

How Good? The Impact of Leadership on Network Effectiveness

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The study of extra-organizational relationships, like networks in public management, has existed for longer than what is suggested by the recent literature. American federalism is perhaps the most enduring model of collaborative problem resolution (Agranoff and McGuire 2003). More than three decades ago, Hanf, Hjern, and Porter presented a comparative analysis of local manpower networks in Europe (Hanf et al. 1978). Research in the 1960s spoke to the “complexity of joint action” that plagued the implementation of intergovernmental programs (Pressman and Wildavsky 1973). And local officials have, to varying degrees, experimented with and depended on non-bureaucratic methods of service production and provision for generations (Wright et al. 2009). While contemporary research continues to incrementally expand our knowledge of public management networks, the foci of this research are largely the same as in the past: who is involved in the network, how is the network structured, where are the gaps in the network structure, and why was the structure a success or a failure. Rich descriptions of the processes or “black box” of public management networks are beginning to emerge (Agranoff 2007; Herranz 2008), but the structural approach to the study of networks continues to pervade the field.

We propose that the next step in empirical network research is to examine the actions and behaviors of network participants. The emergent literature on network management starts us down that path, but few behavioral propositions have been raised (McGuire 2002) and even rarer are large studies of such management (see Meier and O’Toole 2003; Edelenbos and Klijn 2009 for exceptions). Furthermore, what many would argue is a fundamental component of the effective functioning of organizations has largely been overlooked in network research: leadership. Leadership today requires more than just the ability to motivate and influence

employees in a single, self-contained organization. Public managers must now develop the capacity to facilitate productive interaction and move participants in extra-organizational relationships toward the effective resolution of a problem (McGuire and Silvia 2009). The empirical literature in public management rarely speaks to leadership as a possible determinant of collaborative network effectiveness (Huxham and Vangen 2000), and when it does, it is mostly hypothetically stated. For just one example, William Waugh states that in the emergency management field, “Leadership is the key to successful networks and organizations. Providing or facilitating leadership will improve the chances for success” (2002, 36).

This paper attempts to address the research gap by empirically examining leadership behaviors exhibited by public managers in their external network and the degree to which such behavior contributes to how well the network meets the needs of the manager’s jurisdiction. Does leadership improve the effectiveness or success of a network? If so, what specific leadership behaviors are the most significant correlates of effectiveness? In order to test Waugh’s statement, we (1) define the network leadership construct and provide a measure of such leadership and (2) specify a quantitative model that links leadership characteristics to a public manager’s perception of the effectiveness of his/her network. We then compare leadership in networks to leadership in single agencies and identify behaviors that are the most important for effectiveness in these contexts.

A “network” is a form of integrated structure that involves multiple actors with multiple linkages, working on cross-boundary, collaborative activities. Such structures can be formal or informal, and they are typically intersectoral, intergovernmental, and based functionally in a specific problem or policy area. Rarely does a network operate without some degree of leadership. Networks are governed through at least three different types of structures (Provan and Kenis 2008). Some are flat and self-led, where leadership is distributed across network

members, and others are governed by an organization that administers the network. In the third context, an actor representing a specific agency who is ultimately held accountable for arriving at an effective, shared solution to a problem may “take the lead.” This is particularly true in public management networks where the provision and delivery of public goods and services falls on a led actor’s shoulders (McGuire 2002).

Within our study context—emergency management—the department director typically assumes great responsibility for leading his/her relevant network. As stated in the National Response Framework from the U.S. Department of Homeland Security, the “responsibility for responding to incidents, both natural and manmade, begins at the local level—with individuals and public officials in the county, city, or town affected by the incident. Local leaders and emergency managers prepare their communities to manage incidents locally” (Department of Homeland Security 2008, 15). It further states that

The local emergency manager has the day-to-day authority and responsibility for overseeing emergency management programs and activities. He or she works with chief elected and appointed officials to ensure that there are unified objectives with regard to the jurisdiction’s emergency plans and activities. This role entails coordinating all aspects of a jurisdiction’s capabilities. The emergency manager coordinates all components of the local emergency management program, to include assessing the availability and readiness of local resources most likely required during an incident and identifying and correcting any shortfalls (16)

So emergency managers at the local level assume great responsibility for the creation, maintenance, and operation of the network.

Leadership can be based on behaviors that deal with the job itself, those that address relationships within the workplace/network, and those that are dedicated to maintenance of the organization/network. We find that leadership does matter, but the latter two classes of behaviors—those that focus on relationships and those that are organization-oriented—tell the most important story about network and agency effectiveness. As we will demonstrate, networks need relationships, but it doesn't mean they are easy to form and maintain, and much like public agencies, networks also have external and internal environments that must be tended to.

We have organized this paper into six sections. The next section discusses the leadership framework employed in this study by elucidating the behaviors undertaken by an emergency manager in his/her leadership role. The second section addresses the need for, but difficulties of, assessing the effectiveness of a network. The third section of this paper describes in general terms the models tested in this research, provides an explanation of the sample, and describes in detail the variables use for the quantitative analysis. The fourth section, the heart of the paper, discusses the results of the analysis. The fifth section offers a discussion of the results, which is followed by the concluding section. We now turn to a discussion of the public sector leadership framework.

LEADERSHIP FRAMEWORK

The scholarly investigation of the behaviors exhibited by leaders can be traced back to the late 1940s, when researchers at The Ohio State University and the University of Michigan, disenchanted with the trait approach to understanding leadership, attempted to study leadership by examining the behaviors exhibit by leaders while leading. Although operating independently, the researchers at these two institutions each uncovered two basic categories of leadership behaviors: people-oriented and task-oriented behaviors (Daft 2008). The first category, referred

to as consideration behaviors by the Ohio State group and employee-orientation by the University of Michigan group, included those behaviors focused on building and fostering interpersonal relationships. The second category, which was referred to as initiating structure or production-oriented behaviors by the Ohio State University and University of Michigan researchers respectively, included those behaviors related to the accomplishment of tasks.

The field of leadership studies has evolved since the 1940s. While some have contended that “the behavior approach to leadership, by concentrating only on behaviors and disregarding powerful situational elements, provides a simplistic view of a highly complex process” (Nahavandi 2009, 69), “the focus on leadership behavior...has remained a common theme in the literature” (Fernandez 2008, 176). In fact, many of the more recent leadership theories, such as Blake and Mouton’s leadership grid (1964; 1978; 1985), Situational Leadership/Life-Cycle Theory (Hersey & Blanchard 1969; Hersey et al. 2000), Path-Goal Theory (House 1971; 1996) Leader-Member Exchange (LMX) (Dansereau et al. 1975), and even transformational leadership (Bass 1998; Burns 1978), while attempting to take into account the context or situation in which the leader operates, are essentially behavior based approaches to leadership in that they all focus on what the leader does as opposed to his or her characteristics or traits.

Additionally, behavioral approaches to leadership research have also remained prevalent in studies that attempt to link leadership with organizational outcomes and effectiveness (Rainey, 2003). While Rainey (2003) noted that research in the private sector has shown “that there are weak relationships between leader behaviors and objective performance measures such as sales and profit margins, or at least that the effects of leadership are highly contingent on other factors...studies of leaders in the public sector, however, have recently been attributing a lot of influence to leader behaviors” (289). The findings presented by McGuire and Silvia (forthcoming), Fernandez (2005; 2008), Moynihan and Ingraham (2004), Brudney et al. (1999),

and Hennessey (1998) all indicate that leadership does matter. In fact, Crosby and Bryson (2005) stated that “perhaps the most effective tool a leader can wield for accomplishing an organization’s mission is his or her own behavior.”(95) Despite the growing evidence related to the relationship between leadership and effectiveness in the public sector, there is very little leadership research being conducted by public sector scholars (Van Wart, 2003). As Fernandez asserts, “The dearth of public administration research on leadership is even more startling given the amount of resources the federal government and other public agencies dedicate to leadership development” (2008, 176).

