

***** Draft: Please Do Not Cite Without Permission *****

**The Ties that Share* :
Relational Characteristics that Facilitate Information Seeking**

Rob Cross
McIntire School of Commerce
University of Virginia

Stephen P. Borgatti
Carroll School of Management
Boston College

Please address correspondence to:
Rob Cross
McIntire School of Commerce, University of Virginia
Monroe Hall Room 262
Charlottesville, VA 22904
434 924-6475
robcross@virginia.edu

* A prior version of this paper was presented at the 2000 Vancouver Sunbelt Social Network Conference. We are grateful for the thoughtful comments received on this work from Paul Adler, Michael Johnson-Cramer, Candace Jones, Ron Rice, Lee Sproull, Kathleen Valley and Mike Zack.

Title

The Ties that Share: Relational Characteristics that Facilitate Information Seeking

Abstract

The social network and situated learning traditions have richly demonstrated the extent to which people acquire information and learn from other people. However, little has been done to identify characteristics of relationships that are learned and predict information seeking. In-depth interviews with forty managers revealed four such characteristics: 1) the information seeker's awareness of a potential source's expertise; 2) timely access to the information source; 3) a degree of safety in the relationship and 4) willingness of an information source to cognitively engage in problem solving. These four dimensions were then used as the basis for a social network model of information seeking tested quantitatively using data collected from a different organization. Empirical and practical implications of these findings are considered at a network level in relation to transactive memory and organizational learning.

The Ties that Share

“Despite all the technology we have and the huge investment we make as a firm into it, people are the only way I get information that matters to me...learning how to use the constellation of people around you requires understanding what they can and will do for you. In part this means knowing what they are good at and can be relied on for, but just as importantly, it means knowing to what degree you can trust someone or how to get them to respond to you in a timely fashion.”
– informant.

In knowledge-intensive work such as professional services or software development, employees must solve complex problems with short time horizons. Those better able to find information should be better performers. In part, people find information and solve problems by relying on their own memory and on impersonal sources such as databases and file cabinets. However, they also rely heavily on other people (Granovetter, 1973; Allen, 1977: p. 182-228; Rogers, 1995: p. 284-289; Lave & Wenger, 1991: p. 27-42; Brown & Duguid, 1991). Thus we can anticipate that individual networks that facilitate effective information acquisition constitute an important form of social capital and contribute to the performance of those engaged in knowledge intensive work. Yet while people are critical sources of information, aside from the construct of tie strength (Granovetter, 1973), we know little about characteristics of relationships that are learned and affect information seeking in field-based settings. This research was undertaken to illuminate this form of relational social capital in organizations.

Traditionally, social network research in this realm has focused on structural properties of information or communication networks and paid less heed to the quality of relationships binding a network together (Monge & Contractor, 2000; Adler & Kwon, 2002). A potential limitation to this approach is its focus on current or past information flows. Mapping such interaction patterns misses those relationships not currently employed for informational purposes but that could be should opportunities emerge requiring new expertise. This perspective is important because it can reflect an individual's, or even an entire network's,

potential to recognize, assimilate and take action on new problems or opportunities. This view is not necessarily revealed by analyzing current interaction patterns but rather requires one to map relational dimensions that precede information seeking.

What determines who goes to whom for information? We suggest that people develop relational awareness of others in organizations that affects information seeking. In part, this is sure to include awareness of other's knowledge and skills as shown important in studies of transactive memory (e.g., Wegner, 1987; Moreland, Argote & Krishnan, 1996; Hollingshead, 1998; Rulke & Galaskiewicz, 2000). A baseline condition for seeking information from someone is at least some perception (even if initially inaccurate) of their expertise as it relates to a given problem or opportunity. However, it is also likely that social features of relationships are learned over time and determine whom a given person seeks out for information in the face of new opportunities or problems. When seeking information or knowledge held by other people, simply knowing where knowledge or expertise might reside is not enough. Getting information from someone requires his or her cooperation, which at some level is a function of the kind of relationship that one has with that person (Lin, 1982; 1988). Research on situated learning and communities of practice has richly demonstrated the importance of social interaction (from gossip to formal problem solving) in the development of knowledge (Lave & Wenger, 1991; Brown & Duguid, 1991; Orr, 1996; Tyre & von Hippel, 1997; Wenger, 1998). This point is under-appreciated in the distributed cognition and transactive memory literatures, perhaps because the bulk of this research has been done in regimented settings such as ship navigation or the laboratory.

This research seeks to contribute to the emerging relational perspective on learning by establishing characteristics of relationships that are learned and affect information seeking in field-based settings. Huber (1991: p. 89) claimed that an organization learns when "through its

processing of information its range of potential behaviors has changed.” Along with social network analytic techniques, this relational perspective holds potential to inform modeling of organizational learning concerns, such as absorptive capacity, that to date have been under-explored from a social perspective (Zahra & George, 2002). Our study employs a two-part methodology, consisting of a qualitative phase followed by an hypothesis-testing quantitative phase. We will next review the relevant literature that guided our empirical efforts and describe the results of the qualitative phase of our work. We will then review findings from a quantitative study informed by our qualitative results. Finally, we conclude with a discussion of implications for scholarship and practice.

Seeking Information From People

When considering information seeking as a dyadic phenomenon (person *i* seeks information from person *j*), there are three factors researchers can examine: attributes of the information seeker, attributes of the relationship between the seeker and the source, and attributes of the source. The first and last of these factors have received the most scholarly attention. Examples of work on attributes of the seeker include research on gender differences in help seeking (Good et al, 1989; Ibarra, 1993), job categories (Shah, 1998), and motivation (Lee, 1997). Examples of work on attributes of the source include research on information seeking by newcomers (Morrison, 1993), performance feedback (Ashford, 1993), information technology helping relationships (Rice, Collins-Jarvis & Zydney-Walker, 1999) and differentiating characteristics between information held by people and information stored in repositories such as file cabinets or databases (O’Reilly, 1982).

