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The dynamics of power in disaster response networks

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Abstract

A major challenge for disaster scholars and policymakers is to understand the power dimension in response networks, particularly relating to collaboration and coordination. We propose a conceptual framework to study interests and negotiations in and between various civic and professional, response networks drawing on the concepts of "programming" and "switching" proposed by Manuel Castells in his work on the network society. Programming in disaster response refers to the ability to constitute response networks and to program/reprogram them in terms of the goals assigned to the network. Switching is the ability to connect different networks by sharing common goals and combining resources. We employ these concepts to understand how the US Federal Emergency Management Agency organized its response in the aftermath of Hurricanes Katrina and Sandy. Our conceptual framework can be used both by disaster scholars and policymakers to understand how networked power is constructed and utilized.

KEYWORDS

coordination and collaboration, crisis management, disaster governance, networked power, network governance, power, programming and switching

INTRODUCTION

Disasters disturb social order and have a huge impact on citizens and their communities. A major challenge in the aftermath of disasters is the coordination between response organizations. For decades, disaster scholars have raised attention to the significance of local community responses (Quarantelli & Dynes, 1977). Traditionally, disaster sociology scholars have attended to the capacity of communities to foster their own response, for instance, looking at convergence (Drabek & McEntire, 2003; Dynes, 1994), community resilience (Aldrich & Meyer, 2015), and self-organization (Kendra & Wachtendorf, 2003). By drawing attention to the capacities of affected and responding communities, disaster sociology has gradually moved away from a command and control approach, toward coordination and collaboration (National Research Council, 2006).

However, coordination and collaboration are not without problems (Comfort, 2007; Majchrzak et al., 2007; van de Walle & Dugdale, 2012; Wolbers et al., 2018). The origin of network governance challenges is that a multitude of actors converges toward the disaster-struck area to provide help or resources, organizing into different response networks (Fritz & Mathewson, 1957). This convergence introduces required resources but may also overload public officials already burdened with their emergency duties (Kendra & Wachtendorf, 2003). The central network governance challenge is that a heterogeneous yet interdependent set of public, private, and civic actors need to negotiate their interests to create a coherent approach (O'Toole, 1997). This gives way to power dynamics, resulting from potential conflicts of interests in networks that emerge when various actors attempt to claim and negotiate their interests and responsibilities. Such power dynamics include among others, interagency bureau-political conflicts, which may hinder the desired coherent approach. Bureau-politics in crisis management has been "associated with a concern for self-interest, institutional power or overzealousness in pursuit of what is defined by different agencies as the 'common cause'" (Rosenthal et al., 1991, p. 212).

To understand the role of such power dynamics, we highlight three specific network governance challenges. First, disaster response networks are structured according to a dominant *institutional design* aimed to direct the response operation, in contrast to varying efforts by a multiplicity of independent actors. These networks thus comprise established, expanding, extending, and emergent groups (Dynes, 1994). For instance, after Hurricane Katrina, a dominant governmental response network claimed centralized authority while excluding private actors and affected communities—including citizens themselves—who needed to negotiate expression of voice and inclusion in access in different response networks (Koliba et al., 2011; Moynihan, 2009). Second, *compliance* to the logic of the dominant network design is often problematic due to exclusive institutionalized practices. For instance, following Hurricane Katrina, private actors had difficulties collaborating with federal agencies and were denied access to the affected area (Horwitz, 2009a; Stuver, 2005). Third, other actors in the network struggle to connect to the response network to *advocate their own interests and values*. For instance, following the Haiti earthquakes, connections between incoming relief organizations were difficult to set up, and actors had difficulty negotiating the distribution of goods and tasks in the relief operation (Boersma et al., 2014; Nolte & Boenigk, 2011; Sapat & Esnard, 2012).

A conceptual framework that explains these power dynamics in disaster management in the context of network governance has so far not been developed. This is surprising, given the significance of understanding how networks connect and, in doing so, differentiating between interests and contributions of participants

(Fisk et al., 2019). Public administration scholars predominantly focus on the structure of crisis networks (Choi & Brower, 2006; Kapucu & Garayev, 2013; Kapucu et al., 2010; Vasavada, 2013), or modes of governance (Moynihan, 2008, 2009). Building upon these insights, we address the question: *How are the interests and responsibilities in disaster response negotiated and claimed between various civic and professional response networks*? To increase our understanding of this network power dynamic, we conceptualize how response networks are structured and how they interact. We draw on the approach of communication power proposed in sociological media analysis by Castells (1996, 2009) as a useful analytical perspective to understand the origin and effects of power imbalances. To address the three network governance challenges of design, compliance, and advocacy, we illustrate the analytical leverage of this perspective to crisis management and disaster studies by focusing on two well-documented cases: Hurricanes Katrina and Sandy. In doing so, we analyze the interconnections that arise between different networks active in response operations through the lens of "networked power" (Castells, 2009).

