Embeddedness and New Idea Discussion in Professional Networks:

The Mediating Role of Affect-Based Trust

(In Press at Journal of Creative Behavior)

Roy Y. J. Chua

Harvard University, Harvard Business School
312 Morgan Hall, Soldiers Field
Boston, Massachusetts, MA 02138
Tel: 617-495-6465 Fax: 617-496-6568
E-mail: rchua@hbs.edu

Michael W. Morris

Columbia University, Columbia Business School
718 Uris Hall 3022 Broadway
New York, NY 10027-6902
Tel: 212-854-2296 Fax: 212-316-9355
E-mail: mwm82@columbia.edu

Paul Ingram

Columbia University, Columbia Business School
712 Uris Hall 3022 Broadway
New York, NY 10027-6902
Tel: 212-854-2740 Fax: 212-854-3778
E-mail: pi17@columbia.edu

ABSTRACT

This article examines how managers' tendency to discuss new ideas with others in their professional networks depends on the density of shared ties surrounding a given relationship. Consistent with prior research which found that embeddedness enhances information flow, an egocentric network survey of mid-level executives shows that managers tend to discuss new ideas with those who are densely embedded in their professional networks. More specifically, embeddedness increases the likelihood to discuss new ideas by engendering affect-based trust, as opposed to cognition-based trust. Implications for network and creativity research are discussed.

KEY WORDS: Creativity, Embeddedness, Innovation, Networks, Trust

Managerial success increasingly depends on creativity at the workplace. However, creative outcomes are typically not accomplished based solely on individual effort (Hansen & Oetinger, 2001; Hargadon & Bechky, 2006; Kogut & Zander, 1992; Mathisen, Martinsen, & Einarsen, 2008; Simonton, 1984). The creativity process is oftentimes a highly social one, involving interpersonal interactions among people both within and outside the organization (Amabile, 1983; Perry-Smith & Shalley, 2003; Woodman, Sawyer, & Griffin, 1993). Specifically, employees within organizations often work in teams which necessitate collaboration and knowledge sharing. Employees are also likely to develop ties with individuals outside the organization through various professional engagements. The exchange of ideas between people within and outside organizations can potentially spark creativity.

Recent research found that managers' social networks play an important role in engendering creativity (Burt, 2004; Perry-Smith, 2006). One way through which networks enable creativity is via exposure to divergent ideas and perspectives (Burt, 2004), allowing managers to make connections among seemingly disparate ideas. Another way in which networks can increase creativity is through discussion of new ideas with others in the social networks. The discussion of new ideas can be stimulating and thought-provoking. New ideas are also refined, evaluated, and improved through discussion with others. Moreover, others may provide social support and encouragement that can help managers see their new ideas through to realization. Regardless of the exact underlying mechanisms, however, the flow of ideas appears to be a central process through which social networks influence creativity in organizations.

Yet, it is risky to share ideas, especially new ones. The idea, and one's judgment, could be criticized. Or, a valuable idea could be "stolen," and one's reward for the idea lost. Thus, interpersonal trust is thought to play an important role in influencing managers' tendency to discuss new ideas with others in their professional networks. Prior theories have proposed that

trust between two people is strengthened if their relationship is embedded within ties to common third parties (Burt, 2005; Burt & Knez; 1995; Coleman, 1988; Ferrin, Dirks, & Shah, 2006). Embeddedness of this sort is empirically associated with increased transfer of knowledge and information between business people (Ingram & Roberts, 2000; Reagans & McEvily, 2003; Reagans & Zuckerman, 2001; Uzzi, 1997, 1999; Uzzi & Lancaster, 2003).

Although the link between embeddedness and information transfer has been well established in the network literature, the mechanism of trust driving this relationship is not well understood for two reasons. First, network researchers have conceptualized trust unidimensionally, whereas a long tradition in psychology distinguishes between types of trust based in different psychological systems. Second, although organizational research has acknowledged that trust can arise from different psychological processes (Lewis & Weigert, 1985), only a few recent studies have actually measured trust in network ties (Chua, Ingram, & Morris, 2008; Ferrin et al., 2006; Levin & Cross, 2004).

In the present research, we adopt the distinction that trust develops on either a socio-emotional basis (affect-based trust) or a calculative basis (cognition-based trust) (McAllister, 1995) to better understand the trust processes that underlie the influence of embeddedness on the discussion of new ideas. We first replicate an important finding in social network research, namely how embeddedness aids the transfer of information, by showing that managers' tendency to discuss new ideas with others increases when relationships are embedded in third-party ties.

Next, we elucidate the trust dynamics underlying this finding. Specifically, we consider the relative viability of two different accounts of trust mechanisms. In one account, embeddedness increases the tendency to discuss new ideas because it engenders affect-based trust, an emotional feeling that the other person has one's welfare and interest at heart. In another account, the link between embeddedness and new idea discussion is explained by cognition-

4

based trust, a calculative judgment that the other person is competent and reliable. By clarifying the trust mechanism in the relationship between embeddedness and new ideas sharing, we can help illuminate the social psychological processes by which creativity emerges in social networks. In the ensuing sections, we first review the relevant literature and then test our hypotheses using data from an egocentric network survey of mid-level executives. For clarity of exposition, we adopt the network analysis convention of referring to a focal manager as "ego" and his or her network contact as "alter."

THEORETICAL BACKGROUND AND HYPOTHESES

We begin by reviewing research on the effects of network embeddedness on information transfer and learning. Embeddedness refers to the degree to which an alter is linked to the other alters in a given ego's network. The more people an alter knows in ego's network, the higher is this alter's embeddedness. Network scholars have argued that embeddedness fosters the sharing of information and knowledge (Ingram & Roberts, 2000; Reagans & McEvily, 2003; Reagans & Zuckerman, 2001; Uzzi, 1997, 1999; Uzzi & Lanchester, 2003). For instance, Uzzi (1999) argued that embedded ties promote the transfer of private knowledge. Ingram and Roberts (2000) found that when hotel managers are densely embedded in a cohesive friendship network, they were better able to learn from each other's experiences. Turning to relationships within an R&D firm, Reagans and McEvily (2003) found that employees perceived knowledge transfer as easier when their networks are more dense.

