EXPLORING NEGATIVE GROUP DYNAMICS: ADVERSARIAL NETWORK, PERSONALITY AND PERFORMANCE IN PROJECT GROUPS

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ABSTRACT

This thesis reports on a two-phase study conducted to explore how negative relations can influence individual group member's performance when working on a group project, and how frequency of communication and personality can moderate this relationship. The first phase of the project examined the impact of negative relations and frequency of communication on performance in project groups. Results showed that group members disliked by others were less likely to perform well, albeit frequent communication with others could make a person more likeable and consequently help him/her perform better. The second phase of the project investigated how the "Big Five" personality traits (conscientiousness, agreeableness, emotional stability, openness to experiences, and extroversion) and position in adversarial networks interacted to influence individuals' performance. The results showed that those individuals disliked by their team members for whatever reasons were less likely to achieve a good performance rating despite having such desirable personality traits as conscientiousness, emotional stability or openness to experiences.

Key words: Adversarial network, group work, personality, communication frequency

BIOGRAPHICAL SKETCH

Ling Xia was born in Changzhou, Jiangsu, P. R. China. Before she came to Cornell University, she received a Bachelor degree in English and a Master degree in Intercultural communication in Huazhong University of Science and Technology. Ling has interests in organizational communication and social network analysis. She will continue her studies as a PhD student in the Department of Communication.

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CHAPTER 1

INTRODUCTION

Social network analysis studies how social relations, in addition to individual attributes, influence human behavior (Wellman & Wortley, 1990). This approach has achieved "a high degree of technical sophistication and has proven to be extremely useful in a strikingly wide range of substantive applications" (Emirbayer & Goodwin, 1994, p. 1411), including sociology (Wellman & Wortley, 1990), organizational behavior (Brass, 1984; Labianca, Brass, & Grary, 1998; Mehra, Kilduff, & Brass, 2001; Sparrowe & Liden, 1997) and communication (Monge & Contractor, 2003). Empirical studies have shown that positive relationships, such as friendship or advice-seeking relationships in organizations, can provide opportunities for social support as well as access to critical resources, which, in turn, can lead to improvement in individual performance (Mehra, Kilduff, & Brass, 2001; Sparrowe, Liden, Wayne, & Kraimer, 2001). For instance, employees may obtain faster promotion by developing supportive network relations in daily communication with friends and colleagues (Podolny & Baron, 1997) . However, demotion may also result from developing negative relationships with others, especially if they involve persons in power (Brass & Labianca, 1999).

In contemporary organizational settings, groups have been widely recognized as the key organizing unit (Argote, 1999; Arrow & McGrath, 2000) partially because group work promises wider access to new information and a greater pool of diverse expertise. However, not all groups collaborate effectively (Peeters, Rutte, Van Tuijl, Harrie, & Reymen, 2006). Negative social interactions happen commonly with people who may be described by co-workers as irresponsible, unmotivated, or indifferent

because they offer "neither valued information and insights, nor support and fun" (Klein, Lim, Saltz, & Mayer, 2004, p. 955). The resulting social ties of the "difficult" communication are usually referred to as "adversarial relationships"(Baldwin, Bedell, & Johnson, 1997, p. 1374). Such relationships, sometimes unavoidable because of task requirements, are more likely to cause emotional distress, anger or indifference. Consequently, the cost, in time or effort, of developing and maintaining such relationships is often not justified by either their long- or short-term benefits.

Most social network studies to date, however, have focused on the positive, rather than the negative, aspects of social networks, and adversarial relations of communication have only been rarely discussed in comparison to other types of communication networks (e.g., friendship, advice, and work-flow networks). Still, more scholars have come to realize the strong detrimental influence of adversarial relations on group collaboration, as well as on individual and group performance (Sparrowe et al., 2001). Defining negative relationships as the "social liabilities" (the opposite of "social capital"), Brass & Labianca (1999) proposed that negative ties may actually have greater importance than positive ties in both explaining and studying organizational dynamics. Their proposition was grounded in diverse psychological studies (c.f. Taylor, 1991) which showed that negative events may "elicit greater physiological, affective, cognitive, and behavioral activity and further lead to more cognitive analysis than neutral or positive events" (p. 325). Labianca & Brass (2006) further explained that negative relationships will adversely influence such individual outcomes like organizational attachment, ability to coordinate activities and willingness to cooperate to achieve organizational goals. At the organizational level, adversarial relationships can have similar detrimental effect to organizations. Yet as Labianca, Brass & Grary (1998) said, it is often very difficult to sever negative relationships in an organization because they are based on "…either required

workflow interactions or hierarchical supervisory relationships…" (p. 55). Furthermore, because group cooperation requires constant interactions among members with diverse psychological and behavioral dispositions, negative relationships are also difficult to avoid.

Among the few studies that have examined how an adversarial network structure may influence individual performance, Baldwin, Bedell and Johnson (1997) found a negative relationship between adversarial network centrality of MBA students and their performance. Yang & Tang (2003)also discovered that adversarial network variables are negatively correlated with students' online and offline performance. Nevertheless, in both of the studies, the researchers either examined the in-degree centrality while neglecting out-degree centrality, or did not distinguish in-degree from out-degree centrality.

When studying adversarial relationships in a group, it is believed that a clear distinction between the two types of centrality measures should be made. The reason is that, similar to friendship ties, adversarial ties are not symmetrical. An observation of "Person A does not like Person B" does not necessarily mean that "Person B does not like Person A." In-degree centrality measures the number of network links a focal node receives reported by other group members in the network (Scott, 2000). Out-degree centrality, on the other hand, measures the number of network links a focal node sends out, based on the focal node's self-report data To address this limitation of the existing studies, the first objective of this research is therefore to replicate and validate findings from earlier works by other scholars, but to make a distinction between in-degree and out-degree centralities in adversarial ties. In the first phase of this project, both centrality measures were included to examine how adversarial network structures are related to individual performance and the level of satisfaction that each group member feels with his or her group experience.

A second objective of this study is to investigate what factors may influence a person's position in adversarial networks, and how these factors will interact with a person's position in adversarial networks to influence performance. Mehra, Kilduff, & Brass (2001) propose that in social network research, scholars should pay more attention to the origins of network positions and the importance of individual characteristics in influencing a person's position in a network (p. 121). Following this call, this research investigated two possible factors that may explain why certain employees end up in central positions in adversarial networks, namely, frequency of communication and personality.

When studying what types of people are more likely to occupy a central position in an adversarial network, this study first focused on profiling people based on their frequency of communication with others. Frequent communication increases people's chances of knowing each other. Although knowing each other more does not guarantee liking, frequent communication does provide a chance for people to resolve differences. Further, this research examined the influence of frequency of communication on the individual's performance and the individual's satisfaction with the group. Baldwin et al., discovered that communication within MBA student teams was directly and strongly associated with perceptions of team effectiveness (1997); however, in their study, researchers identified only the centrality of the communication network and omitted the frequency of communication among team members, i.e., the strength of communication ties. Thus, the current study extends Baldwin et al's research by examining the frequency of within-group communication.

Personality was focused as the second factor in explaining why certain group members occupy central positions in adversarial networks. As Klein et al. (2004) pointed out, most of the network theorists and researchers have directed their attention to the consequences, rather than the antecedents, of the structural properties of social

networks. Consequently, researchers have tended to overlook the impact of psychological antecedents, such as those that involve the influence of individual differences in psychological traits on network structure. Their study stands out as one of the few pioneering efforts dedicated to detecting how certain enduring personal characteristics (e.g., values and personality) influence individuals' positions in different social networks, including adversarial communication networks. A number of their key findings have, however, contradicted more conventional theory, thus justifying additional investigation. For instance, it should be easy to communicate with extroverted individuals, who are generally sociable and energetic. However, in the study by Klein et al., extroversion was found to positively correlate with adversarial communication network centrality. This finding indicates that the more sociable and gregarious an individual is, the more likely he/she is to be disliked by peers, a result which even Klein and his group thought surprising (p. 961).

