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The Evolutionary Role of Interorganizational Communication: Modeling Social Capital in Disaster Contexts

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Employing a community ecology perspective, this study examines how interorganizational (IO) communication and social capital (SC) facilitated organizational recovery after Hurricane Katrina. In-depth interviews with 56 New Orleans organizations enabled longitudinal analysis and a grounded theory model that illustrates how communication differentiated four phases of recovery: personal emergency, professional emergency, transition, rebuilding. Communicative action taking place across phases corresponds with the evolutionary mechanisms. Most organizations did not turn to interorganizational relationships (IORs) until the transitional phase, during which indirect ties were critical and incoming versus outgoing communication was substantively different. Organizations did not consistently use IO SC until the last phase. This study underlines the fact that organizations and their systems are fundamentally human and (re)constructed through communicative action.

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Problems associated with disaster response have become salient to researchers and practitioners keen on solving the challenges associated with recovery. The 2005 hurricane season devastated much of the Gulf Coast region of the United States. In particular, Hurricane Katrina brought New Orleans into dire crisis. New Orleans organizations were left with the challenge of recovery albeit with different types and magnitudes of damage. Numerous studies have examined the factors related to an organization's postdisaster recovery, including organizational size (Dahlhamer & Tierney, 1998), local, regional, or national market levels (Webb, Tierney, & Dahlhamer, 2002), and ownership type (e.g., part of a chain or a franchise; Aldrich & Auster, 1986; Tigges & Green, 1994). These organization-level characteristics, however, only portray a partial picture of organizations' engagement in postdisaster

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recovery. Organizational members engage in the process not only as business actors but also as citizens in the distressed region. Those in charge of businesses and organizations, in particular, are struck twice as both citizens and as business owners/organization leaders (Runyan, 2006).

In the face of unprecedented crisis, organizations might rely on established relationships to help with rebuilding. Both personal and professional networks can play an essential role in lending help to the organization (Granovetter, 1985; Leenders & Gabbay, 1999). Socially related resources available to organizations are linked to the notion of social capital (SC), or those resources embedded and available in social relationships that are accessed and/or mobilized by actors in purposive actions (Lin, 1999). Research has shown that certain network factors, such as institutionalized social ties (Wells, Lee, & Alexander, 2001), embeddedness in dense networks (Granovetter, 1985), and a high degree of SC (Walker, Kogut, & Shan, 1997) help organizations guard against threats to survival. Yet, this work tends to focus on economic and political aspects of SC in relation to an organization's survival, with little attention to how other types of SC are "cashed in" to aid organizational survival. Also less emphasized from this work are the role of communication and the effects of individuals' SC on their organization's survival. Moreover, the notion of survival in these studies is not so much about disaster contexts but rather about how and why businesses "make it" in the context of normal functioning and competition. In other words, these scholars are focused on examining how businesses cope with crises resulting from self-inflicted deficiencies to act, instead of with disasters that are triggered by events beyond businesses' control (Faulkner, 2001). The notion of survival elicits recent organizational communication scholarship that draws on the evolutionary theory perspective of community ecology, which emphasizes a cross-level communication focus. As disaster impacts both organizations (including individuals involved) and the communities (i.e., protective and resource-rich communication networks) in which they exist, we use recent scholarship that emphasizes communication and community ecology.

This study analyzes interorganizational (IO) communication after Hurricane Katrina, with a focus on how survival is fueled by SC acquired in both personal and professional communication networks. We view SC as embodying different dimensions and levels of communication behavior and probe the interplay among IO networks and recovery from organizational leaders' points of view. The article reviews literature on community ecology theory from a communication perspective and SC, describes the methods and procedures for analyzing data collected from New Orleans businesses following the 2005 storms, and reports results based on in-depth interviews of 56 organizational and business leaders. Results are discussed as a way to advance theory about communication, survival, and SC in the context of organization-level disaster recovery.

Communication networks and community ecology

Recent work on communication networks has advanced sociocultural evolutionary theory (Campbell, 1965), which is also known as community ecology (Monge & Contractor, 2003; Monge, Heise & Margolin, 2008). Monge and colleagues argue that studying IO relationships as dynamic systems advances understanding the role of communication in and among populations of organizations nestled in IO communities. Monge and Contractor (2003) explain that communication networks can be viewed as self-organizing complex systems in which interconnected populations of organizations behave following certain rules of interaction. These rules suggest that organizations communicate with others to increase their fitness or the network's overall fitness. For example, new organizations may attempt to strengthen their communication ties to networks of well-established organizations (Baum & Oliver, 1991). Understandably, a concern underlying evolutionary theory is to examine the mechanisms that contribute to an organization's fitness and survival in the population. The principal mechanisms, Monge and Contractor state, are *variation, selection*, and *retention* (VSR), the fundamental processes on which evolutionary systems are built. Variations refer to the change of routines and could include blind (random) and intentional variations. The selection process is performed to select optimal variations (organizational traits) to help organizations better cope with environmental events. In response to such events, then, organizations might learn how to face challenges and thus enhance their knowledge and capabilities. The retention process entails the standardization of the newly retained variations.

Monge and Contractor (2003) further explain that evolutionary theory places the unit of analysis on *organizational populations*—sets of organizations sharing unique configurations of properties among them (e.g., banks). Also relevant are processes of competition and cooperation among organizational populations that vie for limited resources. The ecology of populations includes *ecological processes*, such as adaptation strategies (strategies organizations use to adapt themselves to the environment where resources are available) and *environmental processes* (e.g., political turmoil, government regulation, institutional linkages, technology cycles) (Baum, 1996).[1] This population perspective allows for the examination of the evolutionary processes of organizations taking place through the selection of variations (e.g., optimal organizational forms) and retention in the population (Monge & Contractor, 2003). Moreover, organizations from different populations can be connected through networks of competitive and symbiotic relations, through which the community emerges. These networks can afford those involved to seek resources needed and create collective goods for the entire community. That is, being part of a community can boost the chance of survival because the community helps buffer environmental constraints and helps organizations gain necessary resources.

Monge and Contractor (2003) point out that, despite the substantial work on organizations and evolutionary theory, little attention, empirically and theoretically, has been given to networks connecting organizations within or across populations (DiMaggio, 1994). Since Monge and Contractor's critique, however, some empirical work has emerged in the literature. For example, in their analysis of the children's television IO community, Bryant and Monge (2008) found that over time, ties changed from mutual (during initial phases in which connections among populations of organizations were made) to more competitive (when the community was in a maintenance stage) and back to more mutual than competitive ties during a time when the community is self-sufficient. These phases reflect the community ecology position that external forces (e.g., innovation, new regulations) lead to more collaborative ties (especially at early formative stages) and that in time, the nature of ties becomes more competitive as system qualities such as population density change (Monge et al., 2008).

We contend that disaster creates a context similar to the early stages of the community ecology model. That is, the uncertain situation after the disaster resembles an open-resource environment in which organizations tend to collaborate with each other in order to obtain resources. Because this study takes place within the first 2 years after the disaster and New Orleans had yet to see pre-Katrina characteristics (Nossiter, 2006; Scallan, 2009), we focus on the specific ways the use of ties contributes to early stages of rebuilding. Resources and adaptation are critical theoretical mechanisms of community ecology (Monge et al., 2008), so to tap into their role in disaster recovery, the focus in this study is on the ways in which organizations use their networks to access resources. Echoing Burt's (1992) view that SC can be accrued through economic and human capital, Monge et al. (2008) also note "organizational relationships themselves can be thought of as mechanisms for acquiring and consuming resources" and "communication and other network links can be classified as an investment" (p. 455). We thus turn to SC to elaborate on network links as investments that can translate into the accrual of resources.

From interpersonal to organizational SC

SC refers to the resources embedded in and available through relations that are accessed and/or mobilized by actors in purposive actions (Lin, 1999; Nahapiet & Ghoshal, 1998). Unlike human capital that resides in an individual's skills and knowledge, SC is embodied in relationships (Coleman, 1990). Yet, similar to human capital, the returns from investing in social networks can be realized in different forms, including instrumental (e.g., economic, political) and expressive (e.g., physical health, mental health) (Lin, 1999). In the organizational context, SC takes on different forms of outcomes and is especially visible at collective levels. Drawing on Burt's (1992) work, Leenders and Gabbay (1999) describe corporate SC as "the set of resources, tangible, or virtual, that accrue to corporate players through the players' social relationships, facilitating the attainment of goals" (p. 3). Inquiries about corporate SC in relation to organizational outcomes have attracted attention (e.g., Greve & Salaff, 2001; Leana & Van Buren, 1999; Lee, 2008). Chung, Singh, and Lee (2000), for example, found that SC is a vital driver of alliance formation. Likewise, SC is related to group effectiveness (Oh, Chung, & Labianca, 2004). Oh et al. showed that a moderate level of informal socializing ties within a group and a large number of external ties to other groups' leaders can enhance group effectiveness. These studies show that SC in the organizational context contributes to positive, instrumental, and collective outcomes. There is also work that attempts to understand SC across levels of analysis by taking on a multidimensional view.