The most commonly invoked argument for the positive effect of embeddedness on information transfer is that embeddedness increases trust (Burt, 2005; Coleman, 1988; Ferrin et al., 2006; Walker, Kogut, & Shan, 1997). When trust exists between two individuals, they are more willing to share information or knowledge with the other party (Andrews & Delahay, 2000; Penley & Hawkins, 1985; Tsai & Goshal, 1998). Drawing on this body of research, we expect

that, because network embeddedness enhances trust, there should be a positive link between an alter's embeddedness and the likelihood that new ideas would be discussed with this person.

Specifying the Mediating Mechanism: Affect- vs. Cognition-Based Trust

Although extant network research that examines the positive effect of embeddedness on knowledge transfer has identified trust as an important mediating factor, the psychological processes underlying this mechanism remain under-explored. In what way does network embeddedness engender trust? How does trust influence the tendency to discuss new ideas? To address these questions, we draw on social psychological research on trust. A key feature of interpersonal trust is the willingness to make oneself vulnerable to the other person despite uncertainty regarding motives, intentions, and prospective actions (Kramer, 1999; Mayer, Davis, & Schoorman, 1995). However, trust can develop from distinct psychological processes. Some studies found that trust can develop from affective bonds that one shares with others (Lewis & Weigert, 1985; Rempel, Holmes, & Zanna, 1985). With affect-based trust, individuals express care and concern for the welfare of their partners and make emotional investment in their relationships. Other research found that trust can also develop from instrumental processing of information about the other party's competence and reliability (Bulter, 1991; Cook & Wall, 1980; Zucker, 1986). This type of trust is calculative and based on rational estimation of the other's behaviors under specific circumstances.

Several studies have found support for this affect-based versus cognition-based distinction (Chua et al., 2008; Levin & Cross, 2004; McAllister, 1995; Ng & Chua, 2006). For instance, measures of the two types of trust were found to be positively associated but had differential effects on organizational citizenship and cooperative behaviors (McAllister, 1995; Ng & Chua, 2006). Levin and Cross (2004) found that trust built on competence (i.e., cognition-based) was especially predictive of the receipt of tacit knowledge, compared to trust built on

6

benevolence (i.e., affect-based). In a recent social network study, Chua et al. (2008) found that embeddedness was positively associated with affect-based trust but not cognition-based trust.

Drawing on this development in the trust and network literature, we argue that the distinction between affect- and cognition-based trust can provide a more detailed account as to *why* managers might be more likely to discuss new ideas with embedded alters. We investigate two distinct mechanisms, one mediated by affect-based trust and another mediated by cognition-based trust. Let us consider each of these accounts separately, although we acknowledge that both mechanisms may occur concurrently.

In the first account, we propose that managers may be more likely to share new ideas with embedded alters because embeddedness increases affect-based trust. Indeed, there is plentiful evidence that dense networks increase feelings of social support (House, Umberson, & Landis, 1988; Kadushin, 1982; Polister, 1980) and solidarity with one another (Kadushin, 1982; Wellman, 1988), bases for the development of affect-based trust. Affect-based trust promotes the discussion of new ideas because new ideas are risky to share. First, new ideas can bring large returns to the originators such as opportunities, promotions, bonuses, and so forth. Managers are naturally cautious about whom they discuss new ideas with, so as to avoid having ideas "stolen." Second, new ideas are often preliminary and underdeveloped, so sharing them involves a risk of ridicule or negative evaluation (Nemeth, Personnaz, Personnaz, & Goncalo, 2004). Research on interpersonal negotiation finds that rapport, which involves affect-based trust, predicts willingness to cooperate with others in mixed-motive conflicts (Drolet & Morris, 2000). Hence, affect-based trust—perceiving the other as having one's interests and welfare at heart—may be particularly predictive of the sharing of new ideas.

> *Hypothesis 1: The effect of network embeddedness on increasing the tendency to discuss new ideas is mediated by affect-based trust.*

Can embeddedness increase the tendency to discuss new ideas through cognition-based trust? Recent research by Chua et al. (2008) did not find evidence that embeddedness was related to cognition-based trust. Although these researchers acknowledged the possibility of such an effect, they argued that cognition-based trust may depend more on firsthand experience derived from one-on-one interaction than from third-party information and monitoring. Yet it is worth further checking if embeddedness increases cognition-based trust because there is ample theoretical underpinning for why one might expect this effect. For example, various researchers have argued that embeddedness provides social insurance for the actors involved (Burt, 2005; Ferrin et al., 2006; Walker et al., 1997). Specifically, with the presence of common third-party ties in a given dyadic relationship, alter needs to be concerned with not only his or her relationship with ego, but also relationships with other alters connected to ego. Thus, an embedded alter should have reduced tendency to act opportunistically toward ego because of potential sanction from other alters. This in turns increases ego's perception of alter's reliability, helping ego develop trust in him or her. This type of trust is generated from calculative considerations by ego regarding how alter would act and is, thus, cognition-based.

Moreover, alter's embeddedness in ego's network may also partially reflect how well-connected alter is in general (i.e., alter's network centrality), an indicator of alter's access to valuable resources such as task-specific knowledge (Cook & Emerson, 1978). Past research has found positive links between network centrality and instrumental outcomes like job performance (Sparrowe, Liden, Wayne, & Kraimer, 2001) and innovation (Ibarra, 1993). Thus, it is plausible that ego interprets alter's dense embeddedness as indicative of alter's network centrality and therefore thinks that he or she is resourceful and competent. Competent individuals are often receivers of new ideas because they are not only able to understand novel information, but also offer useful feedback and suggestions. These individuals might also be perceived to be

influential in garnering support for the new ideas if required. To the extent that managers are more likely to discuss new ideas with individuals who are resourceful, competent, and reliable than with those who are not, the effect of embeddedness on new idea discussion may be mediated by cognition-based trust.

> *Hypothesis 2: The effect of network embeddedness on increasing the tendency to discuss new ideas is mediated by cognition-based trust.*

METHOD

We test the above hypotheses using egocentric network data collected from executives attending an Executive-MBA course at a large west coast university in the U.S. The sample comprised 55 mid-level executives (79% males). Seventy-one percent of these were Caucasians, 13% East Asians, 13% Indians, and the rest other races (e.g., African-Americans). The mean age of these participants was 36. The most common industries of employment were information technology (41%), medical/pharmaceutical (13%), and consumer/food products (13%). Twenty percent of these participants held general management positions in their companies, whereas another 20% were in technology-related positions. Others held sales (16%) and finance/accounting jobs (14%). These executives participated in this study as part of their course requirement.

