've already wasted two weeks trying to get it.' Instances like this demonstrate how participants were often required to improvise to access information or communication they needed for their recovery.

In some cases, failures in improvisation were found in the relief process. Various government-sponsored programs provided substantial financial assistance, but participants had trouble working with the programs, experienced serious miscommunication and arduous paperwork, and found the programs to have lack of local relevance. For instance, one participant described:

We realized that FEMA was worse than Sandy. [...]. They sent caseloads of [...] water and ice. [...] It was November. We had a snowstorm. [...] They just have a stock response to everything. I know they have to deal nationally, but all the faith-based institutions here were here. They knew what we needed. They were bringing firewood, because if you didn't have electricity or heat, you had to have some firewood in the fireplace to stay warm. (Carl, G1)

Thus, FEMA's attempt to support survivors was described as a barrier, as the type of support provided was not what their community needed. The lack of local relevance was also mentioned with insurance companies, where quoted repair estimates did not align with New Jersey costs. Instances of organizations not providing locally relevant support are indicative of ineffective communication occurring at some point(s) in the network of recovery.

Discussion

Grounded in community ecology, systems, and communicative perspectives, this study examined how resilience processes are situated in the interplay of multiple types of support and barrier in informal, institutional, and physical systems. Existing literature and empirical data from the current study inform that improvisation in the context of natural disaster recovery can be conceptualized as the process of activating, extending, joining, and constructing communicative connections in time-sensitive and ad hoc ways to mobilize and coordinate resources. This process can lead to both helpful and unhelpful outcomes for affected entities.

Notably, the findings reveal contrasts between support from informal or pre-existing ties and emergent, ad hoc support such as relief efforts and strangers. The lack of discussion about friends and family providing emotional support was surprising yet could be suggesting that people's closest networks may have difficulty providing support after disasters since they are likely also going through vulnerable situations (Litt, 2008). The role of

social capital in recovery and resilience largely builds upon the definition of social capital as resources embedded in a durable network of relationships (Bourdieu, 1986). The current study shows that, beyond stable ties, the capacity to improvise individual, social, and institutional connections explains several instances of support. In other words, the concepts of bridging social capital (based on connections across heterogeneous groups) and linking social capital (based on connections to formal institutionalized resources) both become relevant (e.g. Hawkins & Maurer, 2010). Disasters bring together neighbors who were previously strangers (e.g. Wickes et al., 2015). In this sense, the process of buffering existed, where creating interdependency through networks helped ensure resources in times of environmental threats or scarcity (DiMaggio & Powell, 1983; Miner et al., 1990).

People's capacity for mobilizing resources for resilience varies (Buzzanell & Houston, 2018). Results from this study showed that some participants more actively overcame crisis, like when dealing with paperwork and having their house raised, than others who struggled to adapt. In this sense, resilience is not a stable trait, but involves proficiencies, behaviors, and situational contexts that help one be aware of what resources are available and then coordinate and mobilize those resources. Often, one type of support was facilitated by another type of support. These findings extend the literature on protective factors which suggests that resilience is a process where individuals use capabilities and resources to protect themselves (Luthar et al., 2000).

Like in the instance where receiving financial support depended on having a home, specific linguistic choices in the policies of recovery programs permitted or barred participants from receiving support. The language used in communicating policies to homeowners begs various questions: What constitutes a home? How is the idea of home understood differently by survivors of natural disaster and relief programs? How do definitions of home serve as a potential point of power and oppression for different populations? Namely, the communication of whether and how a person can access a certain kind of support is a form of support and/or barrier in itself. Future communication research using rhetorical and critical theories and approaches would be useful in understanding these issues.

In addition, there were cumulative effects in which more than one type of resources converged to be the most beneficial to people who possessed all of them (Elliott et al., 2010). More attention should be paid to how various components of the system are linked. For example, future research should examine how support from one source could be in coordination or conflict with support from another source. How multiple sources of support might be providing redundant support beyond what is necessary could also be addressed.

Communication and coordination were key processes. Micro-level exchanges among neighbors and local residents played a critical role in mobilizing support from mesolevel community organizations and agencies (Spialek & Houston, 2018). Externally-coordinated relief and community-emergent relief support sometimes interacted with each other. Cases existed where community members pooled resources together, later gaining support from external agencies. One participant utilized multiple communication channels including face-to-face and social media - quickly coordinating local resources and attracting wider social support - to establish a grassroots community organization that continued after Hurricane Sandy. These cases demonstrate how communication processes enabled the reconstitution of community connections in crisis situations (Sellnow et al., 2002).

Theoretical implications

This study highlights the importance of improvised ties, sometimes by creating and expanding networks. While Buzzanell (2010) hints at the improvised nature of some context-specific resilient messages, this study foregrounds improvised ties as an important resource in connecting households to resources and providing previously inaccessible forms of social capital that might rely on simply maintaining existing networks. The study also extends the theorizing of resilience factors to consider individuals' capacity to engage in buffering by mobilizing resources.