Multidimensional view of SC

SC represents resources that social contacts hold as well as the structure of contacts in a network. Various types of resources available in networks of relations point to the need to look into different dimensions of SC. Nahapiet and Ghoshal (1998) state that three most cited dimensions include structural, relational, and cognitive SC. They propose that dimensions of SC as generated through social relationships within organizations are interrelated yet distinctly contribute to the exchange of and are the main source of organizational knowledge. Structural SC mainly refers to the existence of connections between employee/organizations (e.g., network ties), and relational SC involves the nature and the degree of connection (e.g., mutual trust). Cognitive SC, although less explicitly measured in existing research, focuses on the degree of understanding between partners about their capacity such as common language and shared goals (Inkpen & Tsang, 2005; Nahapiet & Ghoshal, 1998; Tsai & Ghoshal, 1998). Nahapiet and Ghoshal's classification is compatible with other conceptualizations of SC (cf. Lesser, 2000).

Empirical studies yield mixed conclusions about the distinct contributions of each form of SC to various organizational outcomes. The three dimensions provide different types of information benefits (information volume, information diversity, and information richness) and the various benefits have contingency effects on firm performance (Koka & Prescott, 2000; Wu, 2008). Yet, the dimensions do not always go hand in hand to positively affect outcomes. Yli-Renko, Autio, and Sapienza's (2001) study on customer relationships found that social interaction (relational capital) and network ties (structural capital) are associated with greater knowledge acquisition, yet cognitive capital is negatively associated with knowledge acquisition. Similarly, Chen, Chang, and Hung (2008) found that relational and structural SC had significant and positive impacts on creativity of R&D project teams, whereas cognitive SC did not. In other studies, dimensions sometimes weighed less strongly than their combined effects on outcomes. Tsai and Ghoshal (1998) emphasized the interrelationships among them and found that cognitive SC (shared visions) affected the formation of relational capital (trust), which in turn influenced resource exchange. Structural capital exhibited a direct effect on resource exchange even though it also had a causal effect on relational capital. A third line of research considered SC in terms of outcomes and found that embeddedness has a positive influence on relational and cognitive dimensions but negatively influences the structural dimension (Presutti & Boari, 2008). These mixed findings underline the relevance of SC to organizational needs, yet their distinct contributions suggest that types of SC remain fuzzy conceptually.

We contend that the disaster context is a substantially different context than those in which the aforementioned studies took place (e.g., SC use and outcomes with respect to routine organizational practice differs substantially from disaster management). Moreover, as disasters can be pivotal in an organization's history, they are a context in which access, vis-à-vis SC, can be more critical to an organization's survival and thus more lucid to the observer. Previous research on disaster shows that it is a time of unique patterns of social ordering in which people and organizations face tremendous obstacles and often engage in relationships outside of their normal networks (Kreps, 1984; Runyan, 2006).

In fact, disaster response can be patterned in phases. Heifetz, Grashow, and Linsky (2009) suggest that two phases of crisis leadership are an emergency phase and an adaptive phase. In the emergency phase, the leader assesses the underlying causes and builds capacity to thrive in the new reality. The adaptive phase is a time when organizational leaders can revisit and redesign organizational operating rules and bring closure to the past. Assessments on community-level response to disaster grapple with postdisaster recovery with stages that consider community "well-being" and infrastructure management. Such stages include recognizing that the problem is imminent, mitigating possible effects, cleanup and healing, and long-term correction of problems that could not be quickly fixed (Faulkner, 2001; Fink, 1986; Roberts, 1994). Considering the unique challenges disaster brings to bear on an organization, the availability or use of SC may come in phases, too. Specifically, during the emergency, what types of SC are most useful to leaders? Does merely having access to others (structural capital) help stabilize the emergency? Like other research contexts, do the various types of SC have combined effects? Turning to organizational and business response to recovery with an emphasis on communication relationships and how they are used to negotiate postdisaster survival, we ask:

RQ1: How are dimensions of SC leveraged during various phases after a disaster?

Given the micro–macro aspects of social networks coupled with the intrinsic interdependence among individual actions and organizational outcomes (Katz & Kahn, 1978), a cross-level social networks view and consequent SC is necessary in discussing IO contexts. Leenders and Gabbay (1999) suggest no clear distinction between individual and organizational SC. Not surprisingly, an emerging trend of examining IO networks through individual- and organization-level analysis has been observed (Gulati & Westphal, 1999; Kale, Singh, & Perlmutter, 2000; Zaheer, McEvily, & Perrone, 1997). Such studies show a reciprocal effect between organizational and individual SC, suggesting that SC can coevolve with social structure through institutionalization of ties (Leenders & Gabbay, 1999).

Organizational structures influencing individuals

In organizational network research, an enduring dilemma exists between individual interests and organizational benefits. Some argue an ultimate compromise between collective and individual SC, whereas others suggest that individuals can benefit from certain organizational decisions. Leenders and Gabbay (1999) optimistically suggest that firms can engage purposely in IO relationships with the aim of enhancing employees' SC. An example is seen in international collaborative efforts through which an organization builds SC by establishing relationships with other organizations. This IO initiative enables employees to build their social networks by traveling and being involved in international assignments with people in collaborative organizations. In another example, Lazega, Mounier, Jourda, and Stofer (2006) found that the influence of organizational SC on French cancer researchers' performance was more crucial in helping individual researchers to achieve status competition than individual relational capital. Similar to the spillover effect that happens when employees benefit from their organization's SC, can organizations count on the opposite? Does individual SC impact positive organization-level outcomes or do individuals reserve personal SC for their own benefits? Looking at how individual structures can influence organizations highlights the potential for transferability of levels of SC that can benefit both the individual and the organization.

Individual structures influencing organizations

Granovetter's (1985) notion of social embeddedness illuminates the intricate relationship between personal networks and organizational SC. He noted that business relations are mixed up with social relations through which firms are connected based on networks of personal relations. Put differently, the microsocial factors (i.e., employees' social networks) can influence the networks of a firm, which, in turn, affect the performance of a firm. For example, Galaskiewicz and Shatin (1981) showed that ties leaders made through organizational memberships tended to develop cooperative professional relationships. Batjargal and Liu (2004) found that entrepreneurs' direct ties with investors affected venture finance decisions because prior relationships served as a mechanism for reducing social risk (i.e., uncertainties about each other's intentions, trustworthiness, behavioral patterns). Thus, at the individual level, employees of an organization engage in relationships with outside constituencies that may become institutionalized and translate into SC at the organization level. Others within the organization may in turn reap benefits from these relationships and extract SC personally. Corresponding to this cross-level reasoning, Maurer and Ebers (2006) showed that a firm's relational management (delegating the responsibility of maintaining external ties among its members) can moderate the effect of organizational SC on individual members' SC. Put another way, employees can build new contacts based on their assignments. Meanwhile, in aggregate, individual SC consisting of strong and cohesive ties can result in a wide range of external relations at the firm level.

Sharing SC

Many relationships are not simply professional or personal. That is, individual SC does not necessarily refer to only personal relationships, but rather to any relationship brokered on an individual, rather than organizational, level. As pointed out previously, this could include international contacts made as part of an IO alliance, personal relationships within the organization, and can also include personal relationships from outside of the firm. Burt (1997) proposed that the strongest SC effects associated with network constraints should be measured from the combined networks of work and personal relationships. Birley (1985) and Brüderl and Preisendörfer (1998) delved into entrepreneur networks and the impact on their survival. Both studies showed the importance of strong, personal ties, with informal networks being more useful to entrepreneurs (Birley, 1985) and strong ties and family being crucial during the process of business formation (Brüderl and Preisendörfer, 1998). These studies incorporated personal networks and business contacts into the measurement of SC. Gulati and Westphal (1999) and Kale et al. (2000) touched on the conflation of personal and professional networks, too, and found friendship ties of CEOs and outside directors were positively related to the chance of forming joint ventures. A common theme is that there is no clear-cut distinction between individual SC and organizational SC. We consider work relationships and personal relationships and assume that many relationships are not easily distinguished as professional or personal (Burt, 1997). Flap and Volker (2001) echo this assumption in showing the effect of goal specificity of SC on aspects of job satisfaction. They found that networks consisting of strategic, work-related ties can increase employee satisfaction regarding instrumental aspects while closed networks of identity-based solidarity ties can improve employee satisfaction with social aspects (e.g., social climate at work). In other words, merely observing SC from work-related ties or social ties does not obtain a complete picture of the benefits of SC for individuals.

It makes sense that the leadership of a firm will use individual and organizational levels of SC for advancing firm goals and needs, similar to how CEOs turn to their peers for professional advice (e.g., McDonald & Westphal, 2003). Few empirical studies have looked into the relationship between individual and organizational SC, with even fewer in IO contexts. Thus, it is still unknown how levels of SC can be balanced and transferable (Ibarra, Kilduff, & Tsai, 2005). This question has important implications for the investigation of organizational postdisaster recovery as organizations, unlike citizens, are expected to have more resources to sustain themselves through the disaster and then are expected to help members or stakeholders grapple with the urgency. We thus ask:

RQ2a: How are firm- and individual-level SC employed during disaster recovery?
RQ2b: How are professional and personal SC employed during disaster recovery?