Our interest lies with the relationship between the information seeker and source. There has been little research on learned dimensions of such relationships that affect

information seeking, although there is work in other areas that has bearing. For example, we know that communication is likely to occur in homophilous relationships (McPherson, Smith-Lovin & Cook, 2001) and have evidence of the importance of similarity (e.g., Wagner, et al, 1984; Zenger & Lawrence, 1989) and physical proximity (e.g., Allen, 1977; Monge, Rothman, et al, 1985). We also know that information flow is affected by the strength of social ties. Granovetter (1973) argued that novel information is more likely to be obtained through weak ties rather than strong ties, because weak ties are more likely to connect an information seeker with sources in disparate parts of a social network that are circulating information not known to the seeker. Subsequent research on the importance of weak ties has demonstrated that they can be instrumental to finding a job (Lin 1988) and the diffusion of ideas (Granovetter 1985; Rogers 1995). On the other hand, strong ties also have their uses (Krackhardt, 1992). For example, Hansen (1999) found that strong ties are important for transferring complex knowledge across departmental boundaries in an organization. Similarly, Uzzi (1997) and others studying embeddedness (Granovetter, 1985) have argued that strong ties facilitate the transfer of tacit knowledge.

However, outside of tie strength, we have little empirical evidence regarding learned relational characteristics that may affect information seeking. Beyond being aware of another's expertise, it is likely that social dimensions of relationships affect the extent to which another person is helpful and sought for information. For example, from the consistent findings relating physical proximity to the likelihood of collaboration we can infer that access to other people's thinking is important (Archea, 1977). Of course in organizations, other, non-physical, barriers to access can exist as a product of informal influence (Astley & Sachdeva, 1984; Brass, 1984; Burkhardt & Brass, 1990) or relative position in formal

structure (Stevenson, 1990; Stevenson and Gilly, 1993). Thus access might also be thought of as a relational variable not entirely based on physical propinquity.

Similarly, with the development of the concept of social capital (Hanifan, 1920; Coleman, 1988; Putnam, 1995; Leenders & Gabbay, 1999), there has been considerable interest in interpersonal trust and its contributions to group performance (Mayer, Davis & Schoorman, 1995; Kramer & Tyler, 1996). This literature suggests that in organizations trust may contribute to performance by enabling people to share valuable information with each other. From another perspective, trust and psychological safety have been associated with an ability to learn at both the individual (Argyris, 1982) and group levels of analysis (Edmondson, 1996; 1999). Thus one might also anticipate interpersonal trust or a perceived sense of safety to inform a model of information seeking.

In summary, while some research has bearing on attributes of relationships that affect information seeking, the question has not been addressed directly. Consequently, we begin our empirical work with an exploratory, qualitative, phase in which we use the results of previous research as sensitizing concepts (Strauss and Corbin, 1990; Yin, 1994).

Qualitative Phase: Methods

Research was conducted within the business consulting practice of one of the Big Five accounting firms. Consulting work done in this practice largely entailed process, organizational and strategy projects. Typically consultants were staffed on projects and spent the bulk of their time at client sites collecting information from interviews, third party sources, archival data and observation to identify important aspects of client problems. Typically the output of their work entailed either crafting lengthy consulting reports or leading client teams through various analysis and implementation phases of a project. As opposed to technology based consulting, where efforts are focused on developing a specific application, the work of these consultants was much

more ambiguous. Projects were often ill defined, and so problem solving requires not only finding answers but also establishing relevant dimensions of the problem space itself and convincing others of the correctness of a given course of action.

This setting was deemed appropriate because knowledge seeking is central to consulting in defining important dimensions of problems facing a client, developing solutions and convincing organizational members with diverse backgrounds and interests of the correctness of a given course of action. Within the consultancy, forty managers were interviewed from a wide cross-section of offices throughout the United States. We targeted this hierarchical level as these are the people who make the bulk of the decisions regarding problem definition and solution trajectory in consulting engagements.

An iterative process of data collection was employed in order to incorporate new elements as they emerged from interviews (Strauss & Corbin, 1990). Specifically, the first ten interviews were conducted over a two-week period. Following each interview, the taped transcription and notes were reviewed to identify emerging themes and highlight those previously suggested in the literature. At the end of the first ten interviews, data collection was temporarily halted to review results and begin to name the key dimensions of relationships informants indicated as important to information seeking behavior. A second group of ten interviews was then conducted using the same process as the first ten. Once these interviews were reviewed, the first twenty interviewees were re-contacted by phone to ask additional questions that emerged during the course of these interviews. Finally, the last twenty interviews were conducted over a two-week period.

Interviews generally lasted between one and two hours and followed a two-step process common in studies of individual networks (Scott, 1990; Wasserman & Faust, 1994). First, the composition of each respondent's network was determined using a name generator (Burt, 1984; Marsden, 1990). Specifically, respondents were asked to reflect back on a

significant project they had been involved in over the last six months and write down the names of all people they turned to for information or knowledge during that project. From this list, respondents selected the three people they considered most important. The remainder of the interview then focused on these three individuals. To help guard against memory errors, respondents were asked to ground recollections in specific behaviors, names and dates when possible (Dougherty, 1992). Interviews were transcribed, coded and assessed for inter-rater reliability using typical content analysis procedures (Lincoln & Gubba, 1985; Miles and Huberman, 1994). A third party independently coded transcripts with 93% agreement (inconsistencies were not considered as evidence in the analysis).

Qualitative Results

In the 120 relationships explored (three for each of 40 managers), four key relational features emerged from the interviews: 1) awareness of another's relevant expertise; 2) being able to gain timely access to that person; 3) willingness of a potential knowledge source to actively engage in problem solving; and 4) a safe relationship to promote creativity.

