The Dissimilar Effects of Fairness on Knowledge Sharing in Distributed Workgroups: A Social Network Perspective

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THE DISSIMILAR EFFECTS OF FAIRNESS ON KNOWLEDGE SHARING IN DISTRIBUTED WORKGROUPS: A SOCIAL NETWORK PERSPECTIVE

Completed Research Paper

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Abstract

Distributed workgroups are increasingly adopted by global organizations, enabled by technology advances. While social ties and performance of such workgroups have been examined in existing literature, the distinctions in knowledge sharing practices remain blurred. We developed a research model to examine the effects of social ties on knowledge sharing practices through the lens of justice perceptions (i.e., fairness) from a dyadic level. The model was tested in a field study of distributed workgroups at a large multinational organization. Our results suggested that Simmelian-tied dyads (dyads embedded in three-person cliques) had significant influence on justice perceptions and knowledge sharing. Expertise knowledge sharing was influenced by procedural and informational justice perceptions. Contrary to previous studies, our study suggested that product knowledge sharing occurred regardless of distributive justice perception. The findings provided insights to the mechanisms underlying social ties, justice perceptions, and knowledge sharing.

Keywords: Knowledge sharing, Simmelian ties, justice perceptions, distributed workgroups
Introduction

Knowledge sharing had long been identified as central tenet to organizational success (Schultze et al. 2002), improving work productivity and work quality (Haas et al. 2005). However, not all types of knowledge shared are necessarily beneficial to the organization. For example, while sharing work documents may save time, it has been found to be detrimental to work quality. Rather, it is the sharing of expertise that leads to quality and performance (Haas et al. 2005). With the increased adoption of distributed workgroups (Martins et al. 2004) and the reliance on technology to facilitate organizational knowledge flows (Jarvenpaa et al. 2001), there is a need to better understand the different possible motivations that lead to various forms of knowledge sharing, particularly with the unique challenges faced by these workgroups.

Distributed workgroups face challenges such as a smaller social network from which to tap resources (Herbsleb et al. 2003), coordination costs (Boh et al. 2007), and problems in establishing a mutual understandings between workgroup members (Cramton 2001). Asymmetric and delayed communication are brought about through the heavy reliance of technological tools such as email (Ahuja et al. 2003). Compared to regular workgroups where requests for face-to-face favor requests may be obliged (Flynn et al. 2008), the same may not apply to distributed workgroups. This in turn have implications for work outcomes such as knowledge sharing, which may require a greater level of motivation in eliciting knowledge sharing over asymmetric mediums such as email. The propensity to participate and share knowledge stem from factors such as perceived organizational ownership of information, self-efficacy, and recognition (Constant et al. 1994), which have been shown to influence community participation (Chan et al. 2004) and the adoption of knowledge sharing mediums (Jarvenpaa et al. 2001).

Computer-mediated communication have been found to increase the effects of organizational justice (i.e., perceptions of fair treatment), due to the reduced social cues (Tangirala et al. 2006). Employees rely on fair treatment by authorities as a form of “fairness heuristic”, in order to determine whether their organization and authorities may be trusted (Lind 2001). The justice perceptions of employees have also been recognized as a major contributing factor to organizational success (Greenberg 1990), enabling us to further probe the motivations behind knowledge sharing in distributed workgroups. These perceptions in turn influence work outcomes such as job compliance, motivation (Colquitt 2002; Murphy et al. 2003), and organizational citizenship behavior (Choi 2008). Justice perceptions also possessed the ability to distinguish between job compliance and discretionary work performance (Simons et al. 2003).

Our study aims to extend the current literature to explicate between different types of knowledge shared by distributed workgroups members through the lens of justice perceptions of employees. These different types of knowledge have unique implications upon organizational performance. For example, while documentation and reports save time and effort, they undermined performance and work quality (Haas et al. 2005). Considering the importance of different types of knowledge, the influence of justice perceptions upon knowledge sharing has been absent, particularly within the distributed workgroups literature. By tapping upon the ability of justice perceptions to distinguish between different degrees of performance, this allows us to gain a deeper understanding of employees’ knowledge sharing practices.

As social ties play a major role in understanding work behavior of distributed teams (Ahuja et al. 2003), we adopted a social network perspective to better understand the effect of justice perceptions upon knowledge sharing within dyads. The influence of social ties had been demonstrated to be salient within distributed workgroups, such as in the formation of informal status and role (Ahuja et al. 2003). In addition to knowledge sharing (Tortoriello et al. 2008) and cognition of organizational norms (Krackhardt et al. 1988; Wong 2008), social ties also possessed ability to impact justice perceptions (Chia et al. 2006; Fang et al. 2009; Shapiro et al. 2008). This study aims to contribute to existing justice, social network, knowledge sharing literature by (1) clarifying and investigating the influence of social ties on congruent (i.e., similar) justice perceptions of dyads, and (2) the impact of congruent justice perceptions upon knowledge sharing of dyads within distributed workgroups.

Theoretical Foundations

Our study adopted the notion of justice perceptions as a contagion between individuals (Degoey 2000), examining the ability for colleagues and friends to play an active role in shaping justice perceptions through social ties. Using existing social ties as referents of injustice (Kray et al. 2002), employees exchange and process justice information
(Chia et al. 2006; Fang et al. 2009) to process perceived uncertainties, unfair treatments, and to avoid potential injustice. As employees participate in such sensemaking practices and are exposed to the effects of social influence, we investigated whether dyads possessing existing cohesive ties forged congruent justice perceptions by utilizing the concept of a Simmelian-tied dyad (i.e., a dyad embedded within a three-person clique).