In short, both theoretical and empirical research on adversarial networks is sparse and incomplete; moreover, the few existing studies have often produced many controversial results. Therefore, the current research aims to replicate and extend previous studies on adversarial networks by (1) reexamining the impact of individual personality traits on group members' positions in adversarial networks in a different research setting and (2) extending existing adversarial network studies by studying the simultaneous influence of personality variables and network positions on performance.

The paper is organized as follows: First, related empirical studies in social network analysis, organizational management and psychological research are reviewed. Next, a two-phase study was conducted to empirically test the hypotheses on how frequency of communication, performance and satisfaction relate to negative network structures (Phase I) and how the relationship among individual personality traits and adversarial network structure interact to influence individuals' performances

(Phase II). Based on the findings from these two studies, this thesis ends with a discussion of practical implications for managing project groups in organizations.

CHAPTER 2

PHASE I: ADVERSARIAL NETWORK, FREQUENCY OF WITHIN-GROUP COMMUNICATION AND PERFORMANCE

In-degree vs. Out-degree Centrality in Adversarial Networks

Baldwin et al. (1997) studied how network structures relate to team performance outcomes and members' satisfaction towards team effectiveness using a sample of 250 MBA students. At the individual level of analysis, they found that centralities in friendship, communication and adversarial networks were related to both students' grades and their attitudes. Analysis at the team level also revealed that relationships within and between teams had significant effects on student perceptions of team effectiveness and objective team performance. One limitation with their study, however, was that they treated adversarial relationships as symmetric and bidirectional. As discussed previously, adversarial relationships may not be symmetrical: when Person A dislikes Person B, it does not necessarily mean that Person B does not like Person A. Therefore, the in-degree centrality and out-degree centrality of the adversarial network should be differentiated. In-degree centrality of adversarial network counts only adversarial relationships with the focal individual reported by other group members. By reflecting the extent to which the focal student is disliked by his/her group members, it is therefore a better predictor of individual performance than the symmetrized centrality in an adversarial network. For groups working on interdependent tasks, each member will depend on others' advice, efforts, and assistance. Therefore, the more adversarial relationships other group members report with the focal person, the more difficult it is for the focal person to gain the needed resources to achieve good performance.

In another study of social networks in groups, Sparrowe et al. (2001) used a sample of forty-seven work groups to investigate friendship, advice and hindrance networks. In their study, the "in-degree centrality" variables of social networks were especially emphasized in order to understand how an individual's network position within the group and his/her job performance is related. As predicted, the authors found that individual job performance was positively related to centrality in the advice network and negatively related to centrality in the hindrance network. Based on this reasoning and the results from similar empirical research, it is therefore proposed that:

H1: In-degree centrality in the adversarial network will negatively affect individuals' performances.

In addition to performance, understanding how group members are satisfied with their group is very important for studying group experiences because positive affect, as reflected in group satisfaction, has the potential to influence motivation and performance (Brief & Weiss, 2002; George & Brief, 1996). Peeters et al. (2006) maintained that if individuals are dissatisfied with their group, they will develop negative attitudes toward group tasks. This can lead to decreased effort when working with groups in the future. Lester, Meglino and Korsgaard (2002) have also found significant associations between group satisfaction and group effort and between group effort and final performance ratings.

Peeters et al. (2006) found that individual satisfaction with group work was related "either to the team members or the team's composition or to the way team members worked together during the project" (p. 189). In other words, if individuals feel comfortable with either the team members or the degree of cooperation within the team, they will be satisfied and consequently more motivated to work with teams in the future. Taking a network approach, Baldwin et al. (1997) directly examined the association between group members' relationships among each other and their

satisfaction with group effectiveness. The results revealed that centrality in the adversarial network was negatively associated with satisfaction with teams and the program overall. Again, as previously noted in regard to other studies, their study was limited to the extent that the in-degree and out-degree centrality of the adversarial network were not differentiated. It is therefore argued that the out-degree centrality should be used in place of the symmetrical and non-directional adversarial network centrality to predict the satisfaction levels individuals hold towards their group experiences. Out-degree centrality in adversarial network reflects the negative evaluation individuals reported of others, instead of the negative evaluation they received. When group members report disliking many of their group members, such negative evaluation of their group members can greatly influence their group effectiveness as well as their enjoyment and satisfaction with the group. Accordingly, it is hypothesized that

H2: The out-degree centrality of the adversarial network will negatively affect the individual satisfaction of their group experience.

The Impact of Frequency of Communication

To explore why certain group members occupy central positions in adversarial networks, in the first phase of our project, the focus was placed on profiling people by frequency of communication. Frequent communications among group members provide opportunities for people to learn about each other's objectives, work progress and needs. Although it is not guaranteed that people will like each other when they communicate more, frequent interpersonal communication makes it easier to resolve conflicts and inter-group anxiety (e.g., Pelled, 1996; Stephan & Stephan, 1988). In addition, the more frequently individuals communicate with other group members, the more likely they are to be regarded as conscientious and highly motivated by their peers. Since people with a good work ethic and high motivation are more likely to be

respected in the work group than those who are careless and indifferent towards others, it is expected that individuals who communicate more frequently with group members will be less likely to take the central position in adversarial networks.

H3: Frequency of within-group communication will be negatively related to the in-degree centrality of the adversarial network.

In addition, communication among group members is also very important for a group to successfully accomplish its task. In their study on the impact of network relations on group performance, Baldwin et al. (1997) found that communication within MBA student teams was directly and strongly associated with perceptions of team effectiveness. The explanation for this relationship is that frequent communication embeds individuals in groups, and embedding group members in a communication network keeps them informed about essential details, such as the quirks of certain professors and changes in assignments. Following a similar line of reasoning, it is expected that the more frequently an individual communicates with his/her teammates, the better the quality and quantity of information and assistance gained by him/her would be. To the extent that this information and assistance are beneficial for group members, a positive relationship was expected between the frequency of communication and an individual's performance.

H4: Frequency of within-group communication will be positively related to individuals' performances.

Finally, Baldwin et al. also discovered that individual centrality in the communication network was positively associated with perceptions of learning and enjoyment of the program (1997). Communicating with other group members may provide access to valuable information, which will in turn reduce individuals' uncertainty and ambiguity towards group tasks. Moreover, communicating with group members may also enhance mutual understanding and help to build group morale or

even group homogeneity (e.g., Katz, Lazer, Arrow, & Contractor, 2004). It is therefore expected that the more frequently individuals communicate with their group members, the more likely they are to be satisfied with their group experience.

H5: The frequency of within-group communication will positively affect individuals' satisfaction of their group experience.

Method

Sample

The sample for the current study was comprised of university students enrolled in an undergraduate human-computer interaction class in a large northeastern university. Altogether 56 out of 60 students agreed to participate in this study in order to receive extra credit, resulting in a participation rate of 93.3%. Seven students failed to provide complete data and were therefore removed from consideration. This resulted in a final sample of 49 students. Students were assigned to small groups at the beginning of the semester based on instructors' understanding of their common interests and goals for this course (the four students who did not choose to participate were assigned into one group and were excluded from the study). Group size ranged from 3 to 5 students. There were a total of 13 groups. Students stayed in the same group throughout the whole semester to finish a semester-long project. After finishing their final group presentations, students were sent the URL of an online survey through an email. The survey covered feelings of closeness, frequency of communication, and feelings of satisfaction with the group experience. Our sample was composed of 46.9% female and 53.1% male students. Students came from various disciplinary backgrounds, including communication, information science, computer science, etc.