Procedure

We administered a network survey that required participants (egos) to identify up to 24 contacts (alters) deemed as important members of their professional networks, whether co-workers or not. We focused on measuring managers' professional networks, as opposed to specific types of network (e.g., advice networks) because managers may discuss a new idea with others for different reasons, such as to obtain financial assistance to fund the new idea or to get social support for embarking on the new endeavor.

For each alter listed, the participants were asked to provide further details on the nature of their relationships (e.g., duration known, frequency of interaction, and relative rank). Following this step, participants also indicated whether these alters were themselves interconnected. This information was later used to compute embeddedness. The key criterion variable of new idea discussion was measured after these relationship questions had been completed.

Key Measures

Alter's Embeddedness. We asked participants to indicate the presence of positive relationships interconnecting the listed alters by completing a half-matrix where each cell represented the relationship between two alters. We focus on positive ties because these ties, as opposed to negative ones, should engender trust. Specifically, alter's embeddedness is the number of observed positive ties that exist between a given alter and the other network members divided by the total number of possible ties that this alter can have with these other members (excluding alter's tie to ego).

New Idea Discussion. We measured the likelihood that participants discuss new ideas with each alter in their networks through the item: "How likely are you to discuss a *new* work-related idea you have with this person?" This item was measured using a five-point scale ranging from 1 (not at all) to 5 (to a great extent). We used a single item measure to minimize tedium in completing the survey given that participants have to answer the same questions as many times as there are listed contacts. Single item measures are regularly used in social network research for this reason (Burt & Knez, 1995; Ferrin et al., 2006; LaBianca, Brass, & Gray, 1998).

In the present research, we measured participants' prospective action of discussing a new idea when they have one, as opposed to their retrospective recall of whether they had actually discussed new ideas with network members. We chose this approach for two reasons. First, what is considered a new idea might not appear new on retrospection. Conversely, an old idea that was

previously discussed might be construed as new. Thus, participants' recall of new idea discussion in the past is subject to considerable distortions. Second, although people have no problem estimating past general behaviors (e.g., frequency of interaction), specific events like new ideas discussions are often much harder to recall. Our approach of measuring behavioral intention skirts these problems. Our question guides participants to look forward in time and estimate how likely they are to discuss a new idea with someone.

Trust. Measures of affect- and cognition-based trust were adapted from McAllister's (1995) study. For affect-based trust, participants indicated on a five-point scale (1 = not at all, 5 = to a great extent) the extent to which they felt comfortable going to each listed alter to share (a) their personal problems and difficulties and (b) their hopes and dreams. These items capture the extent to which participants are willing to be vulnerable to their network contacts through sharing personal information. Also, these items had the highest factor loadings on McAllister's trust scale (above 0.80). For cognition-based trust, participants indicated on the same five-point scale the extent to which they could *rely* on each listed alter to (a) complete a task that contact has agreed to do for the participant and (b) have the knowledge and competence for getting tasks done. We chose these items because they directly reflect the reliability and competence dimensions of cognition-based trust; their factor loadings as reported in McAllister's study were also high (above 0.80). The correlation for the two affect-based trust items is 0.71, whereas that for the two cognition-based trust items is 0.66. Factor analysis indicates that these four items load onto two distinct factors. The factor loadings for these items are all above 0.71.

In a supplementary set of network survey data (N = 56) where complete trust scales from the McAllister's study were used, we further found that the two-item trust scales correlated highly (above 0.95) with the corresponding complete trust scales. Factor loadings for the four items used in the present research were also high (above 0.90). Cronbach's alpha for the full

affect-based trust scale was 0.96 and for the full cognition-based trust scale was 0.90. This provides greater confidence that our present trust measures adequately capture the two trust constructs.

Control Variables

Whether managers are likely to discuss new ideas with others depends on many factors besides the others' embeddedness. To control for these potential influences, we collected additional data on other determinants of trust and new idea discussion.

Ego's Network Size. Managers with large networks may be exposed to more diverse ideas and naturally have more new ideas to discuss with others. Thus, we control for ego's network size which is operationalized as the total number of contacts in each manager's network.

Ego's Industry and Job Function. Participants in our study came from different industries and held different job functions in their companies. To control for possible industry and job function effects on new idea sharing, we obtained participant's job descriptions from the class "face-book" and coded them into eight main industries (finance/banking, consulting, consumer products, medicine/pharmaceutical, media, manufacturing, information technology, and others) and eight main job functions (finance/accounting, sales/marketing, operations, general management, technical, business development, research and development, and others). Dummy indicator variables for these categories were entered as controls in the analyses.

Relational Attributes. The content of the relationship between ego and alter can play a role in ego's tendency to discuss new ideas with alter. For example, new ideas may be more likely to be discussed in relationships that involve the acquisition of task or career advice, as opposed to other relational content. To assess the types of social exchanges that took place between participants and their network contacts, we asked participants to indicate in the survey which of the following was obtained from each alter: (a) friendship and social enjoyment, (b)

12

information or advice for getting tasks done, (c) economic resources, and (d) information on career guidance and opportunities. We measured these four types of relational content because they are common in managers' professional networks. The content of network ties were captured using dummy codes, coded "1" if the specific form of resource was being obtained from alter and "0" otherwise. Participants can select more than one resource for a given contact.

The duration of relationship and frequency of interaction between ego and alter can also influence new idea discussion. Longer relationship duration may engender trust whereas higher frequency of interaction provides more opportunities for new ideas to be shared. We measured duration known as the number of years ego has known alter. We measured interaction frequency in terms of how often ego talks to the each alter. Participants selected one of four options: (a) daily, (b) weekly, (c) monthly, and (d) not often. The responses were recoded into a single variable where "4" represents daily interaction while "1" represents infrequent interactions.