It should be noted that there is a healthy debate among academics and practitioners regarding the difference between leadership and management. This scholarly argument is particular prevalent in discussions regarding task behaviors. Many argue that management is “doing things right” whereas leadership is “doing the right things” (Bennis & Nanus 1997). In summarizing the opinion of those who view leadership and management as distinct constructs, Northouse (2007) wrote that “to manage means to accomplish activities and master routines, whereas to lead means to influence others and create visions for change.” (11). From this perspective management is comprised of task-oriented behavior aimed at increasing organizational effectiveness and efficiency, and comports with POSDCoRB (Gulick & Urwick 1937) and the managerial functions of planning, organizing, staffing and controlling (Fayol 1916). Leadership, then, “is a process whereby an individual influences a group of individuals to achieve a common goal” (Northouse 2007, 3).

However, not all leadership scholars agree with this dichotomous view. While some see the constructs of leadership and management as at least overlapping (e.g., Fernandez 2008), others have used the terms interchangeably (Van Wart 2005; Yukl 2002). Additionally, Fernandez (2008) wrote that “the distinction between leadership and management is blurred even

further when we examine and compare the leadership and public management literatures, particularly the public management literature on performance” (177). Ultimately, many of the leaders in the field have concluded that the determination of the definition of leadership and management should be based upon the research questions being asked (Bass 2008; Yukl 2002). We have chosen to view leadership and management as synonymous. As we have argued above, the county emergency manager is the leader of his or her department and network. We are investigating the influence of the behaviors exhibited by these leaders on network and agency effectiveness, and therefore the behaviors studied here will be viewed as a leadership behavior.

This study adopts the Leadership Action Cycle (Van Wart 2003; 2005; 2008), one of the few frameworks that specifically focus on leadership in the public sector. This framework consists of three categories of leadership behavior: task-oriented, people-oriented, and organization-oriented behaviors. The first two, task-oriented and people-oriented behaviors, are analogous to the leadership behavior categories discussed in the Ohio State University and Michigan University studies.

Task-oriented behaviors are those that are focused on deciding what to do and how to do it. In other words, these behaviors are aimed at accomplishing objectives and getting things done. Rainey (2003) explained that these behaviors refer “to a leader’s emphasis on setting standards, assigning roles, and pressing for productivity and performance” (291). Task-oriented behaviors also include determining what activities must be accomplished, deciding how to accomplish those activities, and scheduling and coordinating the work to be done. Since “leadership [is] measured by the degree of production of intended effects” (Burns 1978, 22), task-oriented behaviors “are a cornerstone of leadership of successful organizations” (Van Wart 2008, 205) While these behaviors are generally acknowledged to occur while leading an agency, they are employed by network leaders as well. Silvia and McGuire (forthcoming) found that

while both network and agency leaders engage in task-oriented behaviors, these behaviors are more central to agency leadership.

The second category in Van Wart's framework is people-oriented behaviors. These behaviors include "consulting, planning and organizing personnel, developing staff, motivating, building and managing teams, managing conflict, and managing personnel change" (Van Wart 2008, 228). Additionally, such people-oriented behaviors strive to provide employees and network members with an environment conducive to goal and mission achievement by treating the employees and network members as equals, freely sharing information, and maintaining a close knit organization built upon a culture of mutual trust. While these behaviors are among the most commonly employed by leaders in both the agency and network contexts, people-oriented behaviors have been found to be significantly more central to network leadership (Silvia & McGuire, forthcoming).

The final category in Van Wart's framework is organization-oriented behaviors, which are similar to the conceptual skills discussed by Katz (1955). "The emphasis of these [behaviors is] an external prospective and a systems approach (i.e., 'big picture') and more attention is paid to organizational culture and organizational change" (Van Wart 2008, 234). These behaviors involve the management of the external environment and include keeping in good standing with and encouraging continued support from both a higher authority and stakeholders, identifying stakeholders and resources, and publicizing agency/network accomplishments. Organization-oriented behaviors also involve the management of the internal environment through establishing a shared vision and mission commitment, influencing the entity's values and norms, and changing the organizational structure. Silvia and McGuire (forthcoming) did not find a consistent pattern in the frequency of use of organization-oriented behaviors in either context.

The quantitative models of network and agency effectiveness tested in this analysis utilize Van Wart's task-, people-, and organization-oriented behavior classifications to organize 35 different leadership behaviors. Since public leadership studies are few and far between, most assumptions are based on traditional, hierarchical leadership. However, we want to see if there is a difference in what works. So in addition to determining what works in networks, we also want to see if it is different than in single agencies. Based on the previous discussion, we hypothesize that the frequency of task behaviors will be positively and significantly associated with effectiveness in agencies, and negatively and significantly associated with effectiveness in networks. We expect that the frequency of people behaviors will be positively and significantly associated with effectiveness in networks, and that the frequency of organization behaviors will be positively and significantly associated with agency effectiveness. However, it is unclear how organization behaviors will impact the effectiveness of a network. Next we provide a brief discussion of what is meant by effectiveness, followed by a description of the analysis.

EFFECTIVENESS

Much like public sector agencies, public management networks must be held accountable for "how good" the network performs (Bardach 1998). It is thus important for research to examine "the relationship between interorganizational network structures and activities and measures of effectiveness" (Provan and Milward 2001, 414). Leaders in a network endeavor to achieve their individual agency's goals as well as a shared, collective goal. As in any management structure, the goal itself may be different across agencies and networks. However, the typical context for networks is that they are held accountable by stakeholders and partner constituencies (Human and Provan 2000) for the satisfactory design (in some networks) and delivery of goods and services (McGuire 2002). Although goals evolve and are determined interactively over time

(Klijn and Koppenjan 2000) and the success of some networks can be determined largely by the extent to which relationships develop for future endeavors (Rodriguez et al. 2007), effectiveness can still be measured by the extent to which a network achieves its goals, as determined by the community, clients, and the manager. In this study, we look at the latter.

Assessing performance objectively in the field of emergency management is near impossible for a few cases, let alone for a large number of cases. Emergency managers prepare for natural and man-made disasters, but without the existence of an actual disaster, it is difficult to assess the effectiveness of the resulting response network in terms of an outcome variable. Emergency managers must therefore evaluate *before* a disaster strikes whether his/her agency and network are meeting the needs of the jurisdiction. Objective, goal-oriented, and quantitative measures of performance for both the practitioner and the researcher are nearly impossible to determine *a priori*, so subjective measures that attempt to address the perceptions of predicted performance are more appropriate, particularly when the leader of the network is answering the question.

ANALYSIS

Model

We test several quantitative models that seek to explain comparatively the perceived level of effectiveness of an emergency manager's network and agency in terms of the frequency of the leadership behaviors undertaken by the manager. The general hypothesis tested with this model is that leadership substantively and significantly contributes to the perceived effectiveness of both a manager's network and his/her agency. Furthermore, as hypothesized in past research (McGuire 2002; Rethemeyer and Hatmaker 2008) and demonstrated in Silvia and McGuire (forthcoming), we examine possible differences in the behaviors used by managers across the

two contexts, hypothesizing that high frequency of task-oriented behaviors and people-oriented will be positively related to the effectiveness in *agencies* (see Fernandez 2008), whereas a high frequency of people-oriented behaviors will be positively related and task-oriented will be negatively related to *network* effectiveness. Although classic organization theory suggests that we also should expect organizational-oriented behaviors to be important for the manager's home agency, it is unclear how—or even why—organizational behaviors will affect the manager's perception of network effectiveness. We also control for a number of factors in the analysis, including the professional achievements of the manager, previous experience with disasters, the extent to which certain collaborative activities are performed by the manager, and various characteristics of the county, but still expect to find that leadership matters.