Awareness. The managers we interviewed reported turning to 110 of the 120 contacts explored because they considered those people knowledgeable in relation to some aspect of the problem they were facing. Thus, these contacts provided a critical extension to the manager's own knowledge when s/he had at least a semi-accurate understanding of these people's expertise. Such relationships were valued for knowledge in two qualitatively different ways. First, people were often sought out for the specific knowledge they could contribute to some problem. These people were often skilled in technical domains and were sought out simply for the information that they were likely to be able to provide. Second, people were also sought out for their ability to help think through a problem. These people's

expertise lay with either defining or refining complex problems and making salient important dimensions of such problem spaces.

However, the decision to ask another person for information on a given problem was often challenging because it was difficult for informants to critically assess the quality of information received unless they had worked together before. Thus, while ‘weak link’ relationships held potential to yield new, non-redundant information, they were also risky propositions. Our informants often did not have a sufficient base of knowledge in the problem domain to assess contributions of subject matter experts. Thus they often had to trust the source, which was difficult when they had little experience with that person.

Interestingly, of the 120 relationships, 78 involved cases where informants indicated that they would have initially preferred *not* to work with that specific contact if other options had been available in the required time period. These preferences were sometimes personal (e.g., not enjoying another person’s style) and sometimes problem-domain related (e.g., not believing someone to be intelligent). Over time they were altered or at least mitigated by favorable aspects of a person discovered in various interactions. Informants often described working together as the key mechanism by which they formed and modified their understanding of others’ skills and abilities. For example, one manager indicated:

“I tend to form first impressions very quickly, so my first impression of him was that he was slow and dumb and what I came to learn is that he is not dumb. He is very bright and he is bright at all the things that will make you successful in this firm. So my opinion did change, but it took a lot of working together to do this.”

Access. Informants also noted that information received from a source was only useful if it was received in a timely fashion. In 112 of the relationships explored, accessibility and responsiveness of the source was considered critical to the effectiveness of the relationship for information seeking. Learning how to gain access to other people requires

developing an understanding of a person's response style and preferred medium of contact. Several interviewees reported this learning process as critical to being able to utilize an important relationship. When others did not respond quickly, informants were often initially put off. However, when they developed accurate expectations of how a potential information source would make themselves available, informants were better able to utilize that person's expertise. Often, nothing changed in the relationship to make it more effective --- only the informants understanding of how to make contact. For example, one manager said:

“I have gotten less frustrated the more I have worked with him because I have realized that it is hard to get John to stick to a schedule. So now when I meet with John I have a list of like ten things I need to get through. And we set up a meeting for 1:00 and I know that it is not going to happen until 2:30 or 3:00 or maybe not until the next day, but when I do see him I have my list and I am ready and we can run down it. It was important to learn to accept that rather than be frustrated by it...”

While one would expect access to matter, less obvious was the importance of selecting the right strategy for gaining access to specific others. For example, when asked how they would approach contacts for information or advice, interviewees were asked to indicate whether they would make a personal appeal (e.g., I need help) or an appeal based on benefits the other person would receive if they responded (e.g., I have an opportunity for you). By and large, personal appeals were perceived to result in more rapid responses. Estimated response times were much greater (and so the relationship itself likely less functional), for the 38 relationships where people indicated that they would likely employ a non-personal appeal. The average response time estimated for non-personal appeals was 32.8 hours but only 18.1 hours for personal appeals (this in an environment where people indicated that waiting more than a day or two for information often made it useless). Examples include:

Personal Appeal Example: “If I had to get in touch with [the person]? I would give him a call directly and say that I was in a bind or needed some information quickly. This would get his attention a lot more quickly than an impersonal request.”

Non-Personal Appeal Example: “I would have to word it in such a way so that he would see what is in it for him.” *or* “I would relate it to things I knew she was concerned with or tell her how it would be important from a client perspective.”

Engagement. The willingness to be cognitively engaged in helping to solve an information seeker’s problem is an attribute that emerged early in the interviews as a distinguishing feature of relationships that informants truly valued. The 79 contacts that cognitively engaged with the information seekers were consistently described as particularly valuable in helping to create knowledge. Specifically, these people were valued for their willingness to actively inquire into and understand the respondent’s problem and then shape their own knowledge and experience to the problem in generating a solution. Such people were often contrasted to others who used verbal and intellectual skills as a defense to keep a person with a problem from consuming too much of their time. These less helpful people were often able to quickly craft an impressive-sounding answer. However, without taking the time to listen and then actively shape a solution with the information seeker, they were often of little help in creating useful knowledge. For example, one manager said:

“You know, I have been around people who give you a quick spiel because they think they are smart and that by throwing some framework or angle up they can quickly wow you and get out of the hard work of solving a problem. [He], for all his other responsibilities and stature within the firm is not like that. He helps you think about a problem. And by taking his time up front he makes the solution much better and probably reduces the number of times I badger him after that.”

People valued for their willingness to cognitively engage in problem solving were described in one of two qualitatively different ways. Some were described as being good at identifying and making salient to the respondent important dimensions of a complex

problem. Such people were important because they helped define and clarify a small number of important dimensions to what seemed an overly complex or ambiguous problem. They might also expand the perspective of the person seeking information by getting them to consider aspects of the problem not thought of before. For example, one manager recounted:

“The way I would describe [him] is that regardless of what the content issue is, [he] has a fantastic ability to frame issues and to challenge your thinking and help you look at things in a new way... You will often get more value from him than if you go to someone who knows a ton of stuff but will just spiel it out. So he is kind of a thinking partner, a framer.”

Others were described as being good at seeing consequences of a current course of action or plan. These people tended to excel at taking the perspective of third parties who would be affected by a proposed plan and making the respondent aware of their potential concerns. For example, a senior consultant indicated:

“[he] is very good at asking probing questions and exploring situations. He comes up with questions, you know, about a proposal or for a meeting with a prospective client, he comes up with questions that I do not even think of... I just often do not see social or political consequences of actions I take, so I go to him to think these things through...”