SC is inherently relational, so ongoing communication to "periodically renew and confirm" SC is essential to its efficacy (Adler & Kwon, 2002, p. 22). Yet, Burt (2000) conceives of a special type of SC accruing to an organizational outsider as *borrowed SC*, or, benefits an outsider might get by having access to another person's network. To acquire SC, outsiders or newcomers may need a sponsor to broker a connection into a group and attain a legitimate membership. This sponsor would be a partner whose own connections strategically span the network. Borrowed ties are viewed as a strategic action to use another organization's SC. Similarly, the use of indirect ties refers to the situation in which an organization gets to know information about the other through a third party, who has ties with both organizations (Gulati & Westphal, 1999). SC culled from indirect ties still resides in the liaison organization (the organization that has direct contact). Borrowed SC and the creation and maintenance of indirect ties are particularly relevant to communication theory and research because their effects on IO networks emphasize communication processes underlying third-party ties (Burt & Knez, 1995; Gulati, 1995). Hence, we ask:

RQ3: What role do indirect ties play in an organization's recovery following disaster?

Method

This study took place in New Orleans following the 2005 hurricane season. Hurricane Katrina caused such large-scale destruction that over a year later, limited return had occurred on the part of citizens and organizations with the population at about 60% (Nossiter, 2006). In the immediate aftermath, public services (e.g., electric, phone, water) were wiped out or were very limited in availability. Service availability spread to many areas by around December 2005; however, in other areas, like the Lower Ninth Ward district, a lack of services still left perilous living conditions. In the immediate aftermath, the National Guard was deployed to retain order and to facilitate large-scale cleanup. Physical destruction left roads impassable and open areas covered with wreckage and/or water, thick mud and sediment, fallen trees, and houses, building parts, and vehicles that flood waters left strewn about. In December 2005, traffic lights at many intersections across remained dysfunctional and traffic flow was instead managed by temporary stop signs placed on wood construction horses. Neutral grounds (the green space that divides a boulevard) were used to pile debris. Debris piles contained everything from trees, fences, cars, to roofs and building parts, and piles reached about the height of a telephone pole. Other neutral grounds that were deemed "higher" areas included parking lots where owners left vehicles they did not use to evacuate, assuming the cars would be stored safely above flood lines. By December 2005, these vehicles were abandoned, having been destroyed by the muddy brackish water that flooded them. A tour in March 2006 (8 months later) of areas in which many participating businesses and organizations were located indicated that debris piles and abandoned vehicles were removed. By late spring 2006, visits to the city became less about seeing the storm's wreckage even though blue-tarped roofs and ongoing construction remained a presence throughout the course of the field visits. It was in this context that field research and interviews took place.

Methodological approach

In most research, the nature of the research problem dictates the method of study. In general, qualitative problems are driven by questions of "how or a what," and are applied to a topic that needs to be explored, often in its natural setting (Creswell, 1998). The questions generated by the exploration are answered in great detail (Creswell, 1998). Qualitative research has been defined as a "multimethod," "interpretive," "naturalistic," "sensemaking" approach in which a researcher "builds a complex, holistic picture, analyzes words, reports detailed views of informants, and conducts the study in a natural setting," while interpreting the subject at hand using the meanings imbued by the people who experience this phenomenon (Creswell, 1998, p. 15). The problem in this article is to understand *how* organizations and their leaders use SC to recreate networks after a disaster and *what* impact SC has on survival. Thus, a primary methodology of in-depth interviews was employed in order to understand how SC was used and impacted recovery in postdisaster recovery and rebuilding. According to Miles and Huberman (1994): "Words, especially organized into incidents or stories, have concrete, vivid, meaningful flavor that often proves far more convincing to a reader" (p. 1). Thus, we use the participants' words as a basis for examining the role of SC in postdisaster networking and subsequent organizational recovery efforts.

Qualitative research is often conducted in a field setting in which the researcher has contact with people who have experienced or live with the phenomenon under study. Miles and Huberman (1994) say that this is done in order to obtain a "holistic" or systemic approach that studies the "logic . . . arrangement . . . [and] rules" of the phenomenon (p. 6). Research analysis is based on words, which are organized in a way that "permits the researcher to contrast, compare, analyze, and bestow patterns upon them" (Miles & Huberman, 1994, p. 7). Based on patterns and themes derived through analysis, one attempts to understand the thought processes and actions taken regarding the phenomenon under study. Because the participants assign meaning and the researcher is the primary measurement device in the study, there are many possible interpretations of qualitative data. It is the job of the researcher, however, to derive theoretically sound and consistent conclusions from the data.

Sampling

Convenience and snowball sampling methods were used. Initial contact was made with a professional business networking club located in New Orleans. The first author recruited business owners and organizational leaders to participate at the organization's first official meeting held after Katrina. Subsequent field visits ($n = 11$) enabled the first author to recruit when attending various public events such as at the Bring Back New Orleans Commission meetings and when visiting shops, restaurants, and businesses. An additional five field visits for completing interviews were made by other research team members, including two professors and three graduate students. The first author conducted 33 interviews used in this study and the other 23 interviews were by the other research team members who were trained by listening to a sample of interview recordings and/or sitting in on interviews conducted by the first author. Field visits were mostly used for networking and conducting interviews ($n = 39$) although some interviews were by phone ($n = 17$).[2] A difference of means test showed no significant differences in length of interviews conducted face-to-face ($M = 53.82$, $SD = 17.65$ minutes) versus over the phone ($M = 54.29$, $SD = 15.77$ minutes). Similarly, there were no significant differences in terms of number of alters named while interviewed face-to-face ($M = 20$, $SD = 9$) versus over the phone ($M = 18.18$, $SD = 11.93$).

Participants

The population of interest was organizations and businesses. Informants were those in charge and making or privy to critical decisions (e.g., owners, CEOs, presidents). Because the situation was emotional and stressful, data collection techniques were those that are most flexible and least presumptuous about the participants' tenuous circumstances. Thus, longitudinal, in-depth, semistructured interviews were conducted. A total of 90 interviews were conducted with 64 different organizational and business leaders from December 5, 2005 until August 2007 and ranged from 12 to 105 minutes ($M = 52.42$ minutes, $SD = 17.28$). Although the sample was biased toward those who had returned and begun reestablishing their organizations, the method complemented the central concerns about SC and the broader project goal—to understand how organizations rebuild their communities following disaster.

Interviews included a diverse cross-section of organizational types with varying degrees of destruction to their communication and physical infrastructures. Specific financial data were not available in most cases. Given an interest in organizational communication problems, however, most interviews included an overview of problems that are considered structural aspects that can impact SC use. Specifically, most interviews included a discussion of the status of employees and communicating with them via various information and communication technologies (ICTs) after Katrina as well as the extent to which physical damage to working space impacted business functioning. In terms of organizational size, those in this study include (a) small entities consisting of fewer than 10 employees, including the owner ($n = 22$); (b) small entities consisting of 11–20 employees ($n = 11$); (c) medium-sized entities consisting of 21–100 employees ($n = 17$); and (d) large entities having greater than 100 employees ($n = 6$). A majority of the organizations required physical space or to be present in New Orleans to operate ($n = 33$), could (at least temporarily) operate with some mix of face-to-face and virtual work but at some point needed to be local to operate ($n = 21$), or could fully operate virtually ($n = 2$). The amount of physical damage sustained to properties ranged from extensive (e.g., parts of roof off, uninhabitable space, numerous broken windows, flooding inside; $n = 18$) to minimal (e.g., usable space but some damage like a broken window or lack of utilities like electricity; $n = 36$; the two virtual organizations were not included in this count).

This study uses 56 first-round interviews conducted between December 2005 through April 2007.[3] More than half of the first-round (Time 1) interviews were conducted in the first 8 months following the storm ($n = 33$). We collected another five first-round interviews in August 2006, two in November 2006, and one in January 2007. An additional 15 Time 1 interviews were gathered in March and April 2007. In terms of characterizing owners' talk, interviewers directed participants to address what they actually did in the immediate aftermath of the storm as well as when they returned to New Orleans. Stories provided robust accounts of relationship management and communication challenges. Participants generally addressed the interview topics with minimal and often no prompting by the interviewer. The interview guide[4] was designed to ensure that issues covered in the interviews included communicative actions and partnering in the immediate aftermath and when participants returned.

Despite the fact that some interviews were conducted up to 1.5 years after the storm, getting participants to discuss their experiences in specific detail was not difficult. As a way to check varying degrees of detail, a search of all of the transcripts for "remember" or similar indicators of problems with relying on recall in the interviews showed that participants did not indicate poor recall in their reflections. Put another way, participants' nuanced descriptions indicated that their memories were still highly attuned to the events and experiences surrounding Hurricane Katrina. In fact, participants used words like "I remember" and "I recall" to underscore the vividness of their memory. For example, one business owner interviewed in April 2007 explained, "I still remember the first time a customer came into the store and said 'I want to change my mailing address' which we did a lot of." In a November 2006 interview, a law firm partner did not recall some aspects of his story but this did not obscure the data relevant for this study. He explained: "I tried contacting people [at a specified federal office] and I had trouble getting through *for whatever reason. I don't know what the problem was. I don't recall*. But I have a friend who I used to work with at the [federal] Office, so I e-mailed him and I said, look . . . . " (emphasis added). These quotes represent the interviews in which it was apparent that managing post-Katrina business (and personal life) was a very salient experience for all of the participants. They recalled very specific stories and nuanced accounts of their experiences. Sadly, their salient memories bode well for research as these data rely on retrospective accounts. In general, "salient events are more likely to be recalled than nonsalient events, where saliency is a function of the unusualness of an event, its economic and social costs and benefits, and its continuing consequences" (Pearson, Ross, & Dawes, 1992, p. 88). To further examine other possible effects of interview timing, age of the interview (measured by number of months after Katrina the interview took place) was correlated with the number of alters named (an indicator of accurate recall), $r = -.02$, $n = 56$, $p = .88$ ($M = 19$, $SD = 10$). Moreover, studies on participant recall (Kaniasty & Norris, 1993; Norris & Kaniasty, 1992) bolster the qualitative and quantitative evidence gleaned from these data, suggesting that there were minimal effects of timing on the study data.

