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The Effect of Problem Severity, Managerial and Organizational Capacity, and Agency Structure on Intergovernmental Collaboration: Evidence from Local Emergency Management

Spotlight on Public Management at the Grassroots

Like most public managers nowadays, local emergency managers operate within complex, uncertain environments. Rapid changes in the scope and severity of the issues increase the extent of intergovernmental collaboration necessary to address such challenges. Using a large data set of county emergency management agency directors, variations in intergovernmental collaboration reflect influences from problem severity, managerial capacity, and structural factors. The results demonstrate that public managers who perceive problems as severe, possess specific managerial skills, lead high-capacity organizations, and operate in less complex agency structures collaborate more often and more effectively across governmental boundaries.

The public manager of the current era must regularly and skillfully navigate a multitude of actors and programs in the intergovernmental system. In the empirical literature that documents this phenomenon, “collaboration” has become the watchword and “networks” is the descriptive term of choice (McGuire 2006). Although intergovernmental policy implementation and management of this sort has occurred for decades (Elazar 1962), the pace of such management has quickened and the scope of the actors involved has broadened. Many argue that the incidence of managing within collaborative networks is increasing (Kettl 1996; O’Toole 1997). While some remain skeptical about the motivations of intergovernmental actors (Conlan 2006), there is little doubt that interdependence and interconnectedness characterize the intergovernmental environment of today’s public organizations.

As in the case of many other policy areas, much has been written about the need for emergency management organizations to operate intergovernmentally (Moynihan 2005; Waugh and Streib 2006; Wise 2006). Emergency managers face extraordinary challenges, both in number and severity, and as a result, they increasingly prepare for and respond to natural hazards and disasters through intergovernmental collaboration. As demonstrated

by a number of recent natural disasters, collaboration across governmental boundaries is imperative, both before and after disasters. The field is embracing, out of necessity, a collaborative approach to service planning and delivery.

Recent case studies document the critical role of collaboration in planning and responding to disasters (Kendra and Wachtendorf 2003; Moynihan 2005). In a case study of the 2000 Fort Worth, Texas, tornado, McEntire (2002) found that collaborative relationships grounded in an understanding of the resources and roles of the collaborators played an important part in achieving a largely successful response. More often, however, researchers have found that the breakdown of collaborative networks is at least partially to blame for poor outcomes. For example, in their case study of Hurricane Katrina, Kiefer and Montjoy (2006) attribute many of the problems with the evacuation of the residents to a breakdown of emergency management networks. These cases support the contention of Waugh and Streib that collaboration is necessary for dealing with emergency management issues and that “an effective response is unlikely to happen without collaboration” (2006, 138).

Unfortunately, the preponderance of empirical research on intergovernmental collaboration, both in public management generally and emergency management specifically, is drawn from studies of only one or a few cases (for exceptions, see Agranoff and McGuire 2003; Gillespie and Streeter 1987; Meier and O’Toole 2001). While case studies provide unparalleled detail of the practice of collaborative management (Agranoff 2007), offering a richness that large-*n* studies cannot, they do not provide a sufficient test of the many hypotheses that have been posited by public management scholars regarding the conditions for interorganizational relationships. More specifically, beyond such theoretical models and case studies, we have little empirical verification of the determinants

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of intergovernmental collaboration. Using a data set of more than 400 county-level emergency management agencies in the United States, this study tests general management hypotheses, both venerable and recent, regarding the incidence and scope of intergovernmental collaboration. We will show quantitatively that collaboration is a function of the severity of the problem as perceived by public managers, the capabilities of the manager and the manager's agency, and the structure of the agency.

Intergovernmental Relations and Emergency Management

In many ways, emergency management is an ideal context within which to examine the general forces of intergovernmental collaboration. As in other policy areas, emergency management has evolved over time from a predominantly hierarchical, command and control management model to a collaborative one. McEntire refers to this approach as the professional model and defines it as "an approach to disasters that is based on interdependent organizational operations" (2007, 95) and focused on all disasters, both man-made and natural. The professional model employs the comprehensive emergency management approach, which views emergency management activities as corresponding to one of four emergency management phases, which were first described in a 1978 National Governors Association report: mitigation, preparedness, response and recovery.

This approach also accepts the fact that disasters often exceed a single jurisdiction's or entity's ability or resources, and almost never neatly contain themselves within a single city's, county's, or even state's boundaries. Therefore, intergovernmental and intersectoral collaboration is essential. This sentiment is elaborated by Drabek and McEntire, who state that "disasters, by their very disruptive and dynamic nature, create such significant demands on the affected community that well-executed, multiorganizational responses become not only necessary, but essential. In other words . . . no single department or agency has sufficient resources to deal with the disaster at hand. In addition, disasters often require the assistance of outsiders and multiple levels of government, thereby leading to multijurisdictional response operations" (2002, 206).