Alters' Characteristics. Another source of influence on our results might be the specific alter characteristics. For instance, egos may be more likely to discuss new ideas with alters outside the organization since these alters may have different perspectives on issues. Conversely, egos may be more likely to discuss new ideas with alters within the organization because such alters can better appreciate and understand these ideas. In addition, demographic similarity may smooth communication between ego and alter, in turn facilitating new idea discussion. To control for these and other related possibilities, we collected data on (a) alter's locality with respect to ego's organization, (b) alter's demographic differences with respect to ego, and (c) alter's relative rank to ego.

For alter's locality with respect to ego's organization, we measured whether alter was (a) within ego's work unit, (b) not in ego's work unit but within ego's organization, and (c) outside ego's organization. These indicators were then recoded into two dummy indicator variables

13

"alter is not in ego's organization" and "alter is in ego's work unit." "Alter is not in ego's work unit but within ego's organization" was the omitted category in the analysis.

We operationalized demographic differences using two indicator variables: (a) whether alter was of different race from ego and (b) whether alter was of different gender from ego. We used a dummy indicator for each of these variables, coded "1" if ego and alter differ on a given dimension and "0" otherwise.

Finally, we captured alter's rank using three indicators for whether alter was of (a) higher rank, (b) same rank, or (c) lower rank than ego. Participants checked the most appropriate indicator on the network survey. These indicators were then recoded into two dummy indicator variables "higher rank" and "lower rank." "Same rank" was the omitted category in the analysis.

Analyses

Our data contain hierarchically nested variables. Specifically, up to 24 dyadic relationships are nested with a given ego. Our dependent variable, ego's likelihood to discuss new ideas with alters, was measured at the dyadic level. However, other variables such as ego's network size were higher level constructs and measured at the network level for each ego.

Because each ego is associated with multiple alters in the analysis, the non-independence of observations is a methodological concern. In response, we considered fixed- and random-effects models, two common alternatives for controlling for the influence of a given ego on multiple observations (Hausman, Hall, & Griliches, 1984). Both approaches allow us to estimate dyadic-level effects *within* egocentric networks (Hoffman, Griffin, & Gavin, 2000). We report results from random-effects models below, because these allow estimates for important ego-level control variables, e.g., ego's network size. Analyses using ego fixed-effects produced comparable results.

Table 1 shows the descriptive statistics and correlations among the key variables whereas Table 2 reports the regression results. Model 1 contains all the control variables. The results indicate that ego is more likely to discuss a new idea with those from whom he or she receives career-related information ($b = .36$, $p < .01$) and task advice ($b = .24$, $p < .01$). Ego is also more likely to discuss a new idea with friends ($b = .45$, $p < .01$) and those with whom he or she interacts frequently ($b = .33$, $p < .01$). However, ego is *less* likely to discuss a new idea with alters who are of a different gender ($b = -.17$, $p < .01$). Model 2 adds the embeddedness variable. As we expected, there is a positive relationship between alter's embeddedness in ego's network and ego's likelihood to discuss a new idea with alter ($b = .59$, $p < .01$).

INSERT TABLES 1 AND 2 ABOUT HERE

Next, we examine the role of affect- and cognition-based trust as mediators, following Baron and Kenny's (1986) procedure of mediation analyses. First, as described earlier, we demonstrated that alter's embeddedness is positively associated with ego's likelihood to discuss a new idea with him or her. Second, we conducted regression analyses to ascertain the effects of alter's embeddedness on affect-and cognition-based trust, controlling for the other type of trust when a given type of trust was the dependent variable. Results indicate that alter's embeddedness is positively associated with affect-based trust ($b = .63$; $p < .01$) but not cognition-based trust ($b = .21$; $p > .10$). Third, we regressed new idea discussion on both types of trust, excluding alter's embeddedness from the analysis. We found that cognition-based trust ($b = .38$; $p < .01$) and affect-based trust ($b = .35$; $p < .01$) both positively predict likelihood to discuss a new idea. Finally, we examined the effect of alter's embeddedness on likelihood to discuss a new idea by including affect- and cognition-based trust into models 3 and 4 respectively. In model 3

(inclusion of affect-based trust), the effect of alter's embeddedness on new idea discussion diminishes to non-significance ($b = .28$, $p > .10$). This is the sign that the effect of embeddedness runs through that of affect-based trust.

In model 4 (inclusion of cognition-based trust), the effect of alter's embeddedness on new idea discussion remained significant ($b = .46$, $p < .01$). In other words, controlling for cognition-based trust, embeddedness still exerts a positive effect on new idea discussion. Hence, the effect of embeddedness on new idea discussion does not seem to run though cognition-based trust. In both models 3 and 4, the effects of affect- and cognition-based trust on the dependent variable are significant.

Because cognition- and affect-based trust are correlated, it is important to determine the unique effect of each type of trust. Thus, we fitted model 5 which includes both types of trust. Comparing models 4 and 5, we found that while controlling for the effects of cognition-based trust (model 4), adding affect-based trust (model 5) caused the effect of alter's embeddedness to disappear ($b = .25$, $p > .10$). In contrast, as in model 3, adding affect-based trust alone was enough to mitigate the effect of embeddedness. The *Sobel test* for the affect-based trust as mediator model is significant ($z = 3.10$, $p < .01$) whereas that for the cognition-based trust as mediator model is not ($z = 1.30$, $p = .19$). Taken together, these results suggest that the positive effect of embeddedness on the likelihood to discuss new ideas is mediated by affect-based trust but not cognition-based trust. Hence, there is support for hypothesis 1 but not hypothesis 2.

DISCUSSION

One dominant view in social network research is that embeddedness engenders trust which in turn facilitates information and knowledge flow. The present research provides additional insight into this effect by examining how embeddedness influences the surfacing of new ideas in the workplace, an important precursor to organizational innovation and creativity.

Specifically, we have demonstrated directly what many others have speculated, that one key mechanism behind the positive effect of embeddedness on the flow of information, such as new ideas, is trust. Even more, we considered the relative viability of two distinct trust mechanisms and showed that it was affect-based trust, rather than cognition-based trust, that accounts for new ideas discussion in embedded relationships. This finding sheds light on the psychological processes underlying the effect of embeddedness on new ideas discussion. The finding suggests that the perceived trustworthiness of embedded alters is built on an affective basis, as opposed to a calculative basis. The increased affect-based trust in turn renders managers more likely to discuss new ideas with these alters. Put differently, managers are more willing to share new ideas with embedded alters because they are confident that these alters have their welfare and interests at heart and thus are less likely to ridicule them or use these new ideas for their own gains.