Procedures for coding interviews

This study employed inductive coding processes using the constant comparative technique, which focuses on asking questions and making comparisons (Strauss & Corbin, 1998). Coding, as a form of analysis, involves "review(ing) a set of field notes . . . and dissect(ing) them meaningfully, while keeping the relations between the parts intact" (Miles & Huberman, 1994, p. 56). The constant comparison technique increases the internal and external validity of the findings (Boeije, 2002). Strauss and Corbin explain that this is because it forces researchers to examine basic assumptions, biases, and perspectives, and helps researchers to uncover meanings, properties, and dimensions that are embedded in the text. In this study, over 1,500 pages of interviews were assessed over a 2-year period by a team of seven people. While the first author was involved in all steps of the data collection and analysis process, other members of the research team participated in varying degrees. Some of the team members who participated in early stages of code creation were not the same members who later refined and applied the codes to interview transcripts. Coders who were not interviewers were active in creating the coding scheme and their ''once-removed'' relationship with the data helped balance out the interviewers' potential biases and vice versa. Finally, coders who were involved in the earlier part of the coding process were not involved in the creation of this article, thus alleviating the potential for the creation of codes biased toward the subject of this article. Alternating team members in this way allowed for fresh perspective and objectivity when analyzing the transcripts. However, keeping a core group of team members involved in the entire process ensured that research goals, as well as an understanding of both the corpus and the context in which interviews took place, would remain a central focus of the analysis.

This constant comparative technique was applied to interviews to inductively create codes for multiple coders to apply using the ATLAS.ti computer program. ATLAS.ti enables management of large volumes of qualitative data by allowing the coder(s) to create categories and label words, sentences, or whole paragraphs with a particular theme (code). Codes for this collection of interviews were created by taking the following steps. Initially, coders independently evaluated a set of transcripts, then, with a coding partner, compared their emergent themes and discussed their differences and similarities. Coding teams then met together to discuss all emergent themes across initially coded interviews. Over the course of several meetings, the team developed a coding scheme. Next, three different interviews per pair of coders were analyzed, then the entire team met again to review the coding, any newly emergent themes, and issues raised in applying the codes created from the initial themes. After revising codes to reflect the changes, an additional two interviews were coded independently, with coders meeting to compare results, resolve differences, and finalize the codebook. At this stage, each pair of coders reported consistent agreement about episodes that needed to be coded and agreed that a highly reliable and valid coding scheme was achieved.[5] Coders then coded all of the transcripts in ATLAS.ti. Each transcript was coded by two coders but to avoid intrateam biases, coding partners varied. For example, coders A and B coded interviews 1–5, B and C coded interviews 6–10, and so on, with coders F and A coding interviews 85–90. This round robin approach to partnering coders provided assurances that team biases would not emerge and that data were not missed or overlooked when applying codes. Moreover, the approach ensured consistency across teams as a result of having rotating coding partners.

The final code scheme (Table 1)[6] was applied in the ATLAS.ti software program to analyze and organize the data around these emergent themes. ATLAS.ti then allows the analysts to search the entire corpus for those sentences and paragraphs of quotes that have been coded with the general categories summarized in Table 1. Search queries conducted for particular codes in ATLAS.ti point the analyst to specifically labeled interview content. That content was then interpreted by the authors of this article to provide the data analyses and interpretations presented in

Table 1 ATLAS.ti Codes and Subcodes Developed from Constant Comparative Method

Code	Brief Description
3.0 Embeddedness	Nature of ego's general network configuration
3.2.1 Individual level	The connection is on the individual level
3.2.1.1 Personal tie	Ego discusses as a personal tie
3.2.1.2 Educational tie	Ego discusses own networks in educational circles
3.2.1.3 Political tie	Ego discusses own networks in the political arena
3.2.1.4 Board tie	Ego discusses own networks composed of directors of boards
3.2.2 Collective level	The connection is professional/on the organizational level
4.0 Alters	Type of entity of alters discussed by ego. Use the most descriptive option. For example, if the business is also a supplier, use SUPPLIER (4.3) rather than the more generic BUSINESS (4.11).
4.1 Government agency	
4.1.1 FEMA	
4.1.2 SBA	Small Business Administration
4.1.3 City government	
4.1.4 State government	
4.1.5 Federal government	
4.10 Foundation	
4.11 Business	
4.12 Medical	Doctor's office, hospital, outpatient facility
4.13 Insurance	Business/homeowners insurance companies
4.14 Nonprofit (501-(c)(3))	
4.15 Umbrella org	Alter is the larger entity of which ego is a part (e.g., ego is the N.O. location of their global corporation—a McDonald's restaurant might talk about McDonald's headquarters. Headquarters is an umbrella org).

Table 1 *Continued*

Code	Brief Description
4.19 Bring Back New Orleans Commission	
4.2 Client	
4.3 Supplier	Alter is a vendor or supplier of tangible goods or services of ego
4.4 Academic	
4.5 Individual	A person mentioned who was not viewed as an agent of some other organization. For example, personal friend, acquaintance. A contact can be coded for both individual and collective levels (codes 5.8, 5.9) when the friend also acts as a professional contact.
4.6 Media	Television, radio, newspaper, Web-based outlet
4.7 Association	Professional association. For example, American Music Association
4.8 Faith-based	Religious communities such as churches, temples, faith-oriented clubs/meeting groups
49.0 Group alters	General descriptor of groups to which alter is connected
49.1 Donation/volunteer relationship	
49.2 Stakeholders	Ego discusses alters that reflect general groups that have a stake in ego's business
49.3 Employees	Use this for when ego talks about connecting with specific employees. DO NOT use it when ego simply says "I have 7 employees." Only use it if ego then proceeds to discuss his/her interactions with them.
42.0 Alter's business type compared to ego	
42.0 Same type	
42.1 Different type	
5.0 Tie type	Describes the nature of the tie with alter
5.2 New/disaster	Ego and alter link after Katrina and as a direct result of the disaster
5.3 New/nondisaster	Ego and alter link after Katrina but the link is not a direct result of the disaster
5.4 Peripheral, predisaster	Ego and alter knew each other prior to disaster but were not part of each other's key contacts

(*continued*)

Table 1 *Continued*

Code	Brief Description
5.5 Idealized	Ego discusses a potential alter. Ego sees a contact with the potential alter as one that would be important and useful, but has not been realized due to lack of interest on the part of alter.
5.6 Link (unclear timing)	Ego and alter are clearly linked but there is not enough information in the interview to establish more details of the link
5.7 Predisaster link	Ego and alter were clearly linked prior to Katrina but there is not enough detail to establish whether alter is part of ego's core or periphery
5. Tie level	Level of connection (tie is seen as a personal asset and/or an organizational-level asset)
5.8 Individual level	Ego and alter link on the individual/personal level
5.9 Collective level	Ego and alter link on the organizational/professional level
6. Tie activation	Timing of when the connection was made to gain support from alters and whether the tie was to an old or a new contact relative to the hurricane
6.1 Prior to returning.	Made prior to individual returning to New Orleans
6.2 Immediately upon return	Made when ego returned
6.3 After settled in	Time lapsed before ego reconnected to alter
6.4 Have not connected to old contact	
6.7 Difficulty contacting	Contact attempted, but not made
6.8 Latent	Dormant/undeveloped contact
6.9 Link/release	Contact initially made but dissipated shortly thereafter
6.10 Nonreciprocal	One-way contact that ego initiates but alter does not return
6. Tie activation level	Level of activation (in a personal domain vs. on behalf of the collective)
6.11 Individual level	Connection made on the individual level
6.12 Collective level	Connection made on the organizational level

(*continued*)

Table 1 *Continued*

Code	Brief Description
7. Nature of tie	A general description of ego and alter's relationship (not about where the relationship might be going, but what it has been and what it is now)
7.1 Social	Contact primarily from social interactions
7.2 Professional	Contact primarily from business interactions
7.1 Strength of tie	How often ego and alter have contact or interact
7.13 Weak	Cursory levels of interaction (know, but don't often interact—follow the Granovetter rule: 1–2 times/year or a very infrequent interaction yet they do, indeed, know each other)
7.14 Moderate	Limited levels of interaction (know and interact with some frequency, often a uniplex relation, e.g., engage only in work-related interactions)
7.15 Strong	Frequent, significant levels of interaction (know extremely well, interact often such that this is probably a vital relation for ego). This is a multiplex relation, involves a strong personal connection as well as professional interactions.
7.6 Strength unknown	Unclear nature of ego and alter relationship or how often they interact
7.7 Indirect link	Connect to some alter through someone else
7.8 Linking pin	Ego acts as a liaison between two unconnected alters
79. Communication flow	Specifies the direction or flow of communication between ego and alter. Also shows that either ego or alter clearly has an advantage (tangible or intangible) in the relationship.
79.1 Outward flow	Communication flows from ego to alter
79.2 Inward flow	Communication flows from alter to ego
79.3 Bidirectional	Communication flows between ego and alter reciprocally and/or directionality is not clear so we must simply assume that communication could flow in either direction