Partially as a result of the lessons learned from the terrorist attacks of September 11, 2001, and Hurricanes Katrina and Rita in 2005, the debates regarding the questions of "how collaborative?" and "with whom?" continue to permeate the design of emergency management directives in Washington, D.C. One such directive is the National Response Framework (NRF), which went into effect on March 22, 2008. The framework is based in the idea that "communities, tribes, States, the Federal Government, [nongovernmental organizations], and the private sector should each understand their respective roles and responsibilities, and complement each other in achieving shared goals. Each governmental level plays a prominent role in developing capabilities needed to respond to incidents. This includes developing plans, conducting assessments and exercises, providing and directing resources and capabilities, and gathering lessons learned" (DHS 2008, 4). The NRF complements and builds

on the National Incident Management System (NIMS), which provides guidance to agencies at all levels of government, the private sector, and nongovernmental organizations for working together on the four phases of emergency management. The NRF and the NIMS are formal attempts to "sort out" intergovernmental and intersectoral collaboration for natural and man-made disasters. As Wise concludes, "what is required for homeland security is for professionals at various levels to work across boundaries, plan and negotiate future activities, and communicate during operations to resolve unanticipated problems" (2006, 315).

Public Management and Collaboration

Vertical and horizontal collaboration in local emergency management is a relatively emergent phenomenon, and one that is increasing in scope and importance. At the same time, a great deal of variation in the incidence of collaboration exists in many policy areas. While preparation and response to disasters and emergencies is much more visible to the public than, say, social services or economic development, all public managers ultimately are held accountable to outside constituencies for their performance. Finally, much of today's public work in any field, including emergency management, is "applying particular types of data, information, and knowledge to complex situations," and one way to mobilize these resources "is through the collaborative networks of multiple-organizational involvement" (Agranoff 2007, 221).

We use the local emergency management field as a test case for exploring multiple hypotheses

about the determinants of intergovernmental collaboration that are derived from the management literature. The point of the analysis is not to show that collaboration exists in emergency management; this has become a given. However, the following analysis will show that even within a generally collaborative field, variation in the extent of collaboration exists. If we are to test management hypotheses regarding what is associated with collaboration *in general*, then we need (1) a collaborative sample in which (2) the extent of collaboration varies. It is, in fact, for these very reasons that we use emergency management as the context within which to examine the general determinants of intergovernmental collaboration. We discuss these hypotheses in the following sections.

Problem Severity

One of the most venerable ideas in management theory concerns the effect of the external organizational environment on internal organizational operations. When the environment of an organization is highly complex—meaning that "the number of different items or elements that must be dealt with simultaneously by the [manager]" is large (Scott and Davis 2007, 126)—the organization pursues mechanisms to achieve a modicum of stability. It has become a truism, drawn largely from the research of Lawrence and Lorsch (1967) and Thompson (1967), that the most successful organizations match their internal structures and operations to the level of complexity and uncertainty in their environments; the more complex the environment, the more complex the internal structure. Rainey notes that one of the main arguments of this perspective

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“is that a formalized, centralized structure performs well enough in a simple, stable environment . . . As the environment presents more changes and more uncertainty, however, strict rules, job descriptions, and chains of command become more cumbersome and managers are unable to evolve and process information rapidly enough” (2003, 190). Accomplishing goals in complex systems is therefore often a question of how well the inner environment adapts to the constraints and opportunities of the outer environment (Simon 1981).

Sometimes the design (or redesign) of internal structures is insufficient for stabilizing the organization, or it does not result in optimum organizational outcomes. In these operating environments, “individual organizations, however large, cannot expect to adapt successfully simply through their own actions” (Emery and Trist 1965, 28). Therefore, managers will attempt to exploit the environment through external processes. That is, the manager will work across organizational boundaries in collaborative networks. Developing interorganizational partnerships and joint ventures are mechanisms for adapting to a complex organizational environment.

One influence on a public manager’s ability to cope with complexity is the magnitude and severity of the problem or problems that he or she faces. Some problems are readily defined and easily decomposable into technical solutions, but these have given way in large part to “wicked” problems, which are “problems with no solutions, only temporary and imperfect resolutions” (Harmon and Mayer 1986, 9). Wicked problems “have to be dealt with in the context of great uncertainty with regard to the nature and extent of the risks involved for individuals and society as a whole” (Van Bueren, Klijn, and Koppenjan 2003, 193). Managers dealing with wicked problems face uncertainty about what actions relevant organizations or key organizational constituencies might take, what the impact of a future state of the environment or environmental change will be on the organization, and how to act when a pending event or change is perceived to pose a threat (Milliken 1987). For most of the problems that emerged in the first part of the twentieth century, a bureaucratic organization was ideal (O’Toole 1997). However, the metaphor of the wicked problem stands in contrast to traditional bureaucratic policy making and implementation; agreements must be forged by jointly steering courses of action that are consistent with the multiplicity of societal interests (Agranoff and McGuire 2003). Given the salience of problem severity on the structure and process of management, we propose that,

H1: The greater the problem severity for organizations, the greater the level of external collaboration.

