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# **POSITIVE ORGANIZATIONAL SCHOLARSHIP**

## **Foundations of a New Discipline**

Kim S. Cameron, Jane E. Dutton, and  
Robert E. Quinn, Editors



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## **Positive Organizational Network Analysis and Energizing Relationships**

Wayne Baker, Rob Cross, and  
Melissa Wooten

Scientific innovations arise, argued Donald Campbell (1969), where two fields overlap like the scales of a fish. This chapter applies his fish-scale theory by overlapping positive organizational scholarship (POS) and organizational network analysis (ONA) to produce what we call positive organizational network analysis (PONA). Our approach combines POS's focus on resiliency and extraordinary performance with ONA's theories of social structure and analytical methods. By doing so, we hope to make contributions to both POS and ONA. First, our chapter suggests that POS can be expanded beyond its predominately psychological focus to include a *sociological* perspective. In particular, network analytic techniques permit scholars to move beyond individual- or dyadic-level views of positive organizational phenomenon and examine the structural context in which they exist. For example, how does a person's pattern of positive connections to others in an organization produce positive organizational phenomenon? Do positive aspects of organizational life tend to cluster in subgroups? Does the network structure of positive ties influence individual performance?

Second, our chapter suggests that a POS perspective can enrich network research. To date, social network theorists have focused on structural

properties of networks and paid comparatively less attention to the kinds of relationships that bind a network together (Adler & Kwon, 2002; Monge & Contractor, 2000). Early on, the social network paradigm addressed both instrumental and expressive ties, as evidenced in sociometry, small-group research, and anthropology (Wasserman & Faust 1994: 10–13). For example, Jacob Moreno’s first studies in what became sociometry mapped “liking” and “disliking” relationships among 500 girls in the New York State School for Girls, among 2,000 students in a New York public school, and other communities (*New York Times* 1933: L17). Since then, research on networks and important organizational outcomes has tended to emphasize instrumental ties, such as task-related communication, information flow, work flow, or material or monetary resources (e.g., Allen, 1977; Baker, 2000; Baum, 2002; Burt, 1992; Hansen, 1999; Uzzi, 1997). To be sure, researchers have continued to explore socioemotional and expressive relationships, such as friendship (Kilduff, 1992; Lincoln & Miller, 1979; Krackhardt, 1992), personal or career support (Ibarra, 1992; Higgins & Kram, 2001), and trust (Tsai & Ghoshal, 1998; Uzzi, 1997). However, such studies are often not linked to individual performance outcomes in organizations. In this chapter we set out to establish the link between positive relationships and individual performance, demonstrating how a POS perspective can enhance the explanatory power of network models.

We begin by reviewing the social network literature, tabulating evidence of the prevalence of data on positive ties in network studies. Next, we introduce findings from a series of research studies that examine the social structure and performance outcomes of “energizing relationships” (defined below) in organizational settings (Cross & Baker, 2003). Here we demonstrate how POS scholars can employ both visual and quantitative social network techniques to further understand the social network context of positive organizational phenomenon. Next, we offer quantitative evidence of the link between position in a network of positive ties and individual performance, controlling for traditional network and information-processing predictors of performance. By doing so, we demonstrate one way in which network research can be extended to account for positive dimensions of relationships. We conclude the chapter with suggestions for future research in this area.

## **POSITIVE TIES IN SOCIAL AND ORGANIZATIONAL NETWORK STUDIES**

In our review of past work, we looked for evidence of “positive” ties in social network studies.<sup>1</sup> A tie between two people is “positive” if it conveys

positive affect, such as liking or love, socioemotional support, material support, mentoring, and so forth. Positive ties vary in type, as well as strength or quality. Strength, for example, can range from mild liking to what Dutton and Heaphy call “High Quality Connections” (HQCs) (see Chapter 17). We also looked for evidence of “positive” outcomes stemming from positive networks, such as empowerment, high individual or organizational performance, improved well-being, and so forth. To assess the prevalence of positive ties, quality of tie, and positive outcomes in network studies, we systematically reviewed all articles published in *Social Networks* since its first issue, covering the years 1978 to 2001. We chose *Social Networks* because it is “the premier journal for the study of social networks” (from the website for INSNA, the International Network for Social Network Analysis).<sup>2</sup> Articles on networks appear in journals throughout the social and behavioral sciences, as well as in engineering, economics, and marketing. However, since *Social Networks* is dedicated exclusively to the study of networks and it is the main venue for articles on new developments in the field, we feel that it is the best selection for the purposes of our literature review.