Measures

Adversarial network. The adversarial network data was measured using an adapted version of the scale used by Burt (1992). Students were asked to identify those in class that they felt close to and those they would avoid and keep at a distance. To do so, the students were provided an alphabetized list of all their group members and asked to report how they felt about each of them. In our scale, "1" represented "especially close (one of the respondent's closest contacts)" and "5" represented "distant (avoid contact unless necessary)". Both in-degree and out-degree centralities of the adversarial network were computed following Freeman's (1979) definition as implemented in the UCINET 6.0 software package (Borgatti, Everett, & Freeman, 2002). The higher the in-degree score individuals received, the more they were disliked by group members. On the other hand, the higher the out-degree score individuals received, the more they disliked other group members. To control for the influence of differences in group sizes, normalized degree centralities, which vary from 0 to 100, were used for data analysis.

Frequency of communication. Students were asked to report their frequency of communication with other group members when facing problems related to the group project (e.g. problems in design, research, computer skills, programming etc.). The frequency of communication with group members was measured by a five-point scale with "0" meaning "never" and "4" meaning "very often (more than 10 times a week)". Since students sometimes recalled the actual frequency of communication with one another differently, the average of these self-reported data was calculated to represent the actual frequency of communication(Baldwin, Bedell, & Johnson, 1997). The resulting centrality data was also normalized to vary from 0 to 100 in order to control for differences in group size (Borgatti et al., , 2002; Sparrowe et al., , 2001). The

higher the degree centrality an individual received, the more frequently he/she discussed project-related issues with group members.

Individual performance. The variable was measured by the individual's final percentage grade. The instructors took into account individuals' performance in lab exercises, group project assignments, mid-term exams scores, as well as the final group project presentation and group paper[1].

Group satisfaction. The variable was measured using a multi-item scale asking students to report their satisfaction with the group process, as well as the final output. Five point scales were used for each of the items with 1 indicating "extremely dissatisfied" and 5 "extremely satisfied." The Cronbach's (1951) alpha for the multi-item scale was .92.

Results

Table 1 shows the descriptive statistics and zero-order correlations among study variables. Also, because our subjects were clustered by groups and were therefore not completely independent, running regular regression tests on the raw data would not be appropriate (Snijders & Bosker, 1999). To deal with this nested nature of data, following Kreft, Leeuw and Aiken's (1995) recommendation, the data was group-centered prior to running analysis because the focus was on examining relationships at the individual level of analysis, but not on studying cross-level interactions, or across-group differences in means.

Because the dependent variables for hypothesis 1 and 4 were the same, multiple regression analysis was run to test the two hypotheses simultaneously. Table 2 shows the results of the analysis with individual performance as the dependent variable. In Step 1 of our analysis, adversarial in-degree centrality did not show significant impact on performance when it was entered into the regression alone. Its

[1] The instructors are all from Computer Science Department (One professor and two graduate students)

influence on performance remained insignificant when frequency of within-group communication was entered in Step 2 of multiple regressions. Thus, Hypothesis 1 was not supported while Hypothesis 4 was supported. This means that being disliked by group members may be detrimental to an individual's performance; however, the frequency of communicating with group members seemed to play a more important role in determining an individual's performance.

Table 1 Descriptive statistics and correlations for study variables (N=49)

Variable Names	M.	SD	1	2	3	4
1. Adversarial in-degree centrality (Scale: 0-100)	64.5	13.5	-			
2. Adversarial out-degree centrality (Scale: 0-100)	64.5	22.0	-.44**	-		
3. Frequency of communication (Scale: 0-100)	76.3	10.6	-.39**	-.14	-	
4. Individual performance (Scale: 0-100)	92.2	9.2	-.35*	-.08	.50**	-
5..Group satisfaction (Scale: 1-5)	3.9	.9	.35	-.39**	-.07	.06

** Correlation is significant at the 0.01 level (2-tailed).
*Correlation is significant at the 0.05 level (2-tailed).

Table 2 Summary for multiple regression analysis for variables predicting individual performance (N=49)

Variable	B	SE B	β
Step 1			
Adversarial in-degree centrality	-0.24	0.09	-0.35
Step 2			
Adversarial in-degree centrality	-0.12	0.09	-0.18
Frequency of within-group communication	0.37	0.12	0.43**

*p<.05. **p<.01

Hypothesis 3 predicted that individuals who communicate more frequently with group members will be less likely to take the central position in adversarial networks. This hypothesis was supported because frequency of within-group communication was significantly and negatively related to the in-degree centrality of the adversarial network (r=-.39, p<.01) as shown in Table 1.

As hypothesis 2 and 5 had the same dependent variable, multiple regression analysis was used to test the two hypotheses simultaneously, as previously described. Table 3 summarizes the results of this multiple regression analysis with group satisfaction as the dependent variable. Consistent with Hypothesis 2, the adversarial out-degree centrality had significant influences on individuals' satisfaction with group experiences (in both steps of the regression analysis). Frequency of within-group communication, however, did not show expected influence on individual's satisfaction with group experiences. Hypothesis 5 was therefore not supported. This means that whether individuals liked or disliked their group members was the most important factor in deciding their satisfaction with the whole group.

Table 3 Summary for multiple regression analysis for variables predicting group satisfaction (N=49)

Variable	B	SE B	β
Step 1			
Adversarial out-degree centrality	-0.02	0.01	-0.39**
Step 2			
Adversarial out-degree centrality	-0.02	0.01	-0.41**
Frequency of within-group communication	-0.01	0.01	-0.13

*p<.05. **p<.01

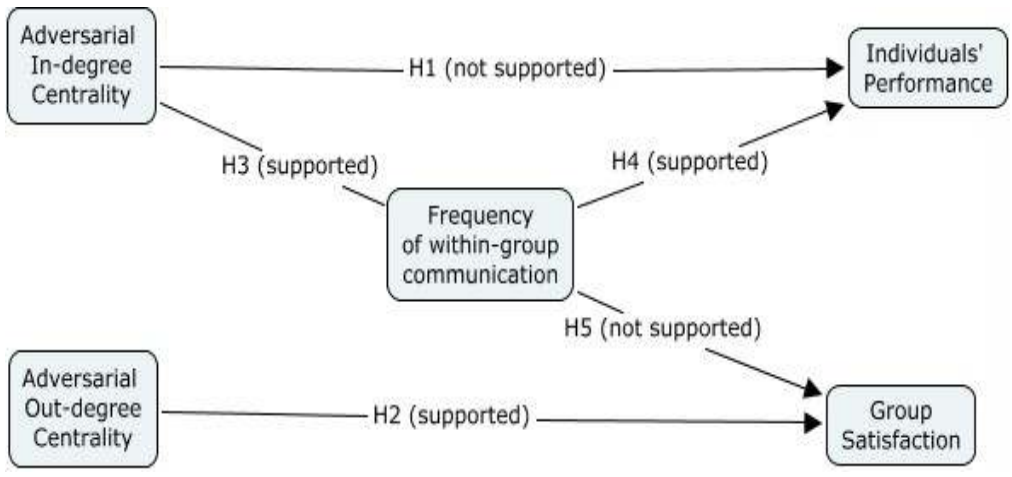

Figure 1 Summary Results Illustrating the Five Hypotheses in the Phase I

Figure 1 provides a visual summary of our proposed hypotheses, as well as the testing results. Overall, three out of five hypotheses were supported in the first phase of our study.

CHAPTER 3

PHASE II: ADVERSARIAL NETWORK, PERSONALITY AND PERFORMANCE

In the second phase of the research, the focus shifted to how personality traits may influence group members' positions in adversarial networks and how positions in adversarial networks interact with personality traits to influence performance. Personality traits theories in psychological research maintain that individual differences in personality can explain all human behavior, albeit to varying degrees (Kalish & Robins, 2006). Some of the personality constructs like extroversion and self-monitoring tendency, are found to be relatively stable over time and are therefore called personality trait characteristics (Allport, 1962). These personality traits can exert significant impact on individuals' likelihood of filling structural holes in social networks (e.g., Burt, Jannotta, & Mahoney, 1998; Kalish & Robins, 2006), having an accurate perception of network relationships (e.g., Casciaro, 1998), or developing a larger ego's network and fostering larger numbers of strong and weak ties (Kalish & Robins, 2006). As discussed above, however, most of these empirical studies focus on positive network relations, and some tend to select only certain personality traits for empirical testing. The current research represents one of few endeavors to study how the "Big Five" personality traits, as detailed below, may (1) influence adversarial network centrality and (2) combine together with members' positions in adversarial networks to influence their performances.