Organizational and Managerial Capacity

The skills and abilities—the administrative capacity—of the manager and the organization also can contribute to collaborative

outcomes. McGuire posits that “any government manager charged with achieving a goal through network settings understands the most critical activities involve operations—identifying and working with the proper players and resources, keeping the players committed, defining the roles of the players, and facilitating effective interaction among the players” (2002, 600). Thus, a competent manager in a single organization may be competent as a collaborative manager. Possessing superior technical knowledge about one’s organization has also been shown to be a core component of collaboration in emergency management, as measured in terms of professional certifications (McGuire 2009). Indeed, as Bardach argues, in some ways “interorganizational collaborative capacity is very much like an organization in its own right” (1998, 21). It follows that,

H2: The greater the program-oriented capacity of a public manager and his or her home organization, the greater the level of external collaboration within that specific program area.

Internal Structure

Often missing in most discussions of the determinants of intergovernmental collaboration are considerations about the manager’s capacity to operate collaboratively from within a given agency structure. One of the exceptions is the simplified model of network forms and dynamics proposed by 6 et al., which suggests that one of the “forces” of network relationships is the internal capabilities for forming and sustaining external links as expressed in terms of boundary spanning roles and levels of internal coordination (2006, 79). That is, the degree to which an organization collaborates, as well as the structure of that collaboration, is at least partially a function of the internal dynamics of the focal organization.

One main component of an organization’s internal operations concerns the type of boundary spanners who work in the organization. As Agranoff (2007) demonstrates empirically, there is a great deal of work involving program specialists that is interdepartmental, interagency, and intersectoral, including work by managers

who act as boundary spanners within an organization or with other program specialists in the larger policy field. An increasing amount of the internal work of many organizations is related to outside-organization contacts through these program specialists. This is consistent with the policy-making and administrative networks developed in program areas that produce “picket-fence federalism,” whereby programs drive intergovernmental relations rather than any real or perceived imbalances in national or state power.

Furthermore, engaging in collaborative networks takes time. Agranoff found that there are multiple, time-related costs borne by public sector managers who choose to collaborate. The first of these is the “time and the opportunity costs lost to the home agency as a result of network involvement” (2006, 62). Thus, if a public manager is responsible for multiple departments or functions

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within his or her jurisdiction, he may not choose or even be driven to collaborate because he cannot afford to spend the time away from his responsibilities in his home organization. The second cost of collaboration identified by Agranoff is related to the “time and energy costs resulting from the protracted decision-making process” (2006, 62). Although some may posit that public servants who manage multiple departments would likely choose to collaborate because they are overwhelmed and seek assistance from other entities and organization, Agranoff’s empirical work indicates that this is likely not the case. The manager may in fact shy away from collaborative arrangements because of the time inefficiencies of these arrangements. Thus, we can predict that,

H3: An organization based in a specific and well-defined program area will collaborate to a greater extent than an organization charged with multiple and conflicting program responsibilities.

The general hypotheses that are drawn from both classic and recent literature also reflect some of the hypotheses discussed in the theoretical literature on collaboration. For example, Bryson, Crosby, and Stone (2006) propose a framework for understanding cross-sector collaborations whereby some of the initial conditions for collaboration are environmental factors such as turbulence and complexity. Thomson and Perry frame their discussion of collaboration in terms of an antecedent-process-outcome framework (see Wood and Gray 1991) and posit that some of the antecedents to collaboration include complexity and interdependence (2006, 21).

Therefore, there is theoretical support for empirically testing the three hypotheses proposed in this section. The general, additive model that we will test in this paper is as follows:

$$IC = P + C + S + V$$

where *IC* = the extent of intergovernmental collaboration by the manager, *P* = problem severity, *C* = capabilities of the manager and the manager’s agency, *S* = agency structure, and *V* = a series of control variables that measure other characteristics of the agency’s environment within which the manager operates.

We now turn to a discussion of the data used in the analysis. We will then discuss the variables used to test the hypotheses. As part of that discussion, we present a profile of the various activities and actors with which county emergency managers collaborate, demonstrating the variation in the level of such activity.