The relationship between leadership behavior and the perception of network and agency effectiveness is examined with ordered logistic regression analysis using substantively weighted analytical techniques (SWAT) (Meier and Gill 2000). The purpose of SWAT is to explore the level of perceived effectiveness for those county emergency managers who judge the network/agency to be the most effective. Managers and scholars are concerned mainly with learning what type of leadership is associated with the highest level of effectiveness. Whereas logistic regression is used to determine the set of variables associated with the “average,” SWAT is an ideal mechanism for isolating those managers who report a high level of effectiveness.

Sample

Web-based questionnaires were sent directly to 2,486 county emergency managers across the country. The distribution list was generated using contact information gathered from county, state, and professional organization websites. A total of 668 county emergency managers from county emergency managers representing 46 states and the District of Columbia responded to the

survey. The emergency management contact information could not be obtained for any of the counties in Connecticut, New Hampshire, Rhode Island, or Vermont. Delaware was the only state to which surveys were sent, but no county officials responded. Because some respondents did not fully complete a section of the questionnaire, the final sample for this analysis is 498. The large number of cases is certainly illustrative of leadership in county-level emergency management activities. Data on even 498 responses is larger than most network leadership studies (c.f. Agranoff 2003), and the number of cases is consistent with other studies of management effectiveness (Meier & O'Toole 2003).

Comments received from the respondents indicated that there was some reluctance on the part of county emergency managers to respond to the survey if they did not have any staff working for them. There are many one-person shops in emergency management, which tend to be in smaller counties. Therefore, the dataset of 498 respondents is over-represented by larger counties with emergency management departments in which there are multiple people working. Geographically, the sample also closely resembles the nation, with two exceptions. There is a smaller percentage of New England counties (FEMA Region 1), since many of the New England states do not have county level governments. Additionally, there is a higher proportion of Midwestern (FEMA Region 5) counties in the sample.

(Table 1 about here)

Measurement of Variables

Dependent Variable. The survey asked the emergency manager how frequently he/she employed various leadership behaviors in his/her agency and his/her network. At the end of the sections covering agency and network leadership behaviors, the respondent was asked to assess the

effectiveness of his/her emergency management agency (in the first section) and the effectiveness of his/her emergency management network (in the second section). For each assessment, the questionnaire asked “How effective is your emergency management network (or agency) in meeting your county’s needs?” The respondent answered these questions using a five-point Likert scale labeled: “Very Ineffective,” “Ineffective,” “Neither Effective nor Ineffective,” “Effective,” and “Very Effective.” The dependent variable used in these analyses is thus the ordinal variable taken from the Likert scale with a range from one to five, with the “1” signifying that the responding emergency manager believes his/her network (or agency) to be very ineffective and a “5” signifying that the respondent believes the network (or agency) is very effective.

Although this is a single, perceptual measure of effectiveness, such measures are commonly used in empirical research on public sector organizational performance. Since the emergency manager may be in the best position to evaluate effectiveness of both his/her agency and network, and objective measures of effectiveness are hard to discern in disaster research, the perceptual measure is sufficient. Furthermore, recent investigations of performance demonstrate that while subjective measures of agency performance are imperfect, they are statistically valid (Brewer 2005; Walker and Boyne 2004; Wall et al. 2004).

Explanatory Variables. The key part of the survey measuring leadership behavior was a section asking the respondent how often they engage in 35 behaviors as part of leading the network and agency. The survey was designed to ascertain behavior. Since there are trade-offs in the amount of time one can spend on different types of leadership, rather than assess importance, the survey measures frequency of behavior. Respondents answered these questions for each of 35 behaviors for both their emergency management agency and their emergency management network. The

questions about behavior were asked using a five-point Likert Scale with answers being “Never,” “Seldom,” “Occasionally,” “Often,” and “Very Often.” The explanatory variables used in these analyses are the ordinal variables taken from the Likert scale with a range from one to five, with the “1” signifying that the responding emergency manager never undertakes a specific behavior and a “5” signifying that the respondent undertakes the behavior very often. Except for modifying the questions to denote the specific contextual setting to consider, the wording of the questions in each section were identical.

Following the leadership behaviors construct by Van Wart (Van Wart 2005; 2008) discussed earlier in this paper, an index was created that summed the values from the five-point scale into each of the three categories: task-oriented, people-oriented, and organization-oriented. The sum for each behavior type was divided by the number of behaviors in each classification, thus producing a single number measuring the frequency of each type of behavior that can be compared across the groupings. A Cronbach’s alpha coefficient was calculated for each grouping of behaviors. The coefficients for the task-oriented, people-oriented, and organization-oriented network leadership behaviors are .92, .90, and .92, respectively. The coefficients for the eleven task-oriented, thirteen people-oriented, and eleven organization-oriented agency leadership behaviors are .85, .93, and .83, respectively. The strength of these alpha coefficients provides a high level of confidence that this categorization is both a theoretically and empirically grounded way to differentiate leadership behavior.

Confirmatory factor analysis using the AMOS 17.0 software was also employed to corroborate the appropriateness of the composition of the three leadership categories for both the network and agency contexts. The relative (normed) chi-square value of 3.01 for the network model and 2.82 for the agency model are both within the acceptable range of 1.0 and 5.0 as established by Schumacker and Lomax (Schumacker & Lomax 2004, 82). The root mean square

error of approximation (RMSEA) for the network model and the agency model were both found to be 0.06, which conforms to the values Thompson (2004) and Hu and Bentler (1999) suggested would indicate a reasonable fit. Finally, the AIC and BIC fit statistics indicate the models using Van Wart's framework provide a better fit than do single factor models. Thus, it was determined that the three factor models for leadership behaviors in networks and in agencies are justifiable based upon both absolute and comparative fit indices. Table 2 contains the list of leadership behaviors investigated in the survey according to the three-category classification.

(Table 2 about here)

Control Variables. There are certainly other factors that impact a manager's perception of the effectiveness of his/her agency or network. The size of the agency, measured as the number of full-time and part-time workers, is included in the analysis. The demands of the home agency, as expressed by the number of employees the emergency manager must lead, can take time and effort away from attending to the home agency's external environment (Daft 2008), so we hypothesize that the greater the number of full- and part-time workers, the lower the perceived effectiveness of the leader's network. Similarly, since the larger the staff size, the greater the number of relationships that must be attended to by a manager, we argue that large staff size will also be associated with a lower perceived effectiveness of the agency.

We control for the position to which the emergency manager officially and administratively reports. Reporting to an elected county commissioner, rather than another appointed administrator, could presumably lead to better relationships with some key external stakeholders (Krueger and McGuire 2005). We hypothesize that an emergency manager who reports to a county commissioner will view the network and the agency as being more effective.

This control variable is measured as a categorical variable with the value of “1” signifying that the emergency manager reports to a county commissioner, “0” if otherwise.

We include a continuous measure for the number of Federal Emergency Management Agency (FEMA) disaster declarations in the county that occurred *during the emergency manager’s tenure in that position*. Only those disasters occurring during the five year period from February 2003 to February 2008, as reported by FEMA on its website, were counted. This variable is measured in terms of the number of declarations that occurred. Therefore, for emergency managers who were hired after February 2003, the count of disaster declarations only includes those declarations that occurred after they were hired. Wise (2006) suggests that managers learn from their experiences with emergencies, presumably becoming better prepared for future occurrences. We thus hypothesize that the greater the number of declarations, the greater one’s perception of both the network’s and the agency’s effectiveness.