(*continued*)

Table 1 *Continued*

Code	Brief Description
9.1 Usefulness of tie	Identifies the usefulness of alter to ego's or ego to alter's individual and business recovery. Ego does not need to explicate but the tie's usefulness (or not) should be unambiguous. Otherwise, don't use the code.
9.11 Useful	Tie provided support that was helpful to business recovery
9.12 Not useful	Tie was not helpful to business recovery
9.2 Level of usefulness	
9.21 Individual level	Tie was most useful to the individual
9.22 Collective level	Tie was most useful to the organization/business
16. Proximity to alter	
16.1 Physically proximate	Alter is physically nearby. In the greater New Orleans region, including the following: Jefferson Parish, Kenner, Metairie, West Bank communities (Terrytown, Harvey, Westwego, Algiers, Gretna), Algiers Point, and the N.O. districts including CBD (Central Business District), Bywater, Carrollton, French Quarter, and the Garden District.
16.2 Physically distant	Alter is physically distant (located outside of the greater New Orleans region)
21. Boundary spanning	
21.1 External organizational	Ego discusses general interaction and networking outside the organization leading to greater quantity of ties
21.2 Referrals	Ego discusses an increase in number of external organizational ties through referrals (e.g., friends of friends; by word of mouth)

the findings section. Research questions were answered using ATLAS.ti search queries of Table 1 codes.

Analysis procedures

Dimensions of SC

Echoing Nahapiet and Ghoshal (1998), SC dimensions were identified as follows. The structural dimension was assessed using excerpts when ego described *embeddedness* (Table 1, code 3) with individual and organizational alters. *Individual-level* (personal tie, educational tie, political tie, board tie) and *collective-level* ties were considered, in order to answer RQs 1–2 regarding the dimensions of SC and firm-level and individual-level SC. For the relational dimension, *the nature of tie* (Table 1, code 7) and *strength of tie* (code 7.1) that ego had with the alter along with the theme of trust emerging from ego descriptions about the relationship with the alter were used.

Firm-level and individual-level SC

Table 1 codes included *tie activation level* (6.0), *social/professional tie type* (7.0), *usefulness of tie* (9.1), and *levels of usefulness* (9.2) to describe individual and organizational levels of SC and the way they overlapped.

Leaders' relationships and indirect ties

To understand the impact of leaders' networks on organizational recovery, the codes that distinguish *individual- and collective-level interactions* (Table 1, codes 3.2.1, 3.2.2, and 5) were used to filter personal from organization-level networks for the codes *embeddedness* (3.0), *tie activation* (6.0), *social/professional tie type* (7.0), *usefulness of tie* (9.1), and *levels of usefulness* (9.2).[7] Indirect ties are those ties to which ego (the leader and/or his or her organization) has potential access through some intermediary with whom ego has a direct relationship. In assessing the effect of leaders' indirect ties on recovery, *indirect link* (7.7) and *linking pin* (7.8) codes were used. An indirect link refers to whether ego reported she or he had a tie to some alter through an immediate and direct tie (i.e., ego's direct tie provided access to a communication partner with whom ego did not have a tie). A linking pin refers to the case when ego served as a liaison connecting otherwise unconnected alters. To elaborate on relationships reported by ego, additional codes included *Business type* (42.0), *proximity* (16), and the extent to which ego had relationships with alter through *referrals* (21.2) or joint networking *alters* (4.0).

Findings

Emergence of postdisaster phases

RQ1 asked about how dimensions of SC are leveraged during phases after a disaster. Before detailing the findings about the SC dimensions, we overview emergent phases (Figure 1) observed in the interviews. Participants recalled their experiences in a chronological way,[8] revealing survival experiences that tended to happen sequentially. In general, participants described first attending to personal/family

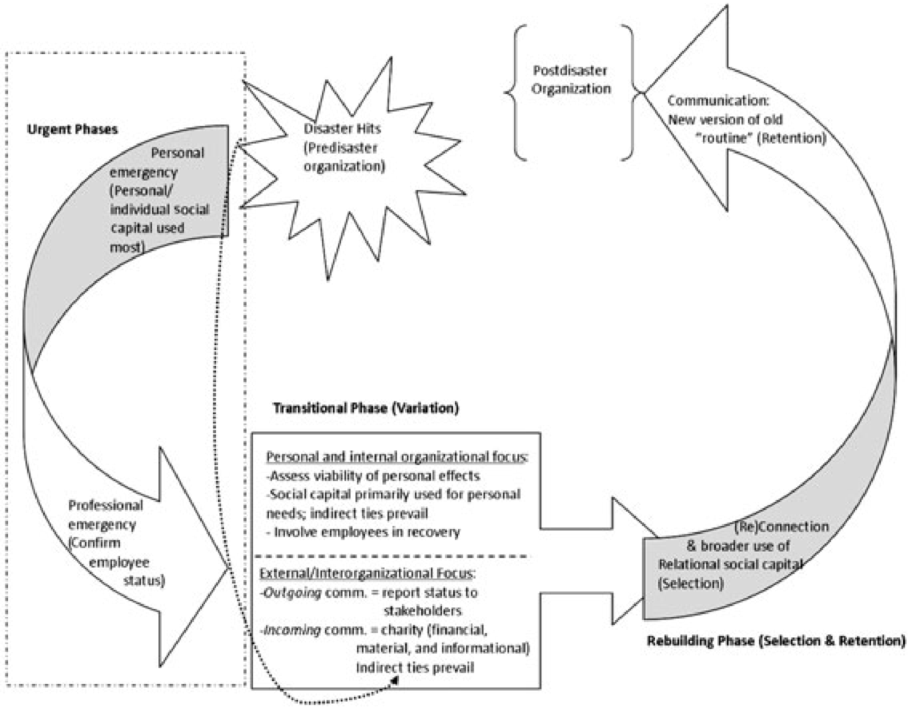

Figure 1 Grounded theory model.

needs, then reported how they contacted and managed employees, followed by a transitional phase in which the external contacts were used for repairing/stabilizing their organizations, and finally they embarked on the process of returning to business "as usual." The way businesses and their leaders communicated and used SC differed among the sequential phases reflective of the VSR framework. These phases, therefore, serve as a chronological guide to discuss dimensions of SC, the evolving nature of how communication, and SC was used, as well as in answering the remaining RQs for this study.

Personal emergency phase

First, most participants experienced evacuation, so their immediate attention was to their nuclear family and securing a place to live. Personal networks were more prevalent in the days following the storm as uncertainty was the norm regarding personal effects (i.e., housing) and the safety of friends and extended family.

Professional emergency phase

Next, leaders described communicating with their employees and informing them of the status of their jobs (including advising employees to seek unemployment, informing employees that they would be paid through a particular date and then "see what happens," and/or coordinating remote work). For example, one family entertainment organization explained that its limited interactions included only employees and not former partnerships in the immediate aftermath.

Transitional phase

The transitional phase was marked by directional, generally one-way, communication. Put another way, outward flows of communication versus inward flows of communication tended to be for distinctly different reasons. Businesses and organizations used various media (Internet, public service announcements, phone contact) and parent organizations to communicate their status and intentions *to* key stakeholders including clients, suppliers, and insurance holders (i.e., outward communication). On the other hand, businesses and organizations alike received communication from various external sources about offers to help in financial, material, and informational ways. While some of these communicative interactions involved alters with whom participants had established SC, in many cases, the inwardly flowing communication was *from* external sources *to* study participants, regardless of whether prior relationships were reported. Organizations received communication about the availability of resources that could best be described as charitable offers rather than "spending" SC. In other words, participants described the "generosity" of others and how much they appreciated help, yet in no way indicated that they "owed" something in return for the help received. Indirect ties to resources via personal contacts (e.g., spouses, family members) and professional contacts (e.g., professional associations) were also prevalent at this stage and are discussed later in answering RQ3.

Another aspect of this phase is that participants assessed their organization's status and used institutional ties to do so. For example, passes were required to get back into the city in the immediate aftermath. One family entertainment organization called U.S. Senator from Louisiana Mary Landrieu's office in Washington and a small business owner turned to his insurance company to obtain copies of the pass. Institutions, however, were not always useful. For example, businesses found the Small Business Administration (SBA) difficult to work with because of bureaucratic roadblocks (e.g., use of personal property for leverage rather than business assets) or things they had heard about working with it. A tourism business complained, "The SBA is a joke" while others were frustrated with banking institutions.

Moving out of the professional emergency stage to the transitional stage is best exemplified by this 501(c)(3) leader's experience:

> Once we were able to get our managers together . . . . we went about the project of attempting to locate both staff and clients through personal contacts, networking and whatever. As soon as the phones were working, we started using the phones. But before that, we used public service announcement, both through the radio and television.

Table 2 includes quotes that illustrate the nature of communication and resources organizations received in the transitional stage and then also includes the types of experiences that may have helped or thwarted progression to the recovery stage. Although there are cases where charitable support overlapped and continued, common to moving out of the transitional phase and into a rebuilding phase was that participants began emphasizing their use of SC while their reports about charitable relationships diminished. This finding reflects the evolutionary framework in that some ties were used for initial resource acquisition yet such ties did not necessarily stay intact because the fitness of these links to organizational survival was reduced, and thus they were not retained.