We content-analyzed all articles published in *Social Networks* from 1978 to 2001, focusing on empirical studies of network data. We first considered all articles whether or not the studies were about networks in organizations. Of the 425 articles published in these years, 39 percent (166) were empirical analyses of network data. Of these, 42 percent (69 of 166) contained data on positive ties. But only 16 of the 69 articles examined positive outcomes as well as positive ties (about 10 percent of all empirical articles). A roughly similar pattern emerges when we examine empirical studies of organizational networks. Sixty-five articles were published in *Social Networks* about organizations. Of these, 32 percent (21 of 65) contained data on positive ties. But only 6 articles examined positive ties and positive outcomes, about 9 percent of all articles about networks in organizations.

Our review indicates a surprising prevalence of network studies with data on positive ties. Does this prevalence suggest that POS is alive and well in the social network tradition? Data on positive ties are necessary but not sufficient for PONA. A study’s purpose also must be considered. For example, if the purpose of a study is to reveal how actors exploit network structure for personal and private gain, the study would not qualify as PONA even if it included data on positive ties. To qualify as PONA, a network study must include data on positive ties and their quality, *and* address the subject matter of POS: “the dynamics in organizations that lead to the development of human strength, foster resiliency in individuals, make possible healing and restoration, and cultivate extraordinary individual and organizational performance” (Cameron, Dutton, & Quinn, n.d.). When we



use these criteria, we find very few articles in *Social Networks* that would qualify as PONA.

## ENERGIZING RELATIONSHIPS IN ORGANIZATIONAL NETWORKS

In our series of empirical network studies, we focused on one type of positive relational tie—“energizing relationships”—in organizations. Specifically, we assessed the extent to which interpersonal relationships generated or depleted a subjective feeling of energy, examining this type of tie within several large distributed groups.<sup>3</sup> Scholars have posited how energy accrues in conversation. Quinn and Dutton (2002) define energy as “a type of positive affective arousal, which people can experience as emotion—short responses to specific events—or mood—longer lasting affective states that need not be a response to a specific event.” Their definition draws on work in psychology and sociology, including the concepts of energetic arousal (Thayer, 1989), emotional energy (Collins, 1993), subjective energy (Marks, 1977), positive affect (Watson, Clark, & Tellegen, 1988), vitality (Ryan & Frederick, 1977), and zest (Miller & Striver, 1997). We simply extend this perspective on a sociological front by applying network analytic techniques to the socioemotional experience of energizing relationships.

We analyzed energizing relationships with network techniques in seven different organizations: a strategy consulting firm, a financial services company, a petrochemical company, a government agency, two software companies, and a technology company (Cross, Baker, & Parker, 2002). In each, we used social network surveys and interviews to collect data on different types of relationships, including relationships that created the subjective perception of energy. Our survey item for “energizing relationships”<sup>4</sup> was: “When you typically interact with this person how does it affect your energy level?” We used a five-point Likert scale, with 1 indicating “strongly de-energizing” and 5 indicating “strongly energizing.” A value of 4 or 5 is an energizing relationship, a value of 1 or 2 is a de-energizing relationship, and a value of 3 is considered neutral—neither energizing nor de-energizing. We also asked a network question about “information flow.” Our survey item here was: “Please indicate which people listed below that you typically turn to for information or knowledge on work-related topics.” Because people also use impersonal information sources, we asked about use of internal and external databases, personal computer files, and paper files. Control variables include tenure in the organization, gender, and hierarchical level (see Cross & Baker, 2003, for details).