**Justice Perceptions**

Research on justice perceptions had grown considerably over the past three decades (Colquitt et al. 2001), holding crucial implications for managers and organizations (Simons et al. 2003). In our study on knowledge sharing, we considered outcomes such as organization citizenship (Lavelle et al. 2007; Niehoff et al. 1993), job satisfaction (Wesolowski et al. 1997), rule compliance, commitment, and helping behavior (Colquitt et al. 2001) to be particularly important. Four dimensions of justice perceptions were operationalized in recent years: distributive, procedural, interpersonal, and informational.

Distributive justice perception concerned the fairness of work outcomes (e.g., pay), originally introduced as equity theory (Adams 1965). According to equity theory, the fairness of outcomes was not necessarily absolute level of outcomes, but as relative to the degree of contribution. Other measures such as equality and need had been identified in the formation of distributive justice perception (Colquitt et al. 2001). Distributive justice perception had been identified with work outcomes such as organizational commitment (Aryee et al. 2002). Procedural justice perception considered the fairness of processes (Lind et al. 1988). A procedure is deemed fair if it is consistent, bias-free, accurate, ethical, and open to opinions (Leventhal 1980). The wide applicability of procedural justice (Colquitt et al. 2001) and its associated effects such as citizenship behavior (Pillai et al. 1999) makes this construct particularly useful in applying this construct to the context of knowledge sharing.

Interpersonal and informational justice perceptions were originally introduced as interactional justice, or the treatment of individuals (Bies et al. 1986). Interactional justice perception was later clarified as two distinct forms of justice items (Greenberg 1990). Interpersonal justice perception referred to respectful and polite treatment, while informational justice is considered the completeness and transparency of work explanations. These supervisor-oriented perceptions (Colquitt et al. 2001) were capable of influencing both highly positive (Simons et al. 2003) and negative work performance (Ambrose et al. 2002).

Existing studies found that social ties not only transmitted justice perceptions (Chia et al. 2006) but also possessed the ability to influence peers (Lamertz 2002; Umphress et al. 2003). However, these findings had been conflicted. For example, while Chia et al. (2006) found that employees within friendship dyads often exchanged and accepted procedural justice perception, Umphress et al. (2003) were not able to find such support for congruent (i.e., similar) procedural justice perception. Similarly, Umphress and colleagues failed to find congruent distributive justice perception in the organization while laboratory studies reported the contrary (Roberson 2006). Our study within an actual organization will serve to clarify these existing findings through the use of Simmelian-tied dyads.

**Social Ties and Simmelian-tied Dyads**

This study concentrates on two types of social ties (i.e., relationships): advice and friendship. Advice ties concern with whom individuals approach for work-related advice (Podolny et al. 1997), while friendship ties consider with whom individuals share perceptions and rely for social support (Coleman 1990). By considering the nature of advice and friendship ties, different justice perceptions may be transmitted (Chia et al. 2006; Umphress et al. 2003). Advice ties strongly influenced areas such as organizational learning (Biele et al. 2008), performance (Verbeke et al. 2007), and knowledge sharing (Cross et al. 2004; Kachra et al. 2008; Reagans et al. 2003). On the other hand, friendship ties transmit affect and emotion, transcending boundaries such as demographics (Plickert et al. 2007) and fostering congruent professional values (Gibbons 2004).

Strong advice and friendship ties afford opportunities available only within one's social network, allowing a stable base of trust to deal with organizational changes and reduce uncertainties (Krackhardt et al. 2002). Such strong ties may be seen in the form of “Simmelian” ties, or reciprocated three-person cliques that exists within the overall social network. Simmelian-tied dyads reinforces the nature of strong ties by considering dyads embedded within such these cliques (Krackhardt et al. 2002). Compared to regular social ties, Simmelian ties are social ties that "bind doubly" (Sparrowe et al. 1997). A Simmelian-tied dyad introduces three properties: (1) enforcing group interests through outvoting (i.e., the perseverance of majority interests), (2) reducing individual bargaining power, and (3)
encouraging cooperation. Simmelian-tied dyads offer opportunities for sensemaking, forging congruent perceptions (Lamertz 2002), social support, and knowledge sharing across boundaries (Dekker et al. 2004; Tortoriello et al. 2008) as well as increased cognition of social ties (Krackhardt 1995) and knowledge sources (Wong 2008).

**Distributed Workgroups, Social Ties, and Knowledge Sharing**

Knowledge sharing, or the exchange of information, expertise or feedback (Cummings 2004), is crucial to organizational success. The transfer of information between employees enable organizations in creating, establishing, and pooling knowledge (Nonaka et al. 1995). However, the increased adoption of distributed workgroups presents several challenges to knowledge sharing between members such as geographic isolation, time coordination difficulties (Cramton 2001), and a lack of social and visual cues (Daft et al. 1987; DeSanctis et al. 1994) stemming from dependence on computer-mediated communication (Gibson et al. 2006).

Studies examining the social ties and knowledge sharing practices of distributed workgroups found evidence for the ability of social ties to transmit knowledge in both collocated (Nahapiet et al. 1998) and distributed workgroups, albeit with greater coordination costs (Boh et al. 2007). Considering the difficulty in communicating and identifying with fellow distributed workgroup members coupled with the relative sparser social networks of distributed workgroups (Herbsleb et al. 2003), the presence of cohesive ties (e.g., Simmelian ties) will allow a more stable environment for sharing of work information, sensemaking and social support as opposed to regular ties. For example, the presence of cohesive social ties (e.g., Simmelian ties) increased cognition of knowledge sources (Wong 2008), potentially aiding the knowledge sharing within distributed workgroups.

