IS EVERYONE CREATED EQUAL? A SOCIAL NETWORK PERSPECTIVE ON

PERSONALITY IN TEAMS

A Dissertation

by

NING LI

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

August 2012

Major Subject: Management

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Approved by:

Co-Chairs of Committee,	Murray R. Barrick
	Bradley L. Kirkman
Committee Members,	Dan S. Chiaburu
	Christopher M. Berry
Head of Department,	Ricky W. Griffin

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ABSTRACT

Is Everyone Created Equal? A Social Network Perspective on Personality in Teams.

(August 2012)

Ning Li, B.B.A., Shanghai Jiaotong University

Co-Chairs of Advisory Committee: Dr. Murray R. Barrick
                Dr. Bradley L. Kirkman

    One important research topic in team research concerns how team composition (i.e., the configuration of team member attributes such as personality factors) affects team effectiveness. To date, researchers have almost exclusively focused on the role of team members' attributes (e.g., extraversion) without considering team members' status in the team. Yet, according to social network theory, a team member who occupies a central position in a team network (e.g., has numerous social ties to others) will have a greater impact on the team than other members who occupy peripheral positions. As a result, the effects of team composition on team effectiveness are not influenced exclusively by an attribute, but also determined by who possesses the attribute. To remedy this limitation and account for member "centrality" effects on personality in teams, I conceptualize team composition in the form of personality from a social network perspective. Using 584 team members of 84 teams in China, I test the effects of various operationalizations of team personality traits on team processes and performance. Specifically, the results indicate that team overall personality traits fail to display superior predictive validity over team mean personality traits in predicting team

processes. However, I report that the most central member's conscientiousness and agreeableness have meaningful impacts on team processes. Finally, team maximum extraversion and openness interact with team member centrality in predicting team processes such that the personality traits have stronger effects on team processes when the traits are possessed by central members. In doing so, I help to clarify the construct of team composition and gain a better understanding of how team composition affects team outcomes.

DEDICATION

To my parents.

ACKNOWLEDGEMENTS

The past four years have been an extraordinary journey for me. I am so grateful to a great number of wonderful people who have worked me through this amazing endeavor and played influential roles in my pursuit of, and consequently achievement of, this doctoral degree.

To begin with, I like to extend my genuine appreciation to Dr. Mike Crant, who has always been a great friend and mentor. Mike is one of the biggest reasons that I decided to pursue a PhD degree in management and this decision has fundamentally changed my life in numerous positive ways. Without him, I would not have the opportunity to achieve what I have achieved now. Additionally, there are several faculty members at Texas A&M that have been extremely supportive and provided me everything I need to succeed in academia. As a great advisor, Dr. Murray Barrick has set an excellent role model for me to learn from. Moreover, I would like to express my deepest gratitude to my advisor, Dr. Brad Kirkman, for his excellent guidance, caring, encouragement, and generous support. As an international student, I have learned so much from Brad in terms of writing and communication skills. I also want to thank my committee members: Dr. Dan Chiaburu and Christopher Berry. Dan is not only a mentor but also a friend, who has helped me out in a variety of different ways.

Importantly, my family is another reason I can succeed. My parents' unconditional love and support have always been a strong motivation pushing me

forward. I am also very grateful to my grandmother for taking good care of me during the past thirty years.

Finally, there are many good friends who have helped me through this process: Xie Zhitao, Brad Harris, Qin Lei, Zhang Xinan, and Shanshan. My loyal friends. Thank you to all.

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CHAPTER I

INTRODUCTION

Facing increasingly complex tasks involving coordination, communication and interactions among multiple decision makers, organizations continue to use teams to accomplish tasks and solve problems (Barua, Lee & Whinston, 1995; Ilgen, 1994; Mathieu, Maynard, Rapp, & Gilson, 2008). As a result, the performance of teams has been of great interest to both organizational scholars and practitioners. Researchers have typically taken two interrelated routes to understanding team performance. In one direction, scholars have built upon the classic input-process-outcome framework (IPO; Cohen & Bailey, 1997; Hackman, 1992; Ilgen, Hollenbeck, Johnson, & Jundt, 2005) to explore how team dynamics, including team processes (i.e., team members' interdependent acts that convert inputs to team outcomes) and emergent states (i.e., cognitive, motivational, and affective states of teams), drive team performance (Ilgen et al., 2005; Marks, Mathieu, & Zaccaro, 2001). Theoretical advances (e.g., Marks et al., 2001) and ample empirical evidence (LePine, Piccolo, Jackson, Mathieu, & Saul, 2008) regarding team processes have helped scholars gain an in-depth understanding of how team processes and emergent states drive team performance. For example, several recent meta-analyses have demonstrated the positive influences of a variety of team dynamic variables on team performance (e.g., team process, LePine et al., 2008; team potency and collective efficacy, Gully, Incalaterra, Joshi, & Beaubien, 2002; Stajkovic, Lee, &

This dissertation follows the style of *Academy of Management Journal.*

Nyberg, 2009; team cognition, DeChurch & Mesmer-Magnus, 2010; team information sharing, Mesmer-Magnus & DeChurch, 2009; team conflict, De Dreu & Weingart, 2003).

Taking a different route, researchers have also sought to understand how team inputs such as team composition affect team performance (Barrick, Stewart, Neubert, & Mount, 1998; Bell, 2007; Hackman, 1987; LePine, 2003; Moynihan & Peterson, 2001; Neuman & Wright, 1999). Team composition is defined as the configuration of team member attributes, including demographics, personality traits, values, and abilities, in a team (Levine & Moreland, 1990). Specifically, considering that numerous studies have shown the meaningful effects of individual personality traits on employee attitudes and behaviors at the individual level of analysis (Barrick, Mount, & Judge, 2001), researchers have begun to examine how team members' personality traits affect team level outcomes (Bell, 2007). However, despite the fact that a large number of empirical studies have demonstrated significant relationships between team personality traits and team performance (Bell, 2007; Stewart, 2006), there are three unresolved questions concerning (1) the conceptualization and operationalization of team composition variables (Humphrey, Morgeson, & Mannor, 2009), (2) the underlying processes that explain the effects of team composition on team performance, and (3) the boundary conditions that modify such the effects.

The first and most critical shortcoming pertains to the conceptualization of team composition. Empirical evidence has demonstrated the critical role of team personality traits in predicting team performance (Bell, 2007). Yet, researchers lack a

comprehensive understanding of the exact meaning of team personality composition. As noted by Bell (2007: 595), "despite its popularity with researchers, team composition has been difficult to use because of a lack of understanding in the area". This lack of understanding is likely the result of teams being inherently complex (Mathieu et al., 2008). Specifically, a key element that distinguishes collectives of individuals from teams is that teams "share one or more common goals, interact socially, and exhibit task interdependencies" (Kozlowski & Bell, 2003: 334). Therefore, it is inappropriate to study team composition without considering teamness, or the intra-team interactions among various team members. Traditional composition research has tended to focus on examining the effects of team members' attributes on team outcomes. This perspective, termed "individual attribute composition," explores how different ways of aggregating individual team member attributes relate to team effectiveness, and relies on an individual attribute perspective as the basis for defining the appropriate unit of analysis (Humphrey et al., 2009: 48). As an example of this work, researchers have used the average level of individual team member conscientiousness across team members, the maximum or minimum conscientiousness of individual team members, or variation in conscientiousness among team members (e.g., Barrick et al., 1998; Bell, 2007). This individual attribute based approach assumes that each team member has the same impact on team performance (the isomorphism assumption; Kozlowski & Klein; 2000). Thus, attribute scores of different members are interchangeable, such that one person's high score on an attribute can replace with the low score on the attribute from another person. However, such an assumption rarely reflects the reality of the team. Rather, team

members tend to have differential impacts on team performance (Humphrey et al., 2009).

A second perspective recognizes that each person has a unique history and position within a team and consequently, that people are not interchangeable. This perspective, referred to as the "individual source based approach" emphasizes that the effect of a team composition variable is not influenced exclusively by the *attribute*, but also determined by the *member* who possesses the attribute (i.e., the source of the attribute). Specifically, certain members likely have more profound influences on team dynamics than do others. As a result, a personality trait of an influential member tends to have a more significant impact on team performance than the trait with the same score but possessed by a less influential member. Essentially, this approach shifts scholars' attention from the team composition attribute itself to the characteristics of the source of the attribute in the team. In particular, the current study builds on social network theory to capture the characteristics of the attribute holder and discusses how the second approach supplements to the individual attribute based approach.

The second shortcoming of team composition research is that previous research has tended to neglect the processes by which the effects of team compositions on team performance are transmitted. The majority of empirical studies have directly related team composition variables to distal team outcomes such as performance. Yet, much less is known about *how* team composition affects team outcomes. Thus, it is critical to investigate the mediating role of team processes in the relationships between team composition and team outcomes. In addition, current theories derived based on the IPO

model make universal predictions of how team composition variables predict team processes and ultimately team performance without sufficiently considering the uniqueness of different composition variables in predicting distinct team processes. Specifically, research has suggested that team processes can be categorized as the processes focusing on tasks (i.e., taskwork) and the processes focusing on interpersonal coordination and relations (i.e., teamwork) (Mathieu et al., 2008). Thus, team member specific attributes such as agreeableness may facilitate team coordination processes (i.e., teamwork) but impede setting difficult team goals (i.e., taskwork).

The third limitation of this line of research pertains to the insufficient consideration of the conditions modifying the effects of team composition on team outcomes. As mentioned above, teams vary in the degree of the intra-team interactions among various team members or teamness, and hence have various team structures. Team structure captures team interactions that determine the allocation of tasks, responsibilities, and authority and reflects the extent to which teams differ from one another (Stewart & Barrick, 2000). Prior research has also suggested that team structure variables have powerful influences on modifying the team process - performance relationships (Beal, Cohen, Burke, & McLendon, 2003; Gully, Devine, & Whitney, 1995; Stewart & Barrick, 2000). Specifically, team structure differs in many aspects such as team interdependence, and team network structures (Guimera, Uzzi, Spiro, & Amaral, 2005; Van der Vegt, Emans, & Van de Vliert, 2001). Consequently, the team structure factors (i.e., team interdependence, team network structures) likely place boundary conditions of the effects of team personality traits on team performance

(Devine, 2002). Yet, this plausible assumption needs to be theoretically qualified and empirically tested.

In summary, to remedy the three aforementioned limitations, the present study conceptualizes team composition from a network perspective, and develops a model examining how and when team composition variables affect team performance. In doing so, this research offers three theoretical contributions to the team and personality literatures. First, considering the conceptual ambiguity of team composition, I examine the effects of team personality traits on team performance from a social network perspective. This approach acknowledges individual members' differential influences in the team and argues that members who occupy a central position in team networks tend to have profound influences on team processes, and thus personality traits possessed by these central members have greater effects on team performance compared to the traits possessed by peripheral members. As a result, I move beyond previous team composition research that treats teams as undifferentiated entities.

Second, extending the IPO model, I propose fine-grained predictions that link specific personality traits with distinct team processes. As a result, this study underpins the mechanisms linking team personality traits with team performance. Finally, I identify several team structure factors, including team interdependence and team network structures, as boundary conditions of the effects of team personality traits on team processes. This is an important contribution, as past work has argued for the inclusion of important contextual factors as a way to embrace the complexity of team research (e.g., Barrick, Bradley, Kristof-Brown, & Colbert, 2007; Mathieu et al., 2008; Morgeson,

DeRue, & Karam, 2010). In total, I propose and test a potentially powerful new model for understanding the role of team composition as it relates to team processes and team performance.

Next, I propose specific ways to address the discussed shortcomings. Specifically, from a social network perspective, I first advance a new conceptualization of team personality that captures the effects of individual attributes as well as the person who possesses the attributes. In addition, building on the IPO framework and research on team structure, I develop a model explaining how and when team personality affects team performance.

Conceptualization of Team Personality

Research on team composition typically distinguishes two types of team member attributes including both: surface-level variables referring to overt demographic characteristics such as age, gender, educational level, and organizational tenure, and deep-level variables capturing underlying psychological characteristics such as personality traits, values, and abilities (Bell, 2007; Harrison, Price, Gavin, & Florey, 2002; Joshi, & Roh, 2009). Because team members' personality traits tend to have more direct and profound influences on team performance compared to surface-level demographic variables, researchers have been devoting more attention to studying team personality as a composition variable (Moynihan & Peterson, 2001). A recent meta-analysis offers merit in this increased attention, finding that team personality traits had sizable effects on team performance (Bell, 2007).

Contemporary research in organizational research has converged on the five factor model (FFM) as a well accepted taxonomy that comprehensively captures the stable individual differences in personality (Barrick & Mount, 1991; Costa & McCrae, 1992). The five factors include extraversion, agreeableness, conscientiousness, emotional stability, and openness to experience. Specifically, conscientiousness describes individuals who are careful, planful, and hard-working, agreeable individuals are cooperative, trusting, and friendly, emotional stability captures individuals who are calm, resilient, and secure, extraverts are energetic and gregarious, and openness to experience describes individuals who are imaginative, cultured, and broadminded (Costa & McCrae, 1988). Consistent with previous work, I use these five personality traits to capture team personality variables.

Concerning the conceptualization of team level constructs, Kozlowski and Klein (2000) developed a taxonomy suggesting that team level constructs can emerge through two qualitatively distinct methods: *composition* and *compilation processes*. Composition, based on assumptions of isomorphism, describes phenomena that are essentially the same as they emerge upward across levels. Compilation, based on assumptions of discontinuity, describes phenomena that comprise a common domain but are distinctively different as they emerge across level.

An important feature of the compilation process emphasizes that team members differ in their impacts on team processes, and thereby contribute to the team differently. For example, in baseball teams, players contribute qualitatively different types and amounts of individual performance to accomplish team performance. In a recent study

on baseball teams, Humphrey et al. (2009) developed a role-based approach to team composition and found that the relationships between team composition in terms of both member experience and job-related skills and team performance are significantly stronger when the characteristics are possessed by core role, as opposed to non-core, role holders.

Building on Kozlowski and Klein's team compilation process model that emphasizes team members' unequal impacts in the team, I develop a *network based perspective* to study team personality composition. From a social network perspective, teams can be viewed as individuals with relatively stable patterns of interaction over time (Weick, 1969). Within the team, there exist a number of social networks through which team members exchange necessary resources such as information, communication, and material inputs to achieve team goals (Brass, Galaskiewicz, Greve, & Tsai, 2004). As a result, team members differ in their positions in team networks (i.e., central versus peripheral positions). Central members are those who have many connections to other teammates and hence are intensively involved in intra-team interactions (Kilduff & Brass, 2010). Therefore, central members should have profound impacts on team processes such as making decisions, coordinating team member efforts, and motivating the team. In contrast, peripheral members who have limited connections with others in the network may find themselves isolated from team processes and cut off from the on-going interactions (Reinholt, Pedersen, & Foss, in press). Consequently, their impacts in the team will be constrained. For example, a conscientious member who happens to be in a central position in the social network tends to have a greater impact

on the team, compared to an equally conscientious member who is not centrally positioned in the team. This is a worthwhile extension because, with one exception (Humphrey et al., 2009), prior research tends to focus on the effect of an individual attribute while overlooking the role of the attribute holder in the team.

Consistent with this social network perspective, I define intra-team influence *as a team member's impact on a team's on-going interactions, which are determined by the member's position in team networks*. This construct is relevant to *network centrality* in social network theory, which is defined as "the extent to which an actor occupies a central position in a network by having many ties to other actors" (Kilduff & Brass, 2010: 355). A central member refers to an individual with many ties to others while a peripheral member refers to an individual with a few ties to others. The fundamental premise of this construct is that a member who occupies a central position in a team will have greater impacts on team dynamics than other members who are in peripheral positions in the team.

As argued above, a member's intra-team influences stem from the member's centrality in the team networks. According to social network research, individuals interact with others in different networks and hence they may have different centrality scores of a variety of networks such as workflow (i.e., the exchange of inputs and outputs as the work flows through the team), friendship (i.e., the ties of affection and camaraderie that link team members, Baldwin et al., 1997), advice (i.e., comprised of relations through which individuals share resources such as information, assistance, and guidance, Sparrowe, Liden, Wayne, & Kraimer, 2001), and communication networks

(i.e., employees' repeated patterns of work-related interaction, Brass & Burkhardt, 1993). From a theoretical standpoint, a team member's influence in a team is likely to be determined by the positions in multiple networks rather than a position in a single network, such that a member who is central in multiple networks is more influential than a member who occupies a central position in only a single network. Therefore, I conceptualize and operationalize team member intra-team influence as a higher-order construct manifested by the team member's centrality scores in different networks (e.g., workflow, friendship, advice, communication). Prior research suggests that centrality scores in different networks seem highly correlated (Klein, Lim, Saltz, & Mayer, 2004), indicating that different centrality scores may reflect a higher-order construct (i.e., intra-team influence).

The essential idea in the present study emphasizes that the effect of a team composition variable is determined by two dimensions including: *the attribute* itself and *the member* who holds the attribute. Concerning the first dimension, ample evidence has suggested that the higher score for an attribute, the more significant effect on the team there will be (Bell, 2007). For example, a team having a higher average score on conscientiousness tends to perform better than teams with lower scores. Yet, the second dimension, as explained above, is also a critical factor determining the effect of team composition. Integrating these two perspectives (i.e., the attribute and the member), the current research proposes a 2 × 2 framework (Table 1-1) to capture the joint effects of an individual attribute (e.g., conscientiousness) and the member who possesses the attribution (e.g., intra-team influence) on team performance. As a result, the framework

suggests differential effects of a team composition variable in four conditions based on different combinations of the influence of the team member and the score of the attribute. Specifically, when the score of the attribute is high, and the member who possesses the attribute occupies a central position in the team, the effect of the composition variable on team outcomes is very high. In contrast, when the score of the attribute is low and the attribute holder is in a peripheral position, the effect of the composition trait is very limited. Table 1-1 illustrates that the effects of a member's personality trait on team performance is jointly influenced by the score of the trait and the intra-team influence of the member who holds the trait.

Team Personality, Team Processes, and Team Performance

Further, the present research relies on the IPO framework to understand the mechanisms whereby team inputs or composition influence team performance (Hackman, 1992; Ilgen et al., 2005; Mathieu et al., 2008). However, rather than predicting universal relationships between team personality and team processes, I posit that the validity of personality traits increase when they are used to predict team processes that are relevant to the nature of the traits (Moynihan & Peterson, 2001; Tett & Burnett, 2003). In particular, drawing on research on team processes, I propose that three types of team processes mediate the relationships between different personality traits and team performance. Historically, team processes were classified as either *taskwork* which refers to functions that individuals must perform to accomplish team tasks or *teamwork* which describes the interaction between team members (Mathieu et al., 2008; McIntyre & Salas, 1995). Building upon this foundation, Marks et al. (2001) redefined team

processes from a temporary perspective and developed a taxonomy of team process that includes three categories including: transition, action, and interpersonal processes. Nevertheless, the updated taxonomy includes behaviors focusing on tasks (e.g., mission analysis, goal specification, strategy formulation and planning, monitoring progress toward goals, resource and systems monitoring) and interpersonal interactions (e.g., coordination, backup, motivating and confidence building, and affect management).

However, not all team processes fall into the two broad sets of processes (i.e., teamwork versus taskwork) or Marks et al's (2001) three-dimensional model (Mathieu et al., 2008). More importantly, today's dynamic business environment require teams to both perform well and generate novel business solutions to cope with unforeseen changes (Burke, Stagl, Salas, Pierce, & Kendall, 2006; Van de Ven & Johnson, 2006). Thus, teams have to build adaptive capabilities focusing on team creativity and adaptation (Kozlowski, Watola, Nowakowski, Kim, & Botero, 2009). Therefore, the taxonomy of team processes can be advanced by including this third dimension – *team adaptive processes* (Mathieu et al., 2008). Team adaptive processes indicate the extent to which teams are able to propose new business solutions or modify existing structures, capacities, and routines to cope with change. In this study, I focus on the mediating role of these three types of team processes, including team task, interpersonal, and adaptive processes.

Personality research at the individual level suggests that personality traits tend to have a greater impact on employee outcomes when they are relevant to the traits (Barrick et al., 2001; Hogan & Holland, 2003). Similarly, team members' personality

traits may have increased validity in predicting relevant team processes. Therefore, I expect that team personality traits differentially predict three sets of team processes (task, interpersonal, and adaptive processes). Specifically, the predictions are guided by the *congruence* between team personality traits and team process types (i.e., trait-process congruence). For example, *conscientiousness,* describing team member characteristics as hardworking, achievement-oriented and persevering, may have stronger effects on team task processes such as goal specification and monitoring progress toward goals; three traits *extraversion*, *agreeableness, and emotional stability* are predicted to be important to social interactions and hence may predict team interpersonal processes such as coordination, affect management, and backup behaviors; *openness*, which captures individuals' curiosities to explore new methods, may affect team adaptive processes to a great extent.

Team Structure

In addition to understanding the processes transmitting the effects of team personality on team performance, it is also theoretically relevant to consider when team personality affects team outcomes. Ample evidence has demonstrated that team structure often serves as a boundary condition modifying the effects of team composition and processes on team outcomes (Mathieu et al., 2008). According to the definition, team structure includes many structure variables that capture unique team interaction patterns. Essentially, team structure determines the allocation of various important resources in the team such as workflow, inputs, information, and tasks (Stewart & Barrick, 2000). The current study focuses on two sets of team structure variables: team interdependence

and team network structure. Specifically, team interdependence, as one of the most important team structure variables, captures the degree to which team members rely on each other to perform tasks (Kozlowski, & Bell, 2003; Van der Vegt, Van de Vliert, & Oosterhof, 2003). Members in highly interdependent teams are expected to interact cooperatively and depend on each other for information, materials, and reciprocal inputs (Campion, Medsker, & Higgs, 1993). In contrast, members in low interdependent teams work without much coordination. As a result, interdependence reflects the ways the team performs tasks, and thereby may moderate the influences of team composition on team outcomes.

In addition to team interdependence, teams also differ in team network structure, a factor that describes how team members are actually interconnected in the team (Balkundi & Harrison, 2006). Team interdependence and team network structure are distinct in that interdependence indicates team task, goal, and reward structures while network structure refers to interpersonal connections in the team. Specifically, there are two key variables frequently used to capture team network structure including: network *density* and *centralization* (Kilduff & Brass, 2010). Network density is conceptualized as the number of ties in a network divided by the maximum number of ties that are possible and reflects the degree to which members in a team are closely connected. In a dense network, a variety of resources are frequently exchanged among members through a large number of social ties. Additionally, team network centralization, which refers to the extent to which a network is centralized around one or a few actors, is another important network structure variable. It is important to note that centralization as a

network level construct (i.e., capturing the property of a whole network) is different from centrality which is an actor level construct that indicates the property of an individual (e.g., a member). In summary, I focus on team interdependence, team network density, and centralization as three key elements of team structure that I, propose will moderate the effects of team personality traits in the team.

Overall Research Model

Figure 1 summarizes the overall research model. Building on the classic IPO framework, I posit that five personality traits differentially predict three sets of team processes, which in turn fully mediates the relationships between personality traits and team performance. Specifically, conscientiousness will be especially relevant to predicting team task processes, emotional stability, extraversion, and agreeableness are expected to predict team interpersonal processes, and openness will have unique effects on team adaptive processes. In addition, three team structure variables will moderate the effects of team personality traits on team processes, and hence modify the mediated effects of team personality traits on performance via team processes, suggesting a first stage moderated mediation model (Edwards & Lambert, 2007; Preacher, Rucker, & Hayes, 2007). In particular, team interdependence and network density are expected to amplify the effects of team personality on team processes and ultimately performance. In addition, team network centralization may augment the influence of the most central member's personality traits on team outcomes.

The previous section summarized that the team's personality emerges from the composition of each individual members' standing on the personality traits in

combination with their role as defined by their social network, and as a result, team personality can be conceptualized and operationalized in different ways. Departing from the traditional view of team personality research, a social network perspective suggests that the effects of team personality are influenced not only by distribution of the scores of the trait across all team members, but also by the centrality scores of each person who possesses the trait. Therefore, I argue that team personality composition should capture both the personality trait itself and the trait holder's influence in the team. Specifically, this research uses three different ways to conceptualize team members' personality traits in teams. A composite measure is developed to capture team overall personality composition that reflects the effects of all the members' personality traits in the team. However, different from the traditional measure of the average of individual members' traits, this composite measure considers the scores of personality traits as well as the influences of members who possess the traits.

Next, consistent with the notion that certain members in the team, in addition to the team as a whole, may have profound effects on the team's success, I examine how particular individuals in a team affect team processes and indirectly affect team performance. According to social network theory, members with extensive social ties (i.e., central members) likely exert more significant influences in the team and these members' personality traits are expected to matter more than people with fewer social ties (i.e., peripheral members). Thus, I focus on examining how the most central member's personality traits in a team influence team outcomes. Finally, I also test the

effects of the minimum and maximum personality trait scores on team outcomes. I elaborate each of these conceptualizations in detail in Chapter 2.