We also conducted semi-structured interviews with sixty-three people drawn from each of the organizational settings. (We call these interviewees

“informants” to distinguish from the “respondents” to our network surveys.) In an open-ended interview format, we asked each informant to describe “energizing relationships” and how these affect the informant. After several open-ended probes, we then placed the “energy” network diagram (examples below) in front of the informant and asked him or her to reflect on relationships the informant had nominated as energizing in the survey. We asked each informant to recount in as much detail as possible specific interactions with these people, focusing on the subjective experience of being energized in these relationships. Throughout, informants were asked to ground recollections in specific behaviors, names, and dates to guard against memory errors (Dougherty, 1992).

Almost all informants described both physical and psychological aspects of energizing relationships. For example, informants said they felt stimulated and they themselves expressed this stimulation with various physical cues, such as voice inflection, eye contact, and gestures. Some physical descriptor of energizing relationships emerged in each of the sixty-three interviews when we asked an informant to describe what he or she meant when claiming to be energized in an interaction. For example, one executive said:

I am just “there” more. Physically I feel more up, more aroused, more intense and attuned to what is going on. And I guess this comes through in voice inflection, body language. All those things kind of reflect how you feel and can be contagious to others too.

Informants consistently described cognitive and motivational characteristics of energizing relationships. Fifty-nine of the informants described being more cognitively engaged in and attentive to dialogue with others in these energizing relationships. They reported a subjective belief that they attended to and processed information more rapidly and more thoroughly. They also felt they retrieved ideas from memory and/or made connections to other ideas more quickly in a way that generated new insights. This allowed them to learn and engage in the “give and take” of a good conversation or “scaffolding” in a meeting or problem-solving session. For example, one informant told us:

They are quick relationships mentally. I am sure I literally think better and faster. I think I remember more and make more connections and that is what is so energizing. To see things newly or differently and still be able to contribute back to the conversation in a way that opens up even more ideas or perspectives.

From a motivational perspective, all informants described being enthused or drawn into the issues of a problem-solving session or conversation.

Informants were willing to commit themselves to the interaction. These conversations could be about business concerns, career issues, or personal topics, but they were distinguished by the way in which they generated enthusiasm. This motivation often carried over into a willingness to devote discretionary time to an issue after the interaction (e.g., willingly staying late or thinking about a problem during the commute home). For instance, this person described the motivation created by energizing relationships:

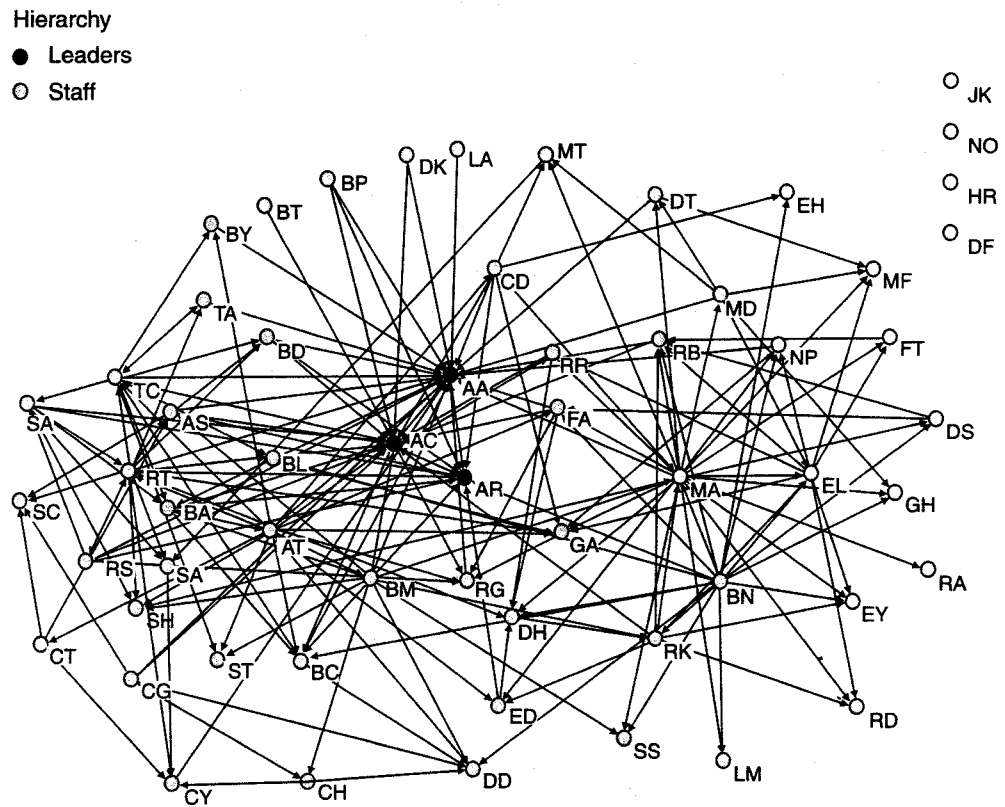
I think when it really happens, when energy is really created, it's more than the intellectual thing. To me it's more than bantering back and forth no matter how interesting the ideas might be. It's when I let go of all the things that say "I've seen this before" or "You're not going to fool me with that one." Rather than looking for the problems and pitfalls, you start to get caught up in the possibilities and this is both energizing and, I think, opens many new doors to possibilities *because you are looking for them, hoping for them* [emphasis from interviewee].