Three control variables—sharing of equipment and supplies, joint response planning, and coordination of mitigation and preparedness activities—are consistent with the mitigation, preparedness, and response phases of emergency management. Using a five-point Likert scale, the county emergency manager was asked to evaluate how often he/she participates in these three tasks. As reasoned above, improvements and adaptations to one’s network are made based on prior experience. We thus hypothesize that the more frequently the emergency manager shares equipment, plans, and coordinates within the network, the greater will be his/her perception of the network’s effectiveness. However, such external activity can “interfere” with managing the internal agency. A trade-off between sharing and coordinating externally, and managing tasks internally, exists for the emergency manager. We hypothesize that these three tasks will be negatively related to that manager’s perceptions of agency effectiveness.

We include as controls three variables that measure the level of professionalization, education, and experience of the emergency manager. Previous empirical research using similar measures demonstrates that professionalization and education is positively correlated with the extent of collaboration (McGuire 2008). We hypothesize that an emergency manager who has received such certification from either the International Association of Emergency Managers, FEMA through its Professional Development Series courses, or from the state (or any combination) will report a higher level of network effectiveness than will a manager who does not have any certification. If the emergency manager reported that he/she earned at least one certification, a value of “1” was given to this variable; “0” if not. The questionnaire also asked the respondent to state the highest level of education completed. If the emergency manager reported that he/she completed at least a college degree, a value of “1” was given to this variable; “0” if not. We also include a variable that measures the time spent in the position of emergency management director in the county. This experience variable is measured in terms of the months served.

Two control variables address characteristics of the county itself. First, we include a binary variable which measures whether the Social Vulnerability Index (SoVI) for the county is above average (measured with a “1”) or below average (“0”). The SoVI is based upon 42 socioeconomic and environmental variables that have been identified in the literature as impacting a county’s ability to prepare for, respond to, and recover from disasters (Cutter et al. 2003). Higher than average scores on the index denotes a county with a higher than average vulnerability to disasters. Second, another binary variable is used to measure whether or not a county is located in a metropolitan area (as opposed to a micropolitan or rural area) with a “1” signifying metro and a “0” signifying non-metro.

The descriptive statistics and variable codes are presented in table 3.

(Table 3 about here)

RESULTS

As described above, the measures of perceived network and agency effectiveness used as dependent variables are based upon a five-point Likert Scale and are therefore coded as ordinal variables. The methodology employed in the following analyses is ordered logit regression. A key assumption made in an ordered logit model—the proportional regression assumption—is that the slopes for each of the probability curves are equal. Long (1997) asserts that this assumption is often violated. In order to assess whether the assumption holds for the network model, the Brant Test (Brant 1990) was performed. The results of this test indicated that the proportional regression assumption was violated.

In cases where the proportional regression assumption is violated, it is suggested that “alternative models should be considered that do not impose the constraint of parallel regressions” (Long 1997, 145). Therefore, the network and agency models were also run using stereotype logistic regression (Anderson 1984), which relaxes the parallel regression assumption. Since the ordered logit model is more parsimonious and the ordered logit estimates for both network and agency models were found to be similar in significance and direction to those found when using stereotype logistic regression, the ordered logit model is used in the analysis.

Based upon the work of McKelvey and Zavoina (1975) and Winship and Mare (1984), Long (1997) stated that “interpretations [of ordered logit models] should be based on fully standardized coefficients or y^* -standardized coefficients” (128). Therefore, the models displayed throughout the rest of this paper include both the y -standardized and fully standardized coefficients. The y -standardized coefficients are interpreted such that a unit change in the

independent variable is expected to change the perception of effectiveness by one standard deviation. The fully standardized coefficients are interpreted such that a one standard deviation change in the independent variable is expected to change the perception of effectiveness by one standard deviation.

Table 4 displays ordered logit estimates for the set of variables hypothesized to impact the measure of network effectiveness based on the task, people, and organization leadership behavior framework. Although there is no widely-accepted direct analog to Ordinary Least Squares regression's R^2 , previous research (Hagle and Mitchell 1992; Veall and Zimmermann 1996; Windmeijer 1995) found that McKelvey and Zavoina's R^2 "most closely approximates the R^2 obtained by fitting the linear regression model" (Long and Freese 2006, 96). In the model displayed in Table 4, McKelvey and Zavoina's R^2 suggests that nearly 40 percent of the variation in perceived network effectiveness is explained by the leadership behaviors and control variables employed in the model. The standard deviation for the network effectiveness dependent variable is 0.68.

(Table 4 about here)

Of the three leadership behaviors variables in the network effectiveness model, only the variable measuring organization-oriented behavior was found to have a statistically significant relationship to perceived network effectiveness. A change of one Likert scale unit in the reported frequency of organization-oriented behavior usage (e.g., moving from "Often" to "Very Often") is expected to change the perceptions of network effectiveness by 0.70 standard deviations or 0.47 Likert Scale points, *ceteris paribus*. Interestingly, people-oriented behaviors,

which the literature would indicate would be important, and task-oriented behaviors were not statistically significant in this model.

A number of the control variables were also found to have statistically significant associations with the perception of network effectiveness. The number of part-time workers and the frequency with which the network entities share equipment and supplies were found to have negative relationships with effectiveness perceptions in networks. The impact of an additional part-time worker has a very small impact on perceptions of network effectiveness (-0.006 standard deviations). In fact, a manager would need to add 24 part-time workers before the perception of his or her network would be expected to decrease by one-tenth of a Likert Scale point. Increasing the frequency of sharing equipment and supplies by one Likert Scale unit is anticipated to decrease effectiveness perception of the network by slightly less than one-tenth (0.09) of a Likert Scale point. The only control variable with a statistically significant, positive association with the dependent variable was the frequency of coordinating mitigation and preparedness activities. The perception of network effectiveness would be expected to increase by 0.13 Likert Scale points if the frequency of these coordination activities were to increase by one Likert Scale unit.

The results from the ordered logit model in table 4 provide mixed evidence regarding the frequency of leadership behaviors predicting the level of perceived network effectiveness. In summary, neither the frequency of task-oriented behaviors nor the frequency of people-oriented behavior is statistically significant. The finding for the people-oriented variable is the same: not significant and in the opposite hypothesized direction. The variable measuring the frequency of organization-related behaviors is, however, statistically significant and positively associated with effectiveness, and is the most substantively significant variable in the model. In terms of organization size, the number of part-time employees in the agency is negatively and

significantly associated with network effectiveness. Findings for the three collaborative activities are significant, but sharing of equipment and supplies is, surprisingly, negatively associated with effectiveness. The education and training variables, as well as the variables measuring county characteristics are not significant.

We can learn about the role of leadership in explaining network effectiveness by studying the managers who reported the highest level of effectiveness, that is, the managers who responded with a “very effective” on the Likert scale, which is coded as a 5 in our analysis. A total of 111 (22.9 percent) managers met this criterion. Substantively Weighted Analytical Techniques (SWAT) were applied to the original model by iteratively weighting the managers who did not select the “very effective” response to the network effectiveness question to count as 0.5 managers (thus weighting the “very effective” managers by two times), 0.2 managers (“very effective” managers by five times), 0.1 managers (“very effective” managers by ten times), and finally, 0.05 managers (“very effective” managers by twenty times). The results for the model of managers responding that the network was “very effective” weighted 20 times are reported in table 5. Substantively, the slope values for each variable indicate the impact of that variable on collaborative activity for the managers who perceive their network as very effective, holding all other variables constant, which can be compared with the average network effectiveness value.