In summary, this chapter discussed three major limitations associated with prior research on team composition. To advance the theory and remedy the shortcomings, the present research offered a new perspective derived from social network theory to team composition research. In particular, I argue that the effect of a composition variable is jointly determined by the attribute and the person who holds the trait. Based on the new conceptualization of team composition, this study is also aimed at investigating the underlying mechanisms and boundary conditions of team personality effects on team performance.

CHAPTER II

LITERATURE REVIEW & PROPOSED MODEL

Chapter 1 briefly discussed the key constructs and described the overall model of the present study. This research takes a social network based approach to study how team composition variables, in the form of FFM traits, predict team processes and indirectly affect team performance. As a result, the present study is built on social network theory and team research. Specifically, according to social network theory, team members impact team dynamics differently due to their unique positions in the team network (Kilduff & Brass, 2010). Thus, the effects of team personality traits on the team are jointly determined by the traits and the members who possess the traits. In addition, accumulated studies in the team literature have revealed implications for understanding the effect of team composition on team processes and performance (Mathieu et al., 2008). Therefore, this chapter provides an in-depth literature review of these two relevant literatures, social network theory and team research. Because several recent articles have provided comprehensive reviews of the two literatures (e.g., Kilduff & Brass, 2010; Mathieu et al., 2008), the present research focuses on several ideas in social network theory and team research that are most relevant to the proposed model. In the remainder of the chapter, I develop a set of testable hypotheses. Specifically, I explore the underlying processes that explain the effects of team personality traits on team performance as well as the boundary conditions that modify these relationships.

Social Network Theory

As a predominant paradigm in management, social network research has received ample attention from organizational scholars (Borgatti, & Foster, 2003; Kilduff & Brass, 2010). Social network studies have been conducted at both micro and macro levels (Brass et al., 2004). At the micro level, researchers examine social connections between individuals or between teams, and are interested in topics such as leadership, teams, social influence, and power (see Brass et al., 2004 for a review). At the macro level, scholars study relationships between organizations and focus on topics including interfirm relations, alliances, interlocking directorates, organizational reputation, and network performance (Borgatti & Foster, 2003). Because the focus of this research is on the team, I primarily review network studies conducted in the micro research domain.

A social network perspective emphasizes the importance of relations between actors, whether they are individuals, work teams, or organizations, in contrast to a traditional view of organizational research that examines individual actors in isolation and focuses on the actors' attributes such as cognitions, personality, knowledge, and skills. The uniqueness of the social network approach is the focus on relations rather than attributes, on structured patterns of interaction rather than isolated individual actors. Thus, a central tenet of social network theory is that an actor's position in a network has a significant impact on the actor's outcomes including behavior, influence, perception, and performance, in addition to the influence of the actor's attributes (Brass & Burkhardt, 1993). For example, an employee who occupies a central position in a

network tends to receive high performance ratings (Sparrowe et al., 2001) and be perceived as influential (Brass, 1984; Sparrowe & Liden, 2005; Scott & Judge, 2009).

Relevant ideas in social network research. Over the last several decades, scholars have developed different research streams to study social network phenomena. Specifically, some studies were conducted at the actor level of analysis and examined how an actor's network position (e.g., centrality) affects the actor's outcomes such as influence, behavior, and performance (Freeman, 1979; Brass, 1984. 1985; Butt, 1992; Sparrowe & Liden, 2005; Scott & Judge, 2009), whereas other studies were conducted at the network level of analysis and focused on the effects of attributes of the whole network (e.g., network density and centralization) on network outcomes such as team performance (Balkundi & Harrison, 2006; Wellman, 1988).

Concerning the first research area, researchers emphasize the critical role of centrality in network research, arguing that "centrality is an important structure attribute of social networks" (Freeman, 1979: 217). As the most widely studied concept, centrality is an actor level property relating to the structural position of an actor in a network (Borgatti, Mehra, Brass, & Labianca, 2009; Brass, 1984). Originally, the notion of centrality was developed based on several small-group laboratory studies in the 1950s (Bavelas, 1950; Guetzkow and Simon, 1955; Leavitt, 1951). These studies found that persons in central positions tended to emerge as group's leaders. To clarify its conceptual foundations, Freeman (1979) developed three different ways to conceptualize and operationalize individual centrality, including (1) degree, or number of contacts, (2) closeness or proximity, and (3) betweenness. First, degree of contacts, herein called

degree, indicates the number of other actors to which a focal actor is directly connected. Thus, degree captures how many direct social ties an actor has. The second measure, closeness, is generally calculated by summing the length of the shortest connections from one actor to all other actors. Different from the degree measure of centrality, this measure accounts for both direct and indirect links in indicating how "close" a person is to others in the network. The third measure, betweenness, refers to the extent to which an actor falls between pairs of other actors on the shortest path connecting them. For example, if persons A and C are connected only through person B, B would fall between A and C and is able to control any resources, such as information, that flow between A and C (Brass, 1984; Freeman, 1979). These three conceptualizations of centrality, each distinct from the others, are indicative of an actor's influence in a network. Further, social network researchers have attempted to identify the antecedents of centrality, including individuals' demographic characteristics, values, and personality, as well as its consequences, such as power, influence, and performance (Brass, 1984; Brass & Burkhardt, 1993; Klein et al., 2004; Sparrowe et al., 2001). Because centrality is a key idea in the present study, this construct is elaborated in detail in the following section.

In addition to the importance of network centrality, social scientists have also placed an emphasis on distinguishing different types of social ties between actors, such as similarities, social relations, interactions, and workflows (Borgatti et al., 2009). Similarities indicate that actors share some key attributes connecting them such as gender, locations, and social clubs. Social relations refer to social ties that are formed based on special relations between actors such as friendship and interpersonal liking.

Interactions capture interactive patterns between actors, such as giving advice and providing assistance. Finally, workflows refer to exchanges of work related materials between actors. These different types of links refer to Tichy, Tushman, and Fombrun's (1979: 509) *transactional content* (i.e., "what is exchanged when two actors are linked?") and serve as a basis for defining several common types of social networks. Of the numerous types of potential social networks, researchers often focus on the friendship network (Baldwin, Bedell, & Johnson, 1997; Klein et al., 2004), the advice network (Klein et al., 2004; Krackhardt & Porter, 1986; Sparrowe et al., 2001), the workflow network (Brass, 1984), and the communication network (Brass, 1984; Scott & Judge, 2009). These networks correspond roughly to a taxonomy of transactional content proposed by Tichy and colleagues (1979) that covers (1) the exchange of goods, (2) the exchange of information and ideas, and (3) the exchange of affect or liking.

Taking a different approach from actor level research that examines how an actor's position in the network (e.g., an actor's centrality, social ties) affects individual outcomes, a second research area examines the role of attributes of the whole network in predicting network outcomes. This makes sense, as individual actors are embedded in large social networks consisting of multiple actors. Specifically, scholars have found that social networks differ from each other in their structures in the form of *network density* and *centralization*, which are considered the two most important properties of a network (Balkundi & Harrison, 2006; Sparrow et al., 2001). These two structure variables capture the overall interaction patterns of the network and have meaningful impacts on the entire network as well as actors in the network (Balkundi & Harrison, 2006; Reagans &

Zuckerman, 2001; Sparrow et al., 2001; Wellman, 1988). In a meta-analysis, Balkundi and Harrison (2006) reported a moderately positive correlation between team network density and team performance ($\rho = .22$). Density is conceptualized as the actual number of social ties in the network divided by the maximum number of ties that are possible (Kilduff & Brass, 2010). Thus, density indicates the cohesiveness of the network. The denser the network, the more interactions between actors there are in terms of content exchange. Another key attribute of the network, centralization reflects the extent to which a network is centralized around one or a few actors (Kilduff & Brass, 2010; Wellman & Berkowitz, 1988). Redirecting attention on the attributes of the whole network such as density and centralization enables scholars to study not only the outcomes of individual actors in the network but also the consequences of the network itself (Wellman, 1988). For example, a researcher wanting to investigate the extent to which an actor's influence is affected by his or her centrality within a decentralized network would be able to do so (Kilduff & Brass, 2010). However, to my knowledge, such analyses have not been undertaken.

In summary, as a complex research paradigm, social network theory covers various constructs and research streams as described above. My intention, however, is not to provide a comprehensive review elaborating all the important topics in social network research. Instead, this study focuses on two constructs that are most relevant to the proposed model. Specifically, centrality captures one of the most important actor-level attributes that is expected to affect the actor's influence in the network. Thus, team member centrality is used to indicate the member's influence in the team, labeled as

intra-team influence. In addition, it is proposed that two key properties of the entire

network – *density* and *centralization* – serve as boundary conditions modifying the

effects of team personality traits on team processes and, ultimately, team performance.

Below, I provide a detailed discussion of the relationship between team member

centrality and intra-team influence.

Team Member Intra-Team Influence

As discussed in Chapter 1, previous research on team composition has taken an

"individual attribute composition" approach to examine the effects of team personality

traits on team outcomes and used different ways of aggregating individual team member

attributes at the team level (Humphrey et al., 2009: 48). Yet, this view overlooks the

notion that team members differ in their influences on team workflow, coordination, and

interaction. Thus, in the present study, I use the term "intra-team influence" to indicate

the degree of the team member's impact on team interactions such as exchanges of

information, resource, and affect between members.

An individual with greater influence means that others are more dependent on the

individual to complete their own tasks (Brass, 1984). Typically, such influence derives

from the control of relevant resources such as information, knowledge, and material

inputs. Because influential members increase others' dependence on them, attributes of

these influential members become more important to team function compared to the

attributes of less influential members. For example, an influential member with high

conscientiousness is able to deliver critical resources such as information, inputs, and

advice in a timely fashion to teammates who depend on him or her to complete their own

tasks. As a result, the influential member ensures that the team performs at a satisfactory level.

Drawing on social network theory, a large number of studies have demonstrated that an individual's position in a network, or network centrality, is a major source of his or her influence in the network (Brass, 1984, 1985; Brass & Burkhardt, 1993; Sparrowe & Liden, 2005). Pfeffer (1981) argued that influence is first and foremost a structural phenomenon. This perspective emphasizes the importance of one's structural position in determining his or her influence in the network, as opposed to a different view that argues for individual attributes as a source of influence (Allen & Porter, 1983; Brass & Burkhardt, 1993; Kipnis, Schmidt, & Wilkinson, 1980). The social influence framework highlights the effect of social proximity on individual influence (Marsden & Friedkin, 1993), such that socially close individuals exert greater influence on each other than do those who are socially distant (Burt, 1987; Erickson, 1988). Specifically, people in central network positions tend to have greater access to, and potential control over, relevant resources such as information and material inputs through intensive social ties with others. For example, Fombrun (1983) found that centrality in the communications network was related to attributed influence.

In addition, a team may be perceived like an individual, as the actors within the team may have relatively stable patterns of interaction over time (Weick, 1969). A variety of content (e.g., information, resources, affect) is exchanged between team members in team networks. Based on the nature of content exchanged, team members are embedded in different networks such as the advice, communication, workflow, and

friendship networks. As a result, a team member's influence in the team is likely determined by his or her positions in many different types of networks rather than the position in a single network (Brass, 1984). For example, a member who is central in the friendship network but periphery in the workflow network is likely less influential than a member who occupies central positions in the two types of networks. In team contexts, team members are expected to engage in a variety of activities to enhance team processes. Specifically, members need to share information with others (i.e., the communication network), offer advice to teammates (i.e., the advice network), provide work related inputs to others (i.e., the workflow network), and maintain healthy interpersonal relations with colleagues (i.e., the friendship network). Therefore, team members manifest their influences on team interactions through their positions in multiple types of networks. In particular, Brass (1984) found that an actor's influence in a network stems from three important networks - the workflow, communication (or advice), and friendship networks. For example, Sparrow et al. (2005) reported that members' centrality scores in the advice network were positively related to their influence in the organization. Therefore, I conceptualize team member intra-team influence as a higher order construct that is captured by the team member's centrality in multiple types of networks.

A different view of team members' influences in the team. I conceptualize team member intra-team influence from a social network perspective, arguing that members who occupy central positions in a network will exert profound influences in the network. However, some scholars have also argued that an actor's influence may be determined

by one's formal position or role in the network (Humphrey et al., 2009). According to

French and Raven's (1959) taxonomy of power, the influence associated with a

hierarchical level in an organization, often referred to as authority or legitimate power,

offers that influence resides in the position, not the person. Because the current study

addresses team contexts which typically have a flat structure, I primarily rely on the

social network perspective rather than the formal structural position arguments.

Specifically, I argue that the social network perspective is an appropriate lens for the

present research question because team members often have equally *formal* positions in

the team and the difference in their influences is mainly attributed to their *informal*

positions in social networks, not their position titles. However, to rule out the effects of

team member formal positions on intra-team influence, I control for team members'

formal job titles in the team.

Also, this network based approach is different from the role based perspective

advanced by Humphrey et al. (2009). Humphrey and colleagues argued that teams may

have differentiated role structures, and certain roles are more tightly linked to the overall

performance of the team than are other roles. These more important roles, dubbed as the

strategic core, "encounter more of the problems that need to be overcome in the team,

have a greater exposure to the tasks that the team is performing, and are more central to

the workflow of the team" (Humphrey et al., 2009: 50). This approach emphasizes that

members' influences in the team are primarily caused by the predefined nature of the

strategic core rather than the members themselves. The approach of the present study, in

contrast, emphasizes that certain people have more influences than others in the team

due to their central positions (often informal) in social networks rather than their predefined roles in the team. One advantage of this network based approach is to consider the effects of informal or emergent patterns of team interactions on the team, in addition to formally prescribed roles. For example, team members may informally modify the prescribed workflow or engage in information exchanges that do not follow the formal communication channels (Brass & Burkhardt, 1993; Wrzesniewski & Dutton, 2001). Thus, a role based approach may not accurately capture members' differential impacts in the team. Also, from a practical perspective, not all teams impose role differences or have a set of strategic core jobs. Instead, differences in team members' influences on team performance may primarily emerge from the patterned, repeated interactions among individuals (James & Jones, 1976; Mintzberg, 1979; Weick, 1969). The role based approach and the network based approach are certainly related in that a member's network centrality may be heavily influenced by his or her formal role in the team. Given that an employee's impact within the team is the result of the particular combination or interaction of both formal and emergent interdependencies, it is theoretically relevant to explore the network based perspective in addition to the role based approach (Humphrey et al., 2009; Summers, Humphrey, & Ferris, in press). More importantly, both approaches are interrelated, it is important to control for role theory to demonstrate the incremental validity of the network based perspective and rule out alternative explanations.

Team Composition, Process, and Structure

As discussed above, the present research draws on social network theory and team research. Thus far, I have reviewed relevant studies in social network research. Building on social network theory, the research has defined intra-team influence and argued that team members' network positions are the key to understanding the effects of team composition variables on team outcomes. The following sections review important studies in the team research area and discuss how these studies help to develop the proposed model. I begin with a review of the team composition literature and then discuss research on team processes. Finally, I argue team structure is a boundary condition that moderates the effects of team personality traits on team outcomes.

Recent progress in team composition research. During the past several decades, the volume of team composition studies, including team personality research, has significantly increased. Consequently, research has repeatedly demonstrated the meaningful effects of team composition variables such as personality traits on team performance (Barrick et al., 1998; Bell, 2007; Harrison et al., 2002). However, as indicated by many team researchers, studies at the team level of analysis face some unique challenges when they are compared with individual level research, particularly in terms of the conceptualization and measurement of constructs at collective levels of analysis that require a consideration of emergent phenomena (Chan, 1998; Kozlowski & Klein, 2000). Specifically, as described above, the traditional view of team composition research has implemented an approach termed "individual attribute composition" to examine how team composition variables influence team outcomes. This approach has a focus on individual members' attributes such as personality traits and explores how

different ways of aggregating individual attributes impact team performance (Bell, 2007; Humphrey et al., 2009). In a recent meta-analysis, Bell (2007) reviewed a large number of studies and examined the effects of different operationalizations of team personality traits such as the mean, variance, minimal and maximal personality scores for the team on team performance. For example, the study reported that the mean and minimal scores of team conscientiousness related to team performance at the correlations of .33 and .27 respectively, and the mean and minimum scores of team agreeableness related to team performance at the correlations of .34 and .37 respectively.

The majority of team composition research has extensively focused on individual attributes in teams, which implicitly assumes that each member has an equal impact on team effectiveness. This assumption, however, runs counter to what we know about teams that consist of different individuals who play unique roles in the teams (Bales, 1950; Humphrey et al., 2009). In other words, studies taking an attribute based focus on the composition variables (i.e., the attributes) of the team, while overlooking the individual members (i.e., the attribute holders) within the team. To gain a better understanding of how team composition affects team performance, one must consider the unique influence of specific team members in the team, in addition to their attributes.

In an effort to address the aforementioned limitations in the literature, Humphrey and colleagues (2009) adopted a role based approach to study how team composition variables influence team performance. Specifically, they focused on role compositions within the team and investigated how the characteristics of a set of role holders impact team performance. A sharp difference between the role based approach of team

composition and the traditional attribute based approach is that the role based

perspective acknowledges the differential impact of various team roles on team

performance. Further, they argued that certain team roles are more important than other

roles in predicting team performance, and labeled these key roles as the strategic core.

Compared to traditional research on team composition, this new perspective more

accurately captures the reality of the team, namely that key role holders have greater

impacts on team performance than the non-key role holders. For example, a core role

holder high on conscientiousness may be more important to team performance than a

non-core role holder who possesses the same level of conscientiousness. This role based

approach is consistent with studies conducted at the organizational level that emphasizes

the differential impact of a subset of a collective on the whole (Barney, 1991). For

example, Delery and Shaw (2001) suggested that organizational success is not

predicated on the high performance of all members, but is instead determined by the

success of a strategic core in the workforce.

   A social network based view of team composition research. In line with the role

based approach of team composition, I adopt a network based view to examine how

team personality traits affect team performance. Similar to the role based perspective, I

make an assumption that team members have differential impact on team interactions

and performance. As a result, an individual attribute such as conscientiousness will be

more impactful to the team if the attribute is possessed by an influential member in

comparison to the attribute being possessed by a less influential member. However, the

network approach differs from the role based perspective in factors that cause members'

influences. Specifically, Humphrey and colleagues (2009) suggested that role differences

in the team are the major reason why certain members are more important than others.

Team members' roles reflect prescribed duties and formal positions in the team. Thus,

the role based perspective emphasizes the differential influence of the formal roles in the

team, rather than the differential influence of the role holders. As acknowledged by

Humphrey et al. (2009), the role based approach may be irrelevant to a team in which

team members hold similar roles. In addition, in a dynamic environment, teams may

have to adapt to new team structures to cope with unforeseen changes. As a result, team

roles may change over time. Research on job crafting also suggests that employees can

change cognitive, task, and/or relational boundaries to shape interactions and

relationships with others at work and hence modify the prescribed workflow in the team.

Consequently, members' roles may not accurately indicate the members' influence in the

team. In contrast, a network based approach argues that individuals' differential impact

in the team stems from their informal positions in social networks rather than from

prescribed roles. This approach captures actual team interaction patterns, linkages

among team members, and workflow within the team. Therefore, using team members'

network centrality is likely a more accurate way to capture their influences in the team,

and is more generalizable to any team than the role based approach.

Chapter 1 introduced a 2x2 model suggesting that the effects of team

composition variables on team performance are determined by both individual members'

attributes and their influences in the team. According to this framework, the effects of

team composition on team effectiveness are not influenced exclusively by an attribute, but are also determined by who possesses the attribute.

At the individual level of analysis, employee performance is typically determined by the employee's efforts and motivation. Prior studies suggest that employee personality traits influence performance through proximal motivational mechanisms such as self-efficacy, goal setting, and performance expectances (Judge & Ilies, 2002). For example, highly conscientious people tend to set higher goals which lead to better performance (Barrick, Mount, & Strauss, 1993; Locke, 1991). Therefore, it is easy to conclude that the more conscientious an employee is, the better he or she will perform. However, at the team level of analysis, this may not be the case. In team contexts, team performance is determined by team members' collective efforts and their interactions with each other. As a result, team performance reflects how hard individual members work, in addition to how well they coordinate their efforts. Similar to the individual level of analysis, team members' attributes such as conscientiousness affect their efforts, which in turn increase team performance. Yet, the quality of interactions among team members cannot be completely predicted by team members' attributes. Instead, scholars could benefit from taking a network approach to understanding team interaction patterns.

For example, prior studies have suggested that backup behaviors are an important team process that can increase team performance (Marks et al., 2001; Porter, Hollenbeck, Ilgen, Ellis, West, & Moon, 2003). Agreeableness is associated with employees' tendencies to be helpful. Thus, team member agreeableness may have positive impacts on team backup behaviors. for example, consider two members with

equal levels of agreeableness in a team. The first member occupies a central position in a team advice network and hence has more opportunities to provide suggestions to others, while the second member is in a peripheral position. Because the first member has more opportunities to interact with others, his or her tendencies to help (i.e., agreeableness) will most likely have significant impacts on team backup behaviors. Conversely, the second member will be unlikely to significantly enhance team backup behaviors because of a paucity of opportunities. As a result, the team will benefit from the first member's agreeableness to a greater extent compared to the second member. This example illustrates that both the member's attribute and the member's intra-team influence matter.

Different conceptualizations of team personality. A significant challenge faced by team researchers is how to conceptualize individual constructs at the team level. Teams are composed of individuals, and thus team level constructs typically emerge by aggregating corresponding variables at the individual level. Therefore, researchers need to not only focus on constructs that capture the properties of the "whole" team, but also pay attention to constructs that reflect the properties of the "parts" of the team (Wu, Tsui, & Kinicki, 2010). For example, team composition research using an attribute based approach has suggested different ways of aggregating individual member attributes, including the *mean*, *variance*, *minimum*, and *maximum* scores of members' attributes. These operationalizations capture both the "whole" and the "parts" of the team. For example, the mean and variance of conscientiousness capture the team's overall

composition, while the minimum and maximal scores of conscientiousness indicate the properties of specific individual members (i.e., the "parts").

Following this logic, I develop different conceptualizations of team composition from a social network perspective to capture the properties of the "whole" team as well as the "parts" of the team. First, I use the term – *team overall composition of an attribute* – to capture all the members' attributes in the team. For example, team overall conscientiousness should include the effects of every member's conscientiousness in the team. However, as argued previously, team members differ in their influences in the team. Thus, the effect of an individual member's conscientiousness on team interactions depends on his or her influence (i.e., network centrality) in the team such that a central member's conscientiousness tends to be more impactful on the team. Therefore, I propose that team overall composition of an attribute is a *product* of individual members' attributes and their intra-team influences. Algebraically, team overall composition of an attribute can be computed as follows:

Team overall composition of an attribute (e.g., team conscientiousness) =

$[\Sigma^n_i (A_i \times I_i)] / N$

A_i = the attribute score of team member # i

I_i = the intra-team influence score of team member # i

N = number of team members in the team

Essentially, this equation calculates a weighted mean of an attribute (weighted by intra-team influence), such that the attribute of the team member who occupies a central position will be assigned with a greater weight in the team overall composition score.

Specifically, the intra-team influence score will be transformed to a standard scale (i.e., 0-1). For example, consider two teams below (Table 2-1). Team 1 consists of eight members with varying levels of conscientiousness, ranging from 1 to 5. Similarly, team 2 also has eight members with exactly the same conscientiousness scores. The mean and variance of conscientiousness for both teams are 3.5 and 2.0 respectively. Similarly, the maximum and minimum scores for both teams are the same. Thus, according to the attribute based composition approach, the two teams are expected to have similar performance. However, a close look at the two teams indicates that in team 1, members who have greater intra-team influences tend to be more conscientious, while in team 2, members who exhibit greater influences happen to be less conscientious. As a result, it makes sense to argue that the first team will outperform the second one. Based on the equation described above, team 1's overall conscientiousness is 14.4 while team 2's overall conscientiousness is 10.8. Thus, the new equation accurately captures the difference between the two teams in conscientiousness composition.

In addition to the conceptualization of team overall composition, I also discuss the ways to operationalize specific members' attributes (i.e., the "parts" of the team), rather than all of the members' attributes in the team. Kozlowski and Klein (2000) suggest that particular individual team members can impact team level outcomes, known as "bottom-up" influences. According to the newly developed team composition taxonomy that emphasizes the role of team member attribute and intra-team influence, I propose two interrelated ways to conceptualize team composition. First, prior studies have demonstrated the critical role of team minimum and maximum scores of an

attribute in affecting team performance (Barrick et al., 1998; Bell, 2007). For example, it is argued that a very disagreeable team member (i.e., minimal agreeableness) can disrupt team functioning to a greater extent. Consistent with previous research, I posit that the member with the minimum or maximum scores of an attribute may have a significant impact on team function. Departing from prior studies, I further argue that the effects of the minimum or maximum on an attribute are contingent upon the member's intra-team influence such that the effects will be much stronger when the member occupies a central position in the team.