## WHAT A NETWORK PERSPECTIVE OFFERS POS

Bringing network theory and methods to study positive organizational phenomena enables POS scholars to observe and measure the "invisible" network of positive relationships in an organizational setting. Network visualization aids interpretation. To illustrate, consider the contrasting network diagrams in Figures 21.1 and 21.2. These diagrams were generated by a computerized visualization method that places well-connected "nodes" in the center of the plot and less-connected or isolated nodes in the periphery. Lines between nodes represent energizing relationships (Figure 21.1) or de-energizing relationships (Figure 21.2). Figure 21.1 is the visualized network of energizing ties among leaders and staff in a government agency. This agency had been reorganized in response to the terrorist attacks on September 11, 2001, with new executives brought in to rebuild the organization around a new set of priorities. As shown in Figure 21.1, the three executive leaders are central in the energizing network diagram. Indeed, many staff employees reported that relationships with these new leaders elevated the employees' energy levels. Further, they reported that these leaders were successful in capturing their commitment to the new set of organizational priorities.

In contrast, consider the network of de-energizing relationships in a petrochemical company (Figure 21.2). Many engineers reported that relationships with supervisors decreased their energy levels. Visual inspection of Figure 21.2 reveals a large number of de-energizing supervisors located in the center of the network diagram, indicating their central role in de-

**Figure 21.1**  
**Network of Energizing Relationships Among Leaders and Staff in a Reorganized Government Agency**



From Cross, Baker, & Parker, 2002.

pleting energy in the organization. Our interviews revealed considerable resentment among workers regarding what they call “micro-management.” We learned that the supervisors were following standard procedures and were not aware of their de-energizing influence on others. The network diagrams became a tool for the group to engage in a constructive discussion about their procedures, roles, and relationships, and to redesign their policies, procedures, and organization.<sup>5</sup>

Network analytic techniques also inform POS via quantitative methods, allowing researchers to precisely describe a social system and analyze the link between network patterns and outcomes. To illustrate, we focus here on three of seven organizations we studied (Cross & Baker 2003): (1) 125 consultants and managers in a major office of a global strategy-consulting firm (“strategy consultants”), (2) 86 statisticians in a major credit card organization (“statisticians”), and (3) 101 engineers within a major petrochemical organization (“engineers”). We focus on these settings for two reasons. First, we were able to obtain reliable performance information on the



in an organization). Consider the frequency distributions of energizing ties and information ties in the three settings (Table 21.1). A key finding, for example, is that energizing relationships are as common as information ties, suggesting that energizing relationships are pervasive features of organizational life.