Data

The data for this analysis were drawn from a national survey of county emergency management directors conducted by the National Center for the Study of Counties at the Carl Vinson Institute of Government on behalf of the National Association of Counties. Because emergencies and disasters rarely conform to jurisdictional boundaries, there is an emerging belief that emergency management agencies should be regional and, toward that end, based in county government. Counties generally are geographically close to environmental problems, are closer in proximity to disasters and hazards, have greater resource bases than do cities, have access

Table 1 Comparison of Sample Counties with U.S. Counties

Classification	Percent of Population	
	All Counties	Sample Counties
Population Group		
Over 500,000	3	6
250,000–499,999	4	8
100,000–249,999	9	17
50,000–99,999	13	16
25,000–49,999	21	18
10,000–24,999	29	19
Under 10,000	22	15
Census Region		
Northeast	6	9
Midwest	35	36
South	45	39
West	14	16

to state resources, and, perhaps most important, have administrative structures that encourage intergovernmental collaboration. Waugh states that “county governments may in fact be the most logical and hospitable hosts for emergency management agencies because of their unique roles in state and local governance” (1994, 253). Thus, the unit of analysis for this study is the emergency management agency and manager located in county government.

A Web-based questionnaire addressing emergency management issues was directed to emergency managers in all 3,066 counties in the United States. The intent of the survey was to establish the capacity of counties to prepare for and respond to emergencies and disasters in their community. The survey addressed budgeting issues, public organization and management structures, citizen readiness, volunteerism, special populations, and disaster concerns for the future, and other issues including collaborative activities. Survey responses were supplemented with data from various sources, including the U.S. Census Bureau and separate data collected by the authors. The final data set comprises 408 cases, with the final analysis including 344 counties for which we have complete data. Although the response rate is low, the distribution of the population and socioeconomic characteristics of the sample closely resembles the nation as a whole (see table 1). The data set includes a slightly greater proportion of large counties (larger than 100,000 population) and a lower proportion of small counties (smaller than 25,000 population) compared to the total county population.

Measurement of Variables

Dependent Variable

The dependent variable for the intergovernmental collaboration model is an additive measure of all intergovernmental (vertical and horizontal) activities and contacts for each county. We recognize that the term “collaboration” is fraught with definitional as well as conceptual confusion among scholars, if not in practice. Some scholars view the term as meaning something much deeper than simple interaction and contacts; that is, it is argued that the use of the term conveys relationships that transcend contracting and social interactions. We acknowledge that position and understand the various attempts made by scholars to classify such interactions and contacts (Mandell and Steelman 2003; Milward and Provan 2006).

As a means to focus the analysis while still maintaining definitional clarity, we adopt the definition of Agranoff and McGuire that collaboration is simply “a concept that describes the process of facilitating and operating in multiorganizational arrangements for solving problems that cannot be achieved, or achieved easily, by single organizations” (2003, 4). Such collaborations can be formal or informal; they can include the exchange of resources such as funding, information, and expertise; and they are typically intersectoral, intergovernmental, and based functionally in a specific policy or policy area. Collaboration is thus a simple, descriptive term that emphasizes the purposeful and multiorganizational context of a program area, rather than trying to capture a qualitative, thus somewhat nebulous dimension of cooperation. Unlike other uses of the term, our measure includes the extent of *purposeful* activity that is intergovernmental (multiorganizational).

Although operationalizing collaboration as a set of actors and activities is common (Agranoff and McGuire 2003; Meier and O’Toole 2003), McGuire (2002) suggests with regard to network management that collaboration is an elusive target to properly measure. As Bardach argues, research that measures activities as the outcome variable should somehow weight these different sorts of activities (1998, 20). However, while an index of contacts and the types of contacts may constitute an imperfect and measure, such a measure does touch on important components of managerial action.

The measure of the dependent variable for this analysis does not incorporate such networking activities as “exchanging business cards” or “sitting through planning meetings,” as Bardach (1998) warns. For this analysis, only intergovernmental contacts and activities are included in the measure, and only emergency management–specific actors and activities that are purposive are incorporated. This exhaustive measure is not all inclusive, but it does tap into a wide variety of actors and activities; the number of potential actors exceeds those used in previous analyses in local economic development (Agranoff and McGuire 2003) and education (O’Toole, Meier, and Nicholson-Crotty 2005).

We have evidence that the level of intergovernmental collaboration by county emergency management agencies is extensive but varied. Survey respondents were asked to choose which of 11 actors in federal, state, and local government, as well as eight nongovernment actors, they worked with for 11 specific mitigation, preparedness, response, and recovery activities. Thus, all four phases of emergency management were addressed in the survey questions, and both vertical and horizontal collaborative management were considered. The activities for which collaboration occurred include formal interactions such as memoranda of understanding, mutual aid agreements, grant applications, grant management, and intergovernmental funding transactions, as well as informal cooperation, technical assistance, equipment provision, and joint planning.