Another conceptualization of team composition is to examine the effects of the most central team member's attributes on team outcomes. This approach argues that the person who has the highest centrality score in the network will have the greatest impact on team dynamics. Thus, the attributes of the most central member matter more than those of peripheral members. This view is different from studies emphasizing the effects of the minimum or maximum on an attribute by focusing on the member's intra-team influence. In summary, from a network perspective, I conceptualize team composition in three ways: team overall composition of an attribute, the minimum or maximum on an attribute, and an attribute of the most central team member. Specifically, team overall composition captures the properties of the "whole" team, while the latter two conceptualizations reflect the "parts" of the team.

The IPO model and team processes. In the team effectiveness literature, the IPO framework is the most popular way of integrating relationships among variables associated with team effectiveness (Campion et al., 1993; Cohen & Bailey, 1997;

McGrath, 1964). According to this paradigm, numerous team variables can be grouped into three categories, including team inputs, team processes and team outcomes. Specifically, team personality traits are important team inputs driving team members' interactions or processes. Team processes capture team members' behaviors that convert inputs to outcomes (Marks et al., 2001). Team researchers have agreed that team processes are the key mechanisms through which team composition manifests its effects on team performance (Hackman, 1992; Ilgen et al., 2005; LePine et al., 2008; Marks et al., 2001; Mathieu et al., 2008). As complex, adaptive, dynamic systems, teams require their members to interact with each other, coordinate individual contributions, and pursue common goals. Team processes capture the dynamic interactions among team members and thereby determine how well a team can perform (LePine et al., 2008).

According to the classic input-process-outcome (IPO) model, team processes convert a variety of team composition variables such as team personality traits into team performance (see Mathieu et al., 2008 for a review). Essentially, this model posits a causal logic that team member attributes such as personality traits drive a variety of team processes, which in turn transform team personality into distal outcomes (Hackman, 1992; Ilgen et al., 2005; McGrath, 1964). Building on this framework, I propose the mediating role of team processes in converting team member personality traits into team performance.

However, despite the popularity of this model, some scholars have criticized the IPO framework for several reasons. The most significant limitation identified by researchers is that many of the mediators that transmit the influence of inputs to

outcomes are not team processes (Ilgen et al., 2005). For example, Marks et al. (2001) distinguish between team emergent states and team processes and suggest that many constructs traditionally included in the IPO model as processes are not really processes at all, but instead reflect emergent cognitive or affective states. A notable difference between team processes and emergent states is that emergent states capture cognitive, motivational, and affective states of teams, as opposed to the nature of their member interaction. Empirically, DeChurch and Mesmer-Magnus (2010) reported a moderately high correlation between team processes and emergent states ($\rho = .43$). Recent meta-analytic studies have demonstrated that both team emergent states and team processes are vital to team performance (DeChurch & Mesmer-Magnus, 2010; LePine et al., 2008; Stajkovic, Lee, & Nyberg, 2009). To keep the scope of the present study parsimonious and manageable, I focus on the mediating role of team processes in the relationship between team composition and team performance.

Dimensions of team processes. Team processes are broadly defined as team members' collective behaviors that aim to achieve team goals. There are a variety of member behaviors identified as team processes. Scholars have attempted to develop parsimonious taxonomies to integrate numerous types of team processes. Historically, two broad categories of team processes, including processes focusing on team tasks (i.e., taskwork) and processes focusing on interpersonal interactions (i.e., teamwork), have been used to conceptualize the multitude of process behaviors (McIntyre & Salas, 1995; Oser, McCallum, Salas, & Morgan, 1989; Stout, Cannon-Bowers, Salas, & Milanovich, 1999). Building on this distinction, Marks et al. (2001) developed a three-dimension

team processes model positing that team processes fall into three categories: team transition, action, and interpersonal processes. A central tenet of this model is that teams perform different processes at different times (i.e., performance episodes). Performance episodes refer to distinguishable periods of time over which work is performed and evaluated. They argued that between performance episodes teams primarily engage in transition processes to review their previous efforts and prepare for future work; during episodes, teams perform action processes to accomplish tasks. In addition, teams engage in interpersonal processes both during and between performance episodes.

Specifically, transition processes capture how teams interpret previous team accomplishments, as well as prepare for future actions, including three primary transition processes: mission analysis, goal specification, and strategy formulation and planning. Action processes cover four narrow processes that aim to accomplish team goals and objectives, including monitoring progress toward goals, systems monitoring, and team monitoring and backup behavior. Interpersonal processes include activities that emphasize the management of interpersonal relationships such as conflict management, motivation and confidence building, and affect management (LePine et al., 2008; Marks et al., 2001). Empirically, LePine et al. (2008) provided support for the structure of this multidimensional theory of teamwork process using meta-analyses of relationships among narrow teamwork processes. In spite of the increasing popularity of this framework, a variety of team processes can be categorized differently. As noted by Marks et al. (2001), team transition and action processes are targeted at the accomplishment of tasks, while interpersonal processes reflect the quality of teamwork.

Thus, team processes can be constructed on two broad dimensions: *task oriented processes* and *interpersonal oriented processes*. Moreover, Marks et al. (2001) emphasized that a team's temporal rhythms may limit the generalizability of the three dimensional model because some teams may not have distinguishable performance episodes. Therefore, to maximize generalizability in the study, I build on the traditional view of team processes, which conceptualizes processes as either task or interpersonally focused.

Yet, not all team processes fall into the two broad sets of processes (i.e., teamwork versus taskwork) or Marks et al's multi-dimensional model (Mathieu et al., 2008). For example, in a recent review, Mathieu et al. (2008) suggested that not all team processes are captured by Marks et al.'s (2001) taxonomy of team processes. Thus, I examine an additional broad dimension of team processes – team adaptive processes - which are defined as *team members' collective acts that help the team cope with change by proposing new or modifications of existing structures, capacities, and routines*. Team adaptive processes are team members' collective actions targeted at increasing team adaptability and ultimately enhancing team performance. In today's dynamic environment, change is an ever present reality for teams (Burke et al., 2006; LePine, 2003; Summers et al., in press). As a result, adaptation lies at "the heart of team effectiveness" (Burke et al., 2006: 1189). Based on Burke's (2006) team adaptation model, team member change oriented actions such as innovative behaviors are the key processes transmitting team adaptation oriented inputs such as openness to experience and cognitive ability into team innovation. Therefore, team adaptive processes capture

an important aspect of team processes. Yet, they are underrepresented in the major team process models. According to Burke et al.'s (2006) conceptual work, team adaptation describes how teams proactively take efforts to initiate functional change and focuses on two aspects including: (a) providing new approaches to accomplish team goals or (b) modifying existing team routines. Accordingly, I propose that team adaptation processes include two narrow sub-dimensions of processes, including team creative processes and team taking charge processes. Team creative processes describe how teams figure out novel methods to perform tasks (Gilson & Shalley, 2004), while taking charge processes emphasize how teams improve existing team procedures (Morrison & Phelps, 1999). Table 2-2 summarizes the taxonomy of team processes.

Team structure. According to the IPO framework, team processes serve as underlying mechanisms explaining the effects of team personality on team performance. Further, scholars are also interested in identifying boundary conditions of the effects of team composition and processes on team outcomes (Barrick et al., 2007; Chen, Kirkman, Kanfer, Allen, & Rosen, 2007; Stewart & Barrick, 2000). The underlying premise of this line of research is that the effects of team inputs and processes on team outcomes vary as a function of team structure, which reflects the extent to which teams differ from each other. One fundamental feature of teams that makes team research different from individual research is the degree of interactions among team members. Thus, the interaction pattern is a parsimonious variable capturing the difference in team structure and thereby serves as a critical boundary condition of the IPO model (Wageman, 1995). Organizational researchers have proposed different ways to capture how team members

interact. In particular, a large number of studies have suggested team interdependence as an important element of team structure (Campion et al., 1993; Van Der Vegt et al., 2001; Wageman, 1995). Team interdependence reflects the extent to which members cooperate and work interactively to complete tasks (Wageman, 1995). Teams with high levels of interdependence require team members to interact cooperatively and depend on each other for information, materials, and reciprocal inputs (Campion et al., 1993). In contrast, team members will have less pressure to work with teammates in less interdependent teams. Essentially, interdependence increases the potential or need for team members to exchange a variety of resources in the team.

In addition to team interdependence, social network theorists emphasize team network structure as a fundamental element of team structure (Balkundi & Harrison, 2006). Specifically, two variables have frequently been used to capture team structure, team network density and centralization (Kilduff & Brass, 2010). As discussed above, density refers to the actual number of ties in the network divided by the maximum number of ties that are possible. The denser the network, the more cohesiveness there is in terms of resources exchanged among team members (Kilduff & Brass, 2010). Both interdependence and network density reflect the degree of interactions in the form of resources exchanged among team members, and thereby they share some similarities. However, network density is different from interdependence in that density captures the actual or realized interaction patterns in the team, while interdependence reflects the potential need for interaction in the team.

Moreover, team network centralization is another element of team structure but has a different focus. Centralization indicates the extent to which a network is centralized around one or a few actors. In a highly centralized team, there will be a few members who occupy central positions in the network and have intensive interactions with others (e.g., informal leaders); and there will also be some members in peripheral positions who have limited influences in the team. In contrast, in a decentralized team, all the members have similar influences. In summary, the present research focuses on team interdependence, team network density, and centralization as three key elements of team structure, which are proposed to moderate the effects of team personality traits on team processes and ultimately performance.

Hypotheses

This section provides a set of hypotheses explaining *how* and *when* team personality traits, conceptualized in different forms, affect team performance. As described previously, team composition research is interested in exploring the effects of all the members' attributes in the team (i.e., the "whole") as well as the effects of specific members' attributes (i.e., the "parts") on team outcomes. In line with this research, I develop hypotheses underpinning the influences of team overall composition and the effects of particular individual members' attributes on team processes and, ultimately, team performance. Regarding team overall composition, I use the formula described above that captures the composite score of individual attribute and intra-team influence, rather than using the mean or variance of the attribute. Concerning the influences of specific team members' attributes, I organize the hypotheses based on two

foci: intra-team influence based predictions (i.e., how the most central member's attribute affects team outcomes) versus attribute based predictions (i.e., how the minimum or maximum on an attribute affects team outcomes).

As a widely accepted taxonomy, the Five Factor Model (FFM) comprehensively captures the critical stable individual differences in personality (Barrick & Mount, 1991; Costa & McCrae, 1992). The Five Factor Model suggests that individuals can be described using five broad traits, including conscientiousness (i.e., careful, planful, hard-working), agreeableness (i.e., cooperative, trusting, friendly), emotional stability (i.e., calm, resilient, secure), extraversion (i.e., being energetic and gregarious), and openness to experience (i.e., imaginative, cultured, broadminded; Costa & McCrae, 1988). Accumulated empirical evidence has demonstrated consistent relationships between FFM traits and employee outcomes such as job performance (Barrick & Mount, 1991; Barrick et al., 2001), organizational citizenship behavior (Chiaburu, Oh, Berry, Li, & Gardner, in press), work motivation (Judge & Ilies, 2002), job satisfaction (Judge, Heller, & Mount, 2002), counterproductive work behavior (Berry, Ones, & Sackett, 2007), and job withdrawal (Zimmerman, 2008). Thus, this research uses the FFM as an overall framework to capture team members' personality attributes.

Further, prior research has also reported that specific traits best predict outcomes that are more relevant to the underlying nature of the trait rather than less relevant outcomes (Barrick et al., 2001; Hogan & Holland, 2003; Tett & Burnett, 2003). For example, Hogan and Holland argued that Big Five personality dimensions have stronger effects on relevant criterion variables than on less relevant criteria. They proposed that

emotional stability, agreeableness, and conscientiousness should predict performance requiring getting along, while the dimensions of emotional stability, extraversion, and openness will predict performance requiring getting ahead (Hogan & Holland, 2003). Similarly, at the team level, personality traits predict team outcomes differently. For example, Barrick et al. (1998) reported that team agreeableness, extraversion, and emotional stability related to team cohesion. In contrast, team conscientiousness did not predict this outcome. Following this logic, I suggest that FFM traits likely have high validity in predicting their relevant team processes. For example, conscientiousness may predict team task processes to a greater extent than predicting adaptive processes, while agreeableness likely predicts team interpersonal processes rather than task processes. To keep the model parsimonious, I only hypothesize the relationships between FFM traits and the outcomes that are most relevant to the traits, even though I acknowledge that FFM traits may predict other outcomes to a lesser extent.

Building on and extending the IPO framework, this research tests the effects of team personality traits on team processes, which in turn mediate the relationships between personality traits and team performance. In addition, three team structure variables, namely team interdependence, team network density, and centralization, moderate the direct effects of FFM traits on team processes and indirect effects on team performance. However, regarding some relationships in the IPO framework such as the process-outcome relationships, which has received ample support in the literature, I only provide concise discussions and refer readers to previous research for the support of the relationships (e.g., LePine et al., 2008).

Before providing an in-depth discussion of the specific hypotheses, the theoretical basis to explain why personality traits predict team performance is developed. Specifically, there are three mechanisms providing support for the effects of personality traits in team contexts. First, prior studies at the individual level of analysis have demonstrated that traits influence employee performance through proximal motivational variables, including task self-efficacy, performance expectancies, goal setting, and motivation orientations (Barrick, Stewart, & Piotrowski, 2002; Judge & Ilies, 2002). I argue that this mechanism is also responsible for explaining the effects of personality traits on team performance. Similarly, members' personality traits capture the way they think, feel, and act, and thereby determine how much effort they invest on tasks and how persistent they are when facing obstacles (Chen & Kanfer, 2006; Chen et al., 2007).

Second, team members' traits influence the way members interact with one another. Due to the highly interdependent nature of most team tasks, team performance is largely determined by how well team members are able to collaborate with teammates and work together as a team to achieve shared goals. Therefore, the patterns of intra-team interaction are another key to team performance. Some FFM traits such as agreeableness, extraversion, and emotional stability are particularly relevant in predicting the quality of team interactions. For example, agreeable people are motivated to maintain social harmony and avoid interpersonal conflict, and in turn have positive effects on team performance.

In addition to the two major mechanisms responsible for team performance, there is a third path that explains how personality affects team performance. Specifically, in a

dynamic context, teams are expected to constantly update work procedures, and adapt to newly developed routines (Burke et al., 2006). Thus, team member openness to experience is particularly important for teams to develop adaptive capacity (Baer & Oldham, 2006; McCrae, 1987). For example, Taggar (2002) found that team member openness was positively related to team creative relevant processes. In summary, team personality traits influence team outcomes through three ways including: increasing team task motivation, facilitating team interaction, and enhancing team adaptability.

The effects of team overall personality composition. Team overall personality composition is a composite score that captures all of the team members' personality traits weighted by their intra-team influence scores in the team. This conceptualization is different from the traditional method using the mean or variance of a trait to indicate team composition. The essential idea of team overall personality emphasizes that all the members' personality traits have impacts on team outcomes. However, the influences of different members are likely to be distinct. In particular, personality traits possessed by central members are of greater impact on the team than traits possessed by peripheral members. For example, in a team network, members who occupy central positions are the key to maintain team functioning as they are in control of a variety of critical resources such as information and reciprocal inputs. As a result, the team relies on these central members to coordinate effort, provide advice to other members, and deliver material inputs to others in a timely fashion. Therefore, the central members' specific personality traits such as conscientiousness and extraversion can help the team members complete tasks on time and facilitate smooth intra-team interactions (Bell, 2007).

In addition, the social influence framework has suggested that central members in a network exert greater influence on others because of the effects of social proximity (Marsden & Friedkin, 1993; Zohar & Tenne-Gazit, 2008). Therefore, the central members may serve as role models of teammates (Lockwood, Jordan, & Kunda, 2002; Wheeler & Miyake, 1992). For example, if the central members possess desirable qualities such as being hardworking, dependable, and trustworthy, other members are likely to imitate the central members' behaviors. In other words, the central members' personality traits not only influence their own behaviors, but also their teammates' actions. Consequently, the team will benefit from the central members' traits to a greater extent. Team overall personality composition precisely captures the differential impact of each team member's personality traits on the team, and thereby is expected to have superior predictive validity over traditional measures of team composition such as the mean and variance of personality. Next, I discuss the effect of each FFM trait on team processes.

Conscientiousness, the most studied individual trait, reflects the extent to which an individual is careful, thorough, responsible, organized, planful, hardworking, achievement-oriented, and persevering (Barrick & Mount, 1991; McCrae & Costa, 1985). Because of these characteristics, conscientious people are expected to perform well on their jobs. Ample evidence has demonstrated positive relationships between conscientiousness and performance at the individual and team levels (Barrick et al., 2001; Bell, 2007; Hurtz & Donovan, 2000). According to the IPO framework (Ilgen et al., 2005), the effects of team personality on team performance are likely explained by

team process variables. Specifically, team overall conscientiousness is particularly relevant in predicting team task oriented processes such as goal specification, strategic planning, team monitoring, and team efforts. For example, Barrick et al (1993) found that employees high on conscientiousness are more likely to set goals and are more likely to be committed to goals. Because conscientious people are planful and organized, they are likely to be particularly strong at developing realistic goals, developing courses of action and contingency plans, and monitoring the progress of task completion (Barrick et al., 1993; Judge & Ilies, 2002). Moreover, conscientious individuals are likely to exert great efforts to perform tasks, which should facilitate team task completion.

However, the effects of team conscientiousness on team task processes also depend on who possesses the trait. From a social network perspective, compared to peripheral members, central members are of greater control of a variety of resources and have greater responsibilities for coordinating team processes such as monitoring work progress, and exerting efforts on tasks. Thus, when high conscientious members are in central positions, they tend to have a greater impact on team task processes. In contrast, peripheral members are likely isolated from ongoing team interactions and hence have limited influences on team outcomes. As a result, conscientious people in peripheral positions may not facilitate task processes. Team overall conscientiousness not only captures the average score of conscientiousness, but also considers the distribution of the trait in the team. Thus, I predict:

H1a: Team overall conscientiousness is positively related to team task focused

processes after controlling for team mean conscientiousness.

Emotional stability also has positive impacts on employee attitude and behavior (Barrick & Mount, 1991; Judge et al., 2002; Judge & Ilies, 2002). Emotional stability describes the degree to which people are anxious, depressed, angry, embarrassed, emotional, worried, and insecure. Emotionally stable individuals are able to handle anxiety and stress effectively, tend to experience positive emotional states, and have strong interpersonal skills (Barrick & Mount, 1991; Costa & McCrae, 1992; Goldberg, 1990). Therefore, a team composed of emotionally stable individuals is able to handle conflict well, create a relaxed atmosphere that promotes cooperation, and maintain a positive work attitude (Bell, 2007). For example, in team contexts, members interact with one another on a daily basis, and thus may experience interpersonal conflicts, low morale, and negative emotions that are detrimental to teamwork. Individuals who are emotionally stable are able to deal with these negative experiences, and contribute positively to teamwork.

Additionally, members differ in their influences in the form of network centrality. Central members' emotional stability traits are particularly important to teamwork as the central members have intensive connections with others and have opportunities to engage in interpersonal processes such as affect management and conflict management. In contrast, if the central members experience negative emotional states due to low emotional stability, the negative emotions may spread in the team through emotional contagion effects (Barsade, 2002). Conversely, if emotionally stable

members are in peripheral network positions, they tend to have constrained influences on interpersonal processes such as facilitating cooperation, and building team confidence. Thus, I predict:

H1b: Team overall emotional stability is positively related to team interpersonal focused processes after controlling for team mean emotional stability.

The third dimension of the FFM is called extraversion. Characteristics frequently associated with this trait include being sociable, gregarious, assertive, talkative, and active (Ashton, Lee, & Paunonen, 2002; Digman, 1990; Lucas, Diener, Grob, Suh, & Shao, 2000). Researchers have suggested that this dimension consists of two components including: *ambition* and *sociability*. Ambition includes descriptors such as initiative, surgency, ambition, and impetuous, whereas *sociability* is reflected in descriptors like sociable, exhibitionist, and expressive (Barrick & Mount, 1991). Based on previous research, both components of extraversion are expected to facilitate team interpersonal processes.

For example, prior work has noted that extraverts are effective at dealing with interpersonal relationships and likely display superior performance on jobs requiring social interactions such as sales and managerial positions (Barrick et al., 2001; Taggar, Hackett, & Saha, 1999). Thus, extraverted individuals may be key in "greasing the wheels" of interpersonal processes. Relatedly, people high on extraversion also tend to have high self-efficacy (Judge & Ilies, 2002) and have also been found to be positively related to leader effectiveness (Judge, Bono, Ilies, & Gerhardt, 2002). Combined, extraverts are likely to emerge as informal leaders in the team and play key roles in

teamwork such as motivating others, leveraging team confidence, and taking initiative to coordinate team efforts.

Additionally, the positive impact that extraverts may exert in facilitating team interpersonal processes is likely accentuated when they occupy central positions in the network. For example, building team confidence, a key interpersonal process with links to team success, is likely increased when extraverted team members have more opportunities to influence other members. That is, extraverted central members are afforded ample opportunities to build confidence in others by way of their above average leadership skills and desire to communicate efficacious messages with others. Thus, I predict:

H1c: Team overall extraversion is positively related to team interpersonal
focused processes after controlling for team mean extraversion.

Agreeableness captures individual characteristics such as being friendly, trusting, courteous, flexible, good-natured, cooperative, forgiving, soft-hearted, and tolerant (Barrick & Mount, 1991; Costa & McCrae, 1992). At the individual level of analysis, agreeableness has been found unrelated with job performance (Barrick et al., 2001). However, agreeableness is a valid predictor of interpersonal related outcomes such as helping behavior and interpersonal harmony (Chiaburu et al., in press; Ilies, Fulmer, Spitzmuller, & Johnson, 2009). Because of the highly interdependent nature of the team, agreeableness is important in team contexts (Mount, Barrick, & Stewart, 1998). Individuals who are agreeable tend to be cooperative and strong at interpersonal facilitation (Hurtz & Donovan, 2000). Further, agreeable people are motivated to

maintain positive social situations and avoid conflicts (Graziano, Hair, & Finch,

1997).Therefore, when a team is composed of agreeable team members, the team is

likely better at facilitating positive interpersonal processes.

Again, from a network based perspective, it is insufficient for a team to have a

high average score of agreeableness. To truly capitalize on the benefit of agreeableness,

people high on agreeableness have to be highly involved in intra-team interactions and

occupy central positions in the team. For example, members in central positions are able

to proactively deal with conflict. As a result, when a team is composed of numerous

agreeable members who are in central positions, the team can effectively manage

interpersonal processes. Thus, I predict:

H1d: Team overall agreeableness is positively related to team interpersonal

focused processes after controlling for team mean agreeableness.

The last dimension of the FFM is called openness to experience, or intellect, and

captures individual traits like being imaginative, cultured, curious, original, broad-

minded, intelligent, and artistically sensitive (Barrick & Mount, 1991; McCrae, 1987;

John, 1989). Individuals with high levels of openness are motivated to explore new

methods and propose new ideas to perform tasks (Baer & Oldham, 2006; Chiaburu et al.,

in press; McCrae, 1987). Although openness is a weak predictor of individual job

performance (Barrick et al., 2001), it is a valuable trait when the situation is novel or

complex (Griffin & Hesketh, 2004). For example, a large number of studies have

demonstrated the positive effects of openness on creativity and other change-oriented

work behaviors (Chiaburu et al., in press). Team adaptive processes involve modifying

outdated routines, and trying new problem-solving strategies (Taggar, 2002). Thus, openness to experience likely predicts adaptive processes as members high on openness are imaginative and open to varied perspectives, and hence experience divergent thinking (Guilford, 1984). As a result, they are likely to encourage group members to apply nontraditional thinking during problem solving (LePine, 2003). Specifically, when members high on openness have intensive connections with teammates (i.e., high centrality), they are able to promote their novel solutions and persuade others to accept alternative strategies. Consequently, team adaptive processes will be greatly enhanced. Thus, I predict:

> *H1e: Team overall openness is positively related to team adaptation focused*
> *processes after controlling for team mean openness.*

Since teams vary in their interaction patterns such that some teams require members to engage in intensive collaborative actions, while others expect their members to work independently, the effects of members' personality traits on team processes depend on team interaction patterns. In particular, personality matters more in teams with more intensive interactions. As mentioned previously, two structure variables capture team interaction patterns, including team interdependence and team network density. The difference of the two constructs is that interdependence reflects the extent to which team members need to work together, while density indicates the degree of actual team interaction patterns. Specifically, as argued in the previous section, team members' personality traits affect team performance through three routes, increasing team motivation, smoothing team interaction, and improving team adaptability. Thus,

the two team structure variables likely moderate the effects of personality traits on the three types of team processes.