In addition to recognizing the importance of knowledge sharing, there is also a need to differentiate the types of knowledge being shared. For example, sharing expertise allows organizations to be flexible and adapt to changes and improve work quality (Ancona et al. 1992; Haas et al. 2005; Nahapiet et al. 1998), while sharing documentation and reports were detrimental to strategic performance and quality (Haas et al. 2005). Constant and colleagues (1994) proposed two main dimensions, product and expertise knowledge, in their theory of information sharing, an information systems theory aimed at understanding the motivations behind different types of knowledge sharing.

Product knowledge is knowledge that is tangible, common and owned by the organization, such as project information or technical documentation. Contributing such knowledge is the motivated by an employee's basic compliance to the organization (Jarvenpaa et al. 2001). Expertise knowledge is usually intangible and unique to the individual, such as work experience and personal advice, relying on the individual's fulfillment of his/her self-expressive, such as being respected (Constant et al. 1994) and recognized (Chan et al. 2004).

These different attitudes associated with product and expertise knowledge sharing closely relate to the nature of the organization (Alavi et al. 2006) and in turn justice perceptions. For example, procedural justice perception which considers the manner in which employees are recognized guided employees' expertise knowledge sharing to organizational surveys (Spitzmüller et al. 2006) and strategic decisions (Kim et al. 1998). On the other hand, the sharing of product knowledge relates to the equity theory aspect of distributive justice perception. With the increased salience of justice perceptions in distributed environments due to the reduction of social cues (Tangirala et al. 2006), the use of organizational justice will provide us with a comprehensive set of lens to better understand and explicate the dissimilar motivations behind product and expertise knowledge sharing.

**Model and Hypotheses**

**Congruent Justice Perceptions and Knowledge Sharing**

Individuals with congruent perceptions (such as organizational values) were likely to be closer and familiar with each other, sharing resources to solve problems (Gruenfeld et al. 1996; McPherson et al. 1987; Umphress et al. 2003). As distributive justice perception is associated with commitment, citizenship (Aryee et al. 2002), and compliance behavior (Kim et al. 1998), we predicted that dyads with congruent distributive justice perceptions will be inclined to share product knowledge with each other in order to comply with required work commitments.

Procedural justice perception is concerned with employees' ability to voice concerns and influence decisions about their work, influencing volunteering, helping, and discretionary service behavior (Colquitt 2001; Simons et al.
Similarly, interpersonal justice perception encourages work performance (Jones et al. 1997; Roch et al. 2006; Simons et al. 2003), while informational justice perception instills voluntary performance-oriented behavior through trust and transparency (Colquitt 2001; Ellis et al. 2001; Turel et al. 2008).

As procedural, interpersonal, and informational justice perceptions relate to employee treatment and recognition (Constant et al. 1994; Jarvenpaa et al. 2001), positive levels of these three justice perceptions motivated employees to fulfill more than the basic job requirements to share expertise and strategic knowledge (Kim et al. 1998; Spitzmuller et al. 2006; Wasko et al. 2000). This is unlike distributive justice perception, which did not induce counterproductive work behavior, and dyads are likely to share product knowledge regardless of positive or negative levels of congruent distributive justice perception.

The inherent nature of procedural, interpersonal, and informational justice perceptions that encouraged volitional work behavior also motivated counterproductive work behavior when negative levels of such justice perceptions were present (Jones et al. 1997). It is likely that employees would withhold utilizing and sharing expertise knowledge in their work in a move to sabotage work quality if they harbored negative perceptions of procedural, interpersonal, and informational justice perceptions. Therefore, considering that congruent perceptions impacted work performance and knowledge sharing (Phillips et al. 2004), employees would be in a position to share and reciprocate expertise knowledge only if they possessed positive congruent justice perceptions.

Simmelian Ties, Congruent Justice Perceptions, and Knowledge Sharing

Distributive justice perception is associated with objective, work-related outcomes (e.g. pay). While laboratories studies report congruent distributive justice perception through sensemaking within workgroups (Roberson 2006), earlier network studies suggest the opposite (Lamertz 2002; Umphress et al. 2003). Although no support was found, Umphress et al. (2003) first proposed that the organization-related nature of distributive justice perceptions might be transmitted through socializing advice ties. Compared to procedural, interpersonal, and informational justice perceptions, which involve the subjective interactions with supervisors, the objective nature of distributive justice does not lend itself to sensemaking and social influence (Lamertz 2002).

We argue that rather than advice ties, distributive justice perceptions are susceptible to social influence through friendship ties, particularly through Simmelian-tied friendship ties. While distributive justice perceptions may be seen as objective and unambiguous, individual perceptions of these work outcomes (e.g. pay satisfaction) remain highly personal and subjective (Colquitt et al. 2001; Sweeney et al. 1993). Such sensitive and subjective perceptions would be subjected to sensemaking and social influence (Klein et al. 2001), particularly with perceived injustice (Shapiro et al. 2008). Considering that strong friendship ties that are associated with trust and concern (Verbeke et al. 2007), and span organizational boundaries (Krackhardt 1995), we hypothesized that Simmelian-tied friendship dyads are likely to form congruent distributive justice perceptions, and in turn, product knowledge sharing.