Five Factor Model of Personality

To study the impact of personality traits on positions in positive network relations, most scholars have adopted the five-factor model of personality (FFM, also known as the "Big Five") (e.g., Digman, 1990; Goldberg, 1992). This model has

achieved widespread acceptance as a "meaningful description of the arrangement of the higher-order structure of personality traits" (Barrick, Parks, & Mount, 2005, p. 747). The five factors include the following: extroversion (sociable, gregarious), agreeableness (helpful, trusting), conscientiousness (dependable, hardworking), emotional stability (tolerant, even-tempered) and openness to experiences (imaginative, curious). They have been used as predictors for a wide range of outcome variables in organizational research (e.g., Barrick et al., 2005). Among the five factors, conscientiousness and emotional stability have been considered more universal or generalizable because they were found to have relevance in nearly all types of jobs (Hogan & Holland, 2003). The remaining personality traits have been described as "contingent predictors" because their relevance depends on the particular job requirements (Barrick et al., 2005, p. 748). However, as discussed above, few studies to date have investigated how the "Big Five" might influence individuals' positions in adversarial communication networks, with the Klein et al. (2004) work being an exception. In this study, they analyzed the possible relationships between the "Big Five" personality traits and varying degrees of centrality held by individuals in the adversarial communication network. As discussed earlier, in-degree centrality measures the number of direct ties that a focal node receives. Thus, a focal person with a high in-degree centrality in an adversarial communication network means that s/he receives many negative nominations. It should be noted that , while Klein et al. did find significant relationships between personality traits and centrality in adversarial communication networks, their results only appeared to be "promising and cautionary" (p. 960) because some of the findings turned out to be very surprising, or even contrary, to the authors' predictions. Altogether, four of the "Big Five" personality traits (except conscientiousness) were found to be correlated with adversarial communication network centrality, and two of those four (extroversion and openness

to experiences) were determined to be in the opposite direction from their predictions. These two personality traits were found to be both significantly and positively related to adversarial communication network centrality. It means that as an individual's extroversion and openness to new knowledge increases, the more likely that he/she is going be disliked by teammates, resulting in relationships generally contrary to the expected norm, as well as contrary to the original predications of Klein et al.. They explained their controversial results by suggesting that "…at close range and with repeated interaction, a teammate's openness (non-conformity, autonomy, and intellectualism) and extroversion (talkativeness, attention seeking, assertiveness) may be a source of annoyance" (p. 961). While their explanation may be valid, it still does not convincingly explain why, or under what conditions, a person who is otherwise extrovert or open to different experiences would, in fact, be so considered central within the adversarial communication network. Moreover, the substantial variance unexplained (e.g., personality traits only explained around 0.04 of the variance of adversarial centrality) in this study indicates a need for further empirical validation of their arguments and results. Therefore, in the current phase, a different research context (the work group project model) was used with which to replicate the Klein et al. study. The study then proceeded to reexamine the relationship between the "Big Five" and adversarial communication network centrality within that research context.

First, it is hypothesized that conscientiousness should correlate negatively with in-degree centrality in adversarial networks. People who score high in the trait of conscientiousness are usually industrious and responsible. They also tend to care more about group work. Their diligence will in turn gain the cooperation and respect of their peers. It is therefore reasonable to hypothesize that people who are high in conscientiousness will be less likely to be disliked.

Hypothesis 6a: Conscientiousness is negatively related to adversarial network centrality.

Individuals who score high in the trait of agreeableness are polite and good-natured. Peers may find it easy to communicate and cooperate with them. Similarly, individuals who score high in emotional stability are tolerant and even-tempered; they are also less likely to be disliked by their peers.

Hypothesis 6b: Agreeableness is negatively related to adversarial network centrality.

Hypothesis 6c: Emotional stability is negatively related to adversarial network centrality.

Individuals who score high in the trait of extroversion are good at social interaction and expressing personal ideas and beliefs. Therefore, they will facilitate the group process and help improve intra-group communication. They will also be less likely to occupy the central position in the adversarial network.

Hypothesis 6d: Extroversion will be negatively related to adversarial network centrality.

Lastly, individuals who score high in openness to experiences will be creative and imaginative in their work. They will also endeavor to search for information and resources with which to solve the group task. Accordingly, these behaviors will be welcomed by their peers.

Hypothesis 6e: Openness to experiences will be negatively related to adversarial network centrality.

The Interaction Effect of Adversarial Network Centrality and Personality on Performance

Exploring connections between individuals' positions in the adversarial communication network and their performance is a key focus for adversarial

communication network research. As has been discussed earlier, previous empirical studies have confirmed the relationship between adversarial network centrality and performance (Baldwin, Bedell, & Johnson, 1997; Sparrowe & Liden, 1997). On the other hand, a separate avenue of theory and research in the field of psychology has also devoted substantive attention to uncovering antecedent variables that predict performance (e.g., Barrick, Mount, & Judge, 2001; Salgado, 1999). That is, empirical studies have shown that, under certain conditions, there are meaningful relationships between personality traits and performance dimensions (Barrick et al., 2005). For example, conscientiousness has been found to be a robust personality trait that reliably and positively correlates with performance across all jobs and settings. Similarly, emotional stability has also shown a positive and consistent relationship to overall performance (e.g., Barrick, Mount & Judge, 2001), regardless of differences in job situations. The other three personality traits (extroversion, agreeableness, and openness to experiences) are "contingent predictors," as noted above in this discussion, since "their relevance depends on the demands of the job" (Barrick et al., 2005, p. 748). Specifically, agreeableness and extroversion will be important predictors whenever job performance requires the need to influence others and/or cooperate with them. Also, openness to experiences will be a good predictor for performance when the job requires training or creative problem-solving (Hogan & Holland, 2003; Barrick, Mount & Judge, 2001; Barrick et al., 2005). However, investigators have yet to account for a marked variance in the personality-performance relationship where "there are other individual difference variables or external conditions that moderate the relationship between personality traits and performance" (Barrick et al., 2005, p. 745). For years, psychologists have been investigating the possible moderators including autonomy (Barrick & Mount, 1993) and self-monitoring (Barrick, Parks, & Mount, 2005), which may influence the relationship

between the Big Five and the job performance across different job categories. Based on the previous discussion about adversarial network centrality and individuals' performance, it is therefore proposed that an individual's in-degree centrality in adversarial communication networks may serve as one of another possible external factors that does, in fact, moderate the relationship between the "Big Five" personality variables and individual performance.

Weiss & Adler (1984) pointed out that personality traits can be good predictors of performance when a person's behavior is unconstrained. It is noted that both the work environment and personal characteristics may either potentially facilitate or constrain the behavioral expression of an individual's personality traits (Barrick et al., 2005). For instance, an extroverted member may talk less when surrounded with introverted coworkers; on the other hand, this same member, feeling less constrained, may have cause to talk more when surrounded by similar others. In practical terms, being disliked by peers will produce strong constraints on individuals' behavior in a workplace environment which requires a high degree of group cooperation. An example of this is a situation in which an individual is cut off from the normal information flow (e.g., Baldwin et al., 1997) as a result of poor relations and is thus constrained from cooperating optimally in that workplace. Relating this to the influence of adversarial (i.e., negative) relationships on task-related outcomes, Labianca & Brass (2006) claimed that one or both individuals involved in an adversarial relationship might, for instance, potentially deny the other party's timely access to the most relevant work-related information or referral. More importantly, being disliked by co-workers could also result in negative peer evaluations of work performance, which could tarnish that individual's reputation in the organization (p. 602). As a result, other task-related outcomes, such as promotions or income

attainment, would also be significantly affected by the fact that the individual is disliked by co-workers.