Regarding interdependence, a significant amount of studies have shown interdependence to be an important moderator variable in teams. For example, Gully and colleagues (1995) found that cohesion had a stronger impact on team performance when tasks were highly interdependent compared to when they were less interdependent. Similarly, LePine et al. (2008) reported that team processes had stronger effects on team performance when interdependence was higher. Team interdependence creates a common fate for team members to work together closely (Johnson & Johnson, 2005; Somech, Desivilya, & Lidogoster, 2009; Van Der Vegt, Emans, & Van De Vliert, 2000; Van der Vegt et al., 2003). For instance, goal interdependence motivates all team members to work together cooperatively because their goal accomplishment depends on others' actions. In addition, reward interdependence binds one's personal interests with others. Similarly, task interdependence intensifies team members' day-to-day interactions and communications through increased coordination needs. As a result, team interdependence is an important factor that influences team communication and resource exchange (Barrick et al., 2007). In contrast, when team interdependence is lower, members work more independently, requisite interpersonal interaction is more limited, and member contributions are pooled rather than integrated (Thompson, 1967).

Concerning specific personality traits, team interdependence is expected to moderate the relationships between personality traits and corresponding team processes such that in highly interdependent teams, personality traits are more impactful on team

processes. For example, conscientious people are described as dependable and hence are able to provide reciprocal inputs to their teammates on time to ensure the internal processes flow smoothly. In contrast, low conscientious people are particularly detrimental to team processes when interdependence is high, as they may significantly disrupt team workflow. As a result, interdependence intensifies the relationship between team conscientiousness and task processes. Furthermore, agreeableness likely enhances team interpersonal processes to a greater extent when interdependence is higher. The intensified team communication and cooperation needs caused by high interdependence require team members to be trusting, friendly, and sociable and consequently augment the effect of agreeableness on interpersonal processes Similarly, when team interdependence is higher rather than lower, members have more opportunities to interact with each other and hence are more likely to experience interpersonal conflict. As a result, people high on extraversion and emotional stability are able to handle interpersonal conflicts well and take initiative to coordinate teamwork. Thus, team interpersonal processes will benefit from team emotional stability and extraversion to a greater extent in highly interdependent teams. Finally, openness to experience becomes more important to team adaptive processes when team interdependence is high. The key of team adaptation is creating new solutions to fit the changing environment. A large number of studies have suggested that new ideas stem from combining divergent perspectives from different members (De Dreu, Baas, & Nijstad, 2008; Nijstad, De Dreu, Rietzschel, & Baas, 2010). Because people high on openness are curious and good at conceiving new ideas, their novel solutions are more easily absorbed by their teammates

when team interdependence is high (Johnson & Johnson, 2005). Based on all of the logic

above, I make the following predictions:

> *H2a: Team interdependence moderates the relationship between team overall*
> *conscientiousness and team task processes such that the relationship is stronger*
> *as team interdependence increases.*

> *H2b: Team interdependence moderates the relationship between team overall*
> *agreeableness and team interpersonal processes such that the relationship is*
> *stronger as team interdependence increases.*

> *H2c: Team interdependence moderates the relationship between team overall*
> *emotional stability and team interpersonal processes such that the relationship is*
> *stronger as team interdependence increases.*

> *H2d: Team interdependence moderates the relationship between team overall*
> *extraversion and team interpersonal processes such that the relationship is*
> *stronger as team interdependence increases.*

> *H2e: Team interdependence moderates the relationship between team overall*
> *openness and team adaptive processes such that the relationship is stronger as*
> *team interdependence increases.*

Similar to team interdependence, team network density is also expected to

moderate the personality-team process relationships. Network density reflects the extent

to which team members are interconnected with one another. Coleman (1990) suggests

that a dense network is composed of closely tied individuals and provides ample

opportunities for team members to exchange a variety of resources through social ties. A

densely connected cluster of individuals may be more motivated to provide reciprocal exchange of information and provide development of norms around acceptable behavior and reciprocity (Zhou, Shin, Brass, Choi, & Zhang, 2009; Zohar & Tenne-Gazit, 2008). Additionally, a dense network enables members to express their behavioral tendencies through a variety of social ties. Because of these characteristics, network density likely accentuates the effects of personality traits on team processes.

Specifically, team conscientiousness becomes vital to team task processes when team density is high. In a dense team, members have many ties to one another, and they are expected to share a significant amount of information with others and behave more collaboratively to formalize team goals, plans, and tasks (Balkundi & Harrison, 2006). Team conscientiousness ensures that all the members can count on one another to coordinate task processes. In contrast, in a dense network, low conscientious members are particularly detrimental to team processes if all the members are bonded together to perform tasks. Likewise, agreeable members are more important to team interpersonal processes when the team requires intensive collaboration. For example, agreeable people are helpful and willing to assist teammates. A dense network creates pressing needs and sufficient opportunities for members to engage in helping behaviors. In contrast, a team in which members do not connect with many other members (i.e., low-density team) may expect the members to work independently. As a result, the effect of team agreeableness on team processes will be minimized.

Similarly, emotionally stable individuals tend to have positive work attitudes and such attitudes can spill over to teammates in a dense network through social ties, and

thereby help to create a positive work environment. In contrast, team members' neurotic traits, considered the opposite of emotionally stable traits, may be detrimental to team interpersonal processes in a dense network as negative emotions can easily spread in the team. Additionally, intensive intra-team connections provide extraverts ample opportunities to motivate teammates, and proactively mediate team conflict. Consequently, people high on extraversion will have positive impacts on interpersonal processes. Lastly, team openness becomes a valuable source of creating novel solutions and enhancing adaptive processes. Specifically, team density pushes members to exchange vital, job-related ideas and tacit knowledge with one another (Hansen, 1999). As a result, alternative solutions generated by members high on openness are likely shared in the team and utilized to adopt new routines. Thus, I predict:

H3a: Team network density moderates the relationship between team overall conscientiousness and team task processes such that the relationship is stronger as team density increases.

H3b: Team network density moderates the relationship between team overall agreeableness and team interpersonal processes such that the relationship is stronger as team network density increases.

H3c: Team network density moderates the relationship between team overall emotional stability and team interpersonal processes such that the relationship is stronger as team network density increases.

H3d: Team network density moderates the relationship between team overall extraversion and team interpersonal processes such that the relationship is stronger as team network density increases.

H3e: Team network density moderates the relationship between team overall openness and team adaptive processes such that the relationship is stronger as team network density increases.

Both the traditional and extended IPO frameworks emphasize the mediating role of team processes in the relationships between team inputs (i.e., team personality traits) and team performance (Cohen & Bailey, 1997; Ilgen et al., 2005; Mathieu et al., 2008). According to this perspective, characteristics of team members' personality traits (i.e., inputs) influence team performance (i.e., outcomes) indirectly through the nature of team members' collective actions (i.e., team process; Hackman, 1992; Ilgen et al., 2005; McGrath et al., 2001). To establish a mediating hypothesis, one must demonstrate the relationship between the predictor and the mediator, the relationship between the mediator and the outcome, and that the relationship between the predictor and outcome is reduced, once one has accounted for the mediator's effect on the outcome. (MacKinnon, 2008). As argued above, different personality traits predict distinct team processes. Specifically, team conscientiousness increases team task processes, agreeableness, emotional stability, and extraversion predict interpersonal processes, and openness to experience enhances adaptive processes.

Additionally, in a recent meta-analysis, LePine and colleagues (2008) reported that team overall processes were modestly related to team performance ($\rho = .31$).

Concerning different forms of team processes, LePine et al. (2008) found that both team task (i.e., action and transition processes) and interpersonal processes were positively related to team performance ($\rho = .29$). In a separate study, team adaptation is also positively related team performance (LePine, 2003). In sum, empirical evidence has demonstrated the positive effects of all the three types of team processes on team performance.

Concerning the mediating logic, team processes capture a variety of team members' volitional behaviors that have direct impacts on team outcomes (Marks et al., 2001). Thus, team processes are proximal driving forces of team performance. Compared to the effects of team processes, the influences of team members' personality traits are likely to be distal. Personality traits capture team members' behavioral tendencies rather than actual behaviors. In other words, personality traits are habitual ways of thinking and doing across situations, and they "provide the best estimate of what a person is most likely to do" (Fiske & Butler, 1963: 258). Therefore, consistent with previous theoretical and empirical work, I argue that team members' personality traits manifest themselves into meaningful work behaviors in the form of team processes, which ultimately determine team performance. Thus, I predict:

> *H4a: Team task processes mediate the relationships between team overall conscientiousness and team performance.*
>
> *H4b: Team interpersonal processes mediate the relationships between team overall agreeableness and team performance.*

H4c: Team interpersonal processes mediate the relationships between team

overall emotional stability and team performance.

H4d: Team interpersonal processes mediate the relationships between team

overall extraversion and team performance.

H4e: Team adaptive processes mediate the relationships between team overall

openness and team performance.

Building on the mediating and moderating hypotheses, I further suggest a first

stage moderated mediation for the relationships between team personality traits and team

performance via team processes (Edwards & Lambert, 2007; Preacher et al., 2007).

According to mediation principles (Baron & Kenny, 1986; MacKinnon, 2008; Sobel,

1982), the mediated or indirect effects of team personality traits on team performance

via team processes are determined by the strengths of two forces including: (a) the

effects of team personality traits on team processes; and (b) the influences of team

processes on team performance. Because I have argued that team interdependence and

team network density amplify the effects of team personality traits on team processes,

the mediated effects of team personality traits on team performance are influenced by

high team interdependence and team density simultaneously, resulting in the magnified

mediating effects of team personality traits on team performance. Specifically, as

suggested, team interdependence and network density increase the team's needs for

collaboration and resource exchange. As a result, team processes will be influenced to a

greater extent by members' personality traits. Thus, the indirect effects of team

personality traits on performance via team processes will be stronger in highly interdependent teams or in dense networks.

For example, both interdependence and network density augment the impact of team conscientiousness on task processes, and hence increase the indirect effects of the personality trait on performance. Similarly, the two team structure variables also enhance the effects of agreeableness, emotional stability, and extraversion on team interpersonal processes. As a result, the mediated effects of the three traits on team performance are amplified. Finally, the indirect effect of team openness on team performance via adaptive processes is likely enhanced by team interdependence and density. Taken together, I predict:

> *H5a: Team interdependence moderates the mediated effect of team conscientiousness on team performance via team task processes such that the mediated effect is stronger as team interdependence increases.*

> *H5b: Team interdependence moderates the mediated effect of team agreeableness on team performance via team interpersonal processes such that the mediated effect is stronger as team interdependence increases.*

> *H5c: Team interdependence moderates the mediated effect of team emotional stability on team performance via team interpersonal processes such that the mediated effect is stronger as team interdependence increases.*

> *H5d: Team interdependence moderates the mediated effect of team extraversion on team performance via team interpersonal processes such that the mediated effect is stronger as team interdependence increases.*

H5e: Team interdependence moderates the mediated effect of team openness on team performance via team adaptive processes such that the mediated effect is stronger as team interdependence increases.

H6a: Team density moderates the mediated effect of team conscientiousness on team performance via team task processes such that the mediated effect is stronger as team density increases.

H6b: Team density moderates the mediated effect of team agreeableness on team performance via team interpersonal processes such that the mediated effect is stronger as team density increases.

H6c: Team density moderates the mediated effect of team emotional stability on team performance via team interpersonal processes such that the mediated effect is stronger as team density increases.

H6d: Team density moderates the mediated effect of team extraversion on team performance via team interpersonal processes such that the mediated effect is stronger as team density increases.

H6e: Team density moderates the mediated effect of team openness on team performance via team adaptive processes such that the mediated effect is stronger as team density increases.

The effects of team most central member's personality. The above hypotheses describe how team overall personality composition, which captures all the team members' traits in the team, influences team performance. Kozlowski and Klein (2000) have suggested different ways to capture team level constructs. In addition to using the

sum of all the team members' personality traits, researchers have argued that some members (i.e., the parts of the team) have more meaningful impacts on team performance than others (Barrick et al., 1998; Bell, 2007). For example, prior research has demonstrated that the member who possesses the minimal score of a trait in the team will have a profound influence on team outcomes (e.g., a disagreeable member may be detrimental to team harmony; Bell, 2007). Following this logic but taking a slightly different perspective, I explore how the most central member's personality in a team affects team performance. From a social network perspective, team members differ in their influences due to their positions in the network. Highly influential members who have more social ties connected with others tend to have greater influences on team processes than less influential members.

Team members high on centrality typically have more opportunities to interact with others in the team. As a result, other members tend to depend on the central members to receive critical resources such as information, material inputs, and advices to get things done. The most central member is the individual who has the highest centrality score in the team and hence is expected to have the greatest influence on team processes. Thus, the most central member is the key to the team's performance because his or her behaviors directly affect the way other people act. If the member fails to provide information, advice, and material inputs to other teammates, team workflow is likely interrupted and the team suffers process losses (Steiner, 1972; Hill, 1982). Personality traits capture individual behavioral tendencies and consequently affect how people behave. Thus, personality traits possessed by the most central member will

directly affect the way the central member interacts with his or her teammates, and ultimately influence team processes.

Concerning specific traits, if the most central member is high on conscientiousness, he or she is likely to be hardworking, dependable, and planful. These desirable characteristics will have positive impacts on team task processes. For example, the conscientious member may serve as a role model influencing others in a positive way. Also, the most central member with high agreeableness may contribute to team interpersonal processes to a greater extent because of his or her helpful tendencies. For example, the member is able to create a cooperative work environment that facilitates mutual respect, willingness to compromise, and develops norms of cooperation and interpersonal harmony. Similarly, an emotionally stable member who happens to be in the most central position in the team can engage in activities that foster emotional balance, positive work attitudes, and help the team cope with stressful demands and frustration. An extravert who occupies the most central position is likely to emerge as an informal leader in the team and plays a critical role in maintaining team members' motivation and confidence and shaping interpersonal processes. Finally, when the most central member is high on openness, he or she can easily share new perspectives with teammates through social ties. As a result, the team is more likely to utilize the member's novel solutions and enhance team adaptive processes. Therefore, I predict:

H7a: The team's most central member's conscientiousness is positively related to team task processes.

H7b: The team's most central member's agreeableness is positively related to

team interpersonal processes.

H7c: The team's most central member's emotional stability is positively related

to team interpersonal processes.

H7d: The team's most central member's extraversion is positively related to team

interpersonal processes.

H7e: The team's most central member's openness is positively related to team

processes.

Further, I posit that the effects of most central member's personality traits on

team processes vary as a function of team structure, namely team network centralization.

Because the most central member has intensive connections with other members and

thereby increases teammates' dependence on the member, personality traits possessed by

the member become critically important. However, the effects of the most central

member's personality will decrease if the team does not primarily depend on the central

member to get things done. For example, if a team relies on all the team members'

shared efforts to perform tasks rather than a single "star" player in the team, the most

centrally located member's traits will matter less. Team network centralization reflects

the extent to which interactions are concentrated in a small number of individuals rather

than distributed equally among all members (Sparrowe et al., 2001; Zohar & Tenne-

Gazit, 2008). In a decentralized team, every member plays an equal role in influencing

team processes, while in a centralized team, a few members have close ties with others

but most members are loosely connected. As a result, a few central members are in

control of a significant amount of critical resources. Clearly, the most central member's personality traits will have more profound effects on team processes in centralized teams but are less impactful in decentralized teams.

For example, when team centralization is high, the most central member will play a pivotal role in performing various team tasks and coordinating interactions among team members. When the member is dependable, hardworking, and planful, he or she is able to track team resources to ensure that the team has necessary resources to accomplish its goals and objectives. Also, the member's tendencies to collaborate and help will facilitate a healthy work climate that facilitates teamwork, cooperation, and interpersonal harmony. Moreover, if the most central member is emotionally stable, he or she can effectively handle team conflict and deal with obstacles. Similarly, an extravert who is in the most central position can proactively develop and maintain members' motivation and confidence. Additionally, when the most central member is high on openness, he or she will stand out when team centralization is high and serve as a role model to motivate others to propose novel solutions (Zhou, 2003). In contrast, in a decentralized team, the most central member may be just as important as other teammates. As a result, the effects of the most central member's traits on team processes will be diminished. Thus, I predict:

> H8a: Team centralization moderates the relationship between the most central
> member's conscientiousness and team task processes, such that the relationship
> is stronger as team centralization increases.

H8b: Team centralization moderates the relationship between the most central member's agreeableness and team interpersonal processes, such that the relationship is stronger as team centralization increases.

H8c: Team centralization moderates the relationship between the most central member's emotional stability and team interpersonal processes, such that the relationship is stronger as team centralization increases.

H8d: Team centralization moderates the relationship between the most central member's extraversion and team interpersonal processes, such that the relationship is stronger as team centralization increases.

H8e: Team centralization moderates the relationship between the most central member's openness and team adaptive processes, such that the relationship is stronger as team centralization increases.

The above hypotheses have demonstrated the meaningful relationships between the most central member's personality traits and team processes. Additionally, as argued above , team processes serve as more proximal forces than team personality traits in influencing team performance. Thus the most central member's personality traits affect the way the member interact with others in the team, and thereby have significant impacts on team processes. Consequently, team processes convert personality traits into team performance. Thus, I predict:

H9a: Team task processes mediate the relationship between the most central member's conscientiousness and team performance.

H9b: Team interpersonal processes mediate the relationship between the most central member's agreeableness and team performance.

H9c: Team interpersonal processes mediate the relationship between the most central member's emotional stability and team performance.

H9d: Team interpersonal processes mediate the relationship between the most central member's extraversion and team performance.

H9e: Team adaptive processes mediate the relationship between the most central member's openness and team performance.

Further, based on the arguments of the mediating and moderating hypotheses, the mediated effects of the most central member's personality traits on team performance via team processes are amplified by team network centralization. Team centralization magnifies the role of the most central member in influencing team processes, and consequently increases the indirect effects of personality traits on team performance, resulting in the magnified indirect effects on team performance. For example, team centralization enhances the effect of the most central member's conscientiousness on task processes, and consequently signifies the indirect effect of the personality trait on performance. In addition, centralization also augments the effects of agreeableness, emotional stability, and extraversion on team interpersonal processes. As a result, the indirect effects of the three traits on team performance via team interpersonal processes are magnified. Finally, the most central member's openness predicts team adaptive processes and indirectly predicts team performance to a greater extent in centralized teams. Taken together, I predict:

H10a: Team centralization moderates the mediated effect of the most central member's conscientiousness on team performance via team task processes such that the mediated effect is stronger as team centralization increases.

H10b: Team centralization moderates the mediated effect of the most central member's agreeableness on team performance via team interpersonal processes such that the mediated effect is stronger as team centralization increases.

H10c: Team centralization moderates the mediated effect of the most central member's emotional stability on team performance via team interpersonal processes such that the mediated effect is stronger as team centralization increases.

H10d: Team centralization moderates the mediated effect of the most central member's extraversion on team performance via team interpersonal processes such that the mediated effect is stronger as team centralization increases.

H10e: Team centralization moderates the mediated effect of the most central member's openness on team performance via team adaptive processes such that the mediated effect is stronger as team centralization increases.

The effects of team minimal and maximal personality. A different approach to team composition research is to focus on the highest or lowest individual trait score for the team (Barrick et al., 1998). An individual who possesses the minimal or maximal trait score for the team tends to have a meaningful impact on team outcomes (Bell, 2007). Prior research has demonstrated the significant effects of both the minimal and maximal score of a few specific traits on team outcomes. In fact, for some traits, the

minimum has more predictive power than the maximum. In contrast, for other traits, the

opposite is true. Specifically, in team contexts, team performance is determined by the

collective efforts of all the members. In other words, each team member must perform at

a minimally acceptable level to achieve team goals (Barrick et al., 1998). Prior research

has suggested conscientiousness, emotional stability, and agreeableness are the

"functional employee" traits, which tend to have positive effects on organizationally

desirable outcomes (Mount & Barrick, 1995). Thus, not surprisingly, prior research has

revealed that the minimal scores of these three traits are important to team processes. For

example, a very low conscientious member may serve as a bad role model to other

members and hence reduce team effort; a very disagreeable member may destroy the

team's capability to work cooperatively, cause team conflict and consequently disrupt

team interpersonal processes. Also, an emotionally unstable person may spread his or

her negative job attitude in the team and create an unpleasant work environment.

In contrast, for the other two traits, extraversion and openness, this is not the

case. It is not necessary that an employee high on extraversion or openness is more

valuable to the team than an introvert or an employee low on openness. Thus, the

minimal scores of these two traits may not predict team outcomes. Instead, the maximum

on extraversion and openness for a team may be functional to the team. For example, a

highly extraverted member may become an informal leader to coordinate team

interactions. Similarly, the inputs from the member with highest openness may be

particularly critical for generating new solutions to problems. Empirically, Bell (2007)

found that team minimum conscientiousness (ρ = .27) and agreeableness (ρ = .37) had

stronger effects on team performance than team maximum conscientiousness ($\rho = .14$)

and agreeableness ($\rho = .14$). In contrast, team maximum extraversion ($\rho = .13$) and

openness ($\rho = .17$) had stronger effects on team performance than team minimum

extraversion ($\rho = .04$) and openness ($\rho = .09$). In addition, Barrick et al. (1998) reported

that team minimum emotional stability had significant effects on team interpersonal

related outcomes ($r = .34$ for social cohesion, $r = -.40$ for team conflict, and $r = .50$ for

team communication). However, team maximum emotional stability did not predict

these outcomes. Consistent with the theoretical reasoning and empirical evidence, I

predict that:

H11a: Team minimum conscientiousness is positively related to team task

processes.

H11b: Team minimum agreeableness is positively related to interpersonal team

processes.

H11c: Team minimum emotional stability personality is positively related to

team processes.

H11d: Team maximum extraversion is positively related to team interpersonal

processes.

H11e: Team maximum openness is positively related to team adaptive processes.

In addition to proposing the main effects of team minimal (maximal) personality

on team processes, I further argue that the effects are likely moderated by the team

member's intra-team influence. As argued above, the person who holds the highest or

lowest trait score has a profound impact on team processes; however, the effect is also

determined by the member's position in the network, such that the influence is likely significantly amplified if the member happens to occupy a central position in the team. In contrast, a peripheral member tends to have a limited effect on team outcomes even though he or she has the highest or lowest individual trait score for the team.

Specifically, a central member who is irresponsible, lazy, and disorganized (i.e., low conscientiousness) can severely disrupt team task oriented processes. For example, the member may fail to deliver necessary inputs to other teammates and destroy team workflow. In contrast, a low conscientious employee who is isolated from team interactions (i.e., low centrality) is less detrimental to the team. Similarly, a disagreeable member who is in a central position in the team may not get along with most of the teammates and thereby harm the team's capability to work cooperatively and hinder team interpersonal processes (Barrick et al., 1998). In addition, an emotionally unstable person tends to be associated with negative affectivity and an unwillingness to cooperate with others. When the member is in a central position, he or she may easily spread negative attitudes such as low confidence, anxiety, and negative moods in the team and hence create an unhealthy work environment. In contrast, an extravert in a central position is well suited for promoting leadership emergence. As a result, the member is likely to fill the leadership role within the team and consequently enhance team interpersonal processes. Moreover, when a central member is high on openness, he or she is able to promote novel ideas to others, and push the team to adopt the new perspectives. Thus, I predict:

H12a: Team member intra-team influence moderates the relationship between team minimum conscientiousness and team task processes, such that the relationship is stronger as the member' intra-team influence increases.

H12b: Team member intra-team influence moderates the relationship between team minimum agreeableness and team interpersonal processes, such that the relationship is stronger as the member' intra-team influence increases.

H12c: Team member intra-team influence moderates the relationship between team minimum emotional stability and team interpersonal processes, such that the relationship is stronger as the member' intra-team influence increases.

H12d: Team member intra-team influence moderates the relationship between team maximum extraversion and team interpersonal processes, such that the relationship is stronger as the member' intra-team influence increases.

H12e: Team member intra-team influence moderates the relationship between team maximum openness and team adaptive processes, such that the relationship is stronger as the member' intra-team influence increases.

According to the arguments developed above, team minimum conscientiousness positively predicts team task processes, team minimum agreeableness and emotional stability predict team interpersonal processes, team maximum extraversion predicts team interpersonal processes, and team maximum openness predicts team adaptive processes. Also, consistent with the IPO framework, team processes have more proximal impacts on team performance than do team personality traits. Thus, I expect that team minimal

(maximal) personality traits are indirectly related to team performance through team processes. Therefore, I predict:

> *H13a: Team task processes mediate the relationship between team minimum conscientiousness and performance.*
>
> *H13b: Team interpersonal processes mediate the relationship between team minimum agreeableness and performance.*
>
> *H13c: Team interpersonal processes mediate the relationship between team minimum emotional stability and performance.*
>
> *H13d: Team interpersonal processes mediate the relationship between team maximum extraversion and performance.*
>
> *H13e: Team adaptive processes mediate the relationship between team maximum openness and performance.*

Further, based on the arguments of the mediating and moderating hypotheses, the mediated effects of team minimal (maximal) personality traits on team performance via team processes are amplified by the member's intra-team influence. When the member occupies a central position in the team, his or her personality traits have stronger effects on team processes, leading to the magnified indirect effects on team performance. For example, when the member who possesses team minimum conscientiousness is in a central position, he or she has a greater impact on team task processes and consequently has an enhanced indirect effect on team performance. In addition, the member's centrality also augments the effects of team minimum agreeableness and emotional stability on team interpersonal processes. As a result, the indirect effects of the traits on

team performance via team interpersonal processes are amplified. A central extravert predicts team interpersonal processes to a greater extent and thereby has a stronger indirect effect on team performance. Finally, team maximum openness has a stronger direct effect on team adaptive processes and has a magnified indirect effect on performance when the trait is possessed by a central member. Thus, I predict:

H14a: Team member intra-team influence moderates the mediated effect of team minimum conscientiousness on team performance via team task processes such that the mediated effect is stronger as the member' intra-team influence increases.