We have evidence that demonstrates extensive variation in the levels of collaboration by the counties. As shown in table 2, more than 80 percent of the sample counties reported contact with state and federal emergency management agencies, and other county, city, and school district governments. More than half of the

Table 2 Use of Intergovernmental Organizations for Emergency Management

Vertical Organizations	Percent
State emergency management agency	95.9
Federal Emergency Management Agency	90.1
Other federal Department of Homeland Security agency	83.7
Other state agency	68.9
State environmental protection agency	61.3
Other federal agency	59.6
Federal Environment Protection Agency	52.9
Horizontal Organizations	
Other county government	93.6
City government	90.4
School district	89.0
Township government	54.4
Number of Actors	
Zero	0.9
Five or more	93.6
Six or more	87.8
Seven or more	79.7
Eight or more	68.9
Nine or more	55.8
Ten or more	40.7
Eleven	21.6

Note: For each collaborative activity listed, respondents were asked to select each intergovernmental organization used for that activity.

Table 3 Counties Engaging in Intergovernmental Emergency Management Activities

Intergovernmental Activities	Percent
Informal cooperation	85.2
Mutual aid agreements	80.8
Provides training	78.2
Joint planning	76.5
Technical assistance	71.2
Grant application	70.6
Receives funding	65.7
Provides funding	60.2
Memoranda of understanding	57.6
Grant management	54.1
Provides equipment	52.6
Number of activities	
10 or more	89.8
20 or more	59.3
30 or more	31.7
40 or more	14.0
50 or more	6.4
60 or more	2.3

counties reported contact with nine or more government agencies (out of a possible 11), but only approximately one-fifth work with all 11 actors. Table 3 shows the percentage of counties that collaborate with these actors for specific emergency management activities. Nearly 60 percent of the counties reported undertaking at least 20 activities, but just 32 percent undertake 30 or more activities (out of a possible 121). Just 6 percent of the counties have at least 50 interactions with intergovernmental actors for emergency activities.

These data suggest that intergovernmental collaboration is not merely an isolated or periodic task; it is an essential part of the emergency manager's repertoire. Many counties collaborate extensively with a number of actors for many different purposes. Whereas state and federal emergency management agencies seem to be the most important external agencies with which to work, a broad variety of local contacts also make up the collaborative field for the county agency. However, there clearly is variation in the extent of intergovernmental collaboration across counties. Furthermore, the total amount of intergovernmental collaboration may be lower than one would expect given the emphasis placed on the value of such collaboration in emergency management.

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The scale for the measurement of the dependent variable ranges from 0, indicating no collaboration with any of the actors, to 121, indicating collaboration with all 11 actors for all of the 11 activities. Variation in the extent of intergovernmental collaboration is evident in the mean number of activities for the sample counties, which is 24.9, with a maximum of 99. In order to confirm the scale measure of intergovernmental collaboration, a Cronbach's alpha coefficient was calculated for the 121 items, with a coefficient of .939 (coefficients of at least .7 suggest good consistency in the index).

Explanatory Variables

So what propels managers to collaborate? What factors help determine such collaboration? We attempt to answer these general questions by examining the association between intergovernmental collaborative activity and what the management literature suggests. Multiple variables are operationalized to account for the practice of intergovernmental collaboration in county emergency management.

Two explanatory variables are used to test the first hypothesis, which addresses the concept of problem severity. The first variable, *future concerns*, is an index measuring the manager's level of concern about potential emergencies and disasters in the county. The survey asked respondents to indicate such concern for three different types of terrorist attacks on a Likert scale of 1–7, with a value of 7 indicating "extremely concerned." Responses for each emergency were summed to create this measure. The mean value for this variable is 10.1 out of a possible 21.

A second variable, *past experiences*, addresses the extent to which a county had faced some form of disaster or emergency in the previous five years. This variable is measured by the total number of major disaster

declarations and emergency declarations for the county by the federal government for the years 2001 to 2005, which are publicly available on the Federal Emergency Management Agency Web site. Forty-six counties had at least four such declarations. The mean for the variable is 2.4. As noted earlier, we hypothesize that the greater the perceived severity, measured in terms of the number of potential and past disasters affecting the county, the greater the extent of intergovernmental collaboration.