H1. Congruent distributive justice perception will partially mediate the relationship between Simmelian-tied friendship dyads and product knowledge sharing.

In the context of our study, we aim to investigate if positive perceptions of procedural, interpersonal, and informational justice perceptions are likelier to promote greater levels of work performance and in turn motivate expertise knowledge sharing. Explicit expressions of injustice have been proposed to be more susceptible to social influence and sensemaking (Shapiro et al. 2008). Therefore, in the absence of explicit sharing of injustice among Simmelian-tied dyads, we propose that it is more likely for Simmelian-tied individuals to share positive levels of procedural, interpersonal, and informational justice perceptions, and in turn share expertise knowledge.

Procedural justice perception was associated with the manner in which processes are executed, such as impartial treatment. Compared to distributive justice perception, which concerns pay and workplace recognition, procedural justice perceptions are of a less sensitive nature, being associated with supervisor evaluation and exchanges (Colquitt 2001). Such perceptions are likely to be exchanged through sensemaking among workgroup members who may or may not be personal friends.

Like distributive justice, research examining the effects of social ties upon congruent procedural justice perception through social ties remains blurred. For example, while the type of social ties was not addressed, workgroups and Simmelian-tied dyads were found to share congruent procedural justice perception (Lamertz 2002; Van Den Bos et al. 2001). Social network studies also found that work-related advice and friendship dyads sought procedural justice information in regular (Chia et al. 2006) and distributed workgroups setting (Hakonen et al. 2008).
While regular dyads exchange and accept procedural justice perceptions, this does not necessarily mean that each individual receives another's justice reports as their own. Reports of secondhand justice information are seen as less reliable and biased compared to personal experiences (Van Den Bos et al. 2001). This issue may be mitigated in a Simmelian-tied dyad, as justice perceptions may be reinforced with the presence of the third party. Thus, it is likely that both Simmelian-tied advice and friendship dyads share congruent procedural justice perception.

H2a. Positive congruent procedural justice perception will partially mediate the relationship between Simmelian-tied advice dyads and expertise knowledge sharing.

H2b. Positive congruent procedural justice perception will partially mediate the relationship between Simmelian-tied friendship dyads and expertise knowledge sharing.

Interpersonal justice perception is often associated with the subordinate’s evaluation of the supervisor (Colquitt 2001). The sensitive nature and associated consequences with the interpersonal perceptions of supervisors means that close friends who share emphatic concerns, trust, and social support are likelier to exchange such information compared to regular colleagues. Informational justice perception addresses the transparency of work-related processes and outcomes (Greenberg 1993). Considering that informational justice perception also deals with sensitive information such as personal treatment, we expect that like interpersonal justice perception, information regarding informational justice is likely to be exchanged among close, trustworthy friends (Chia et al. 2006). Similarly, we predict that these notions will be further reinforced within Simmelian-tied friendship dyads.

H3. Positive congruent interpersonal justice perception will partially mediate the relationship between Simmelian-tied friendship dyads and expertise knowledge sharing.

H4. Positive congruent informational justice perception will partially mediate the relationship between Simmelian-tied friendship dyads and expertise knowledge sharing.

Figure 1 presents the overall research model based on the arguments and hypotheses presented above.

<table>
<thead>
<tr>
<th>Simmelian-tied dyads</th>
<th>Congruent justice perception</th>
<th>Knowledge sharing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advice</td>
<td>Positive levels of congruent justice perception</td>
<td>Product</td>
</tr>
<tr>
<td>Friendship</td>
<td>Procedural</td>
<td>Expertise</td>
</tr>
<tr>
<td></td>
<td>Interpersonal</td>
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<td></td>
<td>Informational</td>
<td></td>
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</tbody>
</table>

Figure 1. Research Model

Research Methodology

Sample

The research was conducted within distributed workgroups in a global knowledge intensive organization with its headquarter in Germany. Our participants were team members from the IT division that developed internal software products for the organization. The workgroups were distributed across several continents, time zones, and cultures such as Germany, Australia, and Singapore. These members communicate over a variety of electronic tools, of which email was most widely and commonly used between distributed and collocated members. The nature of these workgroups mirrored those of existing organizations, providing us with an appropriate and ideal setting (Ahuja et al. 2003) to perform our study. We administered a survey to the members of the distributed workgroups. The average group size was 11. Due to attrition and non-participation, of the 44 members approached, 34 returned the survey...
(77%), a suitable sample size for network surveys (Cross 2006). The average tenure of a workgroup member was 6 years and 12% were of a higher status, such as team leads.

**Procedures**

We designed and developed an online survey tool to capture the social network responses of the workgroup members. We sent out personalized emails to the participants detailing the survey procedures following an introductory email by a senior manager of the organization who acted as a sponsor. Follow-up emails were sent to encourage the response rate. We studied knowledge sharing by considering the extent to which employees provided product and expertise knowledge to each other via email within their respective workgroups. Preliminary interviews and subsequent surveys on communication channels reported that email was reported to be the most frequently and consistently used communication channel throughout the different workgroups, even between collocated members. In addition, knowledge sharing was mostly encouraged but not explicitly rewarded, allowing us to study knowledge sharing perceptions of workgroup members without interference from the prospect of rewards (Bock et al. 2002) or direct face-to-face requests (Flynn et al. 2008). As knowledge sharing was encouraged but not mandated, this was particularly applicable in our study on expertise knowledge sharing, being dependent on a voluntary and vicarious action based on individual attitudes (Constant et al. 1994) and justice perceptions (Kim et al. 1998).