Table 21.1 presents summary statistics of key structural variables for the “energizing network” (3 or 4 on the Likert scale; see above), the “de-energizing network” (1 or 2 on the Likert scale; see above), and the information network. There are many ways to measure actor (or point) centrality in social networks (Wasserman & Faust, 1994: chap. 5). Here, we focus on measures that reveal theoretically appropriate features of energizing networks. “Indegree” is a simple measure of actor centrality that indicates the number of “choices” received by a person in a social network. (In a network diagram, “incoming” arrows illustrate indegree.) A person with high indegree in an energizing network would be chosen by many others as a

**Table 21.1**  
**Descriptive Statistics on Energy, De-Energy, and Information**  
**Networks in Three Settings**

Variable	Strategy Consultants	Engineers	Statisticians
<i>Energizing network</i>			
Indegree (average)	8.50	4.39	6.27
Minimum indegree	0	0	0
Maximum indegree	33	23	27
Graph centralization (degree)	19.9%	18.8%	24.7%
<i>De-energizing network</i>			
Indegree (average)	1.72	0.32	2.43
Minimum indegree	0	0	0
Maximum indegree	16	3	14
Graph centralization (degree)	11.6%	2.7%	13.8%
<i>Information network</i>			
Indegree (average)	5.41	8.23	8.07
Minimum indegree	0	1	0
Maximum indegree	29	27	27
Graph centralization (degree)	19.2%	19.0%	22.5%

From Cross & Baker, 2002.

person with whom they have energizing relationships; a person with low indegree in the same network would be chosen by few others. For example, the statistician with the highest indegree has a score of 27, indicating that 27 of the 125 statisticians reported having energizing relationships with this person. The statistician with the lowest indegree had a score of 0, indicating that no other statistician reported having energizing ties with this person. A person with high indegree in the de-energizing network would be named by many others as a person with whom relationships are de-energizing. For example, the consultant with the highest indegree has a score of 16, indicating that 16 of the 125 consultants reported having de-energizing relationships with this person. The consultant with the lowest indegree had a score of 0, indicating that no consultant reported having de-energizing ties with this person.

Table 21.1 also shows measures of graph centralization. Graph centralization combines the measures of actor centrality in a network, indicating the extent to which one actor is highly central and others are not. It is an indicator of the overall structure of an entire network, showing the extent to which a network is centralized (dominated by a highly central actor, such as the hub of a hub-and-spoke graph) or de-centralized (all actors have the same centrality, such as a circle or fully connected graph). This measure varies between 0 and 100 percent, where higher numbers indicate greater network centralization. In the context of energy, a highly centralized energizing network would mean that one actor accounts for most of the energizing ties; a highly centralized de-energizing network would mean that one actor accounts for most of the de-energizing ties. The centralization statistics in Table 21.1 show that positive ties, in this case energizing relationships, are not concentrated in the hands of a few people.

In sum, these basic statistics show that positive organizational phenomena (like energizing relationships) appear throughout an organization, but they are distributed unevenly. (1) The average number of energizing ties is always higher than the average number of de-energizing ties. (2) The average number of de-energizing ties is always lower than energizing ties or information ties. (3) At least one actor is isolated in each of the three types of networks (minimum indegree is 0 in each network). (4) At least one actor in each of the three types of networks accounts for a large number of ties (examine scores for maximum indegree). However, (5) no graph is dominated by a single actor (graph centralization never exceeds 25 percent). Hence, energizing ties, de-energizing ties, and information-seeking ties are distributed throughout these organizational settings, rather than concentrated in one or a few highly central actors, but they are unevenly distributed—there is a considerable range of centrality, with some people much more central and some people much more peripheral.<sup>7</sup>

## WHAT POS OFFERS TO ONA

POS opens the door for network analysts to look at features of organizational life that have not been examined before. Our chapter is further support of Cameron, Dutton, and Quinn's argument that "POS uncovers new sources and forms of dynamic capabilities that build on human generative processes" (see Chapter 1). Energizing relationships have always existed in organizational settings, but the lens of social network analysis has not been used to observe or measure these positive ties. Our chapter demonstrates the value of observing and measuring networks of energizing relationships and suggests that other types of positive ties could be measured in future network studies.