H14b: Team member intra-team influence moderates the mediated effect of team minimum agreeableness on team performance via team interpersonal processes such that the mediated effect is stronger as the member' intra-team influence increases.

H14c: Team member intra-team influence moderates the mediated effect of team minimum emotional stability on team performance via team interpersonal processes such that the mediated effect is stronger as the member' intra-team influence increases.

H14d: Team member intra-team influence moderates the mediated effect of team maximum extraversion on team performance via team interpersonal processes such that the mediated effect is stronger as the member' intra-team influence increases.

H14e: Team member intra-team influence moderates the mediated effect of team

maximum openness on team performance via team processes such that the

mediated effect is stronger as the member' intra-team influence increases.

Incremental validity of different personality conceptualizations. The present

study conceptualizes team personality in three ways: team overall personality, the most

central member's personality, and team minimum and maximum personality. Also, as

discussed above, all of the three conceptualizations of team personality have meaningful

impacts on team processes and performance. It is theoretically and practically important

to examine the incremental validity of each conceptualization of team personality over

others. Revealing the unique predictive power of each personality conceptualization will

be informative for scholars and practitioners to make team composition decisions.

Specifically, concerning the three types of team personality conceptualizations,

team overall personality, which captures all the members' personality in the team,

reflects the properties of the "whole" team, while both the most central member's

personality and team minimum and maximum personality indicate the properties of the

"parts" of the team. For several reasons, I posit that (a) team overall personality will

predict team processes and performance above and beyond the effects of the most central

member's personality and team minimum and maximum personality on team outcomes;

and (b) the most central member's personality will predict team processes and

performance above and beyond the effects of team minimum and maximum personality

on team outcomes. In other words, I will expect that team overall personality will have

the highest predictive validity, and the most central member's personality will have the second highest predictive validity.

First, compared to the latter two conceptualizations that capture the "parts" of the team, team overall personality accounts the effects of all the members' personality and by definition include the influences of the most central member's personality and team minimum and maximum personality. Consequently, it makes sense to argue that the "whole" team (i.e., team overall personality) will demonstrate the incremental validity over the "parts" of the team (i.e., the most central member's personality and team minimum and maximum personality). In addition, the effects of the most central member's personality and team minimum and maximum personality on team outcomes are likely subject to some team contingencies. As a result, the two conceptualizations may have inconsistent validity across teams. For example, the most central member's personality tends to have weak relationships with team outcomes when the team is decentralized as the team relies on all the members' shared efforts to achieve goals rather than relying on a single "star" member (i.e., the most central member). The effects of team minimum and maximum personality will be diminished when the member who possesses the minimal or maximum personality score is in a peripheral position in the team. In contrast, the effects of team overall personality are less likely subject to these team contingencies. Therefore, team overall personality will demonstrate superior predictive validity over the other two types of personality conceptualizations.

Concerning the most central member's personality and team minimum and maximum personality, I expect that the former will have stronger effects on team

outcomes than the latter conceptualization. As discussed above, the most central member

is the individual who has the highest centrality score in the team and hence is expected

to have the greatest influence on team processes. For example, other team members rely

heavily on the most central member to receive critical resources to complete tasks. As a

result, personality traits possessed by the member will have profound effects on team

outcomes. In contrast, the effects of team minimum and maximum personality are

dependent upon the network position of the person who possesses the trait. Therefore,

the most central member's personality is expected to demonstrate superior validity

overall team minimum and maximum personality. Taken together, I predict:

H15: Team overall personality predicts team processes and performance after

controlling for the most central member's personality and team minimum and

maximum personality.

H16: The most central member's personality predicts team processes and

performance after controlling for team minimum and maximum personality.

CHAPTER III

METHODOLOGY

Sample and Procedures

To test the hypotheses, I collected data from manufacturing teams based in a large Chinese company in the petrochemical industry. The company is one of the largest integrated refining petrochemical companies in China, which was ranked 40th among the Top 500 Chinese Listed Companies by Fortune (2009). The Company's main products fall into four categories including: refined oil products (e.g., gasoline, diesel), petrochemicals (e.g., ethylene, propylene, and butadiene), and synthetic resins and synthetic fiber polymers (e.g., polyethylene, polypropylene, and polyester). Within each production line, business activities such as planning, managing, and manufacturing are organized around work teams. As a result, employees work interdependently with others to perform tasks. Additionally, because these teams worked on a wide variety of products, there were significant variations among the teams in terms of interdependence.

The survey was administered in the company's training center, where team supervisors were trained on management skills. One hundred and two team supervisors and 756 team members from 102 teams were invited to participate in the study. Supervisors were instructed to provide their team performance ratings and distribute employee surveys to all of their followers in the teams. Followers completed the questionnaires and returned them in sealed envelopes directly to research assistants in the company. A coding scheme was utilized to ensure matched supervisor-subordinate

data. Informed consent was obtained before the study began, and the data collection process ensured confidentiality of the responses. Finally, to encourage a higher response rate, each respondent who completed the survey was rewarded with a gift valued at approximately five dollars.

Responses were obtained from all of the 102 supervisors and 661 of the 756 team members, resulting in an overall response rate of 87.4 percent. The mean team size was 7.4, with a range of two to 19 members. On average, I received 6.5 responses from each team for an average within team response rate of 91%. Specifically, there were 80 teams with 100% within team response rates, six teams with within team response rates between 80-99%, eight teams with within team response rates between 50-79%, and eight teams with the response rates below 50%. Because of the high within team response requirement for team social network analyses, I dropped 16 teams with within team response rates below 80% and two teams with team sizes smaller than three. The final sample consisted of 584 members of 84 teams.

Regarding demographics, 26 percent of respondents were female; the average age was 38 years old (SD = 9); fifty three percent reported a high school education or below, 14 percent reported having career training degrees, 26 percent reported having associate degrees, and 8 percent were university graduates; the average tenure in team was 7 years (SD = 7), and the average organizational tenure was 16 years (SD =10).

Measures

To minimize common method variance (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003), I collected different data from different sources (i.e., team supervisors

and team members). Team members were asked to complete measures of personality, team processes, team network centrality, team network density, centralization, and team interdependence. Team supervisors provided information on team performance and each member's role on the team. A seven-point, Likert-type scale (ranging from 1 = "strongly disagree" to 7 = "strongly agree") was used for all study items (except where noted below). All materials were presented in the Chinese language, and the scales were translated into Chinese from English following the standard translation and back-translation procedures (Brislin, 1986). All study items are presented in Appendix A.

Personality. The Five Factor Model (FFM) personality traits were measured using 60 items derived from Goldberg's (1992) IPIP Big-Five factor markers. Specifically, each personality trait was assessed by 12 items. All the items were intermingled. Sample items include: "I am very thorough in any work I do" (conscientiousness, α = .76), "I like initiating conversations with people I do not know" (extraversion, α = .64), "I am genuinely interested in other people" (agreeableness, α = .71), "I wish I could have more respect for myself" (emotional stability, α = .70), and "I like working with difficult concepts and ideas" (openness to experience, α = .75).

Team processes. Team processes that fall into three broad categories including team task, interpersonal, and adaptive processes were measured using different scales. Specifically, based on Marks et al.'s (2001) taxonomy, Mathieu and Marks have developed a team process scale that captures both team task processes and interpersonal processes (c.f. Maynard, Mathieu, Rapp, & Gilson, 2012). Task processes were measured using four sub-dimensions (3 items for each dimension): *monitoring progress*

toward goals (e.g., "we actively work to regularly monitor how well we are meeting our team goals"), *resource and systems monitoring* (e.g., "we actively work to monitor important aspects of our work environment"), *team monitoring* (e.g., "we actively work to develop standards for acceptable team member performance"), and *coordination* (e.g., "we actively work to smoothly integrate our work efforts"). The mean correlation among the sub-dimensions was .62 and the Cronbach's alpha for overall task processes was .92. Interpersonal processes were measured using three sub-processes (3 items for each dimension): *conflict management* (e.g., "we actively work to deal with personal conflicts in fair and equitable ways"), *motivation and confidence building* (e.g., "we actively work to take pride in our accomplishments"), and *affect management* (e.g., "we actively work to manage stress"). The mean correlation among the sub dimensions was .73 and the Cronbach's alpha for overall interpersonal processes was .93.

To measure team adaptive processes, I used two sub-processes, *team creative processes* and *team taking charge processes*. Team creative processes were measured using 3 items from Gilson and Shalley's (2004) scale. A sample item is: "we actively work to come up with new ways of doing things". Team taking charge processes were assessed using five items modified from Morrison and Phelps' (1999) taking charge scale. A sample item reads: "we actively work to change how teamwork is executed in order to be more effective". The correlation between taking charge and creativity processes was .73. The coefficient alpha reliability estimate for overall team adaptive processes was .92.

Because team processes represent team level constructs (Marks et al., 2001), I

aggregated team members' ratings of team processes to the team level to operationalize

team processes. In support of aggregation, I calculated interrater agreement (r_{wg}) and

reliability indices (ICC(1) and ICC(2)), and tested whether or not average scores differed

significantly across teams [indicated by an F-test from a one-way analysis of variance

(ANOVA) contrasting team means on each variable]. ICC(1) indicates the proportion of

variance in ratings due to team membership, and ICC(2) indicates the reliability of team

mean differences (Bliese, 2000). For task processes, the mean and median r_{wg} were .88,

and .90 respectively, indicating "strong agreement" among members within teams

(LeBreton & Senter, 2008). In addition, ICC(1), ICC(2), and respective F-value were

.15, .54, and $F_{(100,550)} = 2.17$, p < .01. For interpersonal processes, the mean and median

r_{wg} were .90, and .94 respectively; ICC(1), ICC(2), and respective F-value were .21, .63,

and $F_{(100,550)} = 2.71$, p < .01. Finally, for adaptive processes, the mean and median r_{wg}

were .85, and .88 respectively; ICC(1), ICC(2), and respective F-value were .13, .50, and

$F_{(100,550)} = 2.00$, p < .01. While supporting aggregation overall, the lower than desired

ICC(2) value stems, in part, from the presence of several teams with small team sizes in

the sample (Bliese, 2000).

Networks and network centrality. To capture a team member's influence in a

team, I measured the member's centrality scores from four types of networks including

the workflow, communication, advice, and friendship networks. Team members were

provided with a list of their teammates and asked to report their relations with each

teammate (ranging from "not at all = 1" to "very much = 5"). Specifically, consistent

with previous studies (Brass, 1984), I assessed workflow relations by asking the

respondents two questions: "to what degree does [insert name] provide you with inputs

to your job?" (i.e., receiving workflow network) and "to what degree do you distribute

the outputs from you work to [insert name]?" (i.e., providing workflow network) A

communication relation was elicited by asking, "to what degree do you talk frequently

with [insert name] about work-related topics?" In addition, I used two items developed

by Klein et al. (2004) to capture team members' advice and friendship relations

respectively, "to what degree do you go to [insert name] for work-related advice?" and

"to what degree is [insert name] a good friend of yours, someone you socialize with

during your free time?"

Additionally, in line with prior network research conducted in team settings (e.g.,

Klein et al., 2004), it is more important to capture the strength of the relationships

among individuals rather than to assess the existence of the relationships. As a result, I

assessed the strength of the relationships using a five-point scale, anchored by "not at

all"(l), "some"(3), and "very much"(5). Further, following previous work on calculating

team member centrality (Borgatti, Everett, & Freeman, 1992; Klein et al., 2004), I

computed normed in-degree centrality scores for each member to capture team member

centrality using UCINET 6 for Windows (Borgatti, Everett, & Freeman, 2002).

Specifically, degree centrality captures the strength of the relationships of other actors to

which a focal actor is directly connected. In-degree centrality is a form of degree

centrality that excludes self-reports by counting only those relations with a focal member

reported by other team members. Thus, it does not suffer from the limitations of self-

reports, as does out-degree centrality (Klein et al., 2004). Moreover, because the teams varied in size, it is important to adjust members' centrality score by team size. Thus, normed in-degree centrality scores were preferred because this measure allows for comparisons across teams of different sizes. A high normed in-degree centrality score indicates that a member is in a central position in the team. Finally, because I argue that a member's influence stems from his or her centrality scores from multiple types of networks, I collapsed each team member's centrality scores obtained from the five types of networks, including the workflow (i.e., receiving and providing network), communication, advice, and friendship networks into a higher order measure of intra-team influence. As expected, the mean intercorrelation among the five network measures was very high (r = .88), indicating the appropriateness of calculating an overall centrality score.

Network density. Following previous research (Sparrow et al., 2001), network density was computed as the sum of the actual responses divided by the total number of actors in the network, using UCINET 6 for Windows (Borgatti et al., 2002). Higher scores indicate greater team density. Further, because I measured five types of networks, I computed five density scores from the networks. Given the considerable overlap among the five networks, an overall density score was calculated by averaging density scores from the five network measures. The mean intercorrelation among the density scores was .88.

Network centralization. In addition, network centralization was also computed using UCINET 6 for Windows (Borgatti et al., 2002) based on Freeman's (1979)

definition. Algebraically, it is necessary to compute the sum of the differences between the largest individual centrality score and the scores of all the other individuals in the network. Then, this sum of the observed differences in individual centrality scores is divided by the maximum possible sum of differences (Wasserman & Faust, 1994). A high score indicates that a network is centralized around one or a few actors, while a low score means that a network is decentralized. The value of centralization ranges from 0 to 1. Similarly, five centralization scores from five network measures were created. Consistent with the previous measures, the five scores were collapsed into one overall centralization score. The mean intercorrelation among the five centralization scores was .52.

Team interdependence. Consistent with prior research that has conceptualized team interdependence as a multidimensional construct, I measured team interdependence using a nine-item scale developed by Campion et al. (1993), which contains three sub-facets including: (a) *task interdependence* (e.g.," Within my team, jobs performed by team members are related to one another"); (b) *goal interdependence* (e.g., "My work goals come directly from the goals of my team"); and (c) *feedback and reward interdependence* (e.g., "Feedback about how well I am doing my job comes primarily from information about how well the entire team is doing"). Given that I focused on the overall construct of team interdependence, I collapsed the three sub-dimensions into an overall measure of team interdependence. The average correlation among three sub-dimensions of team interdependence was .38. The alpha of the overall scale was .75. Supporting aggregation, the mean and median r_{wg} were .87 and .90 respectively; ICC1

and ICC2 were .12 and .47; and $F_{(100,550)} = 1.89$, p < .01. Again, the lower than desired ICC(2) value may be attributable to the presence of several teams with small team sizes in the sample (Bliese, 2000).

   Team performance. I used an eight-item team performance scale developed by Barrick et al. (1998) to assess team performance on a 7-point scale (1 = *somewhat below requirements,* 7 = *consistently exceeds requirements).* Team supervisors were asked to provide team performance ratings on eight dimensions: interpersonal skills, quality of work, knowledge of tasks, quantity of work, initiative, planning and allocation, commitment to the team, and an overall evaluation of team performance. Each dimension is defined by a short description, followed by three interpretative examples explaining important facets of that performance dimension (Barrick et al., 1998). Additionally, the average of the ratings across all dimensions was used to indicate overall team performance. The coefficient alpha reliability estimate of team performance was .91.

   Control variables. A set of control variables were included to ensure that the observed effects of team personality traits on team outcomes were not subject to alternative explanations. First, consistent with prior team research (e.g., Kirkman, Rosen, Tesluk, & Gibson, 2004), I controlled for team size because it may affect team dynamics. Additionally, because the present study has a focus on the effects of team personality on team outcomes, it is important to control for other team composition variables such as members' team experience (team tenure), job tenure, education, role, and gender. Specifically, team demographic diversity, as a commonly studied team

composition variable, may influence team processes and team performance (e.g., van Knippenberg, De Dreu, & Homan, 2004; van Knieppenberg & Schippers, 2007).

Moreover, consistent with a recent meta-analysis on team diversity research (Joshi & Roh, 2009), I controlled for potential influences of team demographic diversity variables (i.e., team tenure, job tenure, gender, age, and education diversity) on processes and outcomes. The standard deviation in team tenure and job tenure were used to calculate tenure diversity, which were the two continuous diversity dimensions. Further, following Harrison and Klein's (2007) team diversity taxonomy, I computed heterogeneity scores for gender and education using Blau's (1977) index with $1 - \Sigma p_k^2$ (p is the proportion of unit members in k^{th} category). Essentially, Blau's index is very similar to Teachman's (entropy) index. However, Teachman's index may have a limitation when the number of unit members n is less than the possible total number of information categories K. Higher scores indicate greater team diversity among team members along the particular dimension investigated.

Finally, as argued in previous chapters, the present research adopts a network perspective to study team personality, which is different from the role based perspective (Humphrey et al., 2009). For example, the role based perspective argues that certain roles in the team, termed the strategic core, are more important for the team than other roles. As a result, the attributes possessed by the core role holders have profound effects on team outcomes. Thus, it is important to control for role theory to demonstrate the incremental validity of the network-based perspective and rule out alternative explanations. Therefore, I asked team supervisors to rate the importance of each

member's role in the team. Because no existing studies have empirically measured this construct, I used three items, which are based on Humphrey et al.'s conceptualization of the strategic core, to capture this construct including: "encounters more of the problems that need to be overcome in the team", "has a greater exposure to the tasks that the team is performing", "is more central to the workflow of the team". The coefficient alpha reliability estimate for role importance was .85.

Analyses

Because all the teams were from the same organization, and thus there are no non-independence issues arising from a higher level, I tested the hypotheses primarily using ordinary least squares regression (OLS). To facilitate the interpretation of results, I standardized all predictors (e.g., Chen et al., 2007), which means that the variables are in effect grand-mean centered (Gavin & Hofmann 2002).

The present study proposed three types of hypothesis tests, including mediation, moderation, and moderated mediation. Thus, I employed different analytic strategies. First, concerning mediating tests that posit the mediating role of team processes in the relationships between team personality traits and team performance, I used the causal steps outlined by Baron and Kenny (1986). According to this approach, mediation is supported if four criteria are met including: (1) the independent variable significantly relates to the dependent variable; (2) the independent variable significantly relates to the mediator; (3) the mediator significantly relates to the dependent variable; and (4) the independent variable no longer significantly relates to the criterion (i.e., full mediation)

or the relationship is significantly reduced (i.e., partial mediation) once the mediators are included.

However, researchers have recently suggested that the first requirement is not necessary because it may obscure a mediated effect that is accompanied by a direct effect of opposite sign (Collins, Graham, & Flaherty, 1998; MacKinnon, Krull, & Lockwood, 2000; MacKinnon et al., 2002). As a result, I further conducted the joint significance test and the product of coefficients test using PRODCLIN (MacKinnon, Fritz, Williams, & Lockwood, 2007) to test the significance of the indirect (mediated) effects. Research has demonstrated that the PRODCLIN program produces asymmetric confidence intervals for the indirect effect. Hence, it has more power than other commonly-used tests, such as the Sobel test (Edwards & Lambert, 2007; MacKinnon et al., 2007).

With regard to moderating hypotheses that posit the interactive effects of team personality and team structural variables (i.e., team interdependence, network density, and centralization) on team processes, moderated regression analysis in OLS was used to test the interactions on team processes. Further, simple slope analyses were reported to examine the actual forms of the interactions by plotting simple slopes at one standard deviation above and below the mean of the moderators.

Finally, the moderated mediation hypotheses posit that the indirect effects of team personality on team performance via team processes are moderated by team structural variables, also known as *conditional indirect effects* (Preacher et al., 2007). I used an SPSS macro developed by Preacher and colleagues (2007) to examine

moderated mediation. The macro employs the recommended bootstrapping methods to

test the significance of conditional indirect effects at different values of the moderator

variables and has been used in recent research (e.g., Cole et al., 2008).

CHAPTER IV

RESULTS

Confirmatory Factor Analyses

I performed a series of confirmatory factor analyses (CFA) in LISREL (Jöreskog & Sörbom, 1993) to establish the discriminant validity of the measures. Because of potential conceptual overlap among various team constructs such as task, interpersonal, adaptive processes, and team interdependence, I focused on examining the discriminant validities of these team constructs. These tests were conducted at the individual level, because the team-level sample size was much lower; in addition, individual-level tests are more conservative (Chen et al., 2007; Kirkman, Chen, Farh, Chen, & Lowe, 2009). To maintain a favorable indicator-to-sample-size ratio, I used scale scores of specific sub-dimensions to form the respective factors, including task, interpersonal, adaptive processes, and team interdependence. Specifically, I compared the hypothesized four-factor model with several alternative models in which the correlation between each pair of factors is fixed to one by conducting chi-square difference tests to show that the model with the freely estimated correlations displays superior fit to each model with fixed correlations (Bagozzi, Yi, & Phillips, 1991). Results (see Table 4-1) indicate that the four-factor model displayed acceptable fit ($\chi^2 = 287.57$; NFI = .94, CFI = .95; RMSEA = .08) and was superior to each alternative model with fixed correlations, indicated by significant chi-square difference tests.

Descriptive Results

Descriptive results are presented in Tables 4-2 to 4-5. Specifically, Table 4-2 presents the correlations among variables at the individual level. Table 4-3 presents the correlations between team demographic variables and team performance. All of the demographic variables had non-significant correlations with team performance. Table 4-4 shows the correlations between team personality traits and team level variables. Table 4-5 presents the correlations among the most central member's personality traits, team minimum and maximum personality traits, and team outcomes. Finally, Table 4-6 presents the correlations among all the personality measures.

Hypotheses Testing

The effects of team overall personality traits. Team overall personality composition, which captures all of the team members' personality traits weighted by their centrality scores in the team, was expected to predict team processes after controlling for team mean personality. Table 4-7 to 4-9 present the results for testing H1a – H1e. To test H1a, I regressed team task processes on the control variables and team overall conscientiousness in the first step, followed by team mean conscientiousness in the second step. Team overall conscientiousness was positively related to task processes ($\beta = .58$, $p < .01$). However, the effect became insignificant when team mean conscientiousness was included ($\beta = -.58$, *ns*). Thus, H1a was not supported.

To test H1b-H1d, I regressed interpersonal processes on the control variables and team overall agreeableness, neuroticism, and extraversion in the first step, followed by team mean agreeableness, neuroticism, and extraversion in the second step. As shown in

Table 4-8, team overall agreeableness ($\beta = .22$, *ns*), neuroticism ($\beta = -.75$, *ns*), and

extraversion ($\beta = -1.16$, *ns*) were not significantly related to interpersonal processes,

regardless of whether team mean agreeableness, neuroticism, and extraversion were

included in the regression model. Thus, H1b, H1c, and H1d were not supported. I note

that because team overall personality highly correlated with mean personality ($r = .99$),

multicollinearity presents a significant problem for interpreting regression coefficients.

For example, the coefficient of team overall conscientiousness changed from .58 to -.58

when team mean conscientiousness was included in the regression. This dramatic

coefficient change is attributable to high multicollinearity (i.e., VIF is greater than 40).

Further, as presented in Table 4-9, team overall openness was positively related

to Adaptive processes ($\beta = .47$, $p < .01$). However, the effect was not significant when

team mean openness was controlled for ($\beta = .25$, *ns*). As a result, H1e was not supported.

Concerning the mediating role of team processes (H4a-e), as reported in Table 4-

7 team overall conscientiousness was positively related to task processes ($\beta = .58$, $p <$

.01). Task processes were marginally related to team performance ($\beta = .26$, $p < .10$).

Bootstrap results indicated that the indirect effect of team overall conscientiousness on

team performance was marginally significant, with the bootstrapped one tailed 95% CIs

around the indirect effects excluding zero (95% CIs were [.05, .68]). Therefore, H4a was

partially supported.

As shown in Table 4-8, the relationships between team overall agreeableness,

neuroticism, and extraversion and interpersonal processes were not significant, nor the

relationship between interpersonal processes and team performance. Thus, H4b-d were

not supported. Table 4-9 presents the results for testing H4e. Team overall openness was positively related to adaptive processes (β = .47, p < .01), which was significantly related to team performance (β = .35, p < .01). Bootstrap results indicated a significant indirect effect of overall openness on team performance, with the bootstrapped 95% CIs around the indirect effects excluding zero (95% CIs were [.08, .62]). Thus, H4e was supported.