**Measures**

Eight variables were adapted from prior studies with the items reworded using the organization as the referent. Two variables measured advice and friendship dyads, four variables measured justice perceptions, and two variables were used for knowledge sharing. As we were considering the effects of Simmelian-tied dyads, congruent justice perceptions, and knowledge sharing, we adopted a dyadic level of measurement and analysis.

*Simmelian-tied advice and friendship dyads.* A roster of participants captured the respondents’ social ties through the network survey. We captured advice ties by asking, "In the past 2 weeks, how often do you go to [a referent] for work-related matters?" (Krackhardt 1995; Umphress et al. 2003). To measure friendship ties we asked, "I consider [a referent] to be my friend" (Shah 1998). In order to generate Simmelian-tied advice and friendship dyads, we utilized a social network analysis package, UCINET 6 (Borgatti et al. 2002). Based on the captured responses, reciprocated advice and friendship dyads were generated in the form of two matrices. A reciprocated advice dyad existed only if person $i$ gave or sought advice from person $j$, and vice versa. The same applied to a friendship dyad. This gave us the raw advice and friendship dyads. Next, a hypergraph matrix illustrating each instance in which a respondent was tied to every other respondent was derived from the raw dyadic matrix obtained from the survey. Next, a matrix of Simmelian-tied respondents was derived (Krackhardt et al. 2002).

*Workgroup membership.* In order to study congruent justice perceptions of dyads within distributed workgroups, we used the workgroup membership and country location of each participant. These items were provided by the organization. We generated a matrix for each original set of advice and friendship ties. The matrix comprised of all Simmelian-tied dyads within each workgroup, including Simmelian-tied dyads that spanned country boundaries.

*Congruent organizational justice perceptions.* Justice measures were adapted from Colquitt’s (2001) four-factor justice model to fit the organization. All of the items were measured using a 7-point Likert-type scale (1=strongly disagree). As this survey was administered in countries where English is not a first language, we simplified and reduced the number of items in each construct consistent with an earlier study (Simons et al. 2003). Distributive justice measured the satisfaction of work outcomes (e.g., pay) relative to effort put in (e.g., “Rewards that I receive at [the firm] (e.g., pay, bonus, recognition) reflect the effort I have put into my work”) while procedural justice captures the fairness at which processes are carried out (e.g., “I had been able to express my views and feelings when decisions about my job are made”). Interpersonal and informational justice taps into the relational and communicative aspects of justice respectively (e.g., “I am treated in a polite manner at [the firm]” and “Explanations of work procedures were thorough”). In order to measure congruent justice perceptions, matrices were generated for each justice perception. Congruent distributive justice perception was calculated by first taking the absolute difference of each pair of responses, giving a new matrix where a larger value signified a greater difference in perception. Next, the matrix was multiplied by -1 such that a higher value between each pair signifies greater congruence. Positive congruent procedural, interpersonal, and informational justice perceptions considered the positive (agree and strongly agree) responses of each respondent. For each justice item, a matrix was derived such a 1 was given to respondents when both shared positive levels of justice perceptions; otherwise a 0 was given.
Knowledge sharing. Based on previous studies (Constant et al. 1994; Cummings 2004) and preliminary interviews, knowledge sharing was captured by considering the degree to which respondents provided work information to a fellow workgroup member. Respondents were asked, "How often have you shared [knowledge type] with [person] using email?" Frequency was measured over a Likert-type scale (1=never and 4=several times a day). We generated two matrices based on the aggregated responses for each type of knowledge. Knowledge sharing between each pair of respondent was present if they shared knowledge with each other at least once a week. A 1 was given if knowledge sharing was present within a dyad; otherwise a 0 was given.

Control variables. We included four other variables to eliminate alternative explanations. We controlled for the effects arising from job hierarchy (e.g. manager vs. non-manager), as this was shown to influence centrality and performance (Ahuja et al. 2003). We also controlled for tenure, which was associated with knowledge sharing in the form of generalized reciprocity or “giving back” to the community (Wasko et al. 2000). We controlled for the workgroup as the structure and leadership differences within workgroups had been shown to impact performance and knowledge sharing (Cummings 2004). We included location as a country's culture had been shown to influence communication and justice perceptions (Brockner et al. 2000). We generated matrices for control variables for the dyadic level analysis. For tenure, we generated the matrix by taking the absolute difference between each pair of respondent’s tenure, followed by a negation, such that higher values represented greater tenure differences. The matrices for hierarchy, workgroup, and location were calculated by giving a 1 between each pair of respondents that shared the same value for each variable; otherwise a 0 was given.

Analyses

With standard regression techniques, regular statistical inferences from network data are not possible as network data are often autocorrelated. To overcome this limitation, we ran analysis quadratic assignment procedure (QAP) and multiple regression quadratic assignment procedure (MRQAP) (Baker et al. 1981; Hubert et al. 1976) using network analysis program, Ucinet 6 (Borgatti et al. 2002). Quadratic assignment procedure was used instead of ordinary least squares, as QAP remained unbiased with non-independent observations (Umphress et al. 2003). QAP was used to generate a bivariate correlation matrix while MRQAP was used to test the hypotheses.