Yet most existing research treating the influence of personality on performance in groups only assumes, but does not empirically test, whether a bad peer relationship may also cause bad performance. To address this problem, the current study aims to extend existing research on the personality-performance relationship by incorporating research findings from the study of adversarial relations. It is therefore believed that the results will more clearly explain why and how personality influences individual performance in groups. Specifically, as suggested above, this thesis aims at exploring whether individuals' centrality in an adversarial communication network will moderate the relationships between the "Big Five" personality traits and individuals' performance. The fundamental premise assumes a group-based project that demands a high level of cooperation and teamwork. The premise further contends that, in such an environment, those disliked by their co-workers will find themselves so constrained in individual action that negative social relations will override the otherwise positive influences that desirable personality traits could, under other circumstances, exert on performance. This causes a substantial weakening of the relationship between otherwise strong and positive personality traits and individual performance. For example, high conscientiousness has been proved to be a good predictor of job performance across all job types (e.g., Mount, Barrick, & Stewart, 1998). However, if, for whatever reasons, individuals high in conscientiousness are disliked by co-workers, they are also likely to be cut off from the natural flow of information exchange among team members, to be given low peer evaluations, or even become "the target of purposefully harmful actions committed by others" (Baldwin et al., 1997, p. 1374). Moreover, in accordance with our premise, as defined above, their chances of achieving a higher supervisory performance evaluation will also likely

decrease. On the other hand, if these same individuals have low adversarial centrality, being conscientious can greatly enhance their chances of achieving good performance because they are more likely to receive assistance and cooperation, rather than hostility, from team members because people support motivated collaborators. Based on this reasoning, it is hypothesized that the relationship between individuals' performance and all of the "Big Five" personality traits will be significantly moderated by individuals' structural positions in adversarial communication networks.

Hypothesis 7a: The relationship between conscientiousness and individuals' performance will be stronger when individuals' degree centrality in the adversarial network is low rather than when it is high.

Hypothesis 7b: The relationship between agreeableness and individuals' performance will be stronger when individuals' degree centrality in the adversarial network is low rather than when it is high.

Hypothesis 7c: The relationship between emotional stability and individuals' performance will be stronger when individuals' degree centrality in the adversarial network is low rather than when it is high.

Hypothesis 7d: The relationship between extroversion and individuals' performance will be stronger when individuals' degree centrality in the adversarial network is low rather than when it is high.

Hypothesis 7e: The relationship between openness to experiences and individuals' performance will be stronger when individuals' degree centrality in the adversarial network is low rather than when it is high.

Method

Sample

Similar to Phase I, the sample in Phase II was composed of 42 students (46.9% female and 53.1% male students) enrolled in a graduate-level software engineering

class in the same northeastern university. Some of the students were fourth-year undergraduates, while the rest were students at the graduate level pursuing master's degrees. The study was designed as a part of the course requirements for the class. Participants formed project groups by themselves at the beginning of the semester, with group size ranging from 4 to 7 students, and participants remained in the same group throughout the entire semester. The adversarial network and the "Big Five" personality traits data were collected after the students finished their project presentation.

Measurement of Research Variables

Network data. The same question in Phase I study was asked to collect the complete social network data from 42 students (using a five-point scale, with 1 representing "especially close and 5, "distant, avoid contact unless necessary"). Consistent with previous research (e.g., Kalish & Robins, 2006; Mehra, Kilduff, & Brass, 2001), the in-degree centrality scores for each participant within his/her own group was computed to allow for comparisons across different groups (Borgatti, Everett, & Freeman, 2002; Sparrowe, Liden, Wayne, & Kraimer, 2001). To control for the influence of differences in group sizes, normalized degree centralities, which vary from 0 to 100, were used for analysis.

The "Big Five" personality traits were measured using the International Personality Item Pool (Goldberg, 1992), which is a 50-item instrument with ten items for each of the five-factor model. The website found at http://ipip.ori.org/ipip/ipip.html provides open access to the full battery. Each item was measured on a five-point scale with 1 representing "strongly disagree" and 5, "strongly agree." The IPIP 50-item scale has been widely used in previous studies involving measurement of personality traits (e.g., Klein et al., 2004; Kalish & Robins, 2006). The Cronbach's alpha of the "Big Five" personality measurement ranged from

.89 to .92 in the current study, demonstrating very high scale reliability across the five personality dimensions.

Individual performance was measured by the individual's final grade. The instructors took into account individuals' performance in class, group project assignments, final group project presentation and final project paper.

Measurement of Control Variables

In addition, two more variables, including previous work experience and the number of group members with whom participants had previous working relationships, were measured in the analysis of the data to control for possible confounding effects they could have on the relationships among key research variables.

Previous work experience was controlled in the current study because people with extensive professional work experience may know more about the importance of teamwork and may therefore be more likely to self-monitor individual behavior when working in groups. Depending on the relative degree of conscious self-monitoring behavior, this, in turn, could skew how personality traits affect centrality in adversarial communication networks. Therefore, students were asked to report their previous work experience. The responses were dummy-coded with "1" representing "having worked in the professional computing industry" and "0" representing "no previous work experience."

Number of group members worked with before was another control variable in our study. Since students self-organized themselves into groups, it was assumed that some of the students may have known each other before and may also have worked together in other classes. This factor could largely change individuals' behavior when communicating with group members. For example, the knowledge of former co-workers could help individuals use certain communication strategies to avoid

conflicts. Students were also provided with an alphabetized list of all their classmates and asked to identify those with whom they had previously worked.

Analysis

To test the hypotheses, a series of multiple regression analyses were conducted. Stepwise procedure was used to control for possible confounding effects of previous professional work experience and teamwork experience with classmates on. For the same reason discussed in Phase I of the study, prior to running the regression analysis, the data was group-centered because the data was clustered by groups; people in the same group were more likely to (a) dislike similar others and (b) receive a similar grade when the group project was a key component for performance evaluation.

Results

The in-degree centrality of adversarial network was computed following the definition of Freeman (1979), as implemented in the UCINET 6.0 software package (Borgetti et al., 2002). Table 4 showed the descriptive statistics and zero-order correlations among study variables. Hypothesis 6a to 6e predicted negative relationships between the adversarial network centrality each of the personality traits. Table 5 showed the testing results. After controlling for the influence of previous work experience, as well as the number of group members designated as prior co-workers, emotional stability was found to be negatively and significantly related to adversarial network centrality (β=-.33, p<.05). Openness to experiences was also found to be significantly related to adversarial network centrality (β=-.35, p<.05). Although agreeableness and extroversion were negatively correlated with adversarial network centrality, no statistical significance was found in regression analysis when controlling for the influence of previous work experience and the number of group members designated as prior co-workers. Conscientiousness was found to be very weakly, but

positively, related with adversarial network centrality (β = .09, p>.05). However, the result was not significant. Therefore, H6c and H6e were supported, while the remaining three were not.

Table 4 Descriptive Statistics and Correlations for Study variables (N=42)

Variable Names	Mean	S.D.	1	2	3	4	5	6	7	8
1. Previous working experiences	.50	.51	--							
2. Number of group members worked with before	3.05	1.68	-.17	--						
3. Adversarial in-degree centrality Scale: 0-100	69.56	14.28	-.12	-.32*	--					
4. Conscientiousness Scale: 1-5	3.66	.69	.46**	.19	-.09	--				
5. Agreeableness Scale: 1-5	3.70	.70	.37*	.25	-.25	.32*	--			
6. Emotional Stability Scale: 1-5	3.44	.73	.37*	.25	-.35*	.32*	.54**	--		
7. Extroversion Scale: 1-5	3.12	.83	.38*	.13	-.39*	.37*	.21	.50**	--	
8. Openness to Experiences Scale: 1-5	3.87	.57	.44**	.02	-.36*	.37*	.51**	.60**	.51**	--
9. Individual Performance	3.55	.67	.14	.12	-.28	.18	-.11	.16	.19	.22

** Correlation is significant at the 0.01 level 2-tailed.

* Correlation is significant at the 0.05 level 2-tailed.