Despite arguments that embeddedness can increase cognition-based trust, our finding is consistent with that of Chua et al. (2008)—embeddedness did not engender this type of trust. Perhaps, as Chua et al. argued, cognition-based trust depends more on first-hand experience and less on third-party monitoring. It is also possible that the effect of embeddedness on cognition-based trust is appreciable solely in contexts where the dearth of legal protections makes social insurance essential to trust in business relationships. Some evidence for this is that mainland Chinese managers are more likely to develop cognition-based trust from dense embeddedness in their social networks than are American managers (Chua, Morris, & Ingram, in press).

Our study also speaks directly to a growing body of research that examines the effect of network density on creativity and innovation. According to Burt's (2004) account of structural holes and good ideas, managers are better able to generate new ideas when their social networks are low in density (i.e., contain many structural holes), because of increased exposure to diverse and non-redundant perspectives. Others argue that dense networks can also be beneficial for

innovation (Ahuja, 2000; Obstfeld, 2005; Staber, 2004). For instance, Obstfeld found that dense networks increase employee involvement in innovation because embeddedness improves coordination and flow of resources. Similarly, Staber argued that embeddedness provides an important source of continuity in markets where intermittent projects are common, and that project workers embedded in cohesive networks tend to engage in more innovation-related behaviors. Our findings are consistent with this latter stream of research.

One way to reconcile these two different effects of network density is to distinguish between the different processes of innovation. When the innovation process requires the synthesis of divergent perspectives and inputs to arrive at new ones, low density would be beneficial. When the innovation process requires coordination and discussion among multiple parties, high density would be more useful. Another way of reconciliation is to distinguish between localized versus global density. Localized high density is valuable against a broader background of low density. Consistent with this notion, Reagans and Zuckerman (2001) found that effective R&D teams had sparse ties to the world outside the team but a dense network within the team. Burt's (2004) arguments suggest that extra-team sparse ties may provide the inputs for synthesis, whereas our results on new idea discussion, along with others on related topics such as team-member involvement and the efficiency of knowledge transfer (Obstfeld, 2005; Reagans & McEvily, 2003), can be applied to understand the advantages of dense intra-team ties for developing those inputs.

Yet, a lingering question remains. When developing a new idea, is it more beneficial to discuss the idea with densely embedded network members who tend to have a common knowledge base as oneself and hence better able to build upon one's thoughts, as opposed to those outside one's dense network who tend to bring diverse perspectives to the given idea? Research has found that mutual understanding is necessary to enable individuals to effectively

18

build upon existing knowledge (Kurtzberg & Amabile, 2001; Mumford & Gustafson, 1988). Put differently, the ability to understand and build on each other's knowledge base can help people further refine and develop their ideas (Kijkuit & van den Ende, 2007). However, individuals who have a similar knowledge background as oneself are also less likely to contribute new perspectives to the given idea. Hence, they are less likely to help one refine the idea in new directions. We believe the relative benefits depend on the stage of idea development. In an early stage of idea development, new perspectives are probably useful in shaping a given idea in new, interesting manners. In later stages of idea development where one gets into the details of implementation, having common domain knowledge becomes especially important in taking the idea forward to fruition.

Practical Implications

The present research has practical implications for promoting knowledge and idea sharing in teams. In many work teams, new and potentially useful ideas often never saw the light of day because people are hesitant to share them for fear of ridicule or rejection. Our findings suggest that people are more likely to discuss new ideas with those who are densely embedded in their networks. Hence, in teams where the flow and exchange of new ideas are critical to team performance (e.g., research and development teams), forging a high density of shared ties among team members and beyond can increase the likelihood that new ideas, no matter how preliminary, are surfaced and discussed. Even though not all new ideas will turn out to be feasible, some may become especially valuable and contribute to team success.

In addition, our research highlights the importance of trust building as a way of facilitating the flow of new ideas in the workplace. Although the notion that trust is linked to information sharing is not novel, we found that affect-based trust appears to be especially important, at least in the context of new ideas. Thus, managers who hope to be recipients of new

19

ideas should aim to build trust with co-workers on a more socio-emotional basis such as through the building of genuine friendship. Indeed, further analyses show that the positive effect of friendship tie on new ideas discussion is mediated by affect-based trust (*Sobel test: z = 9.01, p < .01*). In a similar vein, the positive effect of career-guidance tie on new idea sharing is partially mediated by affect-based trust (*Sobel test: z = 3.90, p < .01*). However, these findings should not be interpreted as suggesting that cognition-based trust is unimportant. In fact, results in Table 2 indicate that cognition-based trust strongly predicts new idea sharing (*b* = .38, p < .01). The effect of task-advice tie on new ideas sharing is also fully mediated by this type of trust (*Sobel test: z = 4.42, p < .01*). It is clear from our results that although both types of trust lead to more new idea sharing, they are related to different types of network ties and can be developed differently.

Limitations and Future Research

The present study has certain limitations. First, as is the case with most cross-sectional network research, causality is difficult to establish. It is not certain that the network structure which surrounds an alter is the *cause* rather than the *effect* of more new idea discussion. Nevertheless, the reversed causal argument that a structural property such as embeddedness, which depends on ties between alters, is the result of discussing new ideas between ego and alter is rather unlikely because ties among alters are not directly within the control of ego. By contrast, it is entirely possible that trust can increase as a result of repeated idea discussion. It is also possible that some sort of reciprocal causality exists between these two factors. Future research should examine the causality link between trust and new ideas discussion in greater detail.

Second, common method bias might be a concern given that the key variables were measured in a single egocentric survey (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). This concern, however, applies more to the relationship between trust and new idea discussion than

20

those involving embeddedness. The embeddedness variable was derived from a half-matrix regarding ties among listed network contacts. Given the large network sizes of our managers (average of 21), it would be highly difficult for them to respond in a systematic manner so as to maintain consistency or express some implicit theory about how entries in the half matrix should be related to trust and new idea discussion. Thus, the usual concerns about common method bias are not compelling accounts for the mediation effects we found in the present research. However, future studies could further mitigate this concern by measuring the independent and dependent variables in separate waves.