THEORETICAL FRAMEWORK

Network approaches in crisis management and disaster studies

The three network governance challenges we defined in the introduction (design of the network, compliance to its internal logic, and inclusion/exclusion effects) can be related to different perspectives in the public administration network literature. The discussion on network design is reflected in the conceptualization of network characteristics, often supported by measures operationalized through social network analysis. The challenges of the networks' internal functioning and inclusion/exclusion can be related to discussions about network governance approaches.

First, to understand the structural characteristics of the networked collaboration between a heterogeneous set of organizations, scholars have turned to social network studies of disaster response (Hossain & Kuti, 2010; Kapucu, 2006; Uhr & Johansson, 2007; Uhr et al., 2008). These studies depict the network in terms of centrality (Kapucu, 2005; Mendonca & Wallace, 2004), connectedness (Hensgen et al., 2006), clusters (Kapucu et al., 2010; Loosemore & Hughes, 2001), or the existence and subsequent influence of different types of networks (Uhr et al., 2008). These types of social network analytical measures explain the composition and structure of the network. As a consequence, power in these network studies is understood by analyzing the (changing) network position of, and connections to, various actors (Wolbers et al., 2013). However, the underlying design of the domination in the network is not problematized in these studies.

Second, a discussion in public administration on the effectiveness of network governance provides another analytical lens. Three modes of governance are distinguished in this body of literature: Participant-governance, lead-organization governance, and governance by a network administrative organization (Provan & Kenis, 2008). These modes of governance can be related to governance embedded in the Incident Command System (ICS) (Boersma & Wolbers, 2021; Moynihan, 2009). ICS is a widely used modular emergency management command structure, originally designed to combat wildland fires in California in the early 1970s (Bigley & Roberts, 2001). The modular and flexible design resembles a network governance form of the network administrative organization (Moynihan, 2009). This entails that a network is

externally governed by a predefined system of role-structures, either voluntarily established or mandated in the network formation process (Bigley & Roberts, 2001).

More recent studies of network governance show that different modes of governance may actually coincide (Kenis et al., 2019) or that the crisis management process is governed not by a singular organization but rather by a set of actors assuming core–periphery positions (Nowell et al., 2017). The power analysis in these studies reflects a network governance typology by emphasizing actors' positions. Though recent studies, thus, show a more hybrid network governance dynamic, there remains limited attention for unpacking the consequences of this hybridity in terms of compliance and effects of inclusion and exclusion.

We build on these two network governance approaches and their identified limitations as a means to address the governance challenges of design, compliance, and inclusion/exclusion in disaster response. To this end, we add a process-oriented approach that draws attention to actors' behavior, thereby explaining how actors build new connections across networks and explaining how, in doing so, they manifest power in various forms.

Network power through programming and switching

We embed our discussion of networked power in disaster response in the view of a networked society, with a special focus on the process of influence and power, as developed in Castells' *"Communication Power"* (Castells, 2009). Castells focuses on the power of communication interconnectedness between different types of international and sectoral (media, politics, etc.) networks in a global society (Arsenault & Castells, 2008). This approach provides a dynamic, process perspective to understand the behavior and influence of actors in networks over time. We focus on two concepts from Castells' approach, namely, *programming* and *switching*, to distinguish the concrete and diverse associations between actors and networks triggered in disaster response.

Castells argues that networks exhibit different collective forms of power, which can *program* a single network toward the interests and values of its members, that is, deciding on inclusion or exclusion of actors, setting standards and rules to enable collective action, and deciding on actors' positions and their interconnectedness within networks. Combined, a program encompasses the rules, norms, and culture that drives interaction between actors in the network. Programming can be achieved in a directive way, through: *"the ability to constitute network(s), and to program/reprogram the network(s) in terms of the goals assigned to the network"* (Castells, 2009, p. 45).