The shipping/freight/storage entry in Table 2 shows an extreme case that amplifies the significance of the stages because this president never stopped working. He explained that his kids were grown, not in the area, and that he is single, so he and a small core of employees worked through the storm. His case illustrates how his use of SC helped him get out of the emergency and transitional phases. This quote illustrates how he was still in the transitional phase in that he was trying to acquire basic needs (charity) to ensure his employees would be comfortable (blankets), yet by engaging a trusted relationship, he was brought out of the mindset of "merely" securing a static organizational state. Echoing the VSR framework, he acquired new resources through the links (variation). Yet, his colleague's insistence that he think of what provisions his business needed to actually function and service its stakeholders shifted the focus and planning to that of recovering—rather than stabilizing—the business. This suggests that turning to one's network and using SC can enable a shift to recovery mode and not allow the organization to linger in emergency and transitional phases (selection). This case also illustrates how SC in the form of communication ties facilitates an organization's survival. As a point of contrast, the last entry in Table 2 illustrates a case of slowly moving through the phases and not turning to SC. The law firm partner described how time was spent in the weeks following the storm and revealed a relatively slow move through phases. At the time of the interview, she had yet to enter a recovery phase. Her experience did not include reaching out to former colleagues or showing evidence that SC had yet to be employed.

Rebuilding phase

Data suggest various ways SC was used as businesses moved out of repair and idle functioning and into recovery and resuming work. Table 3 quotes capture how old contacts facilitated resumption of business. Progression into more advanced stages of the rebuilding phase (i.e., second half of Rebuilding arrow in Figure 1) are illustrated by accounts about how businesses returned to pre-Katrina contacts and nurtured the relationships. For example, a family entertainment organization explained: "our partnerships have strengthened substantially." Similarly, organizations described returning to old relationships but emphasized that they also were building new ones. In other words, some links were used for initial resource acquisition and then transformed into new versions of organizational collaborations (retention), reflective of the VSR model. Other aspects of this stage are discussed in later parts of this section where we unpack the uses of SC in terms of individual and organizational

Table 2 Inwardly Directed Communication During the Transitional Stage

Organization	Quote
Performing arts organization	There was [a peer] company, our general director happened to be in Knoxville at one point, and the Knoxville [peer company] willingly offered him that he could use one of their offices to come in and make phone calls, and use their facilities rather than trying to do it all from his cell phone in his car. That kind of thing. The industry has been very helpful and generous.
501(c)(3)/nonprofit	I mean you got everything you could from whoever you saw.
Business/nontourism	So we had e-mails pouring in from people, what can we do, how can we help you. People were sending us free wine. Our Italian suppliers sent us probably 200 or 300 cases, probably $30,000 worth of free wine. You know, every producer sent 10 cases of wine to help us get started again.
Family entertainment-12	There was a foundation here that gave us a million dollars almost immediately after the storm to help restore [aspects of our holdings] . . . Some [donors] were local, some were national. We had donations from various local foundations . . . . different kinds of people who gave money. Some people just sent checks. Some were local foundations.
Shipping/freight/storage	And so the thought occurred to me to call my good friend John Doe [pseudonym] who was the head of [a named agency] in Washington, who had been a . . . . director like myself up in Wayne County, Detroit . . . . And so I called John. . . . . And he said, what else do you need? And you were thinking basically, because remember there was no recovery plan, you were thinking minute to minute and literally hours went by and you couldn't . . . . He said, no. What do you need? Three times. I remember it clearly. I said, John, I'm telling you what I need. I need water, I need blankets. And he said, no. What do you need to re-open [your business]?
Prof/legal	Interviewer: "Did you work on reconnecting with people right away"? Respondent: "To be honest, I really didn't do much. I think I was in shock, particularly for the first three weeks before I came to see how the office and the house were. And then I was in a different kind of shock. But during the first three weeks, except for a few calls and e-mails from clients basically just saying how are you and where are you and that sort of thing . . . . I didn't do anything. When I came back I got my computer and some CDs with files."

Table 3 Progression into Rebuilding Phase, from Initial Social Capital Use to Building New Relationships

Restaurant/bar-28	. . . over the years, the [we have] built a lot of good will that I'm very fortunate in the fact that there's a lot of people who want to see me back in business, who . . . consider it important that the [business] be there. So when you have people who want you there, things can happen a little faster for you.
Prof/consultant-15	One of the networks that I kept up with because I have a friend of mine who's the Deputy Secretary of Transportation . . . . I called him up. We were just trying to keep up with each other—how you doing? He used to work for me many years ago . . . . And he was now DOT and he was like, well I think this is something that your firm ought to do, could do, and we looked at the RFP and said, okay, cool. And so we went after it. We were one of five and we got selected and we executed on it. So, yeah, that was one and it was very important.
Advocacy-24	So we're positioned with Tulane to launch in the next couple of months what we're calling [a collaborative community outreach program]. And the reason why I brought them in, because one is as an organization, we're an independent nonprofit . . . . You need some smart people to do . . . This is some complicated stuff.
Business-27	The other people that were extremely helpful was some fellow retailers throughout the country. And what they offered to do, and in fact did do, is they came down and spent two days looking at the store, and looking at our situation, and advising us as to how they saw our situation, and giving us some options as to what we could do. They did that on their on, at their own expense, and came down.
Association-3	We've had meetings with the Convention Bureau people . . . . we actually went to the convention bureau and had the meeting there so that some representatives from the Convention Bureau . . . . [a named leader] came and spoke to our group. And then we also had a smaller group meeting with some [peer business] owners about 2 weeks ago. And we've also spoken with people from the State Tourism Promotion, the Louisiana Office of Tourism, because I'm also involved in the State Association, and we had our state conference back in July. And they had somebody there.
Prof/consultant-15	. . . we collaborated with [Joe Pseudonym], who's CEO of [Consulting Company], because we were, pre-Katrina, about to begin a contract to implement an energy efficiency program for the city of New Orleans. Well the storm sort of took all of that away and in fact yesterday we just reinitiated that program. So [Joe] was here in fact yesterday to help do that. So that's one example.

(*continued*)

Table 3 *Continued*

Advocacy-38	. . . we are going to partner with; the grant I wrote, we have a little bit of money in there for equipment and supplies for giveaways, so we're going to partner with the regional planning commission . . . . And we're also working with the national Rails to Trails Program, who thinks that they will have some money for us. The person who is working up there, our contact up there, used to work for me here, so I'm seeding programs all over the country.

levels and personal and professional SC. Although there are exceptions, the results and excerpts demonstrate the nuances of how SC, in general, was used as organizations moved from transition into renewal.

Dimensions of SC

Returning to the dimensions aspect of RQ1, interviews revealed that relational and structural dimensions were interrelated and provided overlapping benefits to organizations. Although aspects of relational and structural SC were used throughout the stages, they were most evident in IO networks as organizations moved out of the transitional stage and into the rebuilding stage. Cognitive SC, however, did not emerge as an aspect of IO relationships discussed by participants. In the structural dimension, the connections with associations or business partners prior to Katrina emerged as the most frequently referenced ties. By virtue of having businesses and associations in their networks, focal organizations' structural capital provided them access to a wide range of support. Professional associations' importance was evident in a variety of interviews and typically in ways that enabled organizations to receive support from others and/or to "get the word out" about the participant's organizational status. In some cases, structural capital was instrumental in facilitating relational capital (e.g., a 501(c)(3) head described a post-Katrina collaborative that built trust among previous competitors). Relational capital was captured in both expressions of support, such as e-mails sent from a local organization or a phone call from caring business friends, and instrumental outcomes, such as loaning a temporary office. Relational capital was useful in gleaning informational support. Having a history of relational capital was also useful when only the structural connection could be made. This excerpt with a leader of a rehabilitation consulting organization illustrates the utility of "merely" structural SC:

> R: . . . Just knowing that they were out there, because everyone disappeared . . . Just knowing that they might still have a business, and that they would still potentially have business for my company. And then naturally, I mean we all have personal relationships with the people we work with, so that was just an emotionally very supportive thing.

Similarly, a 501(c)(3) leader described the support that she or he received as a result of the past relationships: "some people . . . . supported us right along, either emotionally or financially . . . . It was . . . . incredible."

Organizational-level capital and individual-level capital

The second series of research questions considered how personal and professional as well as individual and organizational levels of SC were used after disaster struck. A progressive use of personal capital to organizational capital was observed, which helped reveal that postdisaster communication and actions differed across postdisaster phases. Put another way, throughout participants' experiences, both personal and organizational alters were used, but the prevalence of personal SC shrank and organizational SC grew as they progressed through four general phases. Overall, interviews showed that while organizational and individual SC was used to benefit organizational and individual goals, benefits reaped from both levels of SC were also used interchangeably. That is, leaders often used both levels simultaneously in personal and organizational recovery. Individual SC was structural and relational and helped stabilize personal and, by extension, organizational situations. SC from personal networks was especially prevalent in the emergency phase immediately following the disaster, as business leaders turned to alters with whom they had structural and relational SC to secure basic and immediate needs (e.g., shelter, access to information). Coded as individuals, and emerging as a most frequently mentioned alter (third to associations then different-type businesses), these contacts included friends, family members, former coworkers, and acquaintances who aided recovery in an "unofficial capacity" or as part of an ad hoc relief effort as opposed to a designated organizational action. In some cases, individual SC related to organizational goals was activated on a one-time basis as a "favor" to accomplish organizational goals when organizational SC or organizational resources were missing. In other cases, community or professional associations provided a way to reconnect for both emotional support and business information. For example, a business owner who is a member of a networking club sought out connections there for a "group hug."