Results

Preliminary Analysis

Table 1 provides the number of respondents, means, standard deviations, reliabilities and correlations for all variables used, including the control variables. We observed a low correlation (b=0.170) for the dependent variables of product and expertise knowledge sharing. This is similar to existing studies, which utilized different knowledge types as dependent variables (Haas et al. 2005). Network studies do not usually assess the measurement model as model variables are usually single-item and each network question addresses specific persons in the network. We ran a confirmatory analysis to ensure reliability for the multi-item individual-level justice scales. We eliminated an item from interpersonal justice due to significant inter-correlation. A final clean set (Table 2) with all items reporting Cronbach's alpha above the recommended 0.70 threshold (Nunnally 1979).

Hypothesized Model

The results of the MRQAP regression analyses are summarized in Table 3. With the use of multiple dependent variables in each set of regression analysis (e.g. different types of justice perceptions and knowledge sharing), the results were interpreted in a manner similar to ordinary least squares regression (Shah 1998). That is, individual MRQAP regression analysis was done for each dependent variable. We tested for mediation using three criteria (Baron et al. 1986; Borgatti 2005). First, Simmelian-tied dyads must predict the congruent justice perceptions (i.e., mediating variables). Second, Simmelian-tied dyads must predict knowledge sharing (i.e., dependent variables). Finally, to test for full mediation, the coefficient for Simmelian-tied dyads must become insignificant when the mediating variables are controlled for, otherwise only a partial mediation effect was present.
Table 1. Descriptive Statistics and Correlations

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† = p < 0.1, * = p < 0.05, ** = p < 0.01, *** = p < 0.001 (All significance based on 5,000 permutations, 2 tailed)

Legend

C = sameness of country
T = difference in tenure
G = sameness of workgroup
H = sameness of hierarchy
SA = Simmelian-tied advice dyads
SF = Simmelian-tied friendship dyads
DJ = congruent distributive justice perception
PJ = positive congruent procedural justice perception
IPJ = positive congruent interpersonal justice perception
IFJ = positive congruent informational justice perception
PK = product knowledge sharing
EK = expertise knowledge sharing

Table 2. Factor Analysis and Reliability Statistics

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### Table 3a. Regression Results (DV: Product Knowledge Sharing; IV: Simmlian-tied Advice Dyads)

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### Table 3b. Regression Results (DV: Product Knowledge Sharing; IV: Simmlian-tied Friendship Dyads)

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### Table 3c. Regression Results (DV: Expertise Knowledge Sharing; IV: Simmlian-tied Advice Dyads)

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### Table 3d. Regression Results (DV: Expertise Knowledge Sharing; IV: Simmlian-tied Friendship Dyads)

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† = p < 0.1, * = p < 0.05, ** = p < 0.01, *** = p < 0.001 (All significance based on 5,000 permutations, 2 tailed)

Please refer to the preceding page for the legend.
Hypothesis H1 stated that congruent distributive justice perception would mediate the relationship between Simmelian-tied friendship dyads and product knowledge sharing. This hypothesis was not supported. Simmelian-tied friendship dyads failed to predict product knowledge sharing.

Hypothesis H2a stated that positive levels of congruent procedural justice perception would mediate the relationship between Simmelian-tied advice dyads and expertise knowledge sharing. This hypothesis was supported. Simmelian-tied advice dyads moderately predicted expertise knowledge sharing ($b=0.064; p<0.1$). This relationship became insignificant when controlling for the mediating variable with positive levels of congruent procedural justice perception ($b=0.127; p<0.05$) mediating this relationship.

Hypothesis H2b stated that positive levels of congruent procedural justice perception would mediate the relationship between Simmelian-tied friendship dyads and expertise knowledge sharing. This hypothesis was supported. Simmelian-tied friendship dyads significantly predicted expertise knowledge sharing ($b=0.207; p<0.001$). This significance decreased when controlling for the mediating variable ($b=0.095; p<0.05$), indicating a partial mediation effect by positive levels of procedural ($b=0.110; p<0.01$) justice perception.

Hypothesis H3 stated that positive levels of congruent interpersonal justice perception would mediate the relationship between Simmelian-tied friendship dyads and expertise knowledge sharing. This hypothesis was not supported. While Simmelian-tied friendship dyads significantly predicted expertise knowledge sharing ($b=0.207; p<0.001$), there was no significant relationship predicting congruent interpersonal justice perception.

Hypothesis H4 stated that positive levels of congruent informational justice perception would mediate the relationship between Simmelian-tied friendship dyads and expertise knowledge sharing. This hypothesis was supported. Simmelian-tied friendship dyads significantly predicted expertise knowledge sharing ($b=0.207; p<0.001$). This significance decreased when controlling for the mediating variable ($b=0.117; p<0.01$), indicating a partial mediation effect by positive levels of informational ($b=0.166; p<0.01$) justice perception.

We found several non-hypothesized relationships. When all four justice perceptions were taken together as mediating variables for the relationship between Simmelian-tied friendship dyads and expertise knowledge sharing, congruent distributive justice perception were found to partially mediate this relationship ($b=0.051; p<0.1$) together with positive levels of congruent informational justice perception ($b=0.158; p<0.01$). Positive levels of congruent informational justice perception were also found to partially mediate the relationship between Simmelian-tied advice dyads and expertise knowledge sharing ($b=0.167; p<0.01$). The $R^2$ values were in the 3.5% to 9% range for the hypothesized results, giving a correlation of 0.16 to 0.45. These values were comparable to those found in existing justice perceptions studies (Cohen-Charash et al. 2001; Colquitt 2001; Umphress et al. 2003).