Our fusion of POS and ONA also supports the emerging view of contemporary organizations as dynamic, flexible, and fluid social networks. The traditional structural perspective suggests that people accrue power and influence by occupying particular positions in a relatively stable network (e.g., Burt, 1992, 2000; Granovetter, 1973). For example, a person who links otherwise disconnected parts of a network has multiple sources of information, tends to get more and better information, and is better able to spot and act on emergent opportunities. Yet this view, to some degree, assumes stability in the social fabric of an organization. This seems less the case today as work itself is transformed from stable, long-term employment in large organizations to project-specific, flexible, and short-term jobs (e.g., Castells, 2000: 216–302). In addition, significant organizational changes, such as de-layering, re-engineering, and team-based designs, to name just a few, have decreased organizational network stability and the relationships that are a product of position in formal organizational structure. Together, work-force mobility and continual internal restructurings produce organizational networks that are more dynamic and less static and durable than those analyzed in foundational organizational network studies. Therefore, the structural source of power and influence may be shifting from position in a stable network to an ability to attract, engage, and energize others in the network.

The results from our quantitative analysis support this dynamic view of organizational networks. In addition to measuring energizing relationships, we measured information flow among members of the organizational network. We also measured each person's usage of impersonal information sources such as files and databases. We expected that performance ratings would be correlated with network positions usually thought to confer advantages—positions rich in structural holes<sup>8</sup> (Burt, 1992, 2000)—as well as the use of impersonal sources of information. We found, however, that the



**Table 21.2**  
**OLS Regression Models of the Relationship Between Energy and Performance**

Variable	Strategy Consultants	Engineers	Statisticians
<i>Controls</i>			
Tenure	0.114	-0.124	0.072
Gender	0.031	0.050	-0.045
Hierarchy	-0.004	0.031	0.097
<i>Information acquisition variables</i>			
Internal database usage	-0.121	-0.106	0.144
External database usage	-0.137	0.050	0.004
Personal computer files usage	0.095	0.189	0.084
Paper files usage	-0.118	-0.311**	0.144
Structural hole information network (constraint measure)	-0.123	-0.214*	-0.195*
<i>Energizing network variable</i>			
Number of people energized by ego (indegree in energizing network)	0.380***	0.246*	0.387***
Adjusted R-Square	0.109	.243	.268
N	125	101	86

\*\*\* $p < 0.001$ , \*\* $p < 0.01$ , \* $p < 0.05$ ,  $\wedge < 0.10$ .

Beta coefficients are standardized.

From Cross & Baker, 2002.

use of impersonal sources of information and positions rich in structural holes only influenced performance for the statisticians and engineers once we factored in the effect of position within the energy network. In other words, in organizational settings that tend to be constrained by rules or a physical reality, the ability to acquire information via a structural-hole position does seem to promote performance beyond energizing behavior. In all three settings, performance was predicted by people's position within the energizing network. Specifically, individuals who energized others were better performers—even after controlling for information processing variables, structural holes, and other variables (see Table 21.2). These findings imply that the ability to energize others—to develop a network of energizing relationships—may be more important than occupying certain positions in an information or communication network.

## CONCLUSION

This chapter combines positive organizational scholarship and organizational network analysis to produce what we call positive organizational network analysis. This approach links POS's focus on resiliency and extraordinary performance with ONA's theories and methods. One of our contributions to POS is to demonstrate that POS can be expanded profitably beyond its psychological focus to include a *sociological* perspective on organizational phenomena. This contribution suggests that it may be possible to successfully combine POS with other organizational theories and perspectives, such as institutional theory, organizational ecology, diffusion theory, and resource dependence. One of our contributions to ONA is to show that the POS perspective can open new territory for social network analysts—the analysis of energizing relationships and other types of positive ties that have not been examined before. The full toolbox of social network analysis (e.g., Wasserman & Faust, 1994) could be applied to study and understand positive organizational phenomena.

We hope our initial work on PONA will stimulate future research. First, our conception of energizing networks holds potential for theorizing about positive dimensions of relationships and networks. Rather than considering network structure as a constraint and network position as power (e.g., Brass and Burkhardt, 1992; Burt, 1992; Krackhardt, 1990), we suggest that patterns in energizing networks can be generative and enabling. Energizing networks are not merely affect or liking—our informants provided evidence that they were energized on tasks they did not care for and with people they did not like. Rather, the relationships themselves were perceived to generate energy. We hope that future network research will explore organizational processes (e.g., diffusion) and organizational outcomes (e.g., group-level performance, individual satisfaction, and organizational commitment) of energizing networks.