Third, we used a single item measure for our dependent variable. Although this practice is common and acceptable in social network research, the use of more items would have further strengthened the present research. Also, we acknowledge the possibility that the term "new work-related idea" might be interpreted in different ways by participants. For example, some participants might interpret a new idea as one that is new to the organization whereas others might interpret it as being new to themselves. Such distinctions are useful to make and should be incorporated in future research.

Going forward in the study of new idea sharing in social networks, it might be interesting to explore the flow of ideas between individuals of different genders. Our results suggest that the likelihood of new idea sharing decreases when alter is of a different gender from ego (model 5: b = -.17, p < .01). To further examine this effect, we reanalyzed our data by gender and found that male participants (79% of our sample) were significantly less likely to discuss new ideas with opposite sex network members than with same sex network members (b = -0.20, p<.05). Perhaps men show a bias of being less likely to share new ideas with women because they do not perceive women as fruitful innovation or idea exchange partners. Female participants, however, are not statistically less likely to discuss new ideas with opposite sex network members than

same sex network members (b=- 0.13, p>0.10). It is unclear whether this is due to the small sample size of female participants or there exists no similar effect whereby woman managers are less likely to discuss new ideas with men. Future research should more systematically investigate the dynamics of new idea sharing across gender lines.

Conclusion

In closing, we contemplate the effects of social network on innovation and creative processes in organizations. Although creative efforts by individual employees are important, organizational innovation and creativity often rely on interaction among employees embedded in networks of relationships (Hargadon & Bechky, 2006; Harrison & Laberge, 2002). A key process by which this happens is through the flow of ideas. New ideas and perspectives from others can stimulate new ideas whereas the discussion of a new idea can help refine and improve it. The former corresponds to the process of idea generation whereas the latter relates to the process idea evaluation and selection, both of which are important aspects of creative behavior (Campbell 1960). Scholarly research on the impact of social networks on creativity processes is still in its nascent stage given the small number of published works in this area (e.g., Perry-Smith, 2006; Perry-Smith & Shalley, 2003). Our current research contributes to this emerging body of knowledge by illustrating the nuances involved in the effects of network embeddedness on the creativity-related process of new idea discussion.

REFERENCES

Ahuja, G. (2000). Collaboration networks, structural holes, and innovation: A longitudinal study. *Administrative Science Quarterly, 45,* 425–455.

Amabile, T. M. (1983). The social psychology of creativity: A componential conceptualization. *Journal of Personality and Social Psychology*, *45,* 357–377.

Andrews, K. M., & Delahay, B. L. (2000). Influences on knowledge processes in organizational learning: The psychosocial filter. *Journal of Management Studies*, *37,* 797–810.

Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic and statistical considerations. *Journal of Personality and Social Psychology, 51,* 1173–1182.

Bulter, J. K. (1991). Towards understanding and measuring conditions of trust: Evolution of a condition of trust inventory. *Journal of Management, 17,* 643–663.

Burt, R. S. (2004). Structural holes and good ideas. *The American Journal of Sociology, 110*(2), 349–399.

Burt, R. S. (2005). *Brokerage and closure*. New York: Oxford University Press.

Burt, R. S., & Knez. M. (1995). Kinds of third-party effects on trust. *Rationality and Society, 7,* 255–292.

Campbell, D. T. (1960). Blind variation and selective retention in creative thought as in other knowledge processes. *Psychological Review, 67,* 380–400.

Chua, R. Y. J., Ingram, P., & Morris, M. (2008). From the head and the heart: Locating cognition and affect-based trust in managers' professional networks. *Academy of Management Journal, 51*(3), 436–452.

Chua, R. Y. J., Morris, M., & Ingram, P. (in press). Guanxi versus networking: Distinctive configurations of affect- and cognition-based trust in the networks of Chinese and American managers. *Journal of International Business Studies*.

Coleman, J. (1988). Social capital in the creation of human capital. *American Journal of Sociology, 94,* 95–120.

Cook, J., & Wall, T. (1980). New work attitude measures of trust, organizational commitment and personal need nonfulfilment. *Journal of Occupational Psychology*, *53,* 39–52.

Cook, K. S., & Emerson, R. M. (1978). Power, equity and commitment in exchange networks. *American Sociological Review, 43,* 721–739.

Drolet, A. L., & Morris, M. W. (2000). Rapport in conflict resolution: Accounting for how face-to-face contact fosters mutual cooperation in mixed-motive conflicts. *Journal of Experimental Social Psychology*, *36*, 26–50.

Ferrin, D. L., Dirks, K. T., & Shah, P. P. (2006). Direct and indirect effects of third-party relationships on interpersonal trust. *Journal of Applied Psychology*, *91,* 870–883.

Hansen, M. T., & Oetinger. B. (2001). Introducing T-shaped managers: Knowledge management's next generation. *Harvard Business Review, 79*(3), 107.

Hargadon, A. B., & Bechky, B. A. (2006). When collections of creatives become creative collectives: A field study of problem solving at work. *Organization Science, 17*(4), 484–500.

Harrison, D. & Laberge, M. (2002). Innovation, identities and resistance: The social construction of an innovation network. *Journal of Management Studies, 39*(4): 497–521.

Hausman, J., Hall, B. H., & Griliches, Z. (1984). Econometric-models for count data with an application to the patents–R and D relationship. *Econometrica, 52*, 909–938.

Hoffman, D., Griffin, M., & Gavin, M. (2000). The application of hierarchical linear modeling to organizational research. In K. Klein & S. Kozlowski (Eds.), *Multilevel theory, research, and methods in organizations* (pp. 467–511). San Francisco: Jossey Bass.

House, J. S., Umberson, D., & Landis, K. R. (1988). Structures and processes of social support. *Annual Review of Sociology*, *14,* 293–318.

Ibarra, H. (1993). Network centrality, power, and innovation involvement: Determinants of technical and administrative roles. *Academy of Management Journal*, *36*, 471–501.

Ingram, P., & Roberts P. W. (2000). Friendships among competitors in the Sydney hotel industry. *The American Journal of Sociology, 106*(2), 387.

Kadushin, C. (1982). Social density and mental health. In P. V. Marsden & N. Lin (Eds.), *Social structure and network analysis* (pp. 147–158). Beverly Hills, CA: Sage.