Discussion

The first item of interest is the marginally significant relationship between Simmelian-tied friendship dyads and congruent distributive justice perception. Due to the nature of distributive justice, it has been suggested that work-related ties would influence this justice item although no support for this hypothesis was found (Umphress et al. 2003). While we were not able to find support for Hypothesis H1, a non-hypothesized relationship between Simmelian-tied friendship dyads, congruent distributive justice perception, and expertise knowledge sharing was found. This hinted at the possibility that the sensitive nature of distributive justice perception indeed lent itself to be shared through friendship ties rather than advice ties. Future studies may further probe the relationship between friendship ties and distributive justice perceptions, and the flow and exchange of such justice information.

We were not able to find any relationship between Simmelian-tied dyads and product knowledge sharing. This may be attributed to the fact that product knowledge need not be elicited from close friends or colleagues, but regular members of the organization. The highly significant relationships between Simmelian-tied dyads and expertise knowledge sharing indicated the importance of social ties and perceptions when it comes to volunteering expertise knowledge within distributed workgroups. Compared to congruent distributive justice perception, the positive levels of procedural and informational justice perceptions were pivotal to predicting expertise knowledge sharing.

Our findings extended existing justice literature by including friends as well as colleagues who were found to share congruent procedural justice perceptions (Lamertz 2002; Umphress et al. 2003). The ability for congruent procedural justice perception to span across geographical boundaries through Simmelian-tied dyads highlighted the importance of procedural justice at the workplace. The presence of the third-party within Simmelian ties may indeed be vital to the sharing and acceptance of procedural justice perceptions among close friends and colleagues.
We hypothesized but failed to find any direct relationship between Simmelian-tied friendship dyads, positive levels of congruent interpersonal justice perception, and expertise knowledge sharing. This was a surprising result as like procedural justice perception, this justice perceptions dealt with the respect and recognition of employees. Repeating these tests on Simmelian-tied advice dyads also failed to yield any congruent interpersonal justice perception. This may be attributed to the individualized nature of interpersonal justice perception. While interpersonal justice perception may be sought and exchange (Chia et al. 2006), employees may not necessarily forge congruent perceptions within each other, as the individual nature of each person may affect interpersonal treatment. For example, individual self-monitoring behavior led to both positive and negative social ties (Sasovova 2006).

Considering the highly personalized nature of interpersonal justice perception, the triadic nature of a Simmelian-tie works against itself in establishing congruent interpersonal justice perception. Umphress et al. (2003) found that interactional (a combination of interpersonal and informational) justice perceptions were most strongly related to colleagues who shared weak friendship. Thus, a simple tie may be all that is required to transmit and share interpersonal justice perception, particularly if both parties were subjected to the same treatment.

As predicted, positive levels of congruent procedural justice perceptions led to expertise knowledge sharing. This further supports prior findings (Kim et al. 1998; Spitzmüller et al. 2006) that positive levels of procedural justice perceptions encouraged volitional performance and in our study, expertise knowledge sharing. Furthermore, we were also able to establish the same effects for positive levels of informational justice perception. These findings point to the importance of fair treatment, impartiality, the ability to participate in the decision-making process, and trust in eliciting expertise knowledge sharing that is crucial to an organization's success. Congruent distributive justice perception did not play as large a role compared to other forms of justice perceptions in motivating knowledge sharing, demonstrating that basic work outcomes such as pay and rewards played a limited role.

The mediating role of justice perceptions (with the exception of interpersonal justice perception) was found between Simmelian-tied advice and friendship dyads and expertise knowledge sharing. These findings highlighted the importance of both the ability of cohesive individuals to form congruent justice perceptions, and for these justice perceptions to impact knowledge sharing practices.

**Theoretical Implications**

Our findings contributed to existing social network and organizational justice research by examining the ability of justice perceptions ability to span distributed workgroups. The study reinforced notions of social influence, social ties, and cliques to share justice perceptions across locations, and not solely confined to collocated employees.

We found marginal support for the shared perceptions of distributive justice perceptions within Simmelian-tied friendship dyads in sharing expertise knowledge. This finding reinforced an often-overlooked perspective to distributive justice perception: that perceptions (e.g. pay satisfaction) were sensitive and as such ambiguous between employees (Colquitt et al. 2001; Sweeney et al. 1993). With workgroup members spanning multiple countries and work cultures, the ambiguity of such justice perceptions are further increased, affording the new opportunities for social comparison to occur and the reliance upon fairness heuristics as a means to judge the trustworthiness of authorities (Lind 2001). Thus, regardless whether workgroup members are distributed or collocated, these perceptions may still be transmitted over close friendship ties and cliques. While the outcomes of distributive justice perception may be associated with basic work compliance and in eliciting volitional behavior, this finding offered alternative approaches to interpreting the communication of justice perceptions. For example, the ambiguity of distributive justice stemmed from the voluntary non-disclosure due to subject sensitivity rather than the direct implications of unambiguous formalized job scope, remuneration, and compensation.