Safety. All managers interviewed indicated that they felt safe asking other people for information, claiming that they were willing to admit a lack of knowledge when necessary. However, when we asked respondents to categorize relationships in terms of safety, it was clear that not all of their contacts were equally rated. Specifically, respondents considered interactions in 64 of the 120 relationships explored highly safe, 50 of medium safety and 6 of low safety. This was a subjective assessment of each relationship as we simply asked informants to classify relationships in these categories. In general though informants considered highly safe relationships penalty free and were willing to explore novel or ill-formed ideas in these interactions. In low safety relations, this kind of latitude did not exist. Informants reported being more cautious in both admitting to their lack of knowledge as well

as in testing ill-formed ideas. Thus safer relationships offered certain advantages. First, they provided more learning value as informants said they were not afraid to explore new ideas. Second, informants indicated that they were more creative in safer relationships. An important feature of these relationships to them was that they were more willing to take risks with ill-formed ideas or opinions. For example, one manager indicated:

“[he] is always looking for the positive spin on something. I mean even if he thinks that it is crap and if he really thought that, he would always always find something positive or he would say “Well I think we might be a little off track on that and heres why” and then say why and of course there is learning that comes from that.”

Summary. Qualitative results suggested that awareness of who knows what is not always sufficient for effective knowledge transfer in organizational settings. A person’s awareness of the knowledge or expertise of contacts does dictate whether and for what kinds of problems a contact will be consulted. However, our interviews elicited additional features of relations that underlie effective information sharing: access, safety and engagement. Access was anticipated as important as it has been a basis for weak tie, structural hole and social resource theories claiming advantage to derive from bridging relationships (Granovetter, 1973; Lin, 1988; Burt, 1992).

A somewhat surprising finding lay with the limited role of safety. As would be anticipated from theories of learning, relationships considered highly safe seemed to provide certain benefits in terms of learning and creativity in problem solving (Argyris, 1982; Edmondson, 1996 & 1999). However, safety did not seem to emerge as an over-riding concern in dictating whom one would turn to for information. At least in the specific organization under study, people seemed to seek information or knowledge from others without excessive concern for safety.

It was also interesting to observe the role that engagement in problem solving played because it highlights a frequently overlooked consideration in models of knowledge transfer. Recent discussions of knowledge transfer have fingered the limited ‘absorptive capacity’ of the recipient as a block to effective transfer (e.g. Szulanski, 1996; Simonin, 1999). For example, Szulanski’s (1996) study, while acknowledging the difficulty created by an “arduous” relationship, generally pointed to impediments to knowledge transfer from the perspective of the acquirer of knowledge rather than the interaction created by both acquirer and sender. The idea of engagement elicited from informants suggests an alternative dimension --- that our energies should be refocused to better understand the interaction between the sender and the receiver of knowledge. Our findings suggest that a critical behavioral difference between effective and ineffective knowledge exchanges lay with a source’s willingness to engage in problem solving in the interaction. This simple behavior of the knowledge provider first understanding the problem as experienced by the knowledge seeker and then shaping his/her knowledge to the evolving definition of the problem appeared critical to the receiver’s ability to be able to take action on newly acquired knowledge.

Quantitative Phase: Methods

The objective of the quantitative phase was to assess the extent to which the relational dimensions emerging from the qualitative phase were in fact related to information seeking behavior. Informants may bring up relational attributes that are salient but which have little impact on their behavior. Since each of the four relational dimensions were thought by informants to have a facilitating affect on information

seeking, we infer the simple model of information seeking shown in Figure 1 where the dependent variable is information seeking between any two parties within the network. The model is stated at the dyadic level. That is, for any pair of persons, we claim that the extent that one person goes to another for information is a function of perceptions on the four dimensions of awareness, access, engagement and safety.

[Editor's Note: Insert Figure 1 About Here]

In order to test the model, we collected social network data from a group of 38 members of a telecommunications practice in a global consulting organization. This is a separate organization from the one in which the qualitative data were collected. However, the work and organizational structure (in terms of roles and hierarchical levels) were almost identical to the first consultancy. Table 1 gives the wording of the key survey items. All of the data were collected on a 5-point scale. Since all of the variables are dyadic, the unit of observation is an ordered pair of persons. For each ordered pair, (i,j) , we have measured the extent to which person i seeks information from person j (the dependent variable), as well as the extent to which i believes they know what j 's expertise is, how accessible j is to i , how safe i feels in seeking information from j , and the extent to which i feels that j will engage in problem solving with i (the independent variables). As is typical of social network research, a single sociometric question was employed to measure each theoretical variable. While some have faulted this practice (Rogers & Kincaid, 1981), a review by Marsden (1990) suggests that these indices are largely reliable when appropriate procedures are followed to help individuals report their

network links accurately. Here we both pre-tested the items as well as constructed question items that were highly specific and which elicited typical patterns of interaction rather than one-time events (Rogers & Kincaid, 1981; Freeman, Romney & Freeman, 1987).

[Editor's Note: Insert Table 1 About Here]

An important concern in collecting social network data is respondent accuracy. In particular, Bernard, Killworth & Sailor, (1982) have shown that respondents have difficulty recalling accurately who they did what with in a specified time period. This is not a concern in the case of our independent variables, since they are explicitly respondent perceptions and not objective truths. However, it is a concern for our dependent variable, which is meant to capture the respondent's behavior. To mitigate the accuracy problem, we asked not only "How often did you turn to X for information?", but also "How often has X turned to you for information?". Then, to measure the extent to which person i sought information from person j (i.e., construct the dependent variable), we took the smaller of two quantities: the amount i claimed to seek advice from j , and the amount that j indicated that he or she was sought out by i (Borgatti, Everett and Freeman, 1999).

We also collected demographic data, including each person's position in the organization (partner, manager, senior consultant, staff consultant) and tenure within the group (in months), both of which were used as control variables. In both cases, a dyadic difference variable was constructed from the individual level data. That is, for each

ordered pair of persons we subtracted the second person's value (such as number of months in the organization) from the first person's.