Castells (2009, p. 45) conceptualizes *switching* as *"the ability to connect and ensure the cooperation of different networks by sharing common goals and combining resources while fending off competition from other networks by setting up strategic cooperation."* Actors able to switch between networks can be seen as managing a boundary between distinct domains. Castells approaches switching as a form of "counterpower," which is exercised by actively seeking to change the programs of specific networks. Furthermore, switching involves efforts aimed at disrupting actors that reflect dominant interests ("switches"), replacing them with alternative switches between networks that better serve program interests (Castells, 2009). Similar roles have been evaluated as the power of brokerage in social network literature, providing an understanding of the calculative behavior of an individual to selectively connect information between two different groups in networks (Burt, 1982). Castells focuses

on a particular aspect of this role, generating a form of counterpower that flows from one network to the other (Castells, 2009).

PROGRAMMING AND SWITCHING IN ACTION

In what follows, we analyze network power imbalances during the response to Hurricanes Katrina and Sandy through a perspective on programming and switching. These cases are useful illustrations of our approach, as they each feature a distinct role of the United States Federal Emergency Management Agency (FEMA) in its attempt to coordinate relief networks. FEMA's primary purpose is to coordinate disaster response, in such cases that response requirements overwhelm local and state authority ability and resources (Karaca et al., 2012). This independent, executive-branch agency is activated after a state of emergency has been declared by a state governor and reports directly to the President. As the local state response is often already in progress, FEMA has to take into account and coordinate with ongoing efforts by local authorities and stakeholders that converge on the disaster site. These stakeholders have access to context-specific human(s) (skills), resources (material), and information, complementary to the capacities of official agencies, which introduces counterpower in the network. Making use of this local capacity was a key coordination challenge during Hurricane Katrina, as local emergency services were severely impeded by the hurricane whereas FEMA struggled to retain control of the response in negotiation with the National Guard. During Hurricane Sandy, FEMA opted for a whole-community approach (WCA), actively seeking to incorporate different public, private, and citizen groups in the response network. These two contrasting network governance approaches form the baseline of our analysis.

Dominance of a network program during Hurricane Katrina

When Hurricane Katrina made landfall near the Louisiana–Mississippi border on the morning of August 29, 2005, it exposed vast numbers of US citizens to one of the deadliest and most costly natural disasters in the country's history (Davis, 2006). As the hurricane winds pushed water levels, it overtopped and breached the New Orleans levee system, submerging vast areas of the city. Soon, local capacities for emergency management were overwhelmed, calling for the US Department of Homeland Security to intervene and send in federal assistance. This meant that formal response to hurricane Katrina became programmed under the Department of Homeland Security through the National Response Plan (NRP) and the National Incident Management System (NIMS). In short, the NRP defines the structure and mechanisms for coordinating federal support to disasters, whereas NIMS defines the roles and responsibilities of federal, state, and local first responders. When the NRP was activated, the coordination of emergency management resources and direct assistance to affected citizens fell under the authority of FEMA.

In line with its role as established coordination authority, FEMA attempted to *program* the response network: emphasizing the core values, logics, and culture of the organizations and people engaged in social activities and actions. However, it soon turned out that FEMA was unable to bring the collective federal resources to bear on the local situation in a timely fashion (Cooper & Block, 2006; Curtis, 2015). As has previously been argued, the struggle to set up an inclusive program could not be ascribed only to FEMA, in that FEMA was constrained in its actions by the local state

response structure, which itself was also overwhelmed by the hurricane (Boin et al., 2019). Moreover, there was far-reaching uncertainty between FEMA, the National Guard, and the governor of Louisiana about who was in charge of which parts of the operation and who had specific jurisdictional authority (Davis, 2006). The consequence of this struggle to set up a working network program was that the authorization process required for moving staged supplies became bogged down in excessive interconnection (Tierney et al., 2006).

As a result, FEMA attempted to regain control by blocking official ad hoc responses, urging first responders to not cease their efforts unless they fell under local and state authorities that adhered to the mutual aid agreements of the Emergency Management System Compact (FEMA, 2005). FEMA's efforts to exert authority by programming the response network in this way affected nonofficial agencies trying to bring in resources. By enforcing this network position, FEMA blocked the switching opportunities in the response network offered by numerous stakeholders that converged towards the disaster site to provide help. For example, FEMA officials turned away Wal-Mart trailer trucks loaded with water (Horwitz, 2009a), denied access to civilian helicopters called in for evacuation by local hospitals (Stuver, 2005), and declined the offer from Amtrak to provide trains for evacuation (Davis, 2006). Furthermore, in attempts to control the evacuation of local hospital patients, FEMA replaced hospital evacuation bracelets on patients with FEMA IDs, causing hospital personnel to lose track of their patients' whereabouts (Grey & Hebert, 2006).