The moderating hypotheses are presented in Table 4-10 to 4-12. H2a-e and H3a-e predicted the moderating effects for both team interdependence and team network density, respectively, on the relationship between team overall personality traits and team processes. The results in Table 4-10 showed that the moderating effects of both team interdependence (β = .05, ns) and team network density (β = .08, ns) on the relationship between team overall conscientiousness and task processes were not significant. Thus, H2a and H3a were not supported. Further, Table 4-11 showed that team interdependence did not moderate the effects of team overall agreeableness (β = -.12, ns), neuroticism (β = -.03, ns), and extraversion (β = .04, ns) on interpersonal processes. Similarly, the effects of team overall agreeableness (β = .00, ns), neuroticism (β = -.07, ns), and extraversion (β = -.09, ns) on interpersonal processes were not moderated by team density. Thus, H2a-d, and H3a-d were not supported. As shown in Table 4-12, the interaction between team overall openness and team interdependence was not significantly related to team adaptive processes (β = -.03, ns), failing to support H2e. In contrast, the interaction between team overall openness and team density was significantly related to team adaptive processes (β = .27, p < .05).

To better understand the nature of this significant interaction, I plotted simple slopes at one standard deviation above and below the mean of the moderator. Figure 4-1 showed that when team density was higher, rather than lower, team overall openness was more strongly positively related to adaptive processes ($\beta = .81$, $p < .01$ versus $\beta = .27$, $p < .01$). Thus, H3e was supported.

Further, H5a-e and H6a-e predicted a first stage moderated mediation model of team interdependence and density on the relationships between team overall personality traits and team performance via team processes. Thus, two conditions are necessary for testing the hypotheses: (a) detecting a significant interaction between the predictor and the moderator on the mediator and (b) confirming the mediating role of the mediator variable in the relationship between the predictor and the outcome. Because I did not find any significant interactions between team interdependence and team overall conscientiousness, agreeableness, neuroticism, extraversion, and openness; and any significant interactions between team density and overall conscientiousness, agreeableness, neuroticism, extraversion, failing to meet the first criterion H5a-e and H6a-d were not supported.

In contrast, because I reported a significant interaction between team density and openness on team adaptive processes, and confirmed the mediating role of team adaptive processes in the relationship between overall openness and team performance, I further examined the indirect effects of openness on team performance via adaptive processes at three values of team density: the mean, one standard deviation above the mean, and one standard deviation below the mean (Preacher et al., 2007). If the indirect effects vary at

the different values of the moderator (i.e., the indirect effect is significant at one standard deviation above the mean but not significant one standard deviation below the mean), the hypothesis will be supported. Specifically, concerning this hypothesis (H6e), the positive indirect effect of team overall openness on team performance via adaptive processes was marginally significant when team density was higher rather than lower (β = .21, $p < .10$ versus $\beta = .04$, *n.s*). Therefore, H6e was partially supported.

The effects of the most central member's personality traits. The most central member's personality captures personality traits of the member with the highest centrality score in the team. As shown in Table 4-13, the most central member's conscientiousness was positively related to task processes ($\beta = .26$, $p < .05$), supporting H7a. In addition, as presented in Table 4-14, the most central member's agreeableness was marginally positively related to interpersonal processes ($\beta = .26$, $p < .10$), providing partial support for H7b. However, neuroticism and extraversion were not significantly related to interpersonal processes. Thus, H7c and H7d were not supported. Finally, the results in Table 4-15 showed an insignificant relationship between the most central member's openness and adaptive processes, failing to support H7e.

Regarding the mediating role of team processes, H9a-e predicted the mediating effects of team processes on the relationships between the most central member's personality traits and team performance. Table 4-13 presents the results for testing H9a. The most central member's conscientiousness was positively related to task processes (β = .26, $p < .05$), which was positively related to team performance ($\beta = .25$, $p < .05$). Bootstrap results indicated that the indirect effect of team overall conscientiousness on

team performance was significant, with the bootstrapped 95% CIs around the indirect

effects excluding zero (95% CIs were [.001, .18]). Therefore, H9a was supported.

Moreover, as shown in Table 4-14, the relationship between interpersonal

processes and team performance was not significant (β = .08, *ns*). Thus, H9b-d were not

supported. Similarly, the results in Table 4-15 indicated a non-significant relationship

between the most central member's openness and adaptive processes (β = .16, *ns*),

failing to support H9e.

The results for the moderating hypotheses are reported in Table 4-16 to 4-18.

H8a-e predicted the moderating effects for team network centralization on the

relationship between the most central member's personality traits and team processes.

The results in Table 4-16 showed that the moderating effect of team centralization on the

relationship between the most central member's conscientiousness and task processes

was significant and *negative* (β = -.35, *p* < .05). To better understand the nature of this

significant interaction, I plotted simple slopes at one standard deviation above and below

the mean of team centralization. Figure 4-2 showed that when team centralization was

lower, rather than *higher*, the most central member's conscientiousness was more

strongly positively related to task processes (β = .80, *p* < .01 versus β = .09, *ns*). In other

words, if a team was centralized around a few members, the most central member's

conscientiousness had limited effects on task processes; in contrast, when the team was

decentralized (i.e., members had similar centrality scores in the team), the most central

member's conscientiousness had profound effects on task processes. Although the

interaction between centralization and conscientiousness on task processes was

significant, the direction was inconsistent with my prediction. Thus, H8a was not supported.

Further, Table 4-17 indicated that team centralization did not moderate the effects of the most central member's agreeableness (β = -.15, *ns*), neuroticism (β = -.06, *ns*), and extraversion (β = -.04, *ns*) on interpersonal processes. Thus, H8b-d were not supported. Finally, as shown in Table 4-18, the interaction between the most central member's openness and team centralization was not significantly related to team adaptive processes (β = -.07, *ns*), failing to support H8e.

Based on the mediating and moderating hypotheses, H10a-e predicted a first stage moderated mediation model of team centralization on the relationships between the most central member's personality traits and team performance via team processes. Because I found no significant moderating effects for agreeableness, neuroticism, extraversion, and openness, H10b-e were not supported. In contrast, because I reported a significant interaction between the most central member's conscientiousness and team centralization and confirmed the mediating role of task processes in the relationship between conscientiousness and team performance, I further examined the indirect effects of the most central member's conscientiousness on team performance via task processes at three values of team centralization: the mean, one standard deviation above the mean, and one standard deviation below the mean (Preacher et al., 2007). The indirect effects were not significant at the any level of team centralization, thus failing to support H10a.

The effects of team minimum and maximum personality traits. H11a-e predicted the positive effects of team minimum and maximum personality traits on team processes.

Specifically, as indicated in Table 4-19, team minimum conscientiousness was positively related to task processes ($\beta = .47$, $p < .01$), supporting H11a. Further, the results in Table 4-20 showed that both team minimum agreeableness ($\beta = .48$, $p < .01$) and neuroticism ($\beta = -.40$, $p < .01$) were significantly related to interpersonal processes. Thus, H11b-c were supported. However, team maximum extraversion was not significantly related to interpersonal processes ($\beta = .07$, ns), failing to support H11d. Finally, as shown in Table 4-21, team maximum openness was significantly related to adaptive processes ($\beta = .38$, $p < .01$). Thus, H11e was supported.

H13a-e posited the mediating role of team processes in the relationships between team minimum and maximum personality traits and team performance. The results in Table 4-19 confirmed that team minimum conscientiousness was positively related to task processes ($\beta = .44$, $p < .01$), while task processes significantly predicted team performance ($\beta = .26$, $p < .05$). The bootstrapped 95% CIs around the indirect effects excluded zero (95% CIs were [.02, .29]), supporting H13a. Also, the effect of team minimum conscientiousness on team performance dropped from $\beta = .37$ to $\beta = .25$. As shown in Table 4-20, because the relationship between interpersonal processes and team performance was not significant, H13b-d were not supported. Finally, the results in Table 4-21 indicated a significant relationship between team maximum openness and adaptive processes ($\beta = .38$, $p < .01$), and a significant relationship between adaptive processes and team performance ($\beta = .31$, $p < .05$). The bootstrapped 95% CIs further confirmed the mediating effect of adaptive processes on the relationship between openness and team performance (95% CIs were [.03, .35]). Additionally, the effect of

team maximum openness on team performance dropped from $\beta = .12$ to $\beta = .00$. Thus, H13e was supported.

Concerning the moderating hypotheses, H12a-e posited the moderating effect for team member centrality on the relationship between team minimum (or maximum) personality traits and team processes. The results for testing H12a-e are presented in Table 4-22. Specifically, the interaction between team member centrality and team minimum conscientiousness on task processes was not significant ($\beta = .07$, *ns*). Similarly, team member centrality did not moderate the effects of team minimum agreeableness ($\beta = .02$, *ns*) and neuroticism ($\beta = -.22$, *ns*) on team interpersonal processes. Thus, H12a-c were not supported. In contrast, team member centrality significantly moderated the effects of team maximum extraversion ($\beta = .29$, *p < .05*) and openness ($\beta = .25$, *p < .05*) on team processes.

Further, I plotted simple slopes at one standard deviation above and below the mean of the moderator. Figure 4-3 showed that when team member centrality was higher, rather than lower, team maximum extraversion was more strongly positively related to interpersonal processes ($\beta = .48$, *p < .01* versus $\beta = -.10$, *ns*). Thus, H12d was supported. Additionally, Figure 4-4 suggested that when team member centrality was higher, rather than lower, team maximum openness was more strongly positively related to adaptive processes ($\beta = .46$, *p < .01* versus $\beta = -.04$, *ns*), supporting H12e.

Combining the supported mediating hypothesis (H13e) and the moderating hypothesis (H12e), I further explored the indirect effects of team maximum openness on team performance via adaptive processes at three values of team member centrality: the

mean, one standard deviation above the mean, and one standard deviation below the mean (Preacher et al., 2007). However, the results showed the indirect effects were not significant across any values for the moderator. Overall, H14a-e were not supported.

Incremental validity of different personality conceptualizations. H15 posited that team overall personality predicts team processes and performance after controlling for the most central member's personality and team minimum and maximum personality. Specifically, I regressed task processes on team overall conscientiousness, the most central member's conscientiousness and team minimum conscientiousness. As predicted, overall conscientiousness was significantly related to task processes (β = .73, p < .01), while the other two predictors were not significantly related to the outcome. Similarly, overall agreeableness (β = .77, p < .01) and extraversion (β = .51, p < .01) predicted interpersonal processes above and beyond the effects of other personality conceptualizations. Overall neuroticism was marginally significantly related to interpersonal processes (β = -.32, p < .10) after controlling for the most central member's neuroticism and team minimum neuroticism. Finally, overall openness was marginally significantly related to adaptive processes (β = .27, p < .10) after controlling for the other personality conceptualizations. However, all five team overall personality traits did not predict team performance after controlling for the other personality conceptualizations. Thus, H15 was partially supported.

H16 predicted that the most central member's personality traits affect team processes and team performance after controlling for team minimum and maximum personality traits. However, the results indicated that the effects of the most central

member's five factor traits on team processes and team performance were not significant after controlling for the effects of team minimum and maximum personality scores. Interestingly, team minimum and maximum personality traits predicted team processes consistently above and beyond the most central member's personality traits. Specifically, team minimum conscientiousness was significantly related to task processes ($\beta = .35$, $p < .01$) after controlling for the most central member's conscientiousness. Team minimum agreeableness significantly predicted interpersonal processes when the most central member's agreeableness was included in the model ($\beta = .35$, $p < .01$). Team maximum extraversion predicted interpersonal processes ($\beta = .23$, $p < .05$) above and beyond the most central member's extraversion. Finally, maximum openness was significantly related to adaptive processes ($\beta = .31$, $p < .05$) after controlling for the most central member's openness. Therefore, H16 was not supported. These results indicate that the effects of team minimum and maximum personality traits on team processes overwhelmed the effects of the most central member's personality traits.

Additional analyses. As argued in previous chapters, the present research adopts a network perspective to study team personality, which is different from the role based perspective. Thus, I further compared the validities of the two related approaches in predicting team outcomes. Specifically, team supervisors rated the importance of each member's role in the team using three items. Based on this score, I created a new composite personality score that captures all the team members' personality traits weighted by their role importance scores in the team. I further regressed team outcomes on both team overall personality traits and the newly created variables. First, the two

"forms" are very highly correlated (.99). This supports the construct validity of the

central measures; but precludes any "independent" contribution from analyses with the

supervisor role ratings. Consequently, because none of the central member hypotheses

were supported; the same effects were found with the supervisor role ratings. Table 4-23

presents a summary of the findings of the present study.

CHAPTER V

DISCUSSION

Integrating team composition research and social network theory, I extended the traditional view on team personality research and developed a new framework to reconceptualize the effects of employee personality traits in team settings. Specifically, traditional team composition research extensively focuses on the impact of composition variables on team outcomes (Humphrey et al., 2009). In line with this view, most of the previous studies have relied on different operationalizations of team composition variables to examine how team composition attributes affect team outcomes (Bell, 2007). One critical omission of this perspective is not considering the potential influence of team members' unique influences in the team. To remedy this limitation, I proposed that the effects of team personality traits on team outcomes are jointly determined by _both_ the traits themselves _and_ the members who possess the traits. As a result, the essential idea of the present study is to investigate how a team member's position within the team modifies the effect of that individual's attributes on the team's overall compositional traits. Specifically, I argued that if a personality trait is possessed by a central member in the team, the trait tends to have more profound effects on team outcomes in comparison to less central member traits.

Guided by this theoretical reasoning, I employed three related approaches to test my hypotheses. First, I developed a new measure of team personality, termed team overall personality, that captures all of the team members' personality traits weighted by

their intra-team influence scores in the team. Second, I examined the role of the most central member's personality traits and expected that personality traits possessed by the most central member would have a significant impact on team outcomes. Finally, I hypothesized the interactive effects of team minimum and maximum personality and team member centrality on team outcomes. Below, I summarize some key findings for these approaches.

Summary of Findings

First, concerning the role of team overall personality, I found that team overall conscientiousness, agreeableness, and openness positively predicted team processes after controlling for team demographic variables. However, these effects disappeared when team mean personality traits were included in the regression models. Thus, results suggested that the new operationalization of team personality (i.e., team overall personality) did not predict team outcomes above and beyond the effects of the traditional measure of team personality (i.e., team mean personality).

Second, the results provided some support for the effects of the most central member's personality on team outcomes. In particular, I found that the most central member's conscientiousness and agreeableness scores displayed significant relationships with team task processes and team interpersonal processes, respectively. However, the other hypothesized relationships were not supported. In sum, although the most central member was expected to have the highest influence in the team, results of the empirical test indicate that only two personality traits, conscientiousness and agreeableness were found to have significant effects on team processes for the most central member.

Third, consistent with previous studies (Barrick et al., 1998; Bell, 2007), I found that team minimum and maximum personality traits tend to have significant impact on team outcomes. Specifically, minimum conscientiousness, agreeableness, and neuroticism significantly predicted team processes, whereas maximum openness was positively related to adaptive processes. Moreover, in line with my predictions, I found that two personality traits (i.e., maximum extraversion and openness) interacted with team member centrality in predicting team processes, such that the personality traits had stronger effects on team processes when the traits were possessed by central members. As a result, these findings provide some support for the proposed theory.

Finally, based on the mediating analyses, I confirmed that team processes served as more proximal predictors of team performance than personality traits did. Specifically, team task processes and adaptive processes mediated the effects of conscientiousness and openness on team performance. However, interpersonal processes were not related to team performance. Concerning the role of team structure variables (i.e., team interdependence, density, and centralization), I found that only team network density amplified the effect of team overall openness on team adaptive processes such that openness had a stronger effect on adaptive processes when team density was higher. Next, I discuss the potential implications of these findings for theory.

Theoretical implications

Taken together, the findings have several important implications for team personality research. First, as described above, team overall personality failed to display superior predictive power over team mean personality, which casts doubt on the

network-based perspective on team personality. However, there are several possible explanations for the non-significant findings. As shown in Table 4-4, team overall personality traits almost had perfect correlations with the corresponding mean personality traits ($r = .99$, $p < .01$). Thus, despite the fact that the measure of team overall personality attempted to account for the influences of both team members' traits and their positions in the team, it contains nearly identical information as team mean personality. One particular reason is that within each team, team members had similar centrality scores. In other words, the teams in this sample were decentralized. According to the proposed algorithm, each member's personality was assigned to a weight that was based on his or her centrality score in the team. Thus, in decentralized teams, members' personality scores received similar weights. Empirically, in this sample, the average of team centralization score was .13, at the low end on a 0 to 1 metric, suggesting that most of the teams were decentralized. Additionally, lack of variance in personality measures is another factor that attributes to the extreme high correlation between team overall personality and mean personality. For example, the mean conscientiousness score was 5.5 on a seven point scale (SD = .64). As a result, the weighted personality scores were very close to the corresponding mean personality scores. Thus, scholars should be cautious when interpreting these non-significant findings.

Further, I conducted supplementary analyses to further examine the assumption that central members' personality traits tend to have stronger effects on team outcomes. Specifically, based on team members' centrality scores, I identified roughly fifty percent of members whose centrality scores were above the team mean centrality score as central

members and labeled the other members as peripheral members in each team. Then, based on this categorical coding scheme, I calculated mean personality for central members and peripheral members respectively. I further compared the effects of central members' personality traits and peripheral members' traits on team outcomes. In predicting team performance, central members' conscientiousness and agreeableness displayed superior predictive validity over peripheral members' traits. However, peripheral members' personality traits (i.e., all the five factors) consistently had stronger effects on team processes than central members' traits. These additional results reveal that the role of team member centrality may not be as clear as I theorized.

Second, the results demonstrated that the most central member's conscientiousness significantly predicted task processes and team performance, and agreeableness was marginally related to interpersonal processes, providing some support for the predictions. As mentioned previously, team level constructs typically emerge by aggregating corresponding variables at the individual level. Thus, scholars should not only focus on constructs that capture the properties of the team as a whole, but also pay attention to specific individuals in the team. Traditional team personality research has considered the important role of team minimum and maximum personality traits in influencing team outcomes. The present study extends this line of research by offering a new construct, "the most central member's personality", to the literature. In testing the effects of this new construct, I found that the most central member by his or herself had meaningful impact on team outcomes.

However, in this sample, team sizes varied from 3 to 19. Thus, it is possible that the most central member's personality traits tend to have stronger effects only in smaller teams. To examine this possibility, I examined the interactive effects of the most central member's personality and team size on team processes and team performance. Contrary to this rationale, no significant results were detected, suggesting that the most central member's personality had influences on team outcomes consistently across teams, regardless of team size.

Third, consistent with previous research that examined the effects of team minimum and maximum personality on team outcomes (Bell, 2007), I found that four out of the five personality traits (i.e., conscientiousness, agreeableness, neuroticism, and openness) had significant impacts on team processes. These findings demonstrated the importance of team attributes in predicting team outcomes. Further, my results indicated that the trait holder's centrality moderated the effects of team maximum extraversion and openness on team processes such that the traits had stronger effects on team processes when the traits were possessed by central members. This finding offers some support for the key assumption of the present study in that team dynamics are jointly determined by the attribute and the person who holds the trait. However, inconsistent with my predictions, the influences of team minimum conscientiousness, agreeableness, and neuroticism on team processes were not affected by the trait holders' positions in the team. Therefore, team member centrality displayed differential moderating patterns for team minimum and maximum personality traits.

This unique pattern may attribute to the distinct nature of personality traits. For example, conscientiousness, emotional stability, and agreeableness are often labeled as the "functional employee" traits (Mount & Barrick, 1995). As a result, low scores on these traits can severely disrupt team dynamics (Barrick et al., 1998). Therefore, even if team minimum personality traits were possessed by peripheral members, they still had meaningful impacts on team outcomes. In contrast, team maximum extraversion and openness may not be necessarily functional to team performance. Thus, the effects of the traits are likely determined by the trait holders' positions in the team. For example, a central extravert is well suited for promoting leadership emergence and a central member with a high openness score is more likely to promote novel ideas to others, and push the team to adopt the new perspectives.

As mentioned previously, traditional personality research emphasizes the importance of each individual's attributes in predicting one's behavior and performance. In contrast, social network research argues that an individual's action is shaped by his or her position in a network. In the present study, I reconciled these two divergent perspectives and argued that both attribute and network position matter. It is also interesting to compare the predictive validity of the two approaches. As reported in Chapter 4, in contrast to Hypothesis 16, I found that team minimum and maximum personality traits predicted team processes consistently above and beyond the most central member's personality traits. These findings suggest that the effects of individuals' attributes on team outcomes tend to overwhelm the effects of their network positions.

Fourth, the present study also has implications for research regarding team processes. Specifically, traditional research has suggested two broad dimensions of team processes: task processes and interpersonal processes (Mathieu et al., 2008). However, recent progress in the literature argues that not all team processes fall into the two broad sets of processes. Therefore, I introduced a third dimension of team processes - *team adaptive processes* – and tested their mediating role in the team personality attributes and team outcome relationship. Interestingly, among the three process dimensions, only task processes and adaptive processes were valid predictors of team performance. Interpersonal processes were not related to team performance. Although potentially important, the non-significant effects of interpersonal processes on team performance may be attributable to the unique setting of the present study. Notably, I received responses from manufacturing teams, which had relatively standardized manufacturing procedurals. Thus, team activities that fall into interpersonal processes may not be meaningful contributors to team performance in the examined context.

Finally, I investigated the moderating effects of several team structure variables, including team interdependence, density, and centralization on the relationships between team personality traits and team processes. In general, I found limited support for the moderating role of these variables. Specifically, as theorized in Chapter 2, both interdependence and network density reflect the degree of interactions in the form of resources exchanged among team members. However, density captures the actual or realized interaction patterns in the team, whereas interdependence reflects the potential need for interaction in the team. As shown in Table 4-4, the two constructs were

moderately correlated ($r = .37, p < .01$), suggesting the two constructs are related but distinct. In support of their distinction, I found that team network density amplified the effect of team overall openness on adaptive processes, but team interdependence did not moderate any relationships between personality traits and team processes. The lack of support for team interdependence may indicate that team density may be a more useful operationalization for capturing intra-team interaction patterns.

Additionally, the non-significant findings may be attributable to the study setting. I collected all the responses from manufacturing teams, which may constrain variance in team structures such as interdependence. Given that previous studies often reported significant interactions between team processes and interdependence on team performance (e.g., Barrick et al., 2007), I further tested the moderating effects of team interdependence on the relationships between team processes and team performance and found no significant results. Thus, I did not replicate previous findings. This may indicate lack of variance in team interdependence.

Regarding team centralization, I argued that the influences of the most central member's traits on team outcomes are more important in centralized team. However, this prediction was not supported. Surprisingly, team centralization actually weakened the positive relationship between the most central member's conscientiousness and task processes, such that conscientiousness had a stronger effect on task processes when team centrality was lower. This counterintuitive finding certainly deserves further investigation. However, it is important to acknowledge that the non-significant findings may be attributable to the lack of variance in team centralization.

In the present study, I hypothesized the interactive effects of team personality and team structures on team processes, which subsequently predict team performance. However, it is also possible that the interactive effects on team performance are not mediated through team processes. In other words, team structures may directly moderate the relationships between team personality traits and team performance. Supporting this idea, additional analyses showed that team density amplified the effect of team overall conscientiousness on team performance (β = .17, p < .10), and team centralization moderated the relationships between the most central member's neuroticism (β = -.30, p < .01) and extraversion (β = -.21, p =.05) and team performance. These results suggest that other mechanisms may be responsible for explaining the interactions between team personality and team structures on team performance.

Practical Implications

The present study suggests several actions that managers can take to enhance team effectiveness. First, the results confirmed that team members' personality traits do matter in terms of predicting important team outcomes such as team processes and team performance. Thus, managers should be encouraged to select team members, at least to an extent, based on their personality traits. For example, different operationalizations of team conscientiousness, such as team overall, mean, minimum, and the most central member's conscientiousness consistently predicted team processes and performance. Also, the effect sizes of personality traits were noticeable and practically important. For example, team overall conscientiousness explained nearly 10 percent additional variance in team performance beyond team size and demographic controls. The most central

member's personality explained 5 percent additional variance in team performance beyond other controls. Therefore, conscientiousness tests may be a valid selection tool for organizations concerned with selecting team members.

Moreover, certain personality traits have been found to have limited effects on individual performance such as agreeableness and openness. However, at the team level, in line with previous studies in this area, I found team agreeableness and openness as valid predictors of team important outcomes. Because of the interdependent nature of teamwork, employees are expected to collaborate with one another to achieve goals. As a result, their personality traits play critical roles in determining intra-team interactions. Therefore, managers should not only select team members based on a few traits such as conscientiousness, but be aware of the potential benefits of the other traits that have typically been overlooked at the individual level of analysis.