ICTs were used to simultaneously activate individual and organizational SC when other connections were not possible. Organizational Websites were used to connect employees and provide information to stakeholders. Organizational leaders also reported e-mailing everyone in their address books in order to reconnect following the storm. Instances of mass communication to both institutional and individual contacts through ICTs point to the importance of simply connecting to activate structural SC. In such cases, the emphasis was less on with whom the connection was made than the fact that a connection was made at all. Thus, leaders sometimes viewed individual and organizational SC as interchangeable in light of the importance of reconnecting.

Indirect ties

Indirect ties, especially through personal networks, were critical to helping organizations secure operations during the transitional phase (RQ3). Indirect ties helped generate resources (e.g., office space, computers, fax, phones, administrative support) needed at the individual and organizational levels. Some participants received immediate resources from their spouse's companies, which helped stabilize their personal situations and also helped stabilize their businesses in various ways. Participants also benefited financially through their spouse's employment and in intangible ways, such as when a business owner's shop enjoyed extra protection from her husband's peers in the Federal Marshal Service. Indirect ties also delivered charity from others, by collecting money then transferring it to the interviewee's business. Such indirect contacts were profoundly helpful, as this performing arts leader described: "[he told me] 'a lot of people are tapped out and a lot of people give to lots of different things, and so far I've only been able to raise a couple hundred thousand dollars from this person .... this foundation, this corporation .... We've got 25,000 from Bloomberg ... ' And just like that, he's rattling off this list ...." Such examples illustrate how leaders mobilized indirect ties and pulled resources from them as they worked to stabilize their businesses.

Moving through the transitional phase and into the early stages of the rebuilding phase, participants were able to maintain their operations either locally or at a distance. In some cases, the resettlement even opened up opportunities for new business. A leader of a counseling service recalled her experience of building new business connections (Table 4, Prof/legal-6). Organizations not only benefited from the leaders' ability to function at a distance through indirect ties but also through new ties their employees made. For example, an organizational member built social connections with other organizations while evacuated, which incubated a connection between two organizations. In another case, an advocacy organization leader explained that an employee cemented a connection with another coalition while staying in Austin (Table 4, Advocacy-38). In the temporarily defunct economy, organizations relied on networks of their contacts to extend the functional terrain and, in some cases, facilitate their initiatives at the industry and community level. The FamEntertainment-30 excerpt on Table 4 demonstrates this and that such resources could be viewed as charity in the transitional phase.

In some cases, organizations accidently shouldered the role as linking pins through their existing contacts. A restaurant owner played a different role as a clearinghouse right after the storm (before the local farmer's market came back) between the farmers and other local restaurants. Organizations became bridges between sponsoring agencies and donation recipients as well as through organizing their own fundraisers to help their suffering client organizations. Indirect ties were mostly employed during the transitional phase, but a few exceptions were seen as organizations entered the rebuilding phase through both old and new contacts. For example, a nonprofit leader described how she mobilized support for the initiative of neighborhood cleanup through the social networks of her family (Table 4, 501(c)(3)-29). A media executive understood the access he had because of his well-connected board (Table 4, Media-33).

A model of spending SC after disaster

Overall, findings suggest how aspects of communication and SC are utilized in stages following a disaster. Figure 1 illustrates the grounded theory representation of the

Table 4 Quotes Illustrating Mobilizing Indirect Ties

Prof/legal-6	And so then when we found out my husband's company was going to give us a place to stay in Houston, we went there . . . . because I was in Houston, I started like calling on new potential customers there, and so I ended up actually developing more business there, as did my business partner. We just called on more people. We were so anxious about trying to keep the business going.
Advocacy-38	Our executive director moved to Austin for 4 months, and actually hooked up with the Texas Bicycle Coalition there, and they paid her to do a little bit of work there on safe routes to school. So she got up to speed on safe routes to school and this has been a real plus. She came back to New Orleans with all this information about that, that she didn't have before, or more.
FamEntertainment-30	There is a catalog company that we have been a part of . . . . which is a real high quality toy catalog, and I've developed a very close relationship with the owner of this catalog. She has invited different vendors to donate toys to us, and so I've worked with her. [later in the interview]: Groups in Houston, or in Chicago, or [peer organizations] around the country . . . . they had a Katrina Fund. They collected money and we were the recipients of about $8,000 from that.
501(c)(3)-29	How did I get through to [a famous athlete]? My dad is friends with somebody in the Saints organization, e-mailed him saying, "My daughter's doing this. Can we somehow get a Saints player"?
Media-33	I went to my board first, and they are very well connected people in the community, and they presumably are successful because they watch what's going on and they act accordingly. One of them I spoke to had just come from a meeting with the 35 people or so who had met with the mayor in Dallas. So I know he's listening to what everybody's saying, and everybody had, you know, they all have their own opinions, and you're trying to figure out what's the right opinion, what's the wrong opinion. You just keep adding it up and adding it up, and then you have to in the end trust your own judgment. But these guys are all where the decisions are being made.

findings. The figure reflects the VSR framework and emphasizes four phases following the strike of the disaster and, more specifically, the communication activities that demarcate progression through the process of (re)constructing a postdisaster version of organizations. The left side of the figure represents communication primarily with personal ties then employees. Relational SC from personal ties and employee communication represent the first two phases, both of which are marked by a sense of urgency. For this reason, the first two phases, *personal emergency* and *professional emergency*, are on the same arrow but in a deliberate order (leaders addressed personal concerns first) and with the arrow twisted to reflect the movement from one phase to the next. The transitional phase has a box divided in half, with simultaneously occurring communication and actions during this phase divided into two dimensions: (a) personal and internal organizational focus; and (b) professional external/IO focus. In this stage, indirect ties prevailed and incoming communication was meaningfully different than outgoing communication. The rebuilding stage was a time during which organizations progressed from stabilizing into a time when actual organizational work was being done. This stage has a twisted arrow to show the progression from reconnecting with old ties and engaging in business then it twists to show the emergence of a new version of the former routine (in VSR terms, retention). These events remain on the same arrow as the rebuilding process is seen as ongoing despite some sense of routine functionality. Except two cases, in which organizations were founded in direct response to the storm, organizations returned to some version of their old selves, albeit with new, strengthened, and/or dropped past IO relationships, reflective of the fitness of such links for survival.

The dotted line in the figure reflects that it is possible to skip a stage or even the first two stages. There were two cases in which the organizational leaders did not pause to attend to personal aspects of the emergency nor did they immediately confirm general employee status. In these cases, the leaders had a small core group of employees who worked alongside them in attempts to retain business functioning or minimize the number of down-days as the storm, then floods, hit. Put another way, they did not concern themselves with personal effects (personal emergency phase), and key employees were already present (professional emergency phase). These two cases show that stages can be skipped, but in this study, they are an anomaly. Despite the exceptions, the phases echo the VSR framework and differentiate organizational recovery efforts from the two-phase return process observed in the leadership crisis literature (Heifetz et al., 2009) and the multiple-phase process observed in the literature about community recovery (Faulkner, 2001). What most differentiates this model from other phase models is the way communication was differentiated in the phases. The following sections discuss these findings, emphasizing an extension of SC theory, contributions to communication and community ecology, and consideration for the applied contexts of disaster and crisis research.

Discussion

Communicating in IO networks creates SC that can be vital and necessary for organizational survival in general, but even more so following disaster. This study illustrates general trends and nuanced differences in how organizations spend their SC vis-à-vis communicating in IO networks in order to rebuild and return to functioning enterprises. This study offers contributions to communication and community ecology research by extending SC theory with an emphasis on communication and by making communication-focused recommendations for organizational practice and disaster policy.

Contributions to SC theory, communication, and community ecology

SC as a renewable resource

SC is seen as achievable through one's relationships or social networks. Much of the SC research considers exchange as the basis of the network relationships, whereas this study emphasizes the nature of exchange by emphasizing the communication that constitutes network links. The call for scholars to focus on what network links are about is hardly new (Monge & Eisenberg, 1987), yet with few exceptions (e.g., Doerfel & Taylor, 2004; Taylor & Doerfel, 2003), IO research overlooks the relevance of the quality or nature of links. A core assumption about SC is that it needs to be maintained and renewed because it is based on social relationships (Adler & Kwon, 2002; Coleman, 1990). Moreover, it differs from human or financial forms during an emergency because it is not so affected by disaster so it becomes a primary recovery source (Dynes, 2002). These results suggest that while many relationships were maintained, SC did not necessarily have to be nurtured in order for disaster victims to find support during the transitional stage. In many cases, old relationships that were not maintained were rekindled during and after the crisis or liaisons "lent" their SC to the organizational disaster victim. In this way, we depart from Adler and Kwon's argument that periodic renewal and reconfirmation is necessary to SC's efficacy. Indeed, in disaster contexts, SC can be renewed, restored, and even initially created when relational maintenance waned or when a prior relationship did not exist. Moreover, while some researchers have shown times when the "strength of strong ties" is critical (e.g., Krackhardt, 1992) or the "strength of weak ties" (Granovetter, 1973) is fundamental to acquiring resources, this study shows a critical side to structural SC. Participants emphasized that "just knowing" others in their networks were okay and "out there" ready to do business gave organizational victims the confidence to return and/or start up operations again. A sense of confidence gleaned from structural SC at an aggregate level could be a critical factor to help revitalize IO relationships and, by extension, give motivation for others to return, too. Simply put, having structural SC gave access to information that, in turn, built confidence for organizations to decide to return.