Positive levels of congruent procedural and informational justice perceptions that brought about expertise knowledge sharing reinforced earlier studies that related these perceptions to discretionary behavior (Colquitt 2001; Ellis et al. 2001; Turel et al. 2008). The highly significant relationships of procedural and informational justice perceptions in expertise knowledge sharing indicated the importance these perceptions compared to distributive justice perceptions. By comparison, while product knowledge sharing was not elicited within Simmelian-tied dyads, a marginal negative relationship was found with congruent distributive justice perception (b=-0.68; p<0.1). This suggested that regardless of distributive and other justice perceptions, helping behavior within dyads may bring about product knowledge sharing in carrying work duties. Thus, taken from a dyadic perspective, product knowledge sharing may still occur with negative distributive justice perception. This phenomenon may be better understood by considering the theory of information sharing.
By introducing the theories underlying justice perceptions to Constant and colleagues’ (1994) often overlooked theory of information sharing in our study as noted by Jarvenpaa et al. (2001), we were able to make new observations in the context of distributed teams. Our findings reinforced the importance of fulfilling self-expressive needs in bringing about expertise knowledge sharing. Interestingly, product knowledge sharing occurred when we considered sharing behavior in the context of dyads, supporting the theory that such knowledge were seen as organization-owned, and were shared regardless of positive or negative justice perceptions. This stood in contrast to the expected general outcomes of distributive justice (i.e., compliance behavior), suggesting that in specific contexts general work outcome measures failed to predict expected employee behavior.

Overall, this study filled in the existing gaps in the literature by considering all four dimensions of justice perceptions and their relationships with different types of social ties and knowledge sharing. Our research also considered the context of distributed workgroups, an increasingly common feature in organizations.

**Managerial Implications**

The ability of congruent justice perceptions to be formed between workgroup members carries important implications for the global organization. As managers and decision-makers attempt to forge close, trusting working relationships among distributed workgroups through means such as occasional face-to-face meetings (Jarvenpaa et al. 1998), there is a need to be aware of the implications of such strong relationships (examined in this study in the form of Simmelian-tied dyads) that are encouraged and built up within the organization. Due to advancing and sophisticated technologies, the relative ease of communication within distributed workgroups across countries further allow the development of close working relationships and friendships. Ironically, while these organizational mandates work to encourage workplace relationships with the intent to boost trust and performance, these efforts may backfire with poor and biased execution of processes and outcomes.

When distributed workgroup members are in a better technological and relational position (e.g., through Simmelian ties) to forge justice perceptions through sense-making and social influence, perceived injustice by individual members may impair work performance (Skarlicki et al. 1997). This situation which may be further aggravated when extended to a collective climate at a team-level (Roberson 2006). Thus, in addition to ensuring organizational fair in terms of work rewards, processes, communication, and interpersonal treatment at the local level, there may be a greater need for uniformity in making and executing decisions at the global level, not just with regards to knowledge sharing but the myriad of crucial work outcomes associated with organizational justice such as citizenship behavior (Colquitt et al. 2001).

In terms of knowledge sharing outcomes, managers and decision-makers may take note of the importance of procedural and informational justice perceptions in influencing expertise knowledge sharing, which is crucial to outcomes such as work quality and innovation. By contrast, none of the justice perceptions played a significant role in eliciting product knowledge sharing, suggesting that such knowledge is exchanged regardless of individual members’ justice perceptions and shared with workgroup members in order to complete work tasks. While this area of study warrants further research to ascertain the psychological, organizational, and technological factors involved in the formation of such knowledge sharing motivations, managers and decisions should maintain a level of procedural and informational fairness across the organization in order to encourage workgroup members to share work expertise to achieve greater levels of work performance.

**Limitations and Future Research**

The sample used for this study is limited by sample size (N=34) and scope (a single organization). However, as this study was carried out in several workgroups, this aided the applicability of the findings. This study may be replicated in other organizations to ascertain the overall applicability of the findings. Findings such as the relationship between procedural justice and expertise knowledge sharing were strengthened through corroboration from existing justice studies. Also, this study was carried out in an actual organization and not a controlled experiment or university surveys common to justice research. While multiple social factors are likely to affect our model outcomes and relationships, this research contributed to existing justice research through the study the distributed workgroups of an actual multinational organization.

Future studies might consider the other factors that may potentially affect the flow of justice information such as network size (Fang et al. 2009), small world networks (Shapiro et al., 2008), and external ties (Umphress et al.
The concept of justice information flow is an important one. While most justice research adopting the social network perspective measured congruent justice perceptions by comparing the similarities in perceptions, this approach did not tap into the manner in which justice perceptions were explicitly exchanged and accepted. By specifically addressing the mechanisms in which justice-related information are transmitted (Fang et al. 2009), the communication and sharing patterns of justice-related information among employees may be observed. In addition to field studies, experiments may further ascertain the different possible outcomes associated with distributed and collocated workgroups (Tangirala et al. 2006).

Issues such as culture may also need to be addressed in the context of justice perceptions in distributed workgroups. The value of the correlation and interactional effects between justice perceptions within distributed workgroups must not be discounted. For example, high procedural justice perceptions may help overcome poor distributive justice perceptions (Brockner 2002). These interactional effects may be examined through the use of counterfactual fairness theory (Colquitt et al. 2005), fairness heuristics theory, or uncertainty management theory (Van Den Bos et al. 2001) may reveal greater insights into how congruent justice perceptions form and influence outcomes.

Conclusion

Our research proposed and found support for congruent justice perceptions as a mediator between Simmelian-tied dyads and knowledge sharing. This study sought to address the limitations and conflicts found in existing studies to examine how social structure may potentially influence justice perceptions between employees. Positive levels of congruent procedural and informational justice perceptions were strongly related to expertise knowledge sharing. These perceptions were also found across organizational and geographical boundaries, mediating the relationship between advice and friendship Simmelian-tied dyads, and expertise knowledge sharing.

References


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