Third, and more specifically, managers should be aware that only a few team members' traits can have significant impact on team outcomes. In particular, the most central member's conscientiousness, the team minimum conscientiousness, agreeableness, and neuroticism, as well as the team maximum openness scores had significant impacts on team outcomes. Thus, managers should pay special attention to these individuals.

Fourth, the findings of the current study provide some evidence to support the idea that certain members in a team are more important than others in determining team outcomes (e.g., central versus peripheral members). Thus, managers should be aware this fact and may consider applying different management practices to the key members

in the team. Considering that managers typical have limited time and resources when managing large groups, it is may be a wise practice to treat followers differently.

Limitations and Future Research

In this section, I note several limitations of the present study that could be addressed in future research. The first limitation to the current study is the lack of significant findings supporting the proposed perspective on team personality. Several factors may have potentially attenuated the findings. Notably, because data were collected from a manufacturing company in which production procedures were relatively standardized, there may have been insufficient variance in team members' centrality scores. As a result, it was difficult to clearly identify who the central members were in the teams. Similarly, I obtained all the responses from one manufacturing company to hold contextual factors constant to avoid potential confounding effects. However, this sampling strategy may also decrease the observed variations in important predictors such as personality traits and team processes. For example, standardized selection procedures may result in a homogeneous workforce (Schneider, 1987). Thus, future researchers should be encouraged to continue this line of inquiry and test the network-based perspective on team personality using different study settings (e.g., managerial teams), in which team members have more apparent variance in centrality.

Second, and also related to the research setting, this sample was country-specific and the data collected from only one organization. Although previous research conducted in a Chinese society in other areas such as leadership has shown highly consistent findings with studies conducted in the West (e.g., Chen, Tjosvold, & Liu,

2006; Kirkman et al., 2009), the generalizability of personality is less clear. Therefore, it may still be important to consider the extent to which our findings are bound by specific cultural factors. A Chinese society is often described as high collectivism and high power distance (Hofstede, 1984). Thus, these unique culture values may influence the findings of this study. Specifically, heavily influenced by collectivism orientation, Chinese employees are not encouraged to stand out to occupy very central positions in the team. As a result, it is more difficult to identify the most central member in the team. Based on my observation, I found that, in many teams, the most central member's centrality score was very close to the second or third most central member's score. Thus, in these teams, the selection of the most central member may be arbitrary. Additionally, because Chinese respondents are particularly concerned their public images (Zhang, Cao, & Grigoriou, 2011), they may have stronger social desirability tendencies (i.e., the tendency of respondents to answer questions in a manner that will be viewed favorably by others), which further decrease response variance.

Third, the sample in this study may have been insufficient to detect small to moderate, but meaningful nonetheless, effect sizes for some of the hypothesized relationships. That is, although I obtained responses from over 600 employees, these responses were ultimately examined at the team-level, resulting in a final sample size of 84. Thus, it may be the case that a larger sample size would have detected significant interaction effects even with a similar pattern of responses as the current study.

Fourth, in previous chapters, I argued that team member intra-team influence is determined by one's positions in multiple networks and, thus, I collapsed centrality

scores from four types of networks (i.e., advice, workflow, friendship, and communication) into one overall centrality measure. However, fine-grained analyses might be more informative than the current aggregate analyses. Specifically, because of the different nature of the five factor personality traits, future research can explore the effects of personality traits in different types of networks. For example, agreeableness may be particularly relevant to the friendship network, conscientiousness may be relevant to the workflow network, and openness may be relevant to the advice network. Said differently, the influences of agreeableness on team outcomes may be mainly transmitted through the friendship network rather than other types of networks, whereas conscientiousness and openness may transmit their effects through the workflow and advice networks, respectively. To this point, I should note that in the current sample the different types of networks were highly correlated ($r = .88$), which is much higher than the correlation reported in previous studies (e.g., $r = .59$, Klein et al., 2004). Thus, it is unlikely that a more fine-grained analysis would yield different results in the present study. However, future researchers should further investigate the effects of personality traits in different types of networks.

Fifth, as mentioned above, I developed an algorithm to calculate team overall personality by weighting each member's centrality scores. As discussed above, this approach requires a significant amount of variances in both personality measures and centrality measures to obtain meaningful differences between the weighted personality scores (i.e., team overall personality) and mean personality scores. This requirement may not be practical in many research settings. Thus, future researchers may develop

alternative measures of team personality from a social network approach, which can be used in most organizational settings. For example, in my dissertation, I examined the effects of the most central member's personality traits on team outcomes. Scholars can further investigate how subgroups affect team outcomes. As discussed above, in many teams, it is difficult to clearly identify the most central member, thus, subgroup analyses may be a useful tool to identify a subset of team members, who occupy central positions in the team. As a result, a central subgroup's personality composition may have meaningful influences on team outcomes.

Sixth, previous research has suggested conscientiousness, emotional stability, and agreeableness are the "functional employee" traits, which have positive effects on employee desirable outcomes (Mount & Barrick, 1995). One extension of the present research is to examine team members' overall functional personality traits on team outcomes. For example, if the most central member has high conscientiousness, agreeable and emotional stability scores simultaneously, the member is expect to have profound positive influences in the team.

Finally, I only considered team performance as an outcome of team personality traits and processes. However, previous research has also suggested team effectiveness as a multidimensional construct that includes team performance, viability, and satisfaction (Hackman, 1992). Moreover, team performance does not only refer to team task performance, but also contains other important aspects such as innovation and contextual performance (Eisenbeiss, van Knippenberg, & Boerner, 2008; Farh, Lee, & Farh, 2010). Thus, team personality may display differential effects on various team

outcomes. For example, team openness may be particularly relevant to predicting team innovation (Shalley, Zhou, & Oldham, 2004) and team agreeableness may have significant impacts on team satisfaction because agreeable members likely help team build a friendly work environment. Therefore, future research might also consider investigating additional team outcomes.

CHAPTER VI

CONCLUSION

Over the past several decades, teams have received a significant amount of research attention among scholars (Mathieu et al., 2008). As a result, our understanding of team function and effectiveness has been greatly advanced. Nevertheless, there still exist several unexplored territories in this field. One significant shortcoming of current team research is that we investigate team dynamics at the surface level and primarily focus on the attributes of the team as a whole (e.g., characteristics at the team level such as aggregate personality traits, knowledge, and team structures), while ignoring the complex dynamics within the team (Kozlowski, & Klein, 2000). In other words, traditional team research tends to treat individual team members as indifferent entities who contribute to team dynamics equally. However, this perspective hardly reflects the reality in real teams.

To advance theory, my dissertation aimed to reconceptualize the effects of personality traits in team contexts and develop a new theoretical framework based on a social network perspective. This new theory deviates from traditional team personality research that has almost exclusively focused on the role of team members' attributes without considering team members' status in the team. Instead, the new perspective posits that the effects of team composition on team effectiveness are not influenced exclusively by an overall attribute, but also determined by *who* possesses the attribute.

This approach fully considers the configural nature of team composition that captures the array of different individual contributions to the whole.

The current results, however, provide mixed support for the new theory. Despite theoretically sound reasoning, some hypotheses did not receive empirical support. Specifically, the newly developed measure of team overall personality failed to demonstrate superior predictive validity above and beyond the traditional operationalization of team personality such as team mean personality. As discussed in Chapter 5, the non-significant findings do not imply that this network based perspective has been disconfirmed. Instead, it suggests the complex nature of team composition. At the bottom line, the team overall personality measure should be used with caution and requires further validation.

However, I did find some support for the effects of the most central member's personality traits and the interactive effects of team maximum personality traits and team member centrality on team outcomes. These findings indicate that members with different positions in a team had differential impacts on team dynamics. For example, high openness and extraversion personality scores predicted team processes only when the personality traits were possessed by central members. Based on these results, I hope that I can research a tentative conclusion that team members differ in their positions in the team and such differences further cause the unique influences of their traits on team outcomes.

Despite the lack of significant findings, my hope is that the initial evidence can further stimulate future researchers to employ a network based approach to study teams.

Specifically, as mentioned, traditional team research is often guided by a predominant paradigm – the input-process-outcome framework. In the current study, I studied team personality as an example of team input variables from a social network perspective. However, the basic tenet of the present study can be extended to studying other team input variables such as team ability (i.e., intelligence), knowledge, and skills. For example, the effects of team intelligence on team performance may be affected by the distribution of members' intelligence in the team. When intelligent members happen to occupy central positions in the team, the team is more likely to benefit from these smart employees.

Additionally, the social network approach can also be used to reconceptualize team processes. Traditional research has relied on aggregating team members' ratings on team processes to indicate team processes. However, this approach captures team members' perceptions of team processes rather than actual team dynamics. As a result, social network theory can be used to improve traditional team process research. For example, researchers can capture the connections and resource exchanges among team members by measuring intra-team social networks, which may accurately reflect team processes.

In conclusion, the new perspective developed in my dissertation extends previous team research focusing on the whole team's characteristics by looking "inside" the team and acknowledging individual team members as unique entities. As an initial step, my hope is that this new approach can offer a new avenue for future research in this area and

ultimately lead to a better understanding of how team composition affects team

outcomes.

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APPENDIX A

TABLES AND FIGURES

Table 1-1
The Joint Effects of Team Member Attribute and Centrality in Teams

	Attribute score Low	Attribute score High
Intra-team influence Peripheral	*Low impact on team performance*	*Moderate impact on team performance*
Intra-team influence Central	*Moderate to high impact on team performance*	*High impact on team performance*

Table 2-1
An Example of the Joint Effects of Team Member Attribute and Centrality in Teams

Team 1

Team member	A	B	C	D	E	F	G	H	Mean
Conscientiousness	5	4	2	4	1	4	5	3	3.5
Intra-team influence	5	5	1	4	1	5	5	2	3.5

Team 2

Team member	A	B	C	D	E	F	G	H	Mean
Conscientiousness	5	4	2	4	1	4	5	3	3.5
Intra-team influence	2	3	5	3	5	3	2	5	3.5

Table 2-2
A Taxonomy of Team Processes

Team process dimensions	Sub-processes
Intra-team processes	
Task oriented team processes	*Mission analysis* *Goal specification* *Strategy formulation and planning* *Monitoring progress toward goals* *Systems monitoring* *Team effort*
Interpersonal oriented processes	*Team coordination* *Backup behavior* *Conflict management* *Motivating and confidence building* *Affect management*
Adaptive oriented team process	*Taking charge processes* *Creative processes*

Table 4-1
Comparison of Measurement Models for Study Variables

Models	Descriptions	χ^2	d.f.	$\Delta \chi^2$	RMSEA	NFI	CFI
Null model	All the indicators are independent	4836.48	78				
Baseline Four-factor Model	Task, interpersonal, adaptive processes, and team interdependence	287.57	48		.08	.94	.95
Model 1	Four factors: the correlation between task and interpersonal processes was fixed to 1;	404.81	49	117.24[**]	.10	.92	.93
Model 2	Four factors: the correlation between task and adaptive processes was fixed to 1;	361.78	49	74.21[**]	.09	.93	.93
Model 3	Four factors: the correlation between interpersonal and adaptive processes was fixed to 1;	435.70	49	148.13[**]	.10	.91	.92
Model 4	Four factors: the correlation between task processes and team interdependence was fixed to 1;	507.94	49	220.37[**]	.11	.90	.90
Model 5	Four factors: the correlation between adaptive processes and team interdependence was fixed to 1;	507.47	49	219.90[**]	.11	.90	.90
Model 6	Four factors: the correlation between interpersonal processes and team interdependence was fixed to 1;	573.40	49	285.83[**]	.12	.88	.89

[**]$p < .01$

Table 4-2
Means, Standard Deviations, and Inter-Correlations for Individual Variables

		Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	Female	.29	.45																
2	Age	38.36	8.56	-.09*															
3	Education	1.88	1.04	.11**	-.51**														
4	Team tenure	81.29	84.01	.07	.19**	-.18**													
5	Organizational tenure	16.08	9.87	-.09*	.79**	-.51**	.22**												
6	Conscientiousness	5.50	.64	.05	-.02	.11**	-.04	-.02											
7	Extraversion	4.35	.67	-.11**	-.11**	.13**	-.04	-.06	.35**										
8	Agreeableness	5.05	.69	-.01	-.05	.16**	-.04	-.07	.63**	.38**									
9	Neuroticism	3.92	.83	-.01	.02	-.05	.05	.02	-.03	-.40**	.02								
10	Openness	4.43	.79	-.06	-.15**	.22**	-.15**	-.11**	.43**	.63**	.38**	-.33**							
11	Role importance	5.41	1.11	-.05	-.07	.06	-.07	-.01	.15**	.13**	.06	-.01	.13**						
12	Advice	59.90	21.22	-.11**	.00	.09*	-.07	-.01	.11**	.12**	.14**	.06	.10*	.14**					
13	Friendship	61.53	20.16	-.08*	-.07	.11**	-.01	-.06	.04	.12**	.13**	.05	.07	.10**	.89**				
14	Workflow receiving	59.98	21.93	-.09*	-.07	.14**	-.03	-.08*	.09*	.13**	.17**	.03	.12**	.15**	.89**	.88**			
15	Workflow providing	59.70	22.31	-.10*	-.09*	.13**	-.07	-.11**	.09*	.14**	.20**	.02	.14**	.12**	.83**	.85**	.86**		
16	Communication	62.30	21.14	-.09*	-.10*	.16**	-.04	-.11**	.11**	.14**	.15**	.01	.15**	.14**	.89**	.90**	.91**	.88**	
17	Overall centrality	60.68	20.28	-.10*	-.07	.13**	-.05	-.08*	.09*	.14**	.17**	.04	.13**	.13**	.95**	.95**	.96**	.93**	.97**

N = 661; * $p < .05$, ** $p < .01$;

Table 4-3
Means, Standard Deviations, and Inter-Correlations for Team Demographic Variables and Team Performance

		Mean	SD	1	2	3	4	5	6	7	8	9	10	11
1	Team size	6.92	3.58											
2	Age (mean)	37.62	6.09	.14										
3	Education (mean)	2.02	0.76	-.23*	-.72**									
4	Female (mean)	0.28	0.24	.01	-.12	.01								
5	Team tenure (mean)	75.08	64.51	.21	.29**	-.24*	.13							
6	Organizational tenure (mean)	15.30	7.10	.19	.88**	-.73**	-.07	.33**						
7	Education heterogeneity	0.43	0.24	.11	-.12	.19	-.03	.05	-.15					
8	Gender heterogeneity	0.29	0.18	.24*	.16	-.15	.45**	.23*	.18	-.04				
9	Age heterogeneity	6.32	3.35	.11	.02	-.08	-.01	.03	-.05	.56**	-.002			
10	Team tenure (month) heterogeneity	28.65	38.99	.22*	.12	-.22*	.08	.54**	.13	.11	.22*	.04		
11	Organizational tenure heterogeneity	6.87	4.12	.07	.27*	-.26*	-.03	.09	.22*	.37**	.24*	.65**	.17	
12	Team performance	5.14	0.84	.07	-.02	-.13	.12	-.13	.01	.01	-.14	.18	-.10	.06

$N = 84$; $^*p < .05$, $^{**}p < .01$;

Table 4-4
Means, Standard Deviations, and Inter-Correlations for Team Overall Personality Traits and Team Variables

		Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	Overall conscientiousness	5.51	.37																
2	Overall extraversion	4.39	.37	.51**															
3	Overall agreeableness	5.09	.43	.72**	.54**														
4	Overall neuroticism	3.90	.52	-.20	-.54**	-.10													
5	Overall openness	4.51	.45	.55**	.64**	.55**	-.46**												
6	Mean conscientiousness	5.52	.36	.99**	.49**	.70**	-.21	.56**											
7	Mean extraversion	4.40	.38	.50**	.99**	.52**	-.54**	.65**	.50**										
8	Mean agreeableness	5.10	.42	.72**	.53**	.99**	-.11	.57**	.72**	.53**									
9	Mean neuroticism	3.91	.52	-.21	-.56**	-.13	.99**	-.47**	-.22*	-.55**	-.13								
10	Mean openness	4.52	.46	.55**	.64**	.54**	-.45**	.99**	.57**	.66**	.57**	-.47**							
11	Interpersonal processes	5.95	.47	.61**	.37**	.54**	-.23*	.45**	.63**	.38**	.56**	-.24*	.46**						
12	Task processes	5.63	.46	.60**	.42**	.50**	-.27*	.33**	.62**	.44**	.52**	-.28*	.34**	.81**					
13	Adaptive processes	5.50	.48	.61**	.35**	.53**	-.12	.36**	.62**	.37**	.54**	-.13	.38**	.73**	.83**				
14	Team performance	5.14	.84	.28**	.18	.22*	-.14	.03	.30**	.17	.23*	-.13	.03	.13	.29**	.23*			
15	Team interdependence	4.92	.41	.48**	.21	.51**	.09	.26*	.50**	.19	.51**	.09	.24*	.57**	.53**	.48**	.09		
16	Centralization	.13	.06	-.02	.05	-.09	-.15	.16	.01	.11	-.04	-.14	.19	.07	.05	.03	-.06	-.07	
17	Density	3.45	.62	.10	.23*	.29**	-.01	.14	.14	.25*	.31**	-.01	.16	.19	.33**	.34**	.20	.37**	-.22*

$N = 84$; $^* p < .05$, $^{**} p < .01$;

Table 4-5

Means, Standard Deviations, and Inter-Correlations for Team Personality Traits and Team Variables

		Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13
1	The most central member's conscientiousness	5.45	.76													
2	Extraversion	4.34	.61	.36**												
3	Agreeableness	4.95	.79	.72**	.36**											
4	Neuroticism	3.89	.81	.15	-.46**	.16										
5	Openness	4.48	.68	.40**	.59**	.30**	-.36**									
6	Conscientiousness (minimum)	4.66	.69	.47**	.06	.44**	.19	.16								
7	Agreeableness (minimum)	4.25	.67	.41**	.10	.59**	.22*	.05	.64**							
8	Neuroticism (minimum)	2.99	.67	.04	-.28*	.08	.53**	-.28*	.16	.28*						
9	Extraversion (maximum)	5.12	.52	.25*	.33**	.25*	-.24*	.20	.10	.07	-.46**					
10	Openness (maximum)	5.44	.59	.35**	.35**	.30**	-.25*	.40**	.33**	.24*	-.49**	.70**				
11	Interpersonal processes	5.93	.45	.29**	.21	.33**	-.05	.21	.42**	.42**	-.19	.26*	.41**			
12	Task processes	5.60	.46	.29**	.29**	.27*	-.07	.18	.42**	.31**	-.17	.26*	.36**	.81**		
13	Adaptive processes	5.49	.48	.31**	.16	.35**	.08	.15	.41**	.39**	-.07	.20	.32**	.74**	.83**	
14	Team performance	5.17	.87	.20	.15	.12	-.01	.07	.24*	.15	-.16	-.01	.04	.11	.22*	.16

N = 84; * $p < .05$, ** $p < .01$;

Table 4-6
Means, Standard Deviations, and Inter-Correlations for Team Personality Traits

		Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1	Overall conscientiousness	5.51	.37																			
2	Overall extraversion	4.39	.37	.51**																		
3	Overall agreeableness	5.09	.43	.72**	.54**																	
4	Overall neuroticism	3.90	.52	-.20	-.54**	-.10																
5	Overall openness	4.51	.45	.55**	.64**	.55**	-.46**															
6	Mean conscientiousness	5.52	.36	.99**	.49**	.70**	-.21	.56**														
7	Mean extraversion	4.40	.38	.50**	.99**	.52**	-.54**	.65**	.50**													
8	Mean agreeableness	5.10	.42	.72**	.53**	.99**	-.11	.57**	.72**	.53**												
9	Mean neuroticism	3.91	.52	-.21	-.56**	-.13	.99**	-.47**	-.22*	-.55**	-.13											
10	Mean openness	4.52	.46	.55**	.64**	.54**	-.45**	.99**	.57**	.66**	.57**	-.47**										
11	The most central member's conscientiousness	5.45	.76	.60**	.31**	.41**	-.08	.251*	.54**	.29**	.38**	-.08	.23*									
12	Extraversion	4.34	.61	.26*	.47**	.21	-.40**	.21	.23*	.41**	.18	-.38**	.17	.36**								
13	Agreeableness	4.95	.79	.52**	.32**	.66**	-.01	.33**	.48**	.28*	.62**	-.02	.31**	.72**	.36**							
14	Neuroticism	3.89	.81	.08	-.25*	.12	.68**	-.20	.08	-.23*	.12	.65**	-.18	.15	-.46**	.16						
15	Openness	4.48	.68	.28*	.25*	.11	-.38**	.51**	.25*	.22*	.10	-.36**	.46**	.40**	.59**	.30**	-.36**					
16	Conscientiousness (minimum)	4.66	.69	.72**	.35**	.55**	-.03	.48**	.73**	.36**	.56**	-.05	.49**	.47**	.06	.44**	.19	.16				
17	Agreeableness (minimum)	4.25	.67	.54**	.29**	.81**	.06	.36**	.52**	.28**	.80**	.03	.36**	.41**	.10	.59**	.22*	.05	.64**			
18	Neuroticism (minimum)	2.99	.67	-.07	-.33**	.10	.75**	-.27*	-.09	-.33**	.08	.77**	-.27*	.04	-.28*	.08	.53**	-.28*	.16	.28*		
19	Extraversion (maximum)	5.12	.52	.40**	.71**	.31**	-.40**	.41**	.39**	.73**	.32**	-.41**	.43**	.25*	.33**	.25*	-.24*	.20	.10	.07	-.46**	
20	Openness (maximum)	5.44	.59	.59**	.66**	.46**	-.51**	.67**	.59**	.67**	.47**	-.53**	.68**	.35**	.35**	.30**	-.25*	.40**	.33**	.24*	-.49**	.70**

N = 84; * $p < .05$, ** $p < .01$;

Table 4-7
The Effect of Team Overall Conscientiousness on Task Processes and Team Performance

	Task processes (H1a)				Team performance (H4a)			
	β	t	β	t	β	t	β	t
Team size	-.05	-.45	-.01	-.06	.13	1.14	.15	1.26
Age heterogeneity	-.09	-.65	-.14	-1.00	.09	.59	.12	.75
Team tenure heterogeneity	-.04	-.42	-.04	-.41	-.12	-1.04	-.11	-.97
Org tenure heterogeneity	.06	.42	.05	.38	.12	.82	.11	.74
Education heterogeneity	.19	1.61	.20	1.75†	-.11	-.84	-.16	-1.20
Gender heterogeneity	.05	.47	.04	.42	-.18	-1.51	-.19	-1.64
Overall conscientiousness	.58	6.08**	-.58	-.95	.32	2.94**	.17	1.29
Mean conscientiousness			1.18	1.92				
Team task processes							.26	1.93†
F	5.75**		5.69**		2.02		2.31*	
F change			3.68†				3.74†	
R^2	.37		.40		.17		.21	
R^2 change			.03				.04	

N = 84; †$p < .10$, *$p < .05$, **$p < .01$;

Table 4-8
The Effect of Team Overall Agreeableness, Neuroticism, and Extraversion on
Interpersonal Processes and Team Performance

	Interpersonal processes (H1b-d)				Team performance (H4b-d)			
	β	t	β	t	β	t	β	t
Team size	.00	.03	.04	.31	.17	1.36	.17	1.35
Age heterogeneity	-.04	-.30	-.09	-.58	.13	.78	.13	.78
Team tenure heterogeneity	-.04	-.38	-.02	-.18	-.12	-1.01	-.12	-.98
Org tenure heterogeneity	-.03	-.24	-.07	-.49	.18	1.08	.18	1.08
Education heterogeneity	.07	.59	.09	.71	-.19	-1.30	-.19	-1.31
Gender heterogeneity	.17	1.48	.16	1.32	-.09	-.68	-.10	-.73
Overall agreeableness	.52	4.17**	.22	.15	.24	1.67	.21	1.32
Overall neuroticism	-.23	-1.73	-.75	-.61	-.22	-1.45	-.21	-1.34
Overall extraversion	-.02	-.11	-1.16	-.91	-.03	-.19	-.03	-.18
Mean agreeableness			.36	.25				
Mean neuroticism			.55	.45				
Mean extraversion			1.14	.91				
Team interpersonal processes							.05	.36
F	4.03**		3.29**		1.36		1.22	
F change			1.03				.13	
R^2	.35		.38		.15		.15	
R^2 change			.03				.00	

N = 84; [†]$p < .10$, [*]$p < .05$, [**]$p < .01$;

Table 4-9
The Effect of Team Overall Openness on Adaptive Processes and Team Performance