The model is tested using bivariate correlation and multivariate regression. Network data do not satisfy assumptions of statistical inference in classical regression since the observations are not independent. Consequently, special procedures, known as QAP and MRQAP (Baker and Hubert, 1981; Krackhardt, 1988; Borgatti, Everett & Freeman, 1999), were used to run the correlations and multiple regressions, respectively. QAP and MRQAP are identical to their non-network counterparts with respect to parameter estimates, but use a randomization/permutation technique (Edgington, 1969; Noreen, 1989) to construct significance tests. Significance levels for correlations and regressions were based on distributions generated from 10,000 random permutations.

Quantitative Results

Bivariate correlations among all variables are reflected in Table 2. As shown in the table, the correlations between the independent variables and the dependent variable are all high and significant, indicating strong initial support for the model. The table also shows that the correlations among the independent variables are high as well. If no other evidence were available, we might be forced to entertain the suspicion that the four independent variables actually measure a single underlying construct. However, our qualitative work makes it clear that respondents conceptualize these dimensions as distinct, and since our model is fundamentally perceptual, we make it our working assumption that the variables are distinct. We attribute their strong intercorrelations to a dynamic process in which favorable relational conditions encourage information seeking,

and, in turn, an information-seeking event between a given pair of persons results in changes to all four relational conditions for that pair in a similar direction (depending on how the interaction went).

[Editor's Note: Insert Table 2 About Here]

We can, however, see if the theorized variables remain significant even when we control for all the others. Table 3 gives the results of regressing information seeking on all four independent variables simultaneously while also controlling for differences in tenure and hierarchical rank. In the table, Model 1 is a baseline model that contains only the two control variables. Neither is significant, and the proportion of variance accounted for is negligible. Model 2 adds the four variables obtained in the qualitative study. Here we find that even when controlling for each other, all the independent variables are significant except Safety. Further, the percentage of variance accounted for is fairly large (37%), suggesting that the qualitative phase has in fact identified at least three key relational conditions relating to information seeking.

[Editors Note: Insert Table 3 About Here]

Discussion and Conclusion

This research has sought to define learned characteristics of relationships that affect information seeking in organizational settings. While existing research in the transactive knowledge tradition has focused on a person's perception of other's

knowledge, our research suggests that simply knowing who knows what does not ensure that valuable knowledge can be drawn out of a network. Other factors, such as access, engagement and (perhaps) safety are also important. Our results suggest that, as we move beyond the restricted settings in which the concepts of transactive memory (Wegner, 1987; Moreland, Argote, Krishnan, 1996; Hollingshead, 1998) and distributed cognition (Hutchins, 1991 & 1995; Weick & Roberts, 1993) have been developed, we must begin to take into account other features of relationships that facilitate knowledge exchange in organizations. This is not to say that knowledge of what others know is not important. Both the ethnographic and quantitative analyses suggest it is perhaps the single most important variable in knowledge seeking. However, in field based settings we find that other learned relational characteristics are also of importance.

First, accessibility was shown important. Knowing that someone has information or knowledge you need does not translate to actually utilizing that knowledge if the person is not accessible. In fact, in today's time-constrained world, it is likely that access alone might be uniquely influential in whether and how others are tapped for information or knowledge. We rarely, if ever, make optimal decisions but rather satisfice (March & Simon, 1958), and the extent to which we satisfice is a function of the ease with which solutions are located --- as solutions are harder to find, the standards of search fall (Cohen, March and Olsen, 1972; Perrow, 1986). Thus, both knowing who to turn to and having access to them are important in pulling information from a network of contacts.

Another key factor is a source's willingness to engage in problem solving with the knowledge seeker. Qualitative findings suggested that this did not necessarily mean a lengthy problem solving session, but rather a simple shift in how people engaged with

others around problems. While engagement is perceived by respondents to be a quality or attribute of their contacts, in this study we choose to treat it as a quality of the relationship between the respondents and their contacts. One reason for this is empirical: respondents disagreed in their ratings of how willing specific individuals are to engage in respondents' problems. This probably reflects both perceptual differences (which are important in themselves as perceptions drive behavior) and differences in actual experiences they have had with the same contact. Another reason is theoretical: a contact's willingness to fully engage with specific others is likely to vary according to their relationship with them. This may be a function of many things, including the perceived importance of the seeker or social capital possessed by the seeker (Lin, 1988).

Finally, we found that while safety was elicited from respondents in the qualitative phase, it did not play an independent role in predicting who turned to whom for information in the quantitative phase of our study. A closer look at the qualitative data suggests that when respondents talked about safety it may have been primarily with regard to improving the learning value of helping interactions, in the sense that they asked different questions when the relationship was safer. This would seem to fit with existing research on trust that has shown that, in trusting relationships, people are more willing to give useful knowledge (Andrews & Delahay 2000; Penley & Hawkins 1985; Tsai & Ghoshal 1998; Zand 1972) and also more willing to listen to and absorb others' knowledge (Carley 1991; Levin 1999; Mayer et al. 1995; Srinivas 2000). Thus it might be that safety is not important in the decision to seek information from others, but improves the learning from those interactions when it is present.

Alternatively, this result may indicate cultural differences between the two organizations studied. Although we did not attempt to measure cultural variables formally, it seemed clear ethnographically that in the organization in which we collected the quantitative data there was a strong cultural norm in place that encouraged asking questions and sanctioned negative reactions to being asked for advice. In contrast, in the organization in which we collected the qualitative data, there did not seem to be any particular norm about asking people questions. Supporting this interpretation is the fact that we obtained very low variance on the safety variable, with most people rating all others in the top two categories. This may not be true of other organizations so we do not wholly dismiss this variable.

Of course our study has limitations. First, the model we test is respondent-centered. This is a strength in terms of grounding the constructs in respondent reality, but is also a weakness with respect to generality and completeness. Since informants are not trying to build a systematic nomothetic model, it is possible that another model could be more parsimonious or account for a wider range of organizational phenomena.