Hypothesis 7a to 7e examined the moderating effect of adversarial centrality on the relationship between personality traits and individuals' performances through hierarchical regression analysis. The main effects of each of the "Big Five" traits on adversarial centrality were tested first by entering them in the initial step of a series of five regression analyses. The hypothesis were tested by examining the significance level of the regression coefficient for the interaction term, as well as the incremental gain in R^2 in the second step, when the interaction term between adversarial network centrality and each of the "Big Five" traits was entered in each regression.

As reported in Table 6, the results showed a significant interaction between adversarial network centrality and three personality traits in predicting individual performance: The standardized regression coefficient for the interaction term between centrality in adversarial networks and conscientiousness was β=.42 ($p<.05$) and the corresponding ΔR^2=. 17 ($p<.01$); for emotional stability β=.30 ($p<.05$) and the corresponding ΔR^2=.09 ($p<.05$); and for openness to experiences β=.39 ($p<.05$) and the corresponding ΔR^2=.14 ($p<.01$). Because centrality in adversarial networks was negatively related to performance, the results showed that, for individuals with lower levels of adversarial network centrality, the positive impact of personality traits, including conscientiousness, emotional stability, as well as openness to experiences, on individuals' performance would be stronger. Conversely, for individuals with a higher level of adversarial network centrality, performance was more likely to be compromised as a result of being disliked by group members. Finally, opposite to the prediction, no significant result was found for the moderating effects of adversarial network centrality on the impact of agreeableness and extroversion on individuals' performance. In summary, Hypothesis 7a, 7c and 7e were supported.

Table 5 Results of Regression Analysis for Adversarial Network Centrality (N=42)

	Step 1	Step 2
Variable	β	β
Constant	81.69**	76.09**
Previous work experiences	-.18	-.23
Number of group members worked with before	-.36*	-.38*
Conscientiousness		.09
Model R^2	.14	.14
ΔR^2		.01
Constant	81.69**	89.14**
Previous work experiences	-.18	-.13
Number of group members worked with before	-.36*	-.32
Agreeableness		-.12
Model R^2	.14	.15
ΔR^2		.01
Constant	81.69**	100.87**
Previous work experiences	-.18	-.05
Number of group members worked with before	-.36*	-.29
Emotional stability		-.33*
Model R^2	.14	.23*
ΔR^2		.09*
Constant	81.69**	91.60**
Previous work experiences	-.18	-.08
Number of group members worked with before	-.36*	-.28
Extroversion		-.25
Model R^2	.14	.18*
ΔR^2		.05
Constant	81.69**	113.03**
Previous work experiences	-.18	-.03
Number of group members worked with before	-.36*	-.32*
Openness to experiences		-.35*

Table 5 (Continued)

Model R^2	.14	.23*
ΔR^2		.10*

*p < .05; **p < .01.

Table 6 Results of Hierarchical Regression Analysis of Individuals' Performance on Personality and Adversarial Network Centrality (N=42)

	Step 1	Step 2
Variable	β	β
Constant	3.55**	3.53**
Conscientiousness	.26	.28*
Adversarial network centrality	-.49**	-.57**
Conscientiousness × Adversarial network centrality		.42**
Model R^2	.28**	.45**
ΔR^2		.17**
Constant	3.55**	3.55**
Agreeableness	-.10	-.13
Adversarial network centrality	-.46**	-.50**
Agreeableness × Adversarial network centrality		.19
Model R^2	.22**	.25*
ΔR^2		.03
Constant	3.55**	3.60**
Emotional stability	.15	.11
Adversarial network centrality	-.43**	-.46**
Emotional stability × Adversarial network centrality		.30*
Model R^2	.23**	.32**
ΔR^2		.09*
Constant	3.55**	3.57**
Extroversion	.08	.08
Adversarial network centrality	-.44**	-.45**
Extroversion × Adversarial network centrality		.10
Model R^2	.22**	.22*

Table 6 (Continued)

ΔR^2		.01
Constant	3.55**	3.60**
Openness to experiences	.22	.23
Adversarial network centrality	-.41**	-.49**
Openness to experiences × Adversarial network centrality		.39**
Model R^2	.22**	.35**
ΔR^2		.14**

$p < .05$; $p < .01$.

CHAPTER 4

DISCUSSION

The increasing level of complexity of tasks in contemporary organizations calls for more group work. Yet not all groups can fully reap the benefits of working collectively (Pavitt, 2003). Negative group dynamics can actually make a group less efficient than the alternative where individuals work independently. Adversarial networks were chosen to be studied in this thesis because, compared with other informal social networks, such as advice and friendship networks, adversarial networks are, more often than not, neglected due to their sensitive nature; at the same time, however, they may exert stronger influence on group dynamics (Labianca, Brass, & Grary, 1998).

Phase I of this study extends previous empirical findings about how adversarial network ties were related to students' academic achievements and satisfaction toward their group experiences because it does not focus exclusively on the rosy side of network relations. Results showed that the in-degree centrality of adversarial networks significantly and negatively correlated with individual performance. The out-degree centrality of adversarial networks, on the other hand, was found to be significantly and negatively related to individuals' satisfaction with their groups. These results, in turn, indicate the fact that both the state of being disliked by group members or disliking group members may have great negative influences on students' experiences with group work, and thereafter negatively influence performance. Taken together, the results showed the importance of making a distinction between in-degree and out-degree centrality in the study of adversarial relationships. Even though high values on both measures implicated negative group dynamics, they had effects of different aspects of group experiences.

Phase I of the study also explored the impact of frequency of communication on adversarial network structure and on individuals' performance and satisfaction with group experiences. The results indicated that frequency of communication with other group members could make a group member more likeable and help him/her perform better, but frequent interactions with others did not make members more satisfied with group processes.

A common theme of both phases of the current study was to explore why certain people end up in central positions in adversarial networks. While Phase I of the study focused on profiling people based on their frequency of communication with other group members, Phase II further explored how personality traits can influence adversarial network structure. Conventionally, network analysis tends to "question the explanatory potential of all those conceptual strategies that emphasize the non-relational attributes and/or purposive actions of individuals or collectivities strategies" (Emirbayer & Goodwin, 1994, p. 1416). As a result, some network scholars tend to focus exclusively on endogenous network variables to explain the creation, maintenance and dissolution of networks, while completely ignoring individual attributes (Monge & Contractor, 2003; Wellman & Berkowitz, 1988). In contrast to this approach, one of the initiatives of this thesis specifically explores how psychological factors influence the formation of network ties.

In the case of adversarial networks, how does an individual become the commonly disliked one by their peers? Will individuals' personality traits influence the positions they ultimately take in a social network? To address these questions, the current research started by replicating the study of Klein et al. (2004) because, as explained above, some of their findings were counter-intuitive and ran against their own predictions. Despite the smaller sample size, the results showed that nearly all the "Big Five" were significantly correlated with adversarial network centrality in the

predicted direction. Furthermore, after controlling for the influence of previous professional experience and the number of team members with whom participants had previously worked, emotional stability and openness to experiences were both found to be significantly related to adversarial network centrality. Thus, the results helped to clarify the fact that openness to experiences and emotional stability could be negatively related to adversarial network centrality, indicating that individuals are less likely to be disliked by team members in group work when they are more embracing of differences and more capable of controlling their emotions.

In their most recent paper, Labianca and Brass (2006) outlined two propositions about the relationship between negative affectivity (the opposite side of emotional stability) and conscientiousness and the number of negative ties an individual may have with others. Consistent with their predictions, emotional stability has been found to be significantly and negatively related to adversarial network positions in the current study. Conscientiousness, on the other hand, was only found to be very weakly, but positively, related to adversarial network centrality (β =0.09). Small sample size may be an issue. However, overall, the results indicated that when working on a project that requires a high level of cooperation, such as that conducted in the present study, team members who are emotionally stable, as well as creative and imaginative (openness to experiences), are less likely to occupy central positions in adversarial networks.