Two additional explanatory variables are used to test the second hypothesis, that the capacity of the manager and the agency is associated with intergovernmental collaboration. The first such variable, *total training functions*, measures the total number of functions for which the county emergency management agency has received training. The survey asked the respondent to select whether the agency had received training for 12 specific functions, including training in incident command, the National Incident Management

Table 4 Summary of Variable Measures

Type of Variable	Variable Name	Operational Measure	Mean	Std Dev	Range
Dependent variable	Total intergovernmental collaboration	Additive measure of the total number of federal, state, and local entities contacted, and the purposes for the contacts	24.90	14.33	0–99
Explanatory variable	Future concerns	Index measuring the level of concern for three types of terrorism	10.12	4.42	3–21
Explanatory variable	Past experiences	Total number of disaster and emergency declaration for the county by FEMA	2.35	1.30	0–8
Explanatory variable	Total training functions	Index measuring the total number of functions for which the agency has received training	6.92	3.63	0–12
Explanatory variable	State training certification	Categorical variable measured as 1 if the lead official has received state-level emergency management training, 0 if not	0.51	0.50	0–1
Explanatory variable	Stand-alone agency	Categorical variable measured as 1 if the county emergency management agency is organized separately from other government functions, 0 if not	0.40	0.49	0–1
Control variable	Total nongovernmental collaboration	Additive measure of the total number of nongovernmental entities contacted and the purposes for the contacts	12.36	9.13	0–67
Control variable	Fragmentation	Total number of local governments in the county	36.62	36.76	1–347
Control variable	Distance to state capital	The number of miles between the county seat and the state capital	150.37	114.76	0–733.2
Control variable	SoVI score	National percentile score on the Social Vulnerability Index	47.57	27.02	0.1–99.2
Control variable	Percentage of urban population	Percentage of a county's population living in an urban area	49.69	31.33	0–99.9

System, terrorism response, and other related emergency functions such as police and fire. Values for this continuous variable range from 0 if the agency received no outside training for any of the functions to 12 if the agency received training for all of the functions. The Cronbach's alpha for this 12-item scale is .902. The mean number of training functions for the sample counties is 6.9. We propose a positive relationship between the two variables; the greater the number of training functions, the greater the level of collaboration.

The second variable used to test the capacity hypothesis corresponds to the level and type of training received by the county emergency manager. The variable, *state certification training*, measures whether the manager has state training certification. The dichotomous variable has a value of 1 if the manager has received state certification training; if not, the variable has a value of 0. Slightly more than 50 percent of the lead officials in the sample have state certification training.

In order to test the third hypothesis, that an organization based in a specific and well-defined program area will collaborate more heavily than an organization charged with multiple, non-emergency-management-specific program responsibilities, a variable was created to measure whether emergency management functions are located in a separate office solely dedicated to emergency management (as opposed to including other functions such as police and fire services, public works, or planning). The variable, called *stand-alone agency*, is measured with a value of 1 if the county agency is a separate unit; 0 if not. Forty percent of the sample counties are structured as stand-alone agencies. As suggested in the third hypothesis, we predict that stand-alone agencies will collaborate to a greater extent than other administrative structures.

Control Variables

Other factors must be considered as controls on the relationship between intergovernmental collaboration and the primary variables. First, we control for the county's *total nongovernmental collaboration*, which we hypothesize to be positively associated with the county's intergovernmental collaboration. This variable is operationalized as an additive index in the same way as the dependent variable, but it includes eight nongovernmental actors, such as hospitals, the Red Cross, and nonprofit organizations. The Cronbach's alpha for this eight item index is .911. Second, the number of governments in a given area is often incorporated in models of interlocal and metropolitan collaboration. Hypothesizing that the greater the number of local governments in the county, the greater the opportunity for and thus extent of intergovernmental collaboration, we include a variable called *fragmentation*, which is measured as the total number of cities, townships, special districts, and school districts in the county. Third, as a means to account for any geographic or locational factors, a variable measures the county seat's *distance to state capital* in miles. Given the importance of state and federal government interaction to emergency management, we hypothesize that the greater the distance away from the state capital, the lower the level of intergovernmental collaboration.

The fourth control variable used in the model of intergovernmental collaboration is a measure known as the Social Vulnerability Index (SoVI), which is a "relative measure of the overall social vulnerability

of each county" (Cutter, Boruff, and Shirley 2003, 254). Cutter, Boruff, and Shirley integrated 42 socioeconomic and environmental variables that the research literature suggests contribute to a community's ability to prepare for, respond to, and recover from hazards, into their index. The 2000 index, employed in this analysis, used principal components analysis to reduce the number of variables into a smaller set of 11 indicators. The resulting index identifies the presence of capacity for preparedness and response, and where resources might be used most effectively to reduce the preexisting vulnerability. The percentile *SoVI score* for each county is incorporated as a control variable into the model such that the higher the score, the greater the level of vulnerability. Therefore, we expect to find a positive association between the values of this control variable and intergovernmental collaboration.

Finally, there is evidence to suggest that the urbanity of a jurisdiction will affect the amount collaboration undertaken (Agranoff and McGuire 2003). Therefore, a variable measuring the county's *percentage of urban population* has been included in the model. We expect that counties with greater percentages of urban population will engage in more intergovernmental collaboration.