These examples make clear that in an attempt to regain control over the response operation, FEMA used its network programming authority to restrict access to relief efforts by numerous stakeholders, claiming that they were unauthorized to act (Davis, 2006). Indeed, by invoking power assigned with its political mandate, FEMA's approach led to delays in the hierarchical decision making and in the distribution of critical resources (Cooper & Block, 2006) and ultimately hindered rather than supported the disaster response (Baker & Refsgaard, 2007; Cooper & Block, 2006). As a result of these failed efforts at programming, FEMA became symbolized all that went wrong with the government's response to Hurricane Katrina (Davis, 2006, p. 12).

When zooming into another response network, we can see a different interplay of programming and switching, contrasting with FEMA's hierarchical, policy-driven decision making; Namely, the actions undertaken by the US Coast Guard during the same event elicited the conditions for adequate use of switching power (Comfort, 2007; Horwitz, 2009b). In its core response, the Coast Guard drew on its modular (toolbased) organization as part of its day-to-day operations and training, emphasizing professional competencies instead of centralized authority (Morris et al., 2007). In operational terms, the Coast Guard prepared for rescue operations, anticipating the failure of information and communication networks, relying on local commanders to make autonomous decisions. Training and authorizations were more flexible than those undertaken by FEMA, and the Coast Guard was able to draw on local connections previously established with civil and military authorities (Baker & Refsgaard, 2007). The Coast Guard was able to operate in this manner, in contrast to other stakeholders, as they had a mandated, stand-alone role in the official response network. This enabled the Coast Guard to activate relevant switches between networks in their response, acting as a supplementary force to local capabilities despite the ongoing blocking efforts by FEMA.

In a similar vein, other private-sector and community networks were also mounting a response, attempting to connect with other networks in the response operation. For instance, the private enterprise Wal-Mart made use of structural switching as a means to circumvent FEMA's initial blockage. That is, Wal-Mart connected with their

existing logistical networks to bring in critical resources, including water, food, clothes, and other relief materials (Horwitz, 2010). In other words, Wal-Mart's logistical network was programmed by its corporate emergency operations planning, which enabled them to stage a response outside of the federal system. Their disaster response teams connected to local stores to start damage repair and resupply, but also to provide the affected community with water and food, thereby gaining access to affected communities. In doing so, Wal-Mart was able to switch between its own supply chain network and other local supply networks (Horwitz, 2009a).

Similarly, smaller local food markets also played a role as switchers during recovery by creating hubs within programmed networks as a means to connect local communities. For instance, in the aftermath of the flooding, several neighborhoods in New Orleans created their own marketplaces, such as the Gretna Farmers Market and the Broadmoor Heaven Sent Market (Schwartz, 2008). These provided the most deeply impacted communities in the city with access to fresh food while also functioning as a social meeting space and a symbolic landmark of recovery. In terms of switching, the food markets supported community gatherings that helped to recreate fractured relationships in the local networks (Menck & Couto, 2013).

As a result of the counter-power emerging from these local switching efforts, FEMA's programming role was challenged, resulting in a loss of legitimacy. Moreover, the total response network showed a far more complex network governance dynamic, including over 1,500 actors (Butts et al., 2012). In the course of the response, multiple network cores emerged next to FEMA where other stakeholders also clearly influenced the direction of the response, such as the American Red Cross, the Colorado Department of Emergency Management, and the Emergency Management Assistance Compact (Butts et al., 2012). This emergence points to the necessity for authorized organizations to construct more flexible network programs as a means to open up the network for coping with stakeholder diversity and thus ensuring wider employment of available capacity.

Opening up the network program during Hurricane Sandy: Room for counterpower

On October 29, 2012, the storm surge of Hurricane Sandy hit New York City, flooding streets, tunnels, and subway lines. Large parts of the city's infrastructure became inaccessible, which imposed a serious challenge on emergency services. In addition, a large fire at Breezy Point, Queens, destroyed over 100 homes of the first responder community. Large parts of the city lost electricity, and several thousands of people were evacuated following a crane collapse in downtown Manhattan. Several hospitals, including the major public hospital Bellevue Hospital Center, were closed and evacuated. As a result of the storm, at least 53 people lost their lives and thousands of homes and approximately 250,000 vehicles were destroyed.