Kijkuit, B., & van den Ende, J. (2007). The organizational life of an idea: Integrating social network, creativity and decision making perspectives. *Journal of Management Studies, 44*(6), 863–882.

Kogut, B., & Zander, U. (1992). Knowledge of the firm, combinative capabilities and the replication of technology. *Organization Science, 3,* 383–397.

Kramer, R. M. (1999). Trust and distrust in organizations: Emerging perspectives, enduring questions, *Annual Review of Psychology, 50,* 569–598.

Kurtzberg, T. R., & Amabile, T. M. (2001). From Guilford to creative synergy: Opening the black box of team-level creativity. *Creativity Research Journal, 13,* 285–94.

Labianca, G., Brass, D. J., & Gray, B. (1998). Social networks and perceptions of intergroup conflict: The role of negative relationships and third parties. *Academy of Management Journal, 41*, 55–67.

Levin, D. Z., & Cross. R. (2004). The strength of weak ties you can trust: The mediating role of trust in effective knowledge transfer. *Management Science, 50*(11), 1477–1490.

Lewis, J. D., & Weigert. A. (1985). Trust as a social reality. *Social Forces, 63,* 967–985.

Mathisen, G E., Martinsen, O., & Einarsen, S. (2008). The relationship between creative personality composition, innovative team climate, and team innovativeness: An input-process-output perspective. *Journal of Creative Behavior, 42*(1), 13–31.

Mayer, R. C., Davis, J. H., & Schoorman, F. D. (1995). An integrative model of organizational trust. *Academy of Management Review, 20,* 709–734.

McAllister, D. J. (1995). Affect- and cognition-based trust as foundations for interpersonal cooperation in organizations. *Academy of Management Journal, 38,* 24–59.

Mumford, M. D., & Gustafson, S. B. (1988). Creativity syndrome: Integration, application, and innovation. *Psychological Bulletin, 103,* 27–43.

Nemeth, C. J., Personnaz, M., Personnaz, B., & Goncalo, J. A. (2004). The liberating role of conflict in group creativity: A study in two countries. *European Journal of Social Psychology, 34,* 365–374.

Ng, K. Y., & Chua, R. Y. J. (2006). Do I contribute more when I trust more?: Differential effects of cognition- and affect-based trust. *Management and Organization Review, 2*(1), 43–66.

Obstfeld, D. (2005). Social networks, the tertius lungens orientation, and involvement in Innovation. *Administrative Science Quarterly, 50,* 100–130.

Penley, L. E., & Hawkins, B. (1985). Studying interpersonal communication in organizations: Leadership application. *Academy of Management Journal, 28,* 309–326.

Perry-Smith, J. E. (2006). Social yet creative. The role of social relationships in facilitating individual creativity. *Academy of Management Journal, 49*(1), 85–102.

Perry-Smith, J. E., & Shalley, C. E. (2003). The social side of creativity: A static and dynamic social network perspective. *The Academy of Management Review, 28*(1), 860–875.

Podsakoff, P. M., MacKenzie, S. B., Lee, J., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology, 88,* 879–903.

Polister, P. E. (1980). Network analysis and the logic of social support. In R. H. Price & P. E. Polister (Eds.), *Evaluation and action in the social environment* (pp. 69–87). New York: Academic Press.

Reagans, R., & McEvily, B. (2003). Network structure and knowledge transfer: The effects of cohesion and range. *Administrative Science Quarterly, 48,* 240–267.

Reagans, R. E., & Zuckerman, E. W. (2001). Networks, diversity and performance: The social capital of corporate R& D units. *Organization Science, 12,* 502–517.

Rempel, J. K., Holmes, J. G., & Zanna, M. D. (1985). Trust in close relationships. *Journal of Personality and Social Psychology, 49,* 95–112.

Simonton, D. K. (1984). Artistic creativity and interpersonal relationships across and within generations. *Journal of Personality and Social Psychology, 46,* 1273–1286.

Sparrowe, R. T., Liden, R. C., Wayne, S. J., & Kraimer, M. L. (2001). Social networks and the performance of individuals and groups. *Academy of Management Journal, 44,* 316–325.

Staber, U. (2004). Networking beyond organizational boundaries: The case of project organizations. *Creativity and Innovation Management*, *13*(1).

Tsai, W., & Goshal, S. (1998). Social capital and value creation: The role of intra-firm networks. *Academy of Management Journal, 41,* 464–476.

Uzzi, B. (1997). Social structure and competition in interfirm networks: The paradox of embeddedness. *Administrative Science Quarterly, 42,* 35–67.

Uzzi, B. (1999). Social relation and networks in the making of financial capital. *American Sociological Review, 64,* 481–505.

Uzzi, B., & Lancaster, R. (2003). Relational embeddedness and learning: The case of bank loan managers and their clients. *Management Science, 49*(4), 383–399.

Walker, G., Kogut, B., & Shan, W. (1997). Social capital, structural holes and the formation of an industry network. *Organization Science, 8,* 109–125.

Wellman, B. (1988). Structural analysis: From method and metaphor to theory and substance. In B. Wellman & S. D. Berkowitz (Eds.), *Social structures: A network approach* (pp. 19–61). UK: Cambridge University Press.

Woodman, R. W., Sawyer, J. E., & Griffin, R. W. (1993). Toward a theory of organizational creativity. *Academy of Management Review, 18,* 293–321.

Zucker, L. G. (1986). Production of trust: Institutional sources of economic structure. *Research in Organizational Behavior, 8,* 53–111.