In addition, Phase II explored how personality traits can interact with adversarial network centrality to predict individuals' performances. Previous studies about adversarial networks demonstrated that having centrality in an adversarial network was predictive of lower individual performance (e.g., Labianca et al., 1998; Sparrowe et al., 2001; Yang & Tang, 2003), without explaining why some people, in fact, rise to centrality in the milieu of adversarial relations. On the other hand, studies

in social psychology have found that personality traits are meaningfully correlated with job performance under certain conditions; however, these studies do not provide empirical evidence to explain why certain individuals who possess these desirable personality traits do not achieve positive performance evaluations when working in a group. One major objective of the Phase II study, then, is to integrate the findings and research propositions from both network analysis and social psychology to gain an understanding of the underlying mechanisms connecting personality traits, adversarial network centrality and individuals' performance. In Phase II, after the exploration of the relationships between the personality traits and adversarial network structure, the moderating effects of adversarial network centrality on the relationship between personality traits and individuals' performance were examined. The results suggested that people who are even-tempered (emotionally stable) as well as curious and creative (openness to experiences) are less likely to be disliked by group members. Moreover, adversarial network centrality would constrain the influences of conscientiousness, emotional stability and openness to experiences on individuals' performance. In other words, when members become the subjects of group dislike, their positive qualities of hard work, tolerance and imaginativeness are less likely to be good predictors of performance. The results have important implications for project group practice. The results showed that developing negative ties with other team members would significantly influence the impact of personality on individual performance. For example, it was found that when disliked, the performance of individuals with a high level of conscientiousness would actually deteriorate. Considering that conscientiousness and emotional stability are regarded as the most consistent predictors of good job performance, the results of the current study further confirmed the power of negative relationships in project groups.

Directions for Future Research

Labianca & Brass (2006) argued that negative relationships may have a greater effect on socio-emotional and task outcomes than positive relationships; however, recognizing the importance of issues impacting negative ties and the adversarial network is far from sufficient. More empirical efforts are needed to explore what factors influence the development of negative ties. Some others individual attributes may play a role. For instance, conscientious group members may be disliked for being sexist; emotionally stable group members may be disliked for being selfish. Thus, in addition to personality variables discussed in the current study, it would be interesting to explore additional factors that may influence individual positions in adversarial networks.

Future studies may also explore how individuals could make the best out of the less than ideal situation or how individuals could adjust their negative ties with peers to improve their performances. As mentioned before, most existing social network research tends to focus solely on positive relations. When the focus is on this type of relationship, the development of an intervention program to change the network dynamic becomes less important. However, when the research focus is on adversarial relations, it then becomes a very interesting topic to explore how group members with high adversarial network centralities can change the negative dynamic. The topic is especially interesting given that the "Big Five" personality traits have been found to contribute positively to individual performance. It is therefore important to design and implement intervention programs to help individuals scoring high in those personality traits to steer clear of the trap of negative peer-to-peer relationships.

The results of the Phase I study showed that frequency of communication within groups was positively related to performance. Group members who do not communicate and interact with each other will be more likely to exclude themselves

from the group knowledge creation process and cannot reap the benefits of intellectual exchange with other group members. The current research results showed that such individuals performed poorly in spite of the fact that they may be highly skilled. Only when they communicate and interact more with other group members will they be able to make better use of their skills for the greater good of themselves and the group. Group-support technologies enabled with social network analysis tools can identify group members who are not communicating and interacting with other group members. This can be achieved by identifying individuals who are isolates in the social network that are not communicating with the rest of group. Because these members are a source of possible negative group dynamics, timely identification of these isolates can help supervisors or even fellow group members intervene before the problem spirals out of control. It is therefore believed the implementation of group support systems can help to achieve this goal with ease.

It should be noted that adversarial relationship not only exist among individuals, but also exist among the groups. Williams (2001) pointed out that, it is very easy for people to perceive individuals from other groups as potential adversaries because of conflicting goals, beliefs, or styles of interacting. The resulted negative relationships among groups will be extremely detrimental to both group performances as well as organizational-level performance. Therefore, researchers should also pay attention to the group-level adversarial relationships to understand more about the underlying mechanisms as well as how can individuals of different group membership to improve their negative relationship to gain trust and cooperation from each other.

On the other hand, Isen and colleagues (e.g., Erez & Isen, 2002; Isen, 2004; Isen & Labroo, 2003) have conducted a series of studies inducing positive affect, e.g. happy or pleasant mood, among employees, for the most part induced at the individual level. It would be interesting to explore whether her research findings could be

extended to interpersonal or group levels to help central persons in adversarial networks improve their social relations.

Limitations

The first limitation of both phases of the current study was that the number of participants was relatively low. Although the sample size was more than sufficient for studying a complete social network, it was less than ideal for running multilevel analysis to study group-level effects. Regardless, significant results were found for many of the hypotheses. It is reasonable to assume that these results are more likely to be robust, as it is more difficult to achieve statistical significance with smaller samples.

Second, the same single-item measure of adversarial network was used in both phases of the studies. The use of single-item measure of network relations is common in network analysis, particularly in the study of adversarial relations (e.g., Baldwin et al., 1997; Labianca et al., 1998; Sparrowe et al., 2001). One of the major reasons for using single-item network measurement is that collecting network data is intrinsically much more difficult and time consuming. On the other hand, researchers have also been encouraged to use questions on affective component of the relations and measures with greater face validity like "How do you generally feel about this person?"(Fishbein & Ajzen, 1975; Labianca & Brass, 2006). However, the validity of these types of single-item measure is still open to interpretation. Qualitative research methods like intensive interviews can be a possible answer for collecting adversarial network data in small networks. People may not feel comfortable rating their relationship with other co-workers using numbers, but it could be expected that they will feel more comfortable to describe a scenario or tell a story about their relationships with others. Thus, the qualitative data will provide more in-depth information about their adversarial relationships with others in the network.

Nevertheless, researchers should still make an effort to use multiple questions to evaluate adversarial relations when it is not too demanding on the subjects' time and attention. Were the sample size in the studies smaller in terms of collecting complete social network data, it would be interesting to explore whether multiple items could yield more reliable results in a way similar to the measurement of attribute variables in regular surveys.

Finally the interactions of students for an entire semester were studied in both phases of the studies. These student groups potentially share many of the characteristics of groups in real organizational settings, but because of their transitory nature will lack certain other characteristics. It is also important to note that situational-based factors are very important when studying personality traits (Barrick et al., 2005). Future studies on real organizational groups are needed to examine if findings of this study could be extrapolated to various situations.

CHAPTER 5

CONCLUSION

This thesis reports results from a two-phase study designed to examine how negative group dynamics may influence group performance and satisfaction. The contributions of the research are threefold. First, it clearly differentiated the effects of in-degree and out-degree centrality on performance and satisfaction. Second, it linked centrality of adversarial networks to frequency of communication with group members, and provided empirical guidelines for possible interventions. Third, the findings also showed the relationship between personality traits and adversarial network centrality as well as how adversarial network positions would constrain the relationship between certain personality traits and individuals' performances. In conclusion, the results of this thesis showed that group members disliked by others were less likely to perform well, group members were less likely to feel satisfied with the group process when they disliked others, and frequent communication with others could make a person more likeable and help him/her perform better. Further, scoring high on the "Big Five" personality traits is not enough for individuals to obtain good individual performance evaluations. Maintaining pleasant peer relations is at least equally crucial because it can determine whether these personality traits can actually work their work on achieving good individual performance.

REFERENCES

Allport, G. (1962). The general and the unique in psychological science. . Journal of Personality, 30, 405-421.

Argote, L. (1999). Organizational learning: Creating retaining, and transferring knowledge. Boston, MA: Kluwer Academic Publishers.