As local and state emergency capacity was put under severe pressure, the help of FEMA was called in. Having learnt from its response during Hurricane Katrina, FEMA had started to reorganize its main and subdivisions and programmed its response network differently during Hurricane Sandy (Davis, 2006; Karaca et al., 2012). Various reports made clear that prior response capacities had failed because of a lack of a comprehensive framework for disaster preparedness, response, and relief. Indeed, the intense criticism of the government response to Hurricane Katrina led to a fundamental debate about the network governance by local, state, and federal response agencies (Drennan, 2018).

In the years after Hurricane Katrina, FEMA started to develop and implement a so-called WCA. According to FEMA, this featured a philosophical approach toward disaster management, aiming for a shared understanding of community needs and capabilities, community empowerment to create a stronger social infrastructure, increased collective preparedness, and greater resiliency (FEMA, 2011). Moreover, WCA recognizes that ensuring community and citizen engagement is critical throughout the process of mitigating, preparing for, responding to, and recovering from disasters (Drabek, 2018; Waugh & Liu, 2014). The key is that throughout this process, community *engagement* is crucial given the position of citizens as first responders (Ferguson et al., 2018), in addition to formal authorities programming their response capacities in line with community resilience and vulnerability (Edwards, 2013). In doing so, the WCA opened up the programming of the federal response network, enabling switching between different actors from the private sector, civil society, including faith-based organizations, social movements, and affected communities.

As a consequence, FEMA's programming role in response to Hurricane Sandy changed significantly compared to its role in Hurricane Katrina. During the latter, FEMA staff exerted their authority by forcing responders to use FEMA IDs, which frustrated local medical evacuation administration (Grey & Hebert, 2006) and many others; in contrast, during Hurricane Sandy, they adopted a more facilitative role during the response (Adalja et al., 2014). This contributed to more switching capacity between networks, as illustrated by the medical evacuation network, programmed by FEMA's Emergency Medical System. Once called upon, it helped to support network switching by identifying available assets and potential receiving hospitals for hundreds of hospital patients in the immediate aftermath of the storm, where necessary supplementing additional resources (Adalja et al., 2014). For instance, FEMA was able to send in their Urban Search and Rescue teams that it had placed nearby (Powell et al., 2012). FEMA's Healthcare Facility Evacuation Center played an important role as a network program, identifying available assets at potential receiving hospitals. However, much additional coordination was arranged as a means of network switching by hospital-based ambulance services that bilaterally coordinated between sending and receiving hospitals (Adalja et al., 2014).

Besides the different programming dynamics and the increase in switching capacity between Hurricanes Katrina and Sandy, changes in society impacted how emergency response could be programmed more responsively. The steep increase in social media usage supported ad hoc network formation among various stakeholders and the affected community (Yates & Paquette, 2011). Existing networks also became more responsive, such as New York's emergency services who shared and received information from citizens about their experiences in using shelters for evacuation (Hughes et al., 2014; Lachlan et al., 2014).

As FEMA's WCA opened up network programs, it also allowed space for emergent networks to take a role in the response. A salient example, showing how an existing network took on a different role, is the Occupy movements that had been mobilized in 2011 as a worldwide protest movement against the role that established institutions and banks played in the financial crisis (Fadaee & Schindler, 2014). The global Occupy movements were very much locally rooted as part of the radical politics of inclusion. It was precisely the interconnectedness with and between local networks that would lead to *Occupy Sandy*, a grassroots relief effort developed by some members of Occupy Wall Street who appeared to be relatively successful (Richter, 2012; Uitermark & Nicholls, 2012).

One of the members of Occupy Sandy established a "pop-up" medical clinic on the peninsula on Long Island, New York, and recruited dozens of volunteer doctors,

nurses, and mental health professionals to provide relief to storm victims (Manuel, 2013). Similar to the spontaneous emergence of farmers' markets in the aftermath of Hurricane Katrina, the Occupy Sandy network played a role as switchers by creating hubs in the networks to connect local actors. Whereas FEMA officials only appeared at the scene of the most damaged places and larger NGOs several days later, the emergent, self-organized networks like Occupy were able to respond much faster, more effectively, and with greater flexibility and empathy than the official FEMA response divisions. Social media platforms appeared to be an effective way to mobilize people to join the relief efforts (Griswold, 2013). Due to such initiatives, solidarity increased among first responders, local governments, communities, aid organizations, and labor unions (Greenberg, 2014).