(Table 5 about here)

Table 6 displays the slopes and p-values for each variable at each iteration of the SWAT models. Two useful ways to examine the table are to look across at the changes from the unweighted model to the model where the most effective networks are weighted 20 times, as well as looking down the far-right column. It is clear that the variables measuring the frequency

of each of the three leadership behaviors is significantly related to network effectiveness for the respondents reporting the highest effectiveness. The variable for task-oriented behaviors approaches significance, whereas the variables for people-oriented behaviors and organization-oriented behaviors are significant at the $p < .05$ level. Thus, all of the leadership behaviors contribute to the manager's perceptions of network effectiveness. However, people-oriented behavior remains negatively associated with the dependent variable. We hypothesized that the variable measuring people-oriented behaviors would be positively related to network effectiveness, but just the opposite is the case. The slope increased by nearly 4.5 times from the unweighted to the most heavily weighted model and the fully standardized slope (in table 5) increased substantially. The slope for the variable measuring the frequency of organization-oriented behaviors increased 1.5 times and remains, by far, the most substantively significant variable.

(Table 6 about here)

Other variables that moved to significance at the $p < .05$ level in the most heavily weighted model are the number of FEMA disaster declarations and the variable measuring whether the manager earned a professional certification. Sharing equipment and supplies is no longer statistically significant.

The order logit regression estimates for the agency effectiveness model are displayed in Table 7. McKelvey and Zavoina's R^2 indicates that approximately 27 percent of the variation in perceived agency effectiveness is explained by the leadership behaviors and control variables employed in the model. The standard deviation for the perceived network effectiveness variable is 0.64.

(Table 7 about here)

Whereas only the organization-oriented behaviors in the unweighted network effectiveness model were found to have statistically significant relationships with effectiveness perceptions, all three leadership behavior categories have statistically significant relationship with perceptions of agency effectiveness. In fact, the three leadership variables have the greatest impact on the dependent variable. Both task- and organization oriented behaviors have a positive relationship with effectiveness perceptions in the agency. Perceived agency effectiveness would be expected to increase by 0.21 and 0.46 Likert Scale points with a one Likert Scale unit increase in task- and organization-oriented behaviors, respectively. People-oriented behaviors, on the other hand, were found to have a negative relationship with the dependent variable. The more frequently the manager engages in people-oriented behaviors, the less favorably he or she views the effectiveness of the agency. A one Likert Scale unit increase in these behaviors is anticipated to decrease effectiveness perceptions by 0.16 Likert Scale units.

Of the control variables, staffing levels were found to have significant relationships with the perceptions of agency effectiveness. While we would anticipate that bringing on 26 part-time workers would be expected to decrease the dependent variable by one-tenth of Likert Scale unit, hiring 7 full-time personnel would increase it by one-tenth of a Likert Scale unit. Also, manager experience as measured by the number of months on the job is also significantly and positively related to perceived effectiveness in the agency setting. An additional 6.85 years of tenure would be anticipated to increase the perceived effectiveness of the agency by one-tenth of a Likert Scale point. Finally, as with the unweighted network model, the increase in the frequency of coordinating preparedness activities by one Likert Scale unit would be expected to increase the perception of agency effectiveness by one-tenth of a Likert Scale.

We can also discern the role of leadership in explaining agency effectiveness by studying the managers who responded with a “very effective” on the Likert scale for the agency effectiveness question on the survey. A total of 165 managers (33.1 percent) met this criterion. As we did for the network effectiveness model, the original ordered logit regression model was run iteratively by weighting the managers who did not select the “very effective” response to the agency effectiveness question by factors of 0.5, 0.2, 0.1, and 0.05. The results for the model of managers responding that the network was “very effective” weighted 20 times are reported in table 8. Substantively, the slope values for each variable indicate the impact of that variable on collaborative activity for the managers who perceive their agency as very effective, holding all other variables constant, as compared to the average agency effectiveness value.

The initial unweighted ordered logit model displayed in table 7 showed that all of the leadership variables were significantly associated with the average level of agency effectiveness. However, when weighting the most effective agencies, both task-oriented and people-oriented behaviors lose their significance. Organization-oriented behavior remains statistically significant and the slope for the variable increased by 1.4 times from the unweighted to the most heavily weighted model (see table 9). None of the three collaboration variables (sharing, joint planning, and coordination) significantly affect the value of the dependent variable, agency effectiveness, which is to be expected. In contrast to the network effectiveness model, the SoVI score variable is significant in the most heavily weighted model, suggesting that when the vulnerability of the manager’s home county is above average, the manager’s perception of the effectiveness of the agency is greater.

(Table 8 about here)

(Table 9 about here)

DISCUSSION

We have provided a “snapshot” of the emergency manager as leader both in network and agency contexts. Our findings suggest that a new perspective on the network leader is warranted, particularly when leadership and network effectiveness is compared to the impact of leadership on agency effectiveness. As was found in previous research (Silvia and McGuire, forthcoming), there are differences across the two contexts; that fact is becoming a given in hypotheses and speculation that dominates so much of network research. However, empirical evidence that demonstrates this “given” is rare, and tying the differences to effectiveness is even rarer. We have attempted to do so in this analysis.

First, leadership does matter for local emergency managers and their networks. It is clear that there are difference across network and agency behavior; what is important for effectiveness in networks is not important in agencies. However, the relationship between behavior and effectiveness runs counter to the established literature. For example, we hypothesized that task-oriented leadership behaviors would be positively and significantly related to agency effectiveness and negatively related to network effectiveness, but the opposite actually exists: the leader who perceives his/her network as the most effective frequently carries out task behaviors in the network in a way that increases, not decreases, network effectiveness. On the other hand, the variable measuring task behaviors is not significantly associated with agency effectiveness. We also hypothesized that people-oriented behavior would be positively and significantly related to network effectiveness, given the literature that says managing people’s perceptions, synthesizing relationships, and “game management” in networks is important (Agranoff and McGuire 2001; Keast et al. 2004; Kickert et al. 1997; Klijn and Edelenbos 2007). However,

such behaviors are *negatively* and significantly related to the cases with the highest level of effectiveness. Finally, in a finding that carries great implications for our understanding of network leadership, we provided no hypothesis with regard to organization-oriented behaviors, only speculating that it would be related to effectiveness to some degree (given previous research on the differences in leadership across agency and network contexts in Silvia and McGuire forthcoming), but attending to the environment, *even in a network*, is clearly the most substantive set of behaviors predicting the level of network effectiveness (we expand upon this finding later in this section).

How does one account for these contrary findings? Perhaps the explanations are simpler than we have been led to believe. With regard to the finding that the greater the frequency of people-oriented behaviors, the lower the perceived network effectiveness, it may be obvious: working with people who do not work for you, who may work against you in some cases, is not necessarily a pleasant experience. Building relationships takes time and energy; settling conflicts takes time and energy; motivating network participants, inspiring work, and facilitating joint decision making takes time and energy. The leader's perception of the network's effectiveness is driven, in part, by the realization that the more he/she has to work at relationships, the "messier" the process of building and maintaining a network becomes. There can be *too much* action or process in a network, which can lead to both suboptimal collaborative outcomes and collaborative inertia (Huxham 2003). Climbing the hurdles of process is essential to achieving real results. Nevertheless, process can wear down collaborative efforts. The leader does frequently undertake people-oriented behaviors—we have evidence of this—but these behaviors are messy, just as the problems tackled by networks are messy (Keast et al. 2004). A leader must be people-oriented, but it doesn't mean that it's easy or even productive for achieving a goal.