Second, the model is incomplete in the sense that we do not take account of group or firm-wide variables such as organizational climate. For example, we found that the safety variable had little variance and was not significantly related to advice-seeking, but believe that in large part this is a product of a firm-wide cultural norm making information seeking acceptable behavior. From a theoretical point of view, this suggests a more complicated model in which some dyadic variables take on greater importance in the absence of cultural or other firm-level attributes.

Despite these limitations, we believe the study offers some useful contributions. First, this work provides a new perspective to the study of organizational learning by offering

evidence of relational characteristics that are learned and related to information seeking. Given the extent to which relationships are critical for informational and learning purposes in organizations we hope others will further consider the importance of “know who” in modeling various concerns. For example, this work holds potential to inform distributed cognition and transactive memory studies by identifying additional social variables that underlie information seeking in field-based settings. Hopefully future research in this area will consider both the structure and content of relations amongst group members and how these relations affect the group’s ability to leverage distributed expertise.

We also hope future research will consider these relations in terms of collective learning processes in organizations. For example, assessment of these relational characteristics via social network techniques might help clarify sources of path dependence and absorptive capacity (e.g., Nelson & Winter, 1982; Cohen & Levinthal, 1990; March, 1991). A firm’s absorptive capacity has been defined in terms of the ability to “recognize the value of new information, assimilate it and apply it to new ends (Cohen & Levinthal, 1990: p. 129).” The construct is often thought of in terms of the top down cognitive biases resulting from existing knowledge or lack of existing knowledge alone. However, the core of the concept is more structural. As Cohen and Levinthal (1990:132) write, “to understand the sources of a firm’s absorptive capacity, we focus on the structure of communication between the external environment and the organization, as well as among the subunits of the organization, and also on the character and distribution of expertise within the organization (Cohen & Levinthal, 1990: 132).” But what determines the structure of communication of information? Our study points to relational characteristics that enable information seeking and therefore index absorptive capacity.

Mapping knowledge, access, engagement and (perhaps) safety relations makes it possible to predict whose knowledge will account for a disproportionate amount of an

organization's absorptive capacity. For example, within the consulting firm where we completed the quantitative phase of this study, we conducted follow-up interviews with the three partners in charge of the group to get an understanding of how important our relations were in identifying people who were disproportionately important in terms of absorptive capacity. In terms of recognizing and realizing opportunities presented by the environment we found that the five people most often mentioned with respect to knowledge, access, engagement and safety relations were also considered critical to 78% of project sales in the past year. In addition to being primarily responsible for recognizing and realizing environmental opportunities, an accounting of billable hours by project over the year prior to our study showed that this group of five also managed or provided subject matter expertise to all but three consulting engagements. As a result, they were critical in operational decisions on these projects informing what would be done and by whom --- decisions having a significant impact on what the organization comes to know over time.

These relationships also hold importance for practitioners. Mapping information seeking as traditionally done in the social network tradition may be illuminating but does not necessarily provide a clear path to intervention. For example, we may find that one group has no information seeking ties with another, but unless we know why it is difficult to suggest interventions. Our model of attributes of relationships underlying information seeking allows us to assess individually or in various combinations each kind of relation and its effect on knowledge exchange.

Very different problems with very different solutions might emerge from this view. For example, if our concern lies with a group not "knowing what it knows" we might suggest action learning, developmental staffing practices or skill profiling systems to help create knowledge of "who knows what." In contrast if a group is having problems with access, for example, one might consider performance metrics that encourage people to be accessible to

others or distributed technologies. Engagement might be developed via rich and synchronous media such as instant messaging and video enhanced collaborative spaces. Safety might be developed via coaching or more broadly via peer feedback processes (See Cross, Parker, Prusak & Borgatti, 2001 for more detail on interventions). By examining the four relations we have proposed, we can begin to diagnose a network and design an informed intervention with greater accuracy than if we just looked at the information network.

References

- Adler, P. S., & Kwon, S. 2002. Social capital: Prospects for a new concept. Academy of Management Review, 27: 17-40.
- Allen, T. (1977). Managing the Flow of Technology. Cambridge, MA: MIT Press.
- Archea, J. (1977). The Place of Architectural Factors in Behavioral Theories of Privacy. Journal of Social Issues, 33, pp. 116-137.
- Argyris, C. (1982). Reasoning, Learning and Action. San Francisco, CA: Jossey-Bass.
- Ashford, S. (1986). The Role of Feedback Seeking in Individual Adaptation: A Resource Perspective. Academy of Management Journal, 29, pp. 465-487.
- Astley, G. & Sachdeva, P (1984). Structural Sources of Intraorganizational Power: A Theoretical Synthesis. Academy of Management Review, 9, pp. 104-113.
- Baker, F. and Hubert, L. 1981. The analysis of social interaction data. Sociological Methods & Research, 9, pp. 339-361.
- Bernard, H.R., Killworth, P. & Sailer, L. 1982. Informant accuracy in social network data V: An experimental attempt to predict actual communication from recall data. Social Science Research, 11, pp. 30-66.
- Borgatti, S., M. Everett, & L. Freeman. 1999. UCINET 5 for Windows: Software for Social Network Analysis. Natick: Analytic Technologies.
- Brass, D. (1984). Being in the Right Place: A Structural Analysis of Individual Influence in an Organization. Administrative Science Quarterly, 29, pp. 518-539.
- Brown, J.S. & Duguid., P. (1991). Organizational Learning and Communities-of-Practice; Toward a Unified View of Working, Learning and Innovation. Organization Science, 2(1) pp. 40-57.
- Burkhardt, M. & Brass, D (1990). Changing Patterns or Patterns of Change: The Effects of a Change in Technology on Social Network Structure and Power. Administrative Science Quarterly 35, 104-127.
- Burt, R. (1984). Network Items and the General Social Survey. Social Networks, 6, pp. 293-339.
- (1992). Structural Holes. Cambridge, MA: Harvard University Press.
- Cohen, W. & Levinthal, D. (1990). Absorptive Capacity: A New Perspective on Learning and Innovation. Administrative Science Quarterly, 35, pp. 128-152.