Empirical Analysis

Linear Regression Analysis

In order to comprehensively test the hypotheses and the theoretical model of intergovernmental collaboration, an ordinary least squares regression analysis was performed that incorporated all five explanatory variables and the four control variables. Table 5 contains regression estimates for each of the model variables.¹ The estimates offer solid evidence for each of the three research hypotheses. Approximately 64 percent of the variation in intergovernmental collaboration is explained by the set of explanatory and control variables. Although this suggests that unspecified factors contribute to collaborative activity, the values and direction of the slopes support the hypotheses, and the results demonstrate a significant relationship between problem severity, managerial and organizational capacity, and agency structure. As shown in table 5, all five of the variables addressing the hypotheses—*future concerns*, *past experiences*, *total training functions*, *state training certification*, and *stand-alone agency*—are statistically significant at $p < .05$.

As indicated by the slopes for the *future concerns* and *past experiences* variables, scoring in the 75th percentile on the future concerns index (13) and in the 75th percentile for past disaster declarations (3) would lead to nearly seven more intergovernmental contacts for that county. This total represents approximately one-fifth of the 75th percentile of the total extent of intergovernmental collaboration. For each past disaster declaration, emergency managers engage in nearly one additional collaborative activity. A county agency that reports a total of 10 training functions (the 75th percentile for the variable) will experience approximately three intergovernmental contacts. A county agency led by a manager with *state training certification* experiences approximately two more intergovernmental contacts, as does a *stand-alone agency*.

The variable *total nongovernmental collaboration* is positively and strongly associated with intergovernmental collaboration (statistically significant at $p < .001$). The slope for the variable suggests an approximately one-to-one relationship between

Table 5 Model of the Determinants of Intergovernmental Collaboration

Variables	Slope	Robust Standard		t-Score	Significance
		Error	Beta		
Future concerns	0.3191	0.1258	0.0984	2.54	0.012
Past experiences	0.8904	0.3723	0.0807	2.39	0.017
Total training functions	0.3455	0.1441	0.0876	2.40	0.017
State training certification	2.5002	0.9458	0.0874	2.64	0.009
Stand-alone agency	2.0370	0.9671	0.0697	2.11	0.036
Total nongovernmental collaboration	1.1379	0.0773	0.7249	14.72	0.000
Fragmentation	0.0012	0.0147	0.0030	0.08	0.937
Distance to state capital	-0.0036	0.0050	-0.0289	-0.72	0.470
SoVI score	0.0342	0.0200	0.0645	1.71	0.088
Percentage of urban population	-0.0351	0.0196	-0.0767	-1.79	0.074
Constant	1.6392	2.0000		0.82	0.413
Number of observations	344				
Adjusted R ²	0.642				
F	43.37*				

*Statistically significant at $p < .001$.

Dependent variable = Total intergovernmental collaborative activity.

nongovernmental collaboration and intergovernmental collaboration; working with a nongovernmental actor for a particular emergency management activity is associated with similar collaborative activity that is intergovernmental. The beta coefficient for the *total nongovernmental collaboration* variable also suggests that this control variable is the most substantively important, relative to the other variables. Likewise, the *SoVI score* variable is positively associated with collaborative activities and is statistically significant at the .1 level. Substantively, a quartile increase in SoVI score is associated with an increase of nearly one additional collaborative contact. Finally, although we hypothesized a positive relationship, *urban population percentage* was found to be negatively associated with intergovernmental collaborative activities ($p = .074$). Here again, a quartile increase in the percentage of county's population living in an urban area is expected to decrease the intergovernmental collaboration by nearly one activity.

The results thus indicate that county emergency managers who have great concern for future disaster activity in a county that experienced a major disaster in the previous five years, who have attained some form of certified instruction from the state and operates in an agency that has been trained in multiple functional areas, and who works in an agency located separately from other county government operations are the most intergovernmentally active. These findings are consistent with our general, management theory-derived hypotheses regarding problem severity, capacity, and structure.

Discussion and Conclusions

The foregoing analysis has shown empirically that which has been anecdotally assumed concerning the determinants of intergovernmental collaboration. As expected, we have shown that the environment in which public managers operate influences their entry into collaborative relationships. As public managers find themselves in situations in which the problems facing their organization are increasingly severe, they will reach out to other

entities and agencies. These relationships appear to be an effort put forth by public managers to collaborate with other "actors who possess the resources (including legal authority, funding, organization, expertise, information) that local managers need to achieve their goals" (Agranoff and McGuire 2003, 48).

It was found that the managerial and technical capabilities of the manager and his or her agency influence the amount of collaborative activity. Although much of the leadership literature claims that program-oriented skill is less important at higher levels in the organization, this study found that the opposite was true, at least in terms of collaborative activity. This study looked at capabilities in relation to collaborative activity and, within this context, technical

skill is positively related to collaborative activity. Rainey notes that the public manager's regular duties include "negotiations and relations with the environment, such as . . . getting information from outside sources (to which they have the best access of anyone in the organization)" (2003, 301). Therefore, in situations in which upper-level managers seek out and establish collaborative relationships,

their technical and program-oriented skills may become necessary for them to understand what is needed from their collaborative partners.