Second, the most consistent finding in our analyses is that organization-related behaviors are statistically and substantively significant predictors of both agency and network performance. The former isn't necessarily a surprise; it is accepted as fact that a manager must tend to the organization's external and internal environment in order to be effective. However, it's apparent that *networks have external and internal environments* as well. The relationships that matter most in the perceptions of a leader's network effectiveness are those that are external to the network: identifying and pleasing stakeholders, keeping in good standing with higher authorities, publicizing the network's accomplishments, etc. As Provan and Milward demonstrated in a series of comparative case studies, "...the task for network organizers is to minimally satisfy the needs and interests of stakeholders at networks and organization levels, while emphasizing the broader needs of the community and the clients the network must serve" (2001, 422). We have quantitative evidence that leaders recognize that networks are political creatures just like public agencies.

Third, we acknowledge that the field of public management attempts to further both theory and practice. By expanding our understanding of the public management phenomenon, researchers can inform practice. Particularly in the area of performance, researchers and practitioners alike want to know what practices and techniques can lead to the best results. In this study, we are focusing on the leadership behaviors exhibited by managers with their networks and agencies. Our goal was not to determine descriptively what leadership behaviors were being exhibited in these contexts. Instead, we wanted to understand the relationship between the leadership behaviors and "how good" or effective the network and agency were perceived as being. Given the time and resources now dedicated to leadership development and collaborative approaches to addressing public issues, a better understanding of the relationship between leadership behaviors and effectiveness is certainly needed. But despite our desire to

understand the exceptional, common quantitative techniques focus only on the average case. Meier and Gill argue that “the supposition that public managers seek to identify and emulate the average performing case is simply wrong” (2000, 1). SWAT was invented to look at the exceptional case and tease out how it may differ from the average case (Meier and Gill 2000). In this paper, the SWAT procedure was employed to highlight the predictors of effectiveness for the exceptional cases, and the differences between the findings in the unweighted and the weighted models are startling. Without focusing on the cases in which the organization was perceived as “very effective,” a great deal of important information would have been lost and, presumably, recommendations for management activity would simply have been wrong.

CONCLUSION

The context of this study is that of the county emergency manager. The study also examined only one leader, the manager, even though leadership can also be shared and integrative in networks (although less so in emergency management networks). Therefore, in the future it would be useful to investigate how the other members of the network perceived the effectiveness of the network and how they perceived the county emergency managers leadership behavior. Expanding the scope to include the network members’ perceptions of effectiveness relative to the county emergency managers’ leadership behaviors would serve to give a clearer picture of how the emergency managers’ actions impact the network as a whole. Is there congruence among all network members, all of whom represent different agencies and thus play different roles, in the assessment of network effectiveness? Based upon these differing situations, it would be interesting to understand the issues that come into play in their perceptions of network effectiveness.

Although the impact of leadership behavior on network effectiveness is thought to be

generalizable to other types of public sector networks, work should be done to investigate this in contexts other than emergency management. The collaborative nature of emergency management is well established and thus provides a good test for examining leadership behavior in a collaborative structure like a network. However, there are other fields on which such a study can be replicated. In leadership studies, context matters. Therefore, more work in other areas and contexts is needed.

Although we examined 35 different leadership behaviors and categorized them both conceptually and statistically according to an accepted public sector-based framework, it is possible that more behaviors exist. Indeed, Huxham and Vangen (2000) identified 204 leadership tasks and 241 leadership processes in collaborative settings. Future models could (1) expand upon the behaviors studied here or (2) isolate a subset of behaviors and include it in an adapted model of effectiveness. Similarly, although we sought to capture structural, professional, and geographic elements of the local emergency manager's network, the mid-range R^2 values in the models suggest there are other factors that explain effectiveness. Subsequent research could focus on just one or a few distinct behaviors and/or expand the data collection to include other aspects of network process.

In a description of the environment of organizations, Rainey states that "public managers must to some degree balance managerial tasks with policymaking and with handling the political and institutional environment" (2003, 323). Network leaders, too, balance the time and effort dedicated to their environments. Indeed, networks have an external environment and an internal environment much like single organizations, and the attention given to these environments, as represented by the organization-oriented leadership behaviors, is a significant predictor of network effectiveness. Networks have cultures; networks have external constituents; networks have common (or not so common) visions of the future; and networks have leaders who, when

dedicating time and effort to acknowledging these environments, view their networks as being effective.

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

	All Counties	Sample Counties
Population Group ^a		
Metro areas of 1 million population or more	13.15%	19.18%
Metro areas of 250,000-1,000,000 population	10.35%	12.95%
Metro areas of fewer than 250,000 population	11.17%	14.15%
Urban population of 20,000 or more, adjacent to a metro area	6.94%	10.31%
Urban population of 20,000 or more, not adjacent to a metro area	3.34%	4.56%
Urban population of 2,500-19,999, adjacent to a metro area	19.38%	17.99%
Urban population of 2,500-19,999, not adjacent to a metro area	14.33%	10.31%
Completely rural or less than 2,500 urban population, adjacent to a metro area	7.48%	5.76%
Completely rural or less than 2,500 urban population, not adjacent to a metro area	13.85%	4.80%
FEMA Region		
Region 1 (CT, MA, ME, NH, RI, VT)	2.13%	0.72%
Region 2 (NY, NJ)	2.64%	4.56%
Region 3 (DC, DE, MD, PA, VA, WV)	9.07%	7.19%
Region 4 (AL, FL, GA, KY, MS, NC, SC, TN)	24.43%	28.06%
Region 5 (IL, IN, MI, MN, OH, WI)	16.68%	23.74%
Region 6 (AR, LA, NM, OK, TX)	16.01%	10.79%
Region 7 (IA, KS, MO, NB)	13.12%	10.07%
Region 8 (CO, MT, ND, SD, UT, WY)	9.23%	6.24%
Region 9 (AZ, CA, HI, NV)	3.02%	2.40%
Region 10 (AK, ID, OR, WA)	4.65%	5.28%

Notes:

a: Data Source: 2003 Urban/Rural Continuum Codes, Economic Research Service (ERS), Dept. of Agriculture

Table 2. Classification of Leadership Behaviors

Leadership Behaviors	Type of Behavior^a
Taking charge when emergencies arise	T
Letting all know what is expected of them	T
Making sure individual roles are understood	T
Scheduling the work to be done	T
Asking to follow standard rules and regulations	T
Coordinating the work	T
Establishing agreement on nature of tasks	T
Keeping work moving at a rapid pace	T
Assigning to particular tasks	T
Selecting performance measures	T
Deciding how tasks will be performed	T
Treating all as equals	P
Freely sharing information	P
Looking out for the personal welfare	P
Creating trust	P
Brainstorming	P
Permitting to use own judgment	P
Sharing leadership role	P
Inspiring enthusiasm for a project	P
Putting suggestions into operation	P
Maintaining a closely knit agency/network	P
Permitting to set its own pace	P
Settling conflicts when they occur	P
Using incentives to motivate	P
Encouraging support from superiors	O
Identifying resources	O
Keeping in good standing with higher authority	O
Encouraging support from stakeholders	O
Keeping in good standing with stakeholders	O
Identifying stakeholders	O
Establishing a shared vision	O
Establishing member commitment to mission	O
Publicizing goals and accomplishments	O
Influencing values and norms	O
Changing the network's structure	O
a. P= People-oriented behaviors T= Task-oriented behaviors O= Organization-oriented behaviors	