Arrow, H., & McGrath, J. E. (2000). Small groups as complex systems: Formation, coordination, development and adaptation. Thousand Oaks, CA: Sage Publications.

Baldwin, T. T., Bedell, M. D., & Johnson, J. L. (1997). The social fabric of a team-based M. B. A. program: Network effects on student satisfaction and performance. Academy of Management Journal, 40(6), 1369-1397.

Barrick, M. R., & Mount, M. K. (1993). Autonomy as a moderator of the relationships between the big five personality dimensions and job performance. Journal of Applied Psychology, 78(1), 111-118.

Barrick, M. R., Mount, M. K., & Judge, T. A. (2001). Personality and performance at the beginning of the new millemium: What do we know and where do we go next? Personality and Performance, 9, 9-30.

Barrick, M. R., Parks, L., & Mount, M. K. (2005). Self-monitoring as a moderator of the relationships between personality traits and performance. Personnel Psychology, 58(3), 745-767.

Borgatti, S. P., Everett, M. G., & Freeman, L. C. (2002). Ucinet for Windows: software for social network analysis. Harvard, MA: Analytic Technologies.

Brass, D. J. (1984). Being in the right place: A structural analysis of individual influence in an organization. Administrative Science Quarterly, 29, 518-539.

Brass, D. J., & Labianca, G. (1999). The dark side of social capital. In R. T. Leenders & S. M. Gabbay (Eds.), Corporate social capital and liability. Boston: Kluwer academic publishers.

Brief, A. P., & Weiss, H. M. (2002). Organizational behavior: Affect in the workplace. Annual Review of Psychology, 53, 279-307.

Burt, R. S. (1992). structural holes: The social structure of competition. Cambridge, Massachusetts: Harvard University Press.

Burt, R. S., Jannotta, J. E., & Mahoney, J. T. (1998). Personality correlates of structural holes. Social Networks, 20, 63-87.

Casciaro, T. (1998). Seeing things clearly: social structure, personality, and accuracy in social network perception. Social Networks, 20, 331-351.

Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. Psychometrika, 16, 297-334.

Digman, J. M. (1990). Personality structure: Emergence of the five-factor model. Annual Review of Psychology, 41(417-40).

Emirbayer, M., & Goodwin, J. (1994). Network analysis, culture, and the problem of agency. American Journal of Sociology, 99(6), 1411-1454.

Erez, A., & Isen, A. M. (2002). The influence of positive affect on components of expectancy motivation. Journal of Applied Psychology, 87(6), 1055-1067.

Fishbein, M., & Ajzen, I. (1975). Belief, attitude, intension, and behavior: An introduction to theory and research. Reading, MA: Addison-Wesley.

Freeman, L. C. (1979). Centrality in social networks: Conceptual clarification. Social Networks, 1, 215-239.

George, J. M., & Brief, A. P. (1996). Motivational agendas in the work place: The effects of feelings on focus of attention and work motivation. Research in Organizational Behavior, 18, 75-109.

Goldberg, L. R. (1992). The development of markers for the Big-Five factor structure. Psychological Assessment, 4(1), 26-42.

Hogan, J., & Holland, B. (2003). Using theory to evaluate personality and job performance relations: a social analytic perspective. Journal of Applied Psychology, 88, 100-112.

Isen, A. M. (2004). Some Perspectives on Positive Feelings and Emotions: Positive Affect Facilitates Thinking and Problem Solving. In A. S. R. Manstead, N. Frijda & A. Fischer (Eds.), Feelings and emotions: The Amsterdam Symposium. NY: Cambridge.

Isen, A. M., & Labroo, A. A. (2003). Some Ways in Which Positive Affect Facilitates Decision Making and Judgment. In S. Schneider & J. Shanteau (Eds.), Emerging perspectives on judgment and decision research. NY: Cambridge.

Kalish, Y., & Robins, G. (2006). Psychological predispositions and network structure: The relationship between individual predispositions, structural holes and network closure. Social Networks, 28(1), 56-84.

Katz, N., Lazer, D., Arrow, H., & Contractor, N. (2004). Network theory and small groups. Small Group Research, 35(3), 307-332.

Klein, K. J., Lim, B.-c., Saltz, J. L., & Mayer, D. M. (2004). How do they get there? An examination of the antecedents of centrality in team networks. Academy of Management Journal, 47(6), 952-963.

Kreft, I. G. G., Leeuw, J. D., & Aiken, L. S. (1995). The effect of different forms of centering in hierarchical linear models. Multivariate Behavior Research, 30, 1-21.

Labianca, G., & Brass, D. J. (2006). Exploring the social ledger: negative relationships and negative asymmetry in social networks in organizations. Academy of Management Review, 31(3), 596-614.

Labianca, G., Brass, D. J., & Grary, B. (1998). Social networks and perceptions of intergroup conflict: The role of negative relationships and third parties. Academy of Management Journal, 41(1), 55-67.

Lester, S. W., Meglino, B. M., & Korsgaard, M. A. (2002). The antecedents and consequences of group potency: A longitudinal investigation of newly formed work groups. Academy of Management Journal, 45, 352-368.

Mehra, A., Kilduff, M., & Brass, D. J. (2001). The Social Networks of High and Low Self-monitors: Implication for Workplace Performance. Administrative Science Quarterly(46), 121-146.

Monge, P. R., & Contractor, N. S. (2003). Theories of communication networks. New York: Oxford University Press.

Mount, M. K., Barrick, M. R., & Stewart, G. L. (1998). Five-factor model of personality and performance in jobs involving interpersonal interactions. Human Performance, 11, 145-165.

Peeters, M. A. G., Rutte, C. G., Van Tuijl, H. F. J. M., Harrie, F. J. M., & Reymen, I. M. M. J. (2006). The big five personality traits and individual satisfaction with the team. Small Group Research, 37, 187-211.

Pelled, L. H. (1996). Demographic Diversity, Conflict, and Work Group Outcomes: An Intervening Process Theory. Organization Science, 7(7), 615-631.

Podolny, J. M., & Baron, J. N. (1997). Resources and relationships: Social networks and mobility in the workplace. American Sociological Review, 62(5), 673-693.

Salgado, J. F. (1999). Personnel selection methods. In C. L. Cooper & I. T. Robertson (Eds.), International review of industrial and organizational psychology. Chichester, NY: Wiley.

Scott, J. (2000). Social network analysis: a handbook. New York: Sage.

Snijders, T. A. B., & Bosker, R. J. (1999). Multilevel analysis: An introduction to basic and advanced multilevel modeling. New York: Sage.

Sparrowe, R. T., & Liden, R. C. (1997). Process and structure in leader-member exchange. Academy of Management Review, 22(2), 522-552.

Sparrowe, R. T., Liden, R. C., Wayne, S. J., & Kraimer, M. L. (2001). Social networks and the performance of individual and groups. Academy of Management Journal, 44(2), 316-326.

Stephan, W. G., & Stephan, C. W. (1988). Intergroup Anxiety. Journal of Social Issues, 41, 157-175.

Taylor, S. E. (1991). Asymmetrical effects of positive and negative events: the mobilization-minimization hypothesis. Psychological Bulletin, 110, 67-85.

Weiss, H. M., & Adler, S. (1984). Personality and organizational behavior. Research in Organizational Behavior, 6, 1-50.

Wellman, B., & Berkowitz, S. D. (1988). Social structure: a network approach. London: Cambridge University Press.

Wellman, B., & Wortley, S. (1990). Different strokes from different folks: Community ties and social support. American Journal of Sociology, 96, 568-588.

Williams, M. (2001). In whom we trust: Group membership as an affective context for trust development. Academy of Management Review, 26(3), 377-396.

Yang, H.-L., & Tang, J.-H. (2003). Effects of social network on students' performances: A web-based forum study in Taiwan. Journal of Asynchronous Learning Networks, 7(3), 93-107.