- Cohen, M., March, J. & Olsen, J. (1972). A Garbage Can Model of Organizational Choice. Administrative Science Quarterly, 17, pp. 1-25.
- Cohen, M.D. & Sproull, L.S. (Eds.) (1996). Organizational Learning. Thousand Oaks: CA: Sage Publications.
- Coleman, J. (1988). Social Capital in the Creation of Human Capital. American Journal of Sociology, 94, pp. S95-S120.
- Dougherty, D. (1992). Interpretive Barriers to Successful Product Innovation in Large Firms. Organization Science, 3(2), pp. 179-202.
- Edmondson, A. (1996). Learning From Mistakes Is Easier Said Than Done: Group and Organizational Influences on the Detection and Correction of Human Error. Journal of Applied Behavioral Science, 32(1), pp. 5-28.
- (1999). Psychological Safety and Learning Behavior in Work Teams. Harvard Business School Working Paper.
- Fiol, C.M. & Lyles, M.A. (1985). Organizational Learning. Academy of Management Review, 10(4), pp. 803-813.
- Freeman, L.C., Romney, A.K. and Freeman, S. 1987. Cognitive structure and informant accuracy. American Anthropologist 89: 310-325.
- Good, G., Dell, D. & Mintz, L. (1989). Male Role and Gender Role Conflict: Relations to Help Seeking in Men. Journal of Counseling Psychology, 36(3), pp. 295-312.
- Granovetter, M. (1973). The Strength of Weak Ties. American Journal of Sociology, 78, pp. 1360-1380.
- (1985). Economic Action and Social Structure: The Problem of Embeddedness. American Journal of Sociology, 91(3), pp. 481-510.
- Hanifan, L.J. (1920). The community center. Boston: Silver, Burdette & Co.
- Hansen, M. (1999). The Search-Transfer Problem: The Role of Weak Ties in Sharing Knowledge across Organizational Subunits. Administrative Science Quarterly, 44, pp. 82-111.
- Hollingshead, A. (1998). Retrieval Processes in Transactive Memory Systems. Journal of Personality and Social Psychology 74(3) pp. 659-671.
- Huber, G. (1991). Organizational Learning: The Contributing Processes and Literatures. Organization Science, 2(1), pp. 88-115.
- Hutchins, E. (1991). Organizing Work by Adaptation. Organization Science, 2(1) pp. 14-29.

- (1995). Cognition in the Wild. Cambridge, MA: MIT Press.
- Ibarra, H. (1993). Personal networks of women and minorities in management: A conceptual framework. Academy of Management Review, 18, 56-87.
- Krackhardt, D. 1988. Predicting with social networks: Nonparametric multiple regression analysis of dyadic data. Social Networks, 10, pp. 359-382.
- (1992). The Strength of Strong Ties: The Importance of *Philos* in Organizations. In N. Nohria & R. Eccles (1992) Networks and Organizations: Structures, Form and Action pp. 216-239.
- Kramer, R. & Tyler, T. (Eds) (1996). Trust in Organizations: Frontiers of Theory and Research. Thousand Oaks, CA: Sage.
- Lave, J. & Wenger, E. (1991). Situated Learning: Legitimate Peripheral Participation. Cambridge, UK: Cambridge University Press.
- Lee, F. (1997). When the Going Gets Tough, Do the Tough Ask for Help? Help Seeking and Power Motivation in Organizations. Organizational Behavior and Human Decision Processes, 72(3), pp. 336-363.
- Leenders, R. & Gabbay, S. (1999). Corporate Social Capital and Liability. Boston, MA: Kluwar.
- Lin, N. (1982). Social Resources and Instrumental Action. In P. Marsden & N. Lin (Eds.) Social Structure and Network Analysis pp. 131-145. Beverly Hills, CA: Sage.
- (1988). Social Resources and Social Mobility: A Structural Theory of Status Attainment. In R. Breiger (Ed) Social Mobility and Social Structure. Cambridge, Cambridge University Press.
- Lincoln, Y., & Guba, E. Naturalistic Inquiry (1985). Beverly Hills, CA: Sage.
- March, J. & Simon, H. (1958). Organizations. New York, NY: John Wiley.
- March, J.G. (1991). Exploration and Exploitation in Organizational Learning. Organization Science, 2(1), pp. 71-87.
- Marsden, P. (1990). Network Data and Measurement. Annual Review of Sociology, 16, pp. 435-463.
- Mayer, R., Davis, J. & Schoorman, F. (1995). An Integrative Model of Organizational Trust. Academy of Management Review, 20(3), pp. 709-734.
- McPherson, M., Smith-Lovin, L., & Cook, J. M. (2001). Birds of a feather: Homophily in social networks. Annual Review of Sociology, 27, 415-444.