TABLE 1: DESCRIPTIVE STATISTICS AND CORRELATIONS (N = 55)

	Mean	SD	Min	Max	1	2	3	4	5	6	7
1. Likelihood to discuss new idea with Alter	3.69	1.25	1	5	1.00						
2. Alter's embeddedness	0.26	0.24	0	1	0.16*	1.00					
3. Economic-resource tie	0.19	0.40	0	1	0.02	0.19*	1.00				
4. Career-guidance tie	0.61	0.49	0	1	0.16*	-0.17*	0.05	1.00			
5. Task-advice tie	0.60	0.49	0	1	0.20*	0.03	-0.01	0.10*	1.00		
6. Friendship tie	0.62	0.49	0	1	0.22*	-0.06	-0.10*	0.05	0.03	1.00	
7. Alter not in Ego's organization	0.71	0.45	0	1	-0.15*	0.34*	-0.07*	0.10*	-0.21*	0.20*	1.00
8. Alter in Ego's work unit	0.14	0.35	0	1	0.17*	0.25*	0.09*	-0.07*	0.19*	-0.08*	-0.65*
9. Alter is of higher rank than Ego	0.43	0.50	0	1	-0.02	-0.07*	0.20*	0.31*	-0.03	-0.23*	-0.02
10. Alter is of lower rank than Ego	0.18	0.39	0	1	0.00	0.19*	-0.13*	-0.30*	0.04	0.04	-0.21*
11. Alter is of different gender from Ego	0.26	0.44	0	1	-0.03	0.00	-0.06*	0.01	0.03	-0.01	-0.06
12. Alter is of different race from Ego	0.28	0.45	0	1	0.00	-0.05	-0.11*	0.01	0.06	-0.04	-0.12*
13. Duration known	6.54	6.63	1	43	0.00	-0.11*	0.03	-0.02	-0.10*	0.21*	0.18*
14. Frequency of interaction	2.30	1.04	1	4	0.38*	0.33*	0.12*	-0.03	0.31*	0.17*	0.09*
15. Ego's network size	21.19	4.39	6	24	0.00	0.16*	0.04	0.00	0.05	-0.07*	0.02
16. Affect-based trust	3.15	1.24	1	5	0.46*	0.06*	-0.04	0.13*	0.09*	0.48*	0.13*
17. Cognition-based trust	4.08	0.94	1	5	0.50*	0.02	0.03	0.15*	0.20*	0.22*	0.02

	8	9	10	11	12	13	14	15	16	17
8. Alter in Ego's work unit	1.00									
9. Alter is of higher rank than Ego	0.04	1.00								
10. Alter is of lower rank than Ego	0.18*	-0.41*	1.00							
11. Alter is of different gender from Ego	0.03	0.01	0.08*	1.00						
12. Alter is of different race from Ego	0.08*	0.01	0.05	0.01	1.00					
13. Duration known	-0.11*	-0.03	-0.01	-0.07*	-0.16*	1.00				
14. Frequency of interaction	0.45	-0.14*	0.10*	-0.02	0.01	-0.08*	1.00			
15. Ego's network size	-0.08*	0.05	0.00	-0.03	-0.08	0.08*	-0.12*	1.00		
16. Affect-based trust	-0.01	-0.14*	-0.04	-0.01	-0.10*	0.27*	0.27*	-0.02	1.00	
17. Cognition-based trust	0.00	0.03	-0.06*	0.09	-0.04	-0.01	0.20*	0.04	0.37*	1.00

TABLE 2: RANDOM EFFECTS REGRESSION

Dependent Variable	Ego's Likelihood to Discuss New Ideas with Alter				
	Model 1	Model 2	Model 3	Model 4	Model 5
Key Predictors					
Alter's embeddedness	-	0.59** (0.22)	0.28 (0.20)	0.46** (0.19)	0.25 (0.19)
Affect-based trust	-	-	0.43** (0.03)	-	0.35** (0.03)
Cognition-based trust	-	-	-	0.49** (0.04)	0.38** (0.04)
Control Variables					
Ego's network size	0.01 (0.02)	0.02 (0.02)	0.01 (0.02)	0.01 (0.02)	0.01 (0.01)
<u>Relationship Attributes</u>					
Economic-resource tie	0.08 (0.09)	0.06 (0.09)	0.08 (0.08)	0.08 (0.08)	0.09 (0.08)
Career-guidance tie	0.36** (0.07)	0.36** (0.07)	0.22** (0.07)	0.30** (0.07)	0.20** (0.07)
Task-advice tie	0.24** (0.07)	0.24** (0.07)	0.16* (0.07)	0.09 (0.07)	0.06 (0.06)
Friendship tie	0.45** (0.07)	0.44** (0.07)	0.04 (0.07)	0.31** (0.07)	0.01 (0.07)
Duration known	0.01 (0.00)	0.01 (0.00)	-0.01** (0.00)	0.00 (0.00)	-0.01* (0.00)
Frequency of interaction	0.33** (0.04)	0.31** (0.04)	0.18** (0.04)	0.24** (0.04)	0.15** (0.04)
<u>Alter Attributes</u>					
Alter is not in Ego's organization	-0.08 (0.10)	-0.02 (0.10)	-0.21* (0.09)	-0.07 (0.09)	-0.21* (0.09)
Alter is in Ego's work unit	0.09 (0.12)	0.09 (0.12)	0.10 (0.11)	0.17 (0.11)	0.16 (0.10)
Alter is of higher rank	-0.03 (0.07)	-0.04 (0.07)	0.06 (0.07)	-0.07 (0.07)	0.01 (0.06)
Alter is of lower rank	0.00 (0.09)	-0.01 (0.09)	0.05 (0.09)	0.06 (0.09)	0.09 (0.08)

Dependent Variable	Ego's Likelihood to Discuss New Ideas with Alter				
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**
Alter is of different gender	-0.17*	-0.18*	-0.16**	-0.19**	-0.17**
	(0.07)	(0.07)	(0.07)	(0.07)	(0.06)
Alter is of different race	-0.01	-0.02	0.03	-0.04	0.00
	(0.08)	(0.08)	(0.07)	(0.07)	(0.07)
Intercept	2.33	1.93	1.96	0.46	0.81
	(0.75)	(0.72)	(0.66)	(0.59)	(0.56)
Number of dyadic observations	1089	1089	1081	1088	1080
Number of participants	55	55	55	55	55
Overall R-square	0.289	0.303	0.418	0.424	0.487
Chi-square change [a]	315.06**	5.49*	188.53**	172.33**	314.77**

[a] Chi-square change for models 3, 4, and 5 are with respect to model 2. Chi-square change for model 1 is with respect to a constant only model.

Notes:

1. *Above analyses also control for Ego's industry and job function. These variables are not presented due to space constraints (there are seven dummy indicators for each variable).*

2. *Numbers in brackets are standard errors*

3. *** $p < .01$ * $p < .05$*