Second, empirical work will also be important to disentangle the role of individual behaviors and traits, relational characteristics, and contextual factors such as network structure and task design in promoting energy. Future research should undertake egocentric network and more standard attribute data-collection processes to further understand the contributing role of networks, attributes and context. Combined with hierarchical linear modeling (Raudenbush & Bryk, 2002; Wellman & Frank, 2001) as an analytic approach, this will allow researchers to measure precisely how the individual, relational, and contextual factors contribute to energy in organizational settings.

Third, another avenue of inquiry lies with the downsides of energy. We do not mean negative relations, though those are clearly important subjects

of study (e.g., Labianca, Brass, & Gray, 1998; Sparrow, Liden, Wayne, & Kraimer, 2001). Rather, it is important to understand the potential downsides of energizing relations themselves. For example, do they introduce biases into organizational learning and the diffusion of knowledge? Our data show that, when choice exists, people seek energizers, even when de-energizers have the necessary expertise and knowledge. In contrast, we found that people attend to, process, and so deeply learn in energizing relationships. People acquire information and learn from others (Allen, 1977; Lave & Wenger, 1991; Orr, 1996). Demographic similarity is a strong predictor of interaction patterns (McPherson, Smith-Lovin, & Cook, 2001). People might get locked into certain sources of information or ways of thinking about a problem due to well-intended but less than effective energizers. At a network level, we might find that energizers account for path dependence in groups. Those central in energizing networks might disproportionately dictate what information a group attends to and processes.

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## NOTES

1. A social network is defined as a specified set of actors and their relationships. Social network analysis applies mathematics to understand the patterns of relationships among actors and the implications of these relationships. In contrast to most approaches in the social sciences, network analysts view actors “as interdependent rather than independent, autonomous units” (Wasserman & Faust 1994: 4). The “actor” and the “relational tie” are the fundamental building blocks of the social network approach (Wasserman & Faust, 1994: 17–18).

2. *Social Networks* “is an inter-disciplinary and international quarterly that provides a common forum for representatives of anthropology, sociology, history, social psychology, political science, human geography, biology, economics, communications science and other disciplines who share an interest in the structure of social relations and associations” (INSNA website).

3. Our colleague Steve Borgatti has also conducted network analyses on energy in unpublished work.

4. As is typical in network research, each independent network variable was measured using a single network question. We constructed question items to be specific and to elicit typical or long-term patterns of interaction rather than one-time events (Freeman, Romney, & Freeman, 1987). Further, our interviews suggest both a common interpretation of the item and consistency to the construct.

5. Network diagrams also offer advantages for sample selection. It is well

known that the choice of informants in qualitative research can be biased by snowball sampling, by using the formal organizational chart, or by a researcher's beliefs and preferences. Network diagrams provide a means of selecting informants systematically, identifying both central and peripheral members of a group for informant interviews.

6. In each setting, performance is the annual human resource rating of each person. Generally, this is a composite figure based on aggregating project evaluations and some objective data collected throughout the year. They are not identical because each organization might be more concerned with different components of the full annual evaluation. However, these evaluations are consistent in process, wording, and scale; each is a general appraisal of a person's performance and not a self-assessment.

7. We can assess the extent to which the three types of networks are correlated, using QAP-correlation (a nonparametric measure similar to the Pearson product-moment correlation). The energy and information networks are significantly correlated ( $p < 0.001$ ) in each setting (consultants = 0.37, statisticians = 0.40, engineers = 0.40). The de-energy and information networks, however, are not significantly correlated ( $p > 0.05$ ). These patterns suggest a preference for energizing ties: people tend to seek out energizers when they search for information. Our qualitative interview data support this interpretation.

8. Structural holes is an indicator of the extent to which a person's relationships provide them access to information in different subgroups within a network. For example, a person who links otherwise disconnected parts of a network has "structural holes" in his/her network. Such people are claimed to enjoy performance benefits because they hear about and so are able to take action on new opportunities earlier than others. People who bridge different groups often learn about new information earlier than others.