The findings regarding communication extend the arguments of disaster communication ecology by accounting for the detailed processes through which communication and information resources at multiple levels are mobilized and improvised. The value of informal ties was apparent in terms of information and communication. Improvising communication, including the technical aspect of using cell phones and the social aspect of finding convenient points of information contact, was a key process. Microlevel and meso-level communication resources were often linked with each other to allow households' access to support, exhibiting a form of integrated storytelling system (Ball-Rokeach et al., 2001). The current study also encourages an in-depth examination of the role of micro-level sources that are outside of one's close and already established networks

Additionally, this study looks to extend the current communicative conception of resilience through considering resilience and networks as temporally in flux. The CTR suggests that networks can be influenced by spatio-temporal reactivity (Buzzanell, 2018b). While research outside of communication (Folke, 2006) has considered temporality as an influence on resilience, few within communication have sought to address this. As the results suggest, time plays an important role in not only what sources and forms of support are most accessible but also the collective dynamics of the community which influence support mobilization.

Practical implications

Insights from this study could provide local officials valuable information about what resources are most supportive and where barriers to acquiring these resources may exist. A prominent issue faced by households when creating networks of support was lack of internal and external coordination among organizations. This exemplifies criticisms in disaster management regarding the lack of communication in national programs, and the need for a better collaboration across offices holding different responsibilities and authorities (Cutter et al., 2013). Opportunities to rebuild can be increased by developing strong bonds and cooperation among organizations (Buzzanell, 2018a). Improving the flow of information within and between insurance companies, governmental agencies, nonprofits, and other organizations would benefit households, helping save time, money, and emotional strain. While many post-disaster collaborations between public, private, and nonprofit entities occur ad hoc, establishing these partnerships beforehand can help streamline the flow of accurate information as well as aid in communicating the expectations and roles of partnering organizations during the recovery.

Ineffective communication between involved entities is evident in the lack of locally relevant support offered to households by government agencies. These results emphasize the importance of dialogic communication in responding to diverse needs after a natural disaster (Nicholls, 2012). Using top-down communication with local communities during disaster recovery may not be as effective as utilizing multiple channels that allow for dialogue between the public and those responsible for facilitating the recovery process (Paton & Irons, 2016). Giving the public opportunities to pose questions, either in a public townhall type setting (Richardson et al., 2014) or online through local groups situated in social media platforms may be useful practices. These processes allow people to interact with official entities and seek out information that can be locally and temporally relevant to their recovery process (e.g. Palen & Hughes, 2018).

Both formal and informal mechanisms can facilitate productive dialogues (Nicholls & Glenny, 2005). In hurricane recovery, which can extend years, continuity in the opportunities for dialogue between the public and recovery organizations at the local, state, and federal levels is vital. In the case of Superstorm Sandy, organizations with boots on the ground in the impacted area, such as the Salvation Army or the Ocean County Longterm Recovery Group, play important roles. They interacted with residents face-to-face, over the phone, and through internet exchanges to provide resources and information as citizens' needs changed and as new recovery programs offered by the local, state, and federal governments became available.

In addition, moving beyond examining accessible social support, the current study examined the communicative processes that facilitated the improvisation of social support, and how various connections were joined in the process. The results show that emphasizing a central point of contact for hurricane survivors is vital. This process could be reinforced by utilizing informal connections among local residents through support groups and key brokers of information. Cultivating networks of information pre-disaster could assist quick and stable mobilization of ties after disasters. Additionally, the information needs of households should be considered in disaster recovery planning. Many residents were unaware of the documentation (e.g. proof of residence, proof of insurance, birth and marriage certificates, social security cards, etc.) they would be required to provide throughout the recovery process. Knowledge of such needs would allow households to better prepare for the recovery process and ensure them to secure those documents prior to evacuating or sheltering.

In addition, participants in this study recount the invaluable role of faith-based organizations. The efforts of recognized relief agencies are supplemented by faith-based organizations who are often already embedded in community networks, leading them to be trusted sources of information (Vanderford et al., 2007). As recent disasters show, the role of faith-based organizations in coordinating relief efforts and serving as a first-step information point for households to access aid (Singer, 2017) can be further facilitated.

Limitations

This study has limitations regarding recruitment and data collection. Regarding recruitment, the process was linked to certain relief organizations, which may contribute to their frequent mention as supportive. Having many older and female participants may have inflated instances of support and expressive support type (e.g. Antonucci & Akiyama, 1987). Given the homogeneity of the participants in terms of race, we were not able to address the effects of race on post-disaster return and recovery (e.g. Elliott & Pais, 2006). In addition, although the sample included some participants who had not yet returned home permanently, people who were displaced from their community entirely were not recruited. Future research should explore the gendered and racial nature of resilience in disasters and the experiences of those survivors who are displaced long-term or permanently.

A limitation to the data collection may include issues related to recollection bias. The ability to accurately recall adverse events can vary temporally as new experiences occur and information is learned (Wright, 1993). Additionally, despite the inclusion of the timeline activity, participants may have placed greater emphasis on describing people and organizations they were actively interacting with at the time of the focus group session. A large majority of support was experienced during the 'after initial return' period or unspecified in terms of timing, making it difficult to investigate temporality in more detail.

In addition, a common concern with focus group interviewing is dominant members' voices being unchallenged and other voices being underrepresented (Smithson, 2000). Some participants had more talking time than others, but the unique timeline component gave all participants an equal amount of time and space for the presentation of more complete sources of support and barrier (Rice et al., 2014). Additionally, the simple interface of using sticky notes lowered technical burden for participants. Future research should continue developing innovative ways of collecting data to create more holistic pictures of support and barriers.

Conclusion

People's experiences with support and barrier in disaster recovery are diverse, and this study provides insights into the complex social and physical systems that households were embedded in after Hurricane Sandy. The findings about improvisation processes for engaging in resilience provide greater understanding of long-term post-disaster resilience and recovery through communicative perspectives.

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