Table 3. Descriptive Statistics for Variables in Analyses

Type of Variable	Variable Name	Mean	Standard Deviation	Range
Dependent Variable	Perceived effectiveness of the network ^a	4.08	0.68	1-5
Dependent Variable	Perceived effectiveness of the emergency management agency ^a	4.25	0.64	1-5
Explanatory Variable	Task behaviors network ^{b, c}	3.63	0.67	1-5
Explanatory Variable	Task behaviors agency ^{b, c}	3.88	0.61	1.27-5
Explanatory Variable	People behaviors network ^{b, d}	3.87	0.56	1-5
Explanatory Variable	People behaviors agency ^{b, d}	3.88	0.79	1-5
Explanatory Variable	Organization behaviors network ^{b, e}	3.82	0.65	1-5
Explanatory Variable	Organization behaviors agency ^{b, e}	3.99	0.50	2.27-5
Control Variable	Number of full-time workers	2.96	9.17	0-128
Control Variable	Number of part-time workers	3.41	15.25	0-205
Control Variable	Reports to county commissioner ^f	0.48	0.50	0-1
Control Variable	Total FEMA disaster declarations ^g	1.30	1.36	0-6
Control Variable	Sharing of equipment and supplies ^h	3.85	0.87	1-5
Control Variable	Joint response planning ^h	4.16	0.82	1-5
Control Variable	Coordination of mitigation and preparedness activities ^h	4.11	0.85	1-5
Control Variable	Professional certification ⁱ	0.78	0.42	0-1
Control Variable	College degree ^j	0.66	0.47	0-1
Control Variable	SoVI score ^k	0.39	0.48	0-1
Control Variable	Metro status ^l	0.41	0.49	0-1
Control Variable	Months on job ^m	100.79	88.83	2-492

NOTES:

a: 1= Very Ineffective; 2=Ineffective ; 3=Neither effective nor ineffective ; 4=Effective; 5=Very effective

b: 1=Never; 2=Seldom; 3=Occasionally; 4=Often; 5=Very Often

c: Mean score for the eleven task behaviors

d: Mean score for the thirteen people behaviors

e: Mean score for the eleven organization behaviors

f: County emergency manager reports directly to the county commission/commissioner (1=yes; 0=no)

g: Total number of FEMA major disaster declarations in the county during the county emergency manager’s tenure

h: Frequency of emergency management activity (1=Never; 2=Seldom; 3=Occasionally; 4= Often; 5=Very often)

i: Holds an federal, state, or professional organization certification or designation (1=yes; 0=no)

j: Earned a college degree (1=yes; 0=no)

k. SoVI score above average (1=yes; 0=no)

l. Metropolitan county (1=yes; 0=no)

m. Total number of months as director of emergency management

Sample size=498

Table 4. Ordered Logit Model of County Emergency Managers' Perceptions of the Effectiveness of the Emergency Management Network, TPO Framework, Unweighted

Variable	Coefficient	y-Standardized Coefficient	Fully Standardized Coefficients	p-value	95% Confidence Interval		Robust Standard Error
Task behaviors	0.386	0.166	0.111	0.159	-0.151	0.923	0.274
People behaviors	-0.256	-0.110	-0.062	0.540	-1.074	0.563	0.418
Organization behaviors	1.608	0.689	0.448	<0.001	0.843	2.373	0.390
Number of full-time workers	0.010	0.004	0.040	0.345	-0.011	0.031	0.011
Number of part-time workers	-0.014	-0.006	-0.093	0.008	-0.025	-0.004	0.005
Reports to county commissioner	-0.267	-0.115	-0.057	0.199	-0.675	0.141	0.208
Total FEMA disaster declarations	0.047	0.020	0.028	0.530	-0.100	0.194	0.075
Sharing of equipment and supplies	-0.310	-0.133	-0.115	0.050	-0.621	0.0005	0.158
Joint response planning	0.321	0.138	0.113	0.086	-0.046	0.688	0.187
Coordination of mitigation and preparedness activities	0.457	0.196	0.167	0.015	0.089	0.826	0.188
Professional certification	0.198	0.085	0.035	0.392	-0.255	0.652	0.231
College degree	-0.003	-0.001	-0.001	0.990	-0.421	0.415	0.213
SoVI score	0.027	0.012	0.006	0.897	-0.382	0.436	0.209
Metro status	0.037	0.016	0.008	0.856	-0.365	0.439	0.205
Months on job	0.002	0.001	0.090	0.071	-0.0002	0.005	0.001

NOTES:

Sample size=498

McKelvey and Zavoina's $R^2 = 0.396$

Dependent variable = County Emergency Managers' Perceptions of the Effectiveness of the Emergency Management Network

Table 5. Ordered Logit Model of County Emergency Managers' Perceptions of the Effectiveness of the Emergency Management Network, TPO Framework, Weighted 20X

Variable	Coefficient	y-Standardized Coefficient	Fully Standardized Coefficients	p-value	95% Confidence Interval		Robust Standard Error
Task behaviors	0.572	0.244	0.151	0.081	-0.070	1.214	0.328
People behaviors	-1.134	-0.485	-0.268	0.019	-2.084	-0.186	0.484
Organization behaviors	2.315	0.989	0.540	<0.001	1.322	3.309	0.507
Number of full-time workers	0.041	0.018	0.204	0.082	-0.005	0.088	0.024
Number of part-time workers	-0.031	-0.0131	-0.114	<0.001	-0.046	-0.015	0.008
Reports to county commissioner	-0.325	-0.139	-0.069	0.219	-0.844	0.194	0.265
Total FEMA disaster declarations	0.252	0.108	0.149	0.046	0.005	0.500	0.126
Sharing of equipment and supplies	-0.259	-0.111	-0.103	0.171	-0.630	0.112	0.189
Joint response planning	-0.060	-0.026	-0.021	0.792	-0.506	0.386	0.227
Coordination of mitigation and preparedness activities	0.823	0.352	0.273	<0.001	0.386	1.261	0.223
Professional certification	0.634	0.271	0.099	0.042	0.024	1.245	0.312
College degree	0.304	0.130	0.0619	0.265	-0.230	0.838	0.273
SoVI score	0.150	0.064	0.031	0.614	-0.433	0.733	0.298
Metro status	-0.390	-0.167	-0.082	0.180	-0.960	0.180	0.291
Months on job	0.003	0.002	0.135	0.057	-0.0001	0.007	0.002

NOTES:

Sample size=498

McKelvey and Zavoina's $R^2=0.400$

Dependent variable = County Emergency Managers' Perceptions of the Effectiveness of the Emergency Management Network