Similarly, it was empirically determined that organizations with well-defined program areas will collaborate more than those without. Public managers in organizations with clearly delineated duties appear to be better able to take advantage of opportunities to work with others, whereas public managers with more nebulously defined or multiple, even conflicting, programmatic responsibilities have less opportunity and time to seek out and establish collaborative relationships because of the necessity to attend to their varied tasks. This relationship between collaboration and internal structure has largely been overlooked in many studies. Therefore, this finding sheds some important light on this often ignored factor influencing collaborative activity.

It was found that the managerial and technical capabilities of the manager and his or her agency influence the amount of collaborative activity.

The findings presented in this paper can serve as the foundation for future research. First, the unit of analysis in this study is the county manager. It is well accepted that government agencies at the county level have unique characteristics that distinguish them from agencies at other jurisdictional levels of government. One question that could be explored is whether these differences impact the practice of collaboration at the municipal, state, or federal level. At the municipal level, government agencies may be able to maintain relationships with various entities because of the administratively manageable size of the city or they may have fewer opportunities to collaborate because they lack nested jurisdictions seen at the county and state levels of government. There may also be differences between state and federal managers and county managers. Perhaps their level of concern and perceptions of preparedness are tempered by the fact that they are not first responders and that they may not be immediately and directly affected by the occurrence of an emergency.

Second, collaborative activity was examined in the context of emergency management activities. Although, as has been stated previously, a claim can be made that this field is ideal for the study of intergovernmental collaboration, there may be contextual differences between emergency management and other government functions that future research could investigate. While it is conceivable that these other functions would also have issues akin to problem severity, management capability, and internal structural dimensions, these factors may manifest themselves differently in these other areas. For instance, the technical and program skills of agency directors may be more critical in emergency management than in other policy areas.

A caveat regarding generalizability should not be taken lightly. We believe that emergency management is an ideal context in which to examine general hypotheses about intergovernmental collaboration—it is a collaborative field, but variance still exists. The analysis shows clearly that our chosen measures explain this variability in purposeful collaboration. However, ordinary least squares regression is used to determine the set of variables associated with counties that have average intergovernmental activity, thus demonstrating only how the “normal” county is affected by the explanatory variables. Additional analysis must be undertaken to evaluate what impacts the very “best” intergovernmental collaborators in emergency management (McGuire 2009). Furthermore, with regard to the generalizability of our emergency management findings to other policy areas, we believe that the results would be similar. The concepts explored in this analysis are management specific, not emergency management specific, so we would expect that the severity of problems in an organization’s external environment, managerial capability, and internal structure would be important factors in explaining intergovernmental collaboration for many public policy areas. Obviously, additional empirical analyses are required to explore this further.

The empirical evidence offered here demonstrates that the emergency manager, and perhaps a public manager in general, is affected . . . [by the] operating environment and that . . . perceptions of the severity of problems and managerial skill explains the level of intergovernmental collaborative activity . . .

A third area for future research could be to expand on the theoretical findings in this study. More work can be done to further tease out details regarding the three hypotheses tested in this paper. In-depth case studies could be performed to elucidate the rich and subtle nuances of collaboration that are not possible in a large, empirical study.

Finally, this study uses an additive measure of the total number of collaborative relationships as the dependent variable. Future research could be conducted in which collaboration is an explanatory variable for an outcome measure. Although outcomes in the area of emergency management are not easily measured in the absence of an actual disaster, the outcome is the ultimate dependent variable and would be worth investigating.

The theoretical and practical implications of this examination of intergovernmental collaboration expand our understanding of public management. The empirical evidence offered here demonstrates that the emergency manager, and perhaps a public manager in general, is affected greatly by his or her operating environment and that his or her perceptions of the severity of problems and managerial skill explains the level of intergovernmental collaborative activity by that manager. To a great degree, public managers are not so internally focused that they forgo external opportunities. On the contrary, they look extensively beyond their home organization to access the people and resources that are needed to adequately manage the complex problems they face on a daily basis.

Notes

1. Both the Cameron and Trivedi test and the Breusch-Pagan/Cook-Weisberg test for heteroscedasticity indicated that the variance of the residuals is not homogenous. Thus, we derived and employed robust standard errors for the ordinary least squares regression equation. The variance inflation factor (VIF) statistic was used to test for multicollinearity among the independent variables. The results of the tests were all less than 1.47. As the rule of thumb is that VIFs greater than 10 indicate a high degree of correlation between variables, there does not appear to be a multicollinearity issue with any of the independent variables used in this model.

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