Although the response to Hurricane Sandy was more effective, better prepared, and more inclusive than the response to Katrina, coordination of efforts was far from perfect (Schmeltz et al., 2013). Despite FEMA's improved performance, the Hurricane fueled ongoing discussions about the inability of established institutions to overcome the problems of social segregation and exclusion, urban sprawl, and socio-economic dynamics (Biedrzycki & Koltun, 2012). FEMA operations revealed that it still lacked preparedness and flexibility, struggling to overcome "red tape" constraints and its inability to reach those most in need (Bucci et al., 2013).

These challenges illustrate that the question is not how FEMA—or any other unique response organization—can perfect its program to respond to catastrophic disasters, but rather that response efforts cannot be coordinated by a single network. Our analysis of programming and switching shows that the way in which response networks are programmed enables or disables switching between various actors. Active switching allows for greater interconnection across a diverse set of stakeholders, which makes response efforts more adaptive and inclusive (Drabek, 2018; Franco et al., 2013; Waugh & Liu, 2014). However, enabling different actors to occupy positions in the network does create new power imbalances and negotiations of interests. This requires a more elaborate conceptual discussion of network power dynamics.

CONCEPTUALIZING NETWORKED POWER

Our analysis of networked power highlights the struggle of a heterogeneous set of (relief) organizations to obtain and enhance their network position while influencing the nature of the disaster response. The way in which formal response organizations attempt to (re)program the relief network often reflects a quest to secure their dominant position to control the network. This is an important condition for network counterpower to appear in the form of switching. Acts of network switching highlight attempts of actors to pursue their own interests when lacking a position of influence in a broader relief context. Switching, as a form of counterpower, aims to alter the network program and make room for other interests. As such, switching is not per se about increasing interconnectedness but is a manifestation of networked power.

Network programs, which define and orient the organizations embedded in the network, are essential to forge action repertoires and responsibilities. At the same time, a struggle exists between regulators and actors inside the network about the nature of programs. The reason is that programs do not only enable action but can also limit the action horizon of organizations and usually empower only core actors instead of peripheral actors. Programming is aimed at realizing compliance to dominant power by those involved in the response network. As such, the behavior of

those in the network is affected by the power being exerted (Lukes, 1974; after Dahl, 1957). In this view, programming is related to decision making in which power is manifest and visible.

The abilities of organizations, groups, or individuals to switch between networks enable them to exert their influence by establishing or blocking connections. Switching occurs when emergent groups or organizations mobilize their network actors, (material) resources, or information. As these actors converge at the disaster site, they often bring local knowledge, interests, and ownership that is often not yet represented in the dominant network program. Bound together by a shared goal of power mobilization, they may engage in advocacy, agenda-setting, or framing. Still, not all local interests can be translated into a position that can wield counter-power. In such switching moments, power is not necessarily related to the actual decision maker (the dominant actor) but instead works subtly by influencing the agenda setting in the connected network (Fleming & Spicer, 2014). Switching power thus refers to the capacity to connect different networks while at the same time influencing each of them (Castells, 2009).

Still, network making power is not unidirectional but can also be challenged and resisted by other network members through the same mechanisms that create power. Such counterpower is exercised through efforts to change the programs of specific networks and through efforts to block switches that function for dominant interests while replacing them with alternative switches between networks (Castells, 2009). An example of such efforts is the collective action asserted by *social movements*, like that of Occupy Sandy, which aimed to introduce new norms and values in the networks' program (Diani, 2015; Kavada, 2015; Maharawal, 2013). Moreover, network resistance can also be achieved by blocking switches, which were predominantly visible during FEMA's efforts to control the network formation during Hurricane Katrina (Castells, 2009).

The ability to "control"—or at least steer and manipulate—what people in disaster situations perceive as relevant, as well as what (kind of) response actions of network (ed) actors are legitimate, can lead to the acceptance of decisions without questioning (Rosenthal et al., 1991). Framing and labeling—as underlying mechanisms—are the tools in-use to shift values and understanding, eventually altering people's perceptions of disaster relief priorities (Gephart, 1984; Laegreid & Serigstad, 2006). Ideology and hegemony—dominant ways of thinking about disasters, their consequences, and the needed response—can play a decisive role in shaping the response network (Boin et al., 2016; Fleming & Spicer, 2014).