Communication as an adaptation strategy

While emphasizing communicative aspects of SC, this study not only assessed the content of communication but also showed how content differed in terms of directionality and in chronological points following a catastrophic event, which echoed cooperative mechanisms of community ecology. Yet, IO relationships were not immediately relevant to organizational leaders until they first stabilized their personal and family circumstances and then established the whereabouts and safety of their own employees. Once organizational leaders turned to their IO relationships, having

SC, per se, was still not necessary. During a transitional phase, when organizations were focused on stabilizing their circumstances (variation), IO relationships were differentiated in terms of the flow of communication. Outgoing communication was to stakeholders through various ICTs when focal organizations reported their operating status. Incoming communication, on the other hand, was best described as charitable, whether the focal organization simply received messages of support or some form of financial or material resources. This incoming communication and financial and material resources that focal organizations received were often brokered by some third party, such as an association or complementary business partner. This finding echoes observations that after disaster, altruism is sent through existing relationships and not as often given to strangers (Murphy, 2007). In other words, during the transitional stage of recovery, indirect ties were critical by being conduits through which information, material, and financial resources flowed.

These findings point to specific and necessary communication strategies including organizational use of ICTs to report to stakeholders and so organizations are available to incoming offers of charitable support. Yet, as experienced after Katrina, ICT infrastructure might not be readily available (e.g., servers and cell towers down and/or destroyed). In such deep-hitting catastrophes, establishing structural SC with associations and complementary businesses prior to such events is a way to "insure" one's organization above and beyond financial insurance policies. It was through structural SC with such organizations that businesses gained initial access to information and resources and, for some, it was through such organizations that they were able to communicate out to others about their own status.

While a combination of relational and structural SC was important in the recovery process, it was not consistently observed until the rebuilding phase of the grounded theory model (Figure 1). In other words, only after a transitional phase of charity and establishing organizational stability did IO SC emerge as relevant to recovery (selection and retention). What is unclear from these data, however, is why this sequence occurred. Future research should investigate whether SC helps move organizations out of needing charity or if organizations turn to their IO relationships once the charitable offers dry up. The former implies a model of charity building as a bridge to recovery, whereas the latter suggests an organization-level welfare reliance that could possibly slow down the ability for the community at large to return to some new version of "normal." In either case, the model presented in Figure 1 contributes to community ecology by showing the timing of and the granular details about how communication relationships facilitated organizational survival. After a disaster, with whom organizations communicate follows a sequence of necessary acts that lead to the organization's (re)building its IO community.

Cross-level communication relationships

This study considers cross-level SC between organizations and their leaders. Previous research has shown the benefits of leaders' mixed social and professional ties at the individual level. At the organizational level, this study shows that leaders' personal and professional networks are intertwined and can be beneficial to organizational survival. Specifically, leaders' personal networks provided short-term aid to organizations in the form of borrowed SC, getting new or more SC by asking a direct tie to be a linking pin, or cashing in on SC to obtain resources from alters. Macro-level networks consisting mainly of structural SC also helped organizations in short- and long-term ways. Notably, professional associations emerged as helpful and acted as liaisons by transmitting information and capital resources between affected businesses and those from other regions of the country and world who wanted to help. In some cases, ego was tied to bureaucracy (i.e., structural SC) but had no "insider" (personal contact) and the weak/lack of support echoed this. On the other hand, organizations that had a personal insider (relational SC) with institutional alters reported activating such relationships for access to resources. The overlap between micro-level and macro-level networks speaks to the human nature of organizing and how it is especially apparent in *interorganizational* relationships. SC is, indeed, social, and *organizations* build it through the communicative actions of their representatives.

In this case, organizational leaders gave voice to their organizations in reconnecting their IO communities.

Contributions to policy

The desire to help and give to victims of disaster is easy to observe. Yet those who wish to give donations and/or emotional and material support must find ways to reach the victims. This study showed (a) the critical role professional associations and parent organizations have in brokering relationships between givers and receivers, (b) a timeline to the recovery process, and (c) that *gifts of communication access* are invaluable. Loaning cell phones or Webpage space may be as critical to supporting displaced organizations as financial support like insurance plans are when the revenue stream stops. Echoing research demonstrating individuals' reliance on ICTs in disaster contexts (Katz & Rice, 2002; Palen & Liu, 2007; Procopio & Procopio, 2007), findings in this study suggest that future disaster policy could be enhanced by including an ICT plan for businesses and organizations. Temporary use of ICTs can enable organizations and businesses to stay in constant contact and bridge the time between the ruin and repair of their own communications infrastructure. In this way, organizations can directly reach out to stakeholders, who, in turn, can more easily offer their help.

Limitations and conclusion

There are three main limitations in this study. First, participants represent the best of recovery—they returned and were relatively successful in business after disaster. At the writing of this article, however, countless small businesses and organizations are not back, and population estimates indicate that New Orleans is still about 25% smaller than it was pre-Katrina (Scallan, 2009). Including businesses and organizations that have not returned or reopened, or have returned but are in more devastated regions would likely provide different experiences, which would be a way to contrast and amplify what success looks like and the role communication and SC factors play in community ecology. Second, we considered IO relationships but did not access complete network data. Although difficult to access, admittedly, complete networks would triangulate the findings and claims here, point to observable facets of cognitive capital, and enable more robust multi-level theorizing. Third, findings may be biased by the prevalence of small- and medium-sized organizations (SMOs), in that only six organizations in our data have over 100 employees. While this is proportional to the population, the needs SMOs have could impact their IO relationships. Small- and medium-sized enterprises are socially embedded in the closely knit networks consisting of stakeholders and local communities in which they operate (Perrini, 2006). In other words, SMOs may benefit more from their investment in SC than large corporations.

Despite these shortcomings, the data offer a rich and longitudinal view with a wide representation of business types. Data reveal communication patterns in IO relationships that played an important role in facilitating organizational survival. The findings indicate that communication flows in and around a system and does not appear to deplete, per se, the way tangible resources do. Moreover, the study extends community ecology theory by focusing on how SC appears to be a part of the shift from a phase in which organizations stabilized themselves (variation) to a phase in which they used SC gleaned from their IO relationships to rebuild (selection) and resume (retention) their operations. The existence of structural capital was sufficient to motivating leaders to return. Relational SC appears to ferry in a rebuilding stage that enables an organization to function and rebuild IO relationships. As Monge et al. (2008) state, evolutionary theory "allows us to understand the ways in which community survival and success are as dependent on their communication linkages as they are on the organizations they connect" (p. 449).

Indeed, the findings underline the importance of being embedded in IO relationships as such relationships can be transformative by facilitating organizational recovery. The grounded theory model extends community ecology in two ways: (a) It illustrates when organizations tap into types of SC during phases of recovery and (b) the directionality of communication flows is differentiated by content, thus suggesting that evolutionary network scholars might attend to the quality and direction of links. In sum, this study enabled a communication-centered analysis of modeling SC in disaster contexts.

Notes

1 For a complete discussion of the ecological processes, see Monge and Contractor (2003) and Baum (1996).

2 Starting in March 2006, follow-up interviews began with some participants who already participated in a Time 1 interview.

3 A total of 64 unique organizations were part of the initial sample. Eight of the original interviews could not be used in this study because of recording problems ($n = 4$), the

informant requested to not be recorded ($n = 3$), or the substance of the interview revealed that the organization never reopened and was thusly substantially different than the others in the dataset ($n = 1$).

4 Contact the first author for the interview guide at mdoerfel@rutgers.edu.

5 The advantage of ATLAS.ti is that each instance of text that reflects codes can be labeled with all of the appropriate and relevant codes from the entire codebook. Quotes from interviews often revealed multiple theoretical themes and concepts simultaneously. The disadvantage is that a quantitative measure of intercoder reliability cannot be accurately calculated. The coders, however, noted the consistency with which they agreed about identifying episodes that needed coding (episodes could be a single phrase or as much as a paragraph or two) and that their code selections (from the codebook, Table 1) were consistently similar, too. Because of the extensive code list from which they could choose, they did regularly have minor differences about which codes each coder applied to the same episode. In all circumstances, coders were compelled to be sure their disagreements were resolved in a rigorous and thoughtful manner. No "standoffs" ever needed resolving by a third coder.

6 In the interest of conserving space, the entire codebook is not included here. Only those codes used for this study were included. For a complete listing of all codes, contact the first author at mdoerfel@rutgers.edu.

7 While complete networks (i.e., gathering data from all members of the system) are normally collected for conducting traditional network analysis, this study uses network concepts to identify themes in the interviews that reflect aspects of participants' communication relationships. Given the IO context and timing of this study, complete network data were not accessible.

8 Most participants required minimal prompting from the interview guide.

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