Table 6. Summary of Slopes and p-Values for Each Regression, Network

Variable	Slope (p-value) Unweighted	Slope (p-value) Weighted 2X	Slope (p-value) Weighted 5X	Slope (p-value) Weighted 10X	Slope (p-value) Weighted 20X
Task behaviors	0.386 (0.159)	0.411 (0.151)	0.459 (0.128)	0.508 (0.103)	0.572 (0.081)
People behaviors	-0.256 (0.540)	-0.464 (0.311)	-0.755 (0.129)	-0.959 (0.052)	-1.135 (0.019)
Organization behaviors	1.608 (<0.001)	1.861 (<0.001)	2.112 (<0.001)	2.233 (<0.001)	2.315 (<0.001)
Full-time workers	0.010 (0.345)	0.017 (0.183)	0.027 (0.127)	0.034 (0.100)	0.041 (0.082)
Part-time workers	-0.014 (0.008)	-0.018 (0.003)	-0.022 (0.001)	-0.026 (<0.001)	-0.031 (<0.001)
County commissioner	-0.267 (0.199)	-0.272 (0.204)	-0.285 (0.212)	-0.301 (0.216)	-0.325 (0.219)
FEMA declarations	0.047 (0.530)	0.083 (0.322)	0.150 (0.128)	0.205 (0.068)	0.252 (0.046)
Sharing	-0.310 (0.050)	-0.298 (0.062)	-0.276 (0.102)	-0.261 (0.145)	-0.260 (0.171)
Joint response planning	0.321 (0.086)	0.203 (0.284)	0.071 (0.726)	-0.006 (0.978)	-0.060 (0.792)
Coordination	0.457 (0.015)	0.514 (0.006)	0.611 (0.002)	0.710 (0.001)	0.823 (<0.001)
Certification	0.198 (0.392)	0.289 (0.235)	0.409 (0.127)	0.519 (0.074)	0.634 (0.042)
College degree	-0.003 (0.990)	0.059 (0.790)	0.156 (0.519)	0.236 (0.356)	0.304 (0.265)
SoVI score	0.027 (0.897)	0.030 (0.891)	0.053 (0.828)	0.091 (0.736)	0.150 (0.614)
Metro status	0.037 (0.856)	-0.082 (0.703)	-0.235 (0.327)	-0.328 (0.218)	-0.390 (0.180)
Months on job	0.002 (0.071)	0.003 (0.032)	0.003 (0.025)	0.003 (0.038)	0.003 (0.057)

Table 7. Ordered Logit Model of County Emergency Managers' Perceptions of the Effectiveness of the Emergency Management Agency, TPO Framework, Unweighted

Variable	Coefficient	y-Standardized Coefficient	Fully Standardized Coefficients	p-value	95% Confidence Interval		Robust Standard Error
Task behaviors	0.684	0.323	0.196	0.025	0.085	1.283	0.306
People behaviors	-0.545	-0.257	-0.203	0.015	-0.983	-0.106	0.224
Organization behaviors	1.510	0.713	0.355	0.000	0.875	2.146	0.324
Number of full-time workers	0.044	0.021	0.192	0.042	0.002	0.087	0.022
Number of part-time workers	-0.013	-0.006	-0.091	0.006	-0.022	-0.004	0.005
Reports to county commissioner	-0.007	-0.004	-0.002	0.970	-0.397	0.383	0.199
Total FEMA disaster declarations	-0.004	-0.002	-0.002	0.960	-0.143	0.136	0.071
Sharing of equipment and supplies	0.071	0.034	0.029	0.647	-0.233	0.375	0.155
Joint response planning	-0.178	-0.084	-0.069	0.343	-0.547	0.191	0.188
Coordination of mitigation and preparedness activities	0.336	0.159	0.135	0.046	0.006	0.666	0.168
Professional certification	0.377	0.178	0.074	0.085	-0.525	0.807	0.219
College degree	0.084	0.040	0.019	0.687	-0.325	0.493	0.209
SoVI score	0.285	0.134	0.065	0.170	-0.121	0.691	0.207
Metro status	0.245	0.116	0.057	0.209	-0.138	0.628	0.195
Months on job	0.004	0.002	0.172	0.005	0.001	0.007	0.001

NOTES:

Sample size=498

McKelvey and Zavoina's $R^2 = 0.267$

Dependent variable = County Emergency Managers' Perceptions of the Effectiveness of the Emergency Management Agency

Table 8. Ordered Logit Model of County Emergency Managers' Perceptions of the Effectiveness of the Emergency Management Agency, TPO Framework, Weighted 20X

Variable	Coefficient	y-Standardized Coefficient	Fully Standardized Coefficients	p-value	95% Confidence Interval		Robust Standard Error
Task behaviors	0.358	0.159	0.094	0.296	-0.314	1.030	0.343
People behaviors	-0.342	-0.152	-0.119	0.165	-0.825	0.141	0.246
Organization behaviors	2.116	0.942	0.415	<0.001	1.441	2.791	0.344
Number of full-time workers	0.058	0.026	0.355	0.022	0.008	0.108	0.025
Number of part-time workers	-0.025	-0.011	-0.183	0.001	-0.040	-0.010	0.008
Reports to county commissioner	-0.056	-0.025	-0.012	0.817	-0.528	0.416	0.241
Total FEMA disaster declarations	-0.026	-0.012	-0.016	0.787	-0.214	0.162	0.096
Sharing of equipment and supplies	0.261	0.116	0.109	0.184	-0.124	0.646	0.197
Joint response planning	-0.376	-0.168	-0.144	0.140	-0.876	0.123	0.255
Coordination of mitigation and preparedness activities	0.321	0.143	0.122	0.180	-0.148	0.789	0.239
Professional certification	0.670	0.298	0.107	0.034	0.049	1.291	0.317
College degree	0.143	0.064	0.030	0.579	-0.362	0.649	0.258
SoVI score	0.727	0.324	0.161	0.005	0.215	1.239	0.261
Metro status	-0.144	-0.064	-0.032	0.583	-0.658	0.370	0.262
Months on job	0.007	0.003	0.286	<0.001	0.004	0.010	0.001

NOTES:

Sample size=498

McKelvey and Zavoina's $R^2 = .349$

Dependent variable = County Emergency Managers' Perceptions of the Effectiveness of the Emergency Management Agency

Table 9. Summary of Slopes and p-Values for Each Regression, Agency

Variable	Slope (p-value) Unweighted	Slope (p-value) Weighted 2X	Slope (p-value) Weighted 5X	Slope (p-value) Weighted 10X	Slope (p-value) Weighted 20X
Task behaviors	0.684 (0.025)	0.591 (0.043)	0.502 (0.095)	0.432 (0.178)	0.358 (0.296)
People behaviors	-0.545 (0.015)	-0.512 (0.019)	-0.463 (0.040)	-0.409 (0.084)	-0.342 (0.165)
Organization behaviors	1.510 (<0.001)	1.761 (<0.001)	1.962 (<0.001)	2.050 (<0.001)	2.116 (<0.001)
Full-time workers	0.044 (0.042)	0.049 (0.034)	0.053 (0.030)	0.056 (0.028)	0.058 (0.022)
Part-time workers	-0.013 (0.007)	-0.015 (0.004)	-0.019 (0.003)	-0.022 (0.002)	-0.025 (0.001)
County commissioner	-0.007 (0.970)	-0.003 (0.987)	-0.008 (0.970)	-0.025 (0.911)	-0.056 (0.817)
FEMA declarations	-0.004 (0.960)	-0.019 (0.805)	-0.028 (0.734)	-0.028 (0.753)	-0.026 (0.787)
Sharing	0.071 (0.647)	0.100 (0.532)	0.156 (0.371)	0.208 (0.267)	0.261 (0.184)
Joint response planning	-0.178 (0.344)	-0.235 (0.219)	-0.289 (0.173)	-0.329 (0.162)	-0.376 (0.140)
Coordination	0.336 (0.046)	0.324 (0.059)	0.320 (0.097)	0.318 (0.143)	0.321 (0.180)
Certification	0.377 (0.085)	0.486 (0.036)	0.594 (0.023)	0.643 (0.027)	0.670 (0.035)
College degree	0.084 (0.687)	0.084 (0.692)	0.095 (0.673)	0.116 (0.630)	0.143 (0.579)
SoVI score	0.285 (0.170)	0.401 (0.057)	0.534 (0.017)	0.629 (0.009)	0.727 (0.005)
Metro status	0.245 (0.209)	0.160 (0.433)	0.046 (0.837)	-0.046 (0.849)	-0.144 (0.583)
Months on job	0.004 (0.005)	0.005 (<0.001)	0.006 (<0.001)	0.006 (<0.001)	0.007 (<0.001)