We argue that increased understanding of disaster response networking dynamics can benefit from a view of society as flexible networks, which are constantly being renegotiated and reconfigured in a dynamic process of control and competition within and between networks. Thus, rather than seeking to analyze a disaster response network as a single entity, it is important to focus on the opportunities for programming and switching between these interacting networks.

CONCLUSION AND AGENDA FOR FUTURE RESEARCH

In this paper, we conceptualized the interconnection between social systems while focusing on the manner in which disaster response networks and operations fit into interacting networks. By analyzing the network dynamics during Hurricanes Katrina and Sandy, we conclude that different types of programs and switches shape adaptations in networked collaboration during disasters. The concepts of programming

and switching enable more dynamic analyses of power processes, showing both the effectuation of power and the mobilization of counterpower. For instance, during Hurricane Katrina, FEMA engaged in network programming to fend off other network actors and reclaim their leading position in response to ongoing struggles for authority. A different programming style was manifested during hurricane Sandy, whereby FEMA opened up their network program and enabled collaboration with a range of public and private actors. This alternative approach supported switching capacity, which increased coordination costs, but at the same time led to a more responsive and inclusive response network.

Our analysis of programming and switching that we introduce in this article enables a fresh perspective toward studying the effectuation of networked power in disaster response; namely, programming and switching provide a conceptual framework to first analyze how rules, logic, and cultural norms are translated into network programs, and second, to understand how programs have an effect on including, collaborating, enabling, or fending off other actors through switching between networks that share common goals and may combine resources. We summarize our analysis of this network power process through four propositions, which pave the way for further investigation by disaster scholars:

- Programming is aimed toward achieving compliance by those involved in the response network and bounds access to the network.
- Switching power refers to the capacity to wield counter-power by connecting different response networks while simultaneously influencing each of them.
- Network making power in disaster response is not unidirectional but can be challenged and resisted by other network members through the same mechanisms that create power.
- Power in response networks is exercised through three dimensions: coercion (decision making), manipulation (agenda setting), and domination (framing).

By studying disaster response through the lens of network power, we advance our understanding of how the style of operating and connecting among network control programs can induce mistakes as well as innovation during response operations. In conclusion, our conceptual framework helps understand the role of interests, responsibilities, and negotiation within response operations while revealing interconnectedness between multiple and heterogeneous networks across a response operation. Moreover, the framework explains how a heterogeneous but interdependent set of public and private actors may wield their influence in the struggle to collectively generate a coherent response.

Future studies that address power dynamics in network governance might focus on comparative case studies toward identifying the conditions that enable programming or switching. These could be related to (strategic) choice, breakdown of dominant networks, specific local knowledge or resources, also in other research settings. Furthermore, more research on feedback loops that reinforce or undermine dominant networks could further increase our understanding of network governance dynamics. Such a focus might also highlight different stressors on lead networks, such as increasing network diversity (core–periphery) (Topper & Carley, 1999), the extent of shared authority, reciprocity, and (lack) of trust relations (Moynihan, 2009). Overall, access to local resources and knowledge seems to be a key driver for switching (counter) power, given the nature of organized behavior after a disaster (Dynes, 1994). Increased understanding of the nature of resistance might help identify the factors that influence the responsiveness of network governance.

IMPLICATIONS FOR POLICYMAKERS

Our conceptual framework of programming and switching is of use to policymakers in at least three ways, contributing to:

- Better recognition of the political/power dimension hidden in networked collaboration.
- Increased awareness of network power dynamics can help to identify switching moments, making it possible to wield counterpower against dominant network programs.
- Better understanding of how the nature of network programs can either limit participation to a set of key actors or open up the network for emergent collaboration among a heterogeneous set of actors across different layers of society.

In our view, understanding society as a set of interconnected networks–each with their own and sometimes incompatible programs, suited or ill-suited to specific aspects of each disaster cycle–can lead to a higher degree of preparedness and adjustments to emergent vulnerabilities. Disaster planning benefit can not only from anticipating existing switches, but also from fostering new linkages between specific networks, thus engaging the most relevant programs. Such an approach can also contribute to practice because it can stimulate planners, operational officers, and those responsible for recovery to engage relevant networks in a conscious, anticipatory, and inclusive manner.

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