- Miles, M. & Huberman, A. (1994). Qualitative Data Analysis (2nd Edition). Thousand Oaks, CA: Sage.
- Monge, P., & Contractor, N. (2000). Emergence of communication networks. In F. Jablin & L. Putnam (Eds.), Handbook of organizational communication, 2nd ed. (pp. 440-502). Thousand Oaks, CA: Sage.
- Monge, P., Rothman, L., Eisenberg, E., Miller, K. & Kirste, K. (1985). The Dynamics of Organizational Proximity. Management Science, 31, pp. 1129-1141.
- Moreland, R., Argote, L. & Krishnan, R. (1996). Socially Shared Cognition at Work: Transactive Memory and Group Performance. In J. Nye & A. Brower (Eds) Whats Social About Social Cognition pp. 57-85. Thousand Oaks, CA: Sage.
- Morrison, E. (1993). Newcomer Information Seeking: Exploring Types, Modes, Sources and Outcomes. Academy of Management Journal, 36(3) pp. 557-589.
- Nelson, R. & Winter, S. (1982). An Evolutionary Theory of Economic Change. Cambridge, MA: Belknap Press.
- O'Reilly, C. (1982). Variations in Decision-Makers Use of Information Sources: The Impact of Quality and Accessibility of Information. Academy of Management Journal, 25, pp. 756-771.
- Orr, J.E. (1996). Talking About Machines: An Ethnography of a Modern Job. Ithaca, NY: Cornell University Press.
- Perrow, C. (1986). Complex Organizations: A Critical Essay. New York, NY: McGraw Hill pp. 119-156.
- Putnam, R. (1995). Bowling alone: America's declining social capital. Journal of Democracy 6:1, Jan 1995, 65-78
- Rice, R., Collins-Jarvis, L., Zydney-Walker, S. (1999). Individual and Structural Influences on Information Technology Helping Relationships. Journal of Applied Communication Research, 27, pp. 285-309.
- Rogers, E. (1995). Diffusion of Innovations (4th ed.). New York, NY: Free Press.
- Rogers, E. & Kincaid, D. (1981). Communication Networks. New York: Free Press.
- Rulke, D. & Galaskiewicz, J. (2000). Knowledge Distribution, Group Structure and Performance. Management Science, 46(5), pp. 612-625.
- Scott, J. (1990). Social Network Analysis. Thousand Oaks, CA: Sage Publications.

Shah, P. (1998). Who Are Employee's Social Referents? Using a Network Perspective to Determine Referent Others. Academy of Management Journal, 41(3) pp. 249-268.

Simonin, B. (1999). Ambiguity and the Process of Knowledge Transfer in Strategic Alliances. Strategic Management Journal, 20, pp. 595-623.

Stevenson, W. (1990). Formal Structure and Networks of Interaction within Organizations. Social Science Research, 19, pp. 113-131.

Stevenson, W. B. & Gilly, M. (1993). Problem-solving networks in organizations: Intentional design and emergent structure. Social Networks, 22, 92-113.

Strauss, A. & Corbin, J. (1990). Basics of Qualitative Research: Grounded Theory Procedures and Techniques. Newbury Park, CA: Sage.

Szulanski, G. (1996). Exploring Internal Stickiness: Impediments to the Transfer of Best Practices Within the Firm. Strategic Management Journal, 17(Winter Special Issue), pp. 27-43.

Tyre, M.J. & Von Hippel, E. (1997). The Situated Nature of Adaptive Learning in Organizations. Organization Science, 8(1), pp. 71-83.

Uzzi, B. (1997). Social Structure and Competition in Inter-Firm Networks: The Paradox of Embeddedness. Administrative Science Quarterly, 42, pp. 35-67.

Wagner, W., Pfeffer, J. & O'Reilly (1984). Organizational Demography and Turnover in Top-Management Groups. Administrative Science Quarterly, 37, pp. 549-579.

Walsh, J. & Huff, A. (Eds) (1997). Organizational Learning and Strategic Management. Greenwich, CT: JAI Press.

Walsh, J.P. (1995). Managerial and Organizational Cognition: Notes From a Trip Down Memory Lane. Organization Science, 6(3): 280-321.

Wasserman, S. & Faust, K. (1994). Social Network Analysis: Methods and Applications. Cambridge University Press.

Wegner, D. (1987). Transactive Memory: A Contemporary Analysis of Group Mind. In B. Mullen & G. Goethals (Eds.) Theories of Group Behavior pp. 185-208. New York, NY: Springer-Verlang.

Weick, K. & Roberts, K. (1993). Collective Mind in Organizations: Heedful Interrelating on Flight Decks. Administrative Science Quarterly, 38, pp. 357-381.

Wenger, E. (1998). Communities of Practice. Oxford: Oxford University Press.

Yin, R.K. 1994. Case study research: Design and methods (Rev.Ed.). Newbury Park, CA: Sage.

Zahra, S. & George, G. (2002). Absorptive Capacity: A Review, Reconceptualization, and Extension. Academy of Management Review, 27(2), pp. 185-203.

Zenger, T. & Lawrence, B. (1989). Organizational Demography: The Differential Effects of Age and Tenure Distributions on Technical Communication. Academy of Management Journal, 32, pp. 353-376.

Table 1. Questionnaire Items for Relational Variables

Variable Name	Question
Aware	I understand this person's knowledge and skills. This does not necessarily mean that I have these skills or am knowledgeable in these domains but that I understand what skills this person has and domains they are knowledgeable in.
Access	When I need information or advice, this person is generally accessible to me within a sufficient amount of time to help me solve my problem.
Safety	Please indicate the extent to which you feel personally comfortable asking this person for information or advice on work-related topics.
Engagement	If I ask this person for help, I can feel confident that they will actively engage in problem solving with me.
Information	Please indicate how often you have turned to this person for information or knowledge on work-related topics during the last 3 months.

Table 2. Correlation Matrix.

	Aware	Access	Safety	Engage	Information	Hierarchy	Tenure
Aware	1.00						
Access	.61	1.00					
Safety	.58	.71	1.00				
Engagement	.58	.75	.79	1.00			
Information	.58	.48	.43	.46	1.00		
Hierarchy	-.11	.02	-.05	-.00	-.04	1.00	
Tenure	-.05	.15	.05	.09	-.04	.64	1.00

N = 1722

Table 3. Predicting Information Seeking

Variable	Model 1	Model 2
Hierarchy	-.02	.07 ***
Tenure	-.03	-.09 ***
AWare		.42 ***
Access		.15 ***
Safety		-.01
Engagement		.12 ***
R-Square	.00	.37
N	1722	1722

***p<0.001 **p < 0.01 *p < 0.05
 (all significance based on 10,000 permutations)

Figure 1. Model of Information Seeking Inferred from Respondents