	Adaptive processes (H1e)				Team performance (H4e)			
	β	t	β	t	β	t	β	t
Team size	-.05	-.40	-.04	-.34	.13	1.02	.15	1.20
Age heterogeneity	.03	.19	.03	.21	.10	.57	.09	.54
Team tenure heterogeneity	-.01	-.05	.00	-.03	-.11	-.90	-.11	-.92
Org tenure heterogeneity	.17	1.07	.16	.98	.12	.67	.06	.35
Education heterogeneity	.14	1.09	.14	1.05	-.12	-.84	-.17	-1.22
Gender heterogeneity	.16	1.42	.16	1.40	-.16	-1.24	-.21	-1.74[†]
Overall openness	.47	3.86**	.25	.25	.07	.52	-.09	-.65
Mean openness			.22	.23				
Team adaptive processes							.35	2.74**
F	3.06**		2.65*		.74		1.65	
F change			.05				7.53**	
R^2	.23		.24		.07		.16	
R^2 *change*			.00				.09	

N = 84; [†] $p < .10$, [*] $p < .05$, [**] $p < .01$;

Table 4-10
The Moderating Effects of Team Interdependence and Density on Task Processes

	Task processes (H2a, H3a)											
	β	t	β	t	β	t	β	t	β	t	β	t
Team size	.00	-.05	.00	.02	.09	.92	.09	.91	.09	.96	.10	1.02
Age heterogeneity	-.10	-.81	-.11	-.81	-.19	-1.47	-.19	-1.46	-.18	-1.43	-.18	-1.44
Team tenure heterogeneity	-.04	-.38	-.03	-.32	-.07	-.79	-.07	-.75	-.06	-.69	-.05	-.58
Org tenure heterogeneity	.05	.44	.05	.37	.06	.48	.06	.47	.06	.49	.05	.40
Education heterogeneity	.22	2.09[*]	.23	2.12[*]	.23	2.19[*]	.22	2.00[*]	.25	2.45[*]	.24	2.26[*]
Gender heterogeneity	.06	.65	.08	.75	.13	1.36	.14	1.43	.13	1.33	.15	1.50
Overall conscientiousness	.39	3.79[**]	.39	3.73[**]	.55	6.21[**]	.54	5.97[**]	.42	4.20[**]	.40	3.89[**]
Interdependence	.37	3.49[**]	.38	3.51[**]					.27	2.59[**]	.29	2.71[**]
Density					.38	3.71[**]	.39	3.77[**]	.29	2.85[**]	.31	2.94[**]
Conscientiousness x interdependence			.05	.51							.05	.49
Conscientiousness x density							.08	.90			.08	.81
F	7.37[**]		6.51[**]		7.67[**]		6.89[**]		8.12[**]		6.78[**]	
F change			.26				.81				.87	
R^2	.46		.46		.41		.41		.52		.53	
R^2 change			.00				.01				.01	

N = 84; [†]$p < .10$, [*]$p < .05$, [**]$p < .01$;

Table 4-11

The Moderating Effects of Team Interdependence and Density on Interpersonal Processes

	Interpersonal processes (H2b-d, H3b-d)											
	β	t	β	t	β	t	β	t	β	t	β	t
Team size	.03	.31	.04	.36	.04	.36	.05	.39	.03	.27	.02	.19
Age heterogeneity	-.07	-.56	-.08	-.60	-.07	-.50	-.06	-.37	-.07	-.53	-.11	-.79
Team tenure heterogeneity	-.06	-.68	-.09	-.85	-.06	-.51	-.05	-.47	-.06	-.66	-.12	-1.14
Org tenure heterogeneity	.00	-.02	.01	.04	-.03	-.23	-.05	-.30	.00	-.02	.09	.61
Education heterogeneity	.11	.98	.10	.84	.09	.67	.08	.62	.11	.96	.05	.40
Gender heterogeneity	.17	1.73[†]	.17	1.64	.19	1.63	.20	1.66	.17	1.67	.14	1.27
Overall agreeableness	.29	2.41[*]	.32	2.54[*]	.52	4.09[**]	.54	4.03[**]	.29	2.39[*]	.30	2.32[**]
Overall neuroticism	-.29	-2.43[*]	-.29	-2.24[*]	-.25	-1.83[†]	-.26	-1.71[†]	-.29	-2.39[*]	-.34	-2.48[**]
Overall extraversion	-.05	-.37	-.06	-.44	-.05	-.32	-.06	-.38	-.05	-.35	-.07	-.45
Interdependence	.47	4.58[**]	.46	4.32[**]					.47	4.45[**]	.49	4.31[**]
Density					.10	.86	.07	.57	-.01	-.05	.01	.04
Agreeableness x interdependence			-.12	-.85							-.26	-1.32
Neuroticism x interdependence			-.03	-.18							-.08	-.52
Extraversion x interdependence			.04	.23							.05	.25
Agreeableness x density							.00	-.01			.25	1.24
Neuroticism x density							-.07	-.48			.08	.59
Extraversion x density							-.09	-.44			-.14	-.79
F	6.80[**]		5.16[**]		3.69[**]		2.77[**]		6.09[**]		3.99[**]	
F change			.36				.16				.58	
R^2	.50		.51		.26		.23		.50		.53	
R^2 change			.01				.01				.03	

N = 84; [†] $p < .10$, [*] $p < .05$, [**] $p < .01$;

Table 4-12
The Moderating Effects of Team Interdependence and Density on Adaptive Processes

	Adaptive processes (H2e, H3e)											
	β	t	β	t	β	t	β	t	β	t	β	t
Team size	-.03	-.26	-.03	-.26	.10	.84	.09	.76	.06	.59	.05	.50
Age heterogeneity	.04	.30	.04	.30	-.08	-.51	-.05	-.37	-.03	-.22	-.01	-.07
Team tenure heterogeneity	.00	.03	.00	.03	-.04	-.38	-.05	-.46	-.02	-.21	-.03	-.30
Org tenure heterogeneity	.11	.79	.11	.78	.17	1.19	.20	1.45	.12	.91	.15	1.16
Education heterogeneity	.20	1.75[†]	.20	1.74[†]	.19	1.59	.15	1.26	.22	2.00[*]	.18	1.66
Gender heterogeneity	.15	1.47	.15	1.39	.25	2.26[*]	.26	2.46[*]	.21	2.04[*]	.22	2.13[*]
Overall openness	.30	2.59[**]	.30	2.55[**]	.46	4.09[**]	.54	4.76[**]	.32	2.89[**]	.40	3.43[**]
Interdependence	.45	4.47[**]	.45	4.39[**]					.37	3.57[**]	.35	3.49[**]
Density					.39	3.42[**]	.47	4.11[**]	.25	2.29[*]	.33	2.88[**]
Openness x interdependence			-.03	-.26							-.02	-.15
Openness x density							.27	2.50[*]			.25	2.41[*]
F	5.90[**]		5.18[**]		4.55[**]		5.05[**]		6.16[**]		5.87[**]	
F change			.07				6.22[*]				2.97[†]	
R^2	.41		.41		.27		.32		.45		.49	
R^2 change			.00				.06				.05	

$N = 84$; [†] $p < .10$, [*] $p < .05$, [**] $p < .01$;

Table 4-13
The Effect of the Most Central Member's Conscientiousness

	Task processes (H7a)		Team performance (H9a)			
	β	t	β	t	β	t
Gender (female)	.12	1.04	.05	.45	.02	.19
Age	.17	.88	-.03	-.17	-.08	-.39
Education	-.02	-.16	-.24	-1.73[†]	-.23	-1.73[†]
Team tenure	-.01	-.07	-.15	-1.21	-.15	-1.23
Organizational tenure	-.06	-.31	-.13	-.67	-.11	-.61
The most central member's conscientiousness	.26	2.14[*]	.24	1.96[*]	.17	1.42
Task processes					.25	2.10[*]
F	1.43		1.27		1.77	
F change					4.41*	
R²	.11		.10		.15	
R² change					.06	

N = 84; [†] $p < .10$, [*] $p < .05$, [**] $p < .01$;

Table 4-14

The Effect of the Most Central Member's Agreeableness, Neuroticism, and Extraversion

	Interpersonal processes (H7b-d)		Team performance (H9b-d)			
	β	t	β	t	β	t
Gender (female)	-.02	-.17	.09	.77	.10	.78
Age	.14	.70	-.01	-.03	-.02	-.09
Education	.15	1.03	-.21	-1.43	-.23	-1.50
Team tenure	-.05	-.36	-.16	-1.27	-.16	-1.24
Organizational tenure	-.14	-.74	-.12	-.62	-.11	-.56
The most central member's agreeableness	.26	1.80†	.12	.79	.10	.63
The most central member's neuroticism	-.05	-.38	.10	.69	.10	.72
The most central member's extraversion	.14	.89	.15	.96	.14	.88
Interpersonal processes					.08	.63
F	*1.52*		*.87*		*.81*	
F change					*.39*	
R^2	.15		.09		.10	
R^2 change					.01	

N = 84; $^\dagger p < .10$, $^* p < .05$, $^{**} p < .01$;

Table 4-15
The Effect of the Most Central Member's Openness

	Adaptive processes (H7e)		Team performance (H9e)			
	β	t	β	t	β	t
Gender (female)	.04	.33	.09	.72	.08	.66
Age	.32	1.61	.05	.23	-.03	-.14
Education	.09	.63	-.19	-1.33	-.21	-1.50
Team tenure	-.08	-.66	-.13	-1.01	-.11	-.87
Organizational tenure	-.06	-.32	-.13	-.67	-.12	-.61
The most central member's openness	.16	1.32	.04	.32	.00	.02
Adaptive processes					.23	1.93†
F	*1.08*		*.61*		*1.07*	
F change					*3.71†*	
R^2	.09		.05		.10	
R^2 change					.05	

N = 84; $^\dagger p < .10$, $^* p < .05$, $^{**} p < .01$;

Table 4-16
The Moderating Effect of Team Centralization on Task Processes

	Task processes (H8a)			
	β	t	β	t
Gender (female)	.12	.97	.02	.20
Age	.19	.94	.05	.23
Education	-.03	-.21	-.08	-.56
Team tenure	-.02	-.12	.05	.37
Organizational tenure	-.08	-.44	-.11	-.60
The most central member's conscientiousness	.26	2.15*	.45	3.25**
Centralization	.09	.73	.17	1.41
The most central member's conscientiousness x centralization			-.35	-2.55*
F	*1.29*		*2.04†*	
F change	*.12*		*6.51**	
R^2			.20	
R^2 change			.08	

N = 84; $^\dagger p < .10$, $^* p < .05$, $^{**} p < .01$;

Table 4-17
The Moderating Effects of Team Centralization on Interpersonal Processes

	Interpersonal processes (H8b-d)			
	β	t	β	t
Gender (female)	-.03	-.24	-.08	-.64
Age	.15	.74	.10	.47
Education	.13	.91	.11	.74
Team tenure	-.05	-.43	-.04	-.33
Organizational tenure	-.17	-.89	-.16	-.85
The most central member's agreeableness	.26	1.82[†]	.31	2.02[*]
The most central member's neuroticism	-.03	-.18	-.03	-.23
The most central member's extraversion	.13	.87	.15	.92
Centralization	.11	.88	.12	.80
The most central member's agreeableness x centralization			-.15	-1.01
The most central member's neuroticism x centralization			-.06	-.38
The most central member's extraversion x centralization			-.04	-.26
F	*1.44*		*1.20*	
F change			.57	
R^2	.16		.19	
R^2 change			.02	

N = 84; [†]$p < .10$, [*]$p < .05$, [**]$p < .01$;

Table 4-18
The Moderating Effects of Team Centralization on Adaptive Processes

	Adaptive processes (H8e)			
	β	t	β	t
Gender (female)	.03	.28	.03	.22
Age	.33	1.64	.33	1.63
Education	.08	.61	.08	.58
Team tenure	-.09	-.69	-.09	-.70
Organizational tenure	-.08	-.40	-.07	-.35
The most central member's openness	.14	1.11	.16	1.23
Centralization	.05	.41	.06	.49
The most central member's openness x centralization			-.07	-.56
F	*.94*		*.85*	
F change			*.31*	
R^2	.09		.09	
R^2 change			.00	

N = 84; $^{\dagger}p < .10$, $^{*}p < .05$, $^{**}p < .01$;

Table 4-19
The Effects of Team Minimum Conscientiousness

	Task processes (H11a)		Team performance (H13a)			
	β	t	β	t	β	t
Team size	.03	.27	.21	$1.75^{\dagger}$	.20	$1.72^{\dagger}$
Age heterogeneity	-.12	-.78	.06	.35	.09	.56
Team tenure heterogeneity	.02	.21	-.07	-.64	-.08	-.71
Org tenure heterogeneity	-.01	-.04	.10	.64	.10	.67
Education heterogeneity	.24	$1.81^{\dagger}$	-.07	-.50	-.13	-.97
Gender heterogeneity	.04	.32	-.20	-1.65	-.20	$-1.78^{\dagger}$
Minimum conscientiousness	.44	3.86^{**}	.37	3.21^{**}	.25	2.07^{*}
Task processes					.26	2.21^{*}
F	2.50^{*}		2.274^{*}		2.71^{*}	
F change					4.89^{*}	
R^2	.20		.19		.24	
R^2 *change*					.05	

$N = 84$; $^{\dagger} p < .10,$ $^{*} p < .05,$ $^{**} p < .01$;

Table 4-20
The Effects of Team Minimum Agreeableness, Neuroticism, and Maximum Extraversion

	Interpersonal processes (H11b-d)		Team performance (H13b-d)			
	β	t	β	t	β	t
Team size	-.05	-.39	.24	$1.77^{\dagger}$	.24	$1.78^{\dagger}$
Age heterogeneity	-.16	-1.06	.01	.04	.01	.08
Team tenure heterogeneity	.01	.06	-.09	-.78	-.09	-.78
Org tenure heterogeneity	.14	.90	.30	$1.77^{\dagger}$	.29	$1.71^{\dagger}$
Education heterogeneity	-.02	-.15	-.24	$-1.69^{\dagger}$	-.24	$-1.67^{\dagger}$
Gender heterogeneity	.12	1.08	-.15	-1.28	-.16	-1.30
Minimum agreeableness	.48	3.93^{**}	.37	2.79^{**}	.34	2.35^{*}
Minimum neuroticism	-.40	-2.89^{**}	-.42	2.78^{**}	-.40	-2.49^{*}
Maximum extraversion	.07	.56	-.23	-1.68	-.24	$-1.69^{\dagger}$
Team interpersonal processes					.05	.35
F		3.46^{**}		$1.93^{\dagger}$		$1.72^{\dagger}$
F change						*.12*
R^2		.31		.20		.21
R^2 *change*						.00

N = 84; $^{\dagger}p < .10$, $^{*}p < .05$, $^{**}p < .01$;

Table 4-21
The Effects of Team Maximum Openness

	Adaptive processes (H11e)		Team performance (H13e)			
	β	t	β	t	β	t
Team size	-.21	$-1.81^\dagger$	.10	.81	.17	1.36
Age heterogeneity	.14	.90	.11	.68	.07	.43
Team tenure heterogeneity	.00	.00	-.11	-.93	-.11	-.96
Org tenure heterogeneity	.06	.42	.12	.74	.10	.64
Education heterogeneity	.11	.82	-.13	-.93	-.16	-1.21
Gender heterogeneity	.11	.98	-.16	-1.31	-.20	-1.64
Maximum openness	.38	3.32^{**}	.12	.97	.00	.01
Adaptive processes					.31	2.52^*
F	2.47^*		.84		1.59	
F change					6.35^*	
R^2	.20		.08		.16	
R^2 *change*					.08	

N = 84; $^\dagger p < .10$, $^* p < .05$, $^{**} p < .01$;

Table 4-22
The Moderating Effects of Team Member Centrality on Team Processes

	Task processes (H12a)		Interpersonal processes (H12b-d)						Adaptive processes (H12e)	
	β	t	β	t	β	t	β	t	β	t
Minimum conscientiousness	.36	2.89**								
Minimum agreeableness			.42	3.46**						
Minimum neuroticism					-.01	-.07				
Maximum extraversion							.19	1.59		
Maximum openness									.21	1.67†
Centrality	.05	.37	-.06	-.56	.02	.13	.17	1.58	.15	1.39
Minimum conscientiousness x centrality	.07	.55								
Minimum agreeableness x centrality			.02	.13						
Minimum neuroticism x centrality					-.22	-1.34				
Maximum extraversion x centrality							.29	2.50*		
Maximum openness x centrality									.25	2.07*
F	4.41**		5.09**		1.26		4.68**		4.82**	
R^2	.16		.17		.05		.16		.16	

N = 76-84; $^\dagger p < .10$, $^* p < .05$, $^{**} p < .01$;

Table 4-23
Summary of the Hypotheses

| Hypotheses	Description	Results	Hypotheses	Description	Results
H1a		N	H8a	The moderating effects of team centralization on the relationships between the most central member's personality traits and team processes	N
H1b	The effects of team overall personality traits on team processes	N	H8b		N
H1c		N	H8c		N
H1d		N	H8d		N
H1e		N	H8e		N
H2a	The moderating effects of team interdependence on the relationships between team overall personality traits and team processes	N	H9a	The mediating effects of team processes on the relationships between the most central member's personality traits and performance	Y
H2b		N	H9b		N
H2c		N	H9c		N
H2d		N	H9d		N
H2e		N	H9e		N
H3a	The moderating effects of team density on the relationships between team overall personality traits and team processes	N	H10a	The moderated mediating effects of centralization on the relationships between the most central member's personality and team performance via team processes	N
H3b		N	H10b		N
H3c		N	H10c		N
H3d		N	H10d		N
H3e		Y	H10e		N
H4a	The mediating effects of team processes on the relationships between team overall personality traits and team performance	P	H11a	The effects of team minimum and maximum personality traits on team processes	Y
H4b		N	H11b		Y
H4c		N	H11c		Y
H4d		N	H11d		N
H4e		Y	H11e		Y
H5a	The moderated mediating effects of interdependence on the relationships between overall personality traits and performance via processes	N	H12a	The moderating effects of team member centrality on the relationships between team minimum and maximum personality traits and team processes	N
H5b		N	H12b		N
H5c		N	H12c		N
H5d		N	H12d		Y
H5e		N	H12e		Y
H6a	The moderated mediating effects of team density on the relationships between overall personality traits and team performance via processes	N	H13a	The mediating effects of team processes on the relationships between team minimum and maximum personality and team performance	Y
H6b		N	H13b		N
H6c		N	H13c		N
H6d		N	H13d		N
H6e		P	H13e		Y

Table 4-23 Continued

Hypotheses	Description	Results	Hypotheses	Description	Results
H7a		Y	H14a	The moderated	N
H7b	The effects of the most central member's personality traits on team processes	P	H14b	mediating effects of centrality on the	N
H7c		N	H14c	relationships between	N
H7d		N	H14d	team minimum and maximum personality	N
H7e		N	H14e	and team performance via team processes	N

Notes: N = not supported; Y = supported; P = partially supported

Figure 1-1

Overall Research Framework
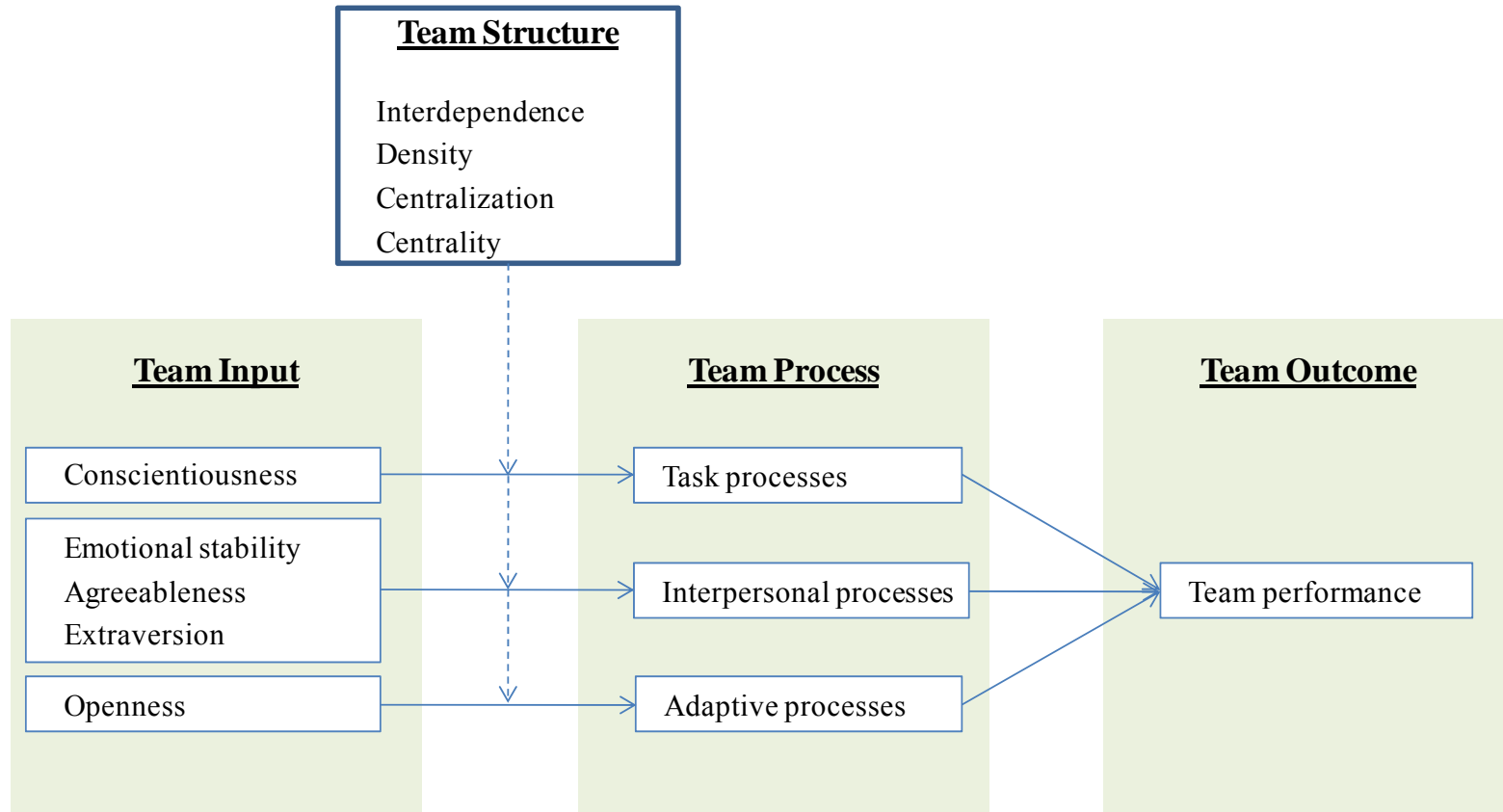
Figure 4-1

The Moderating Effect of Team Density on the Relationship between Team Overall

Openness and Adaptive Processes
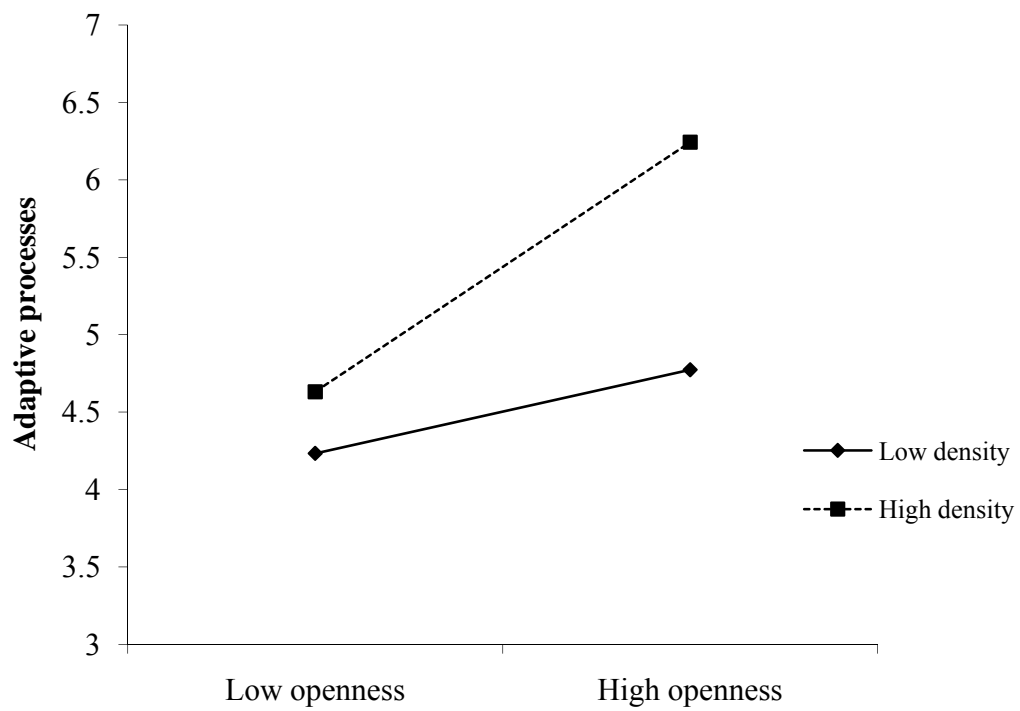
Figure 4-2

The Moderating Effect of Team Centralization on the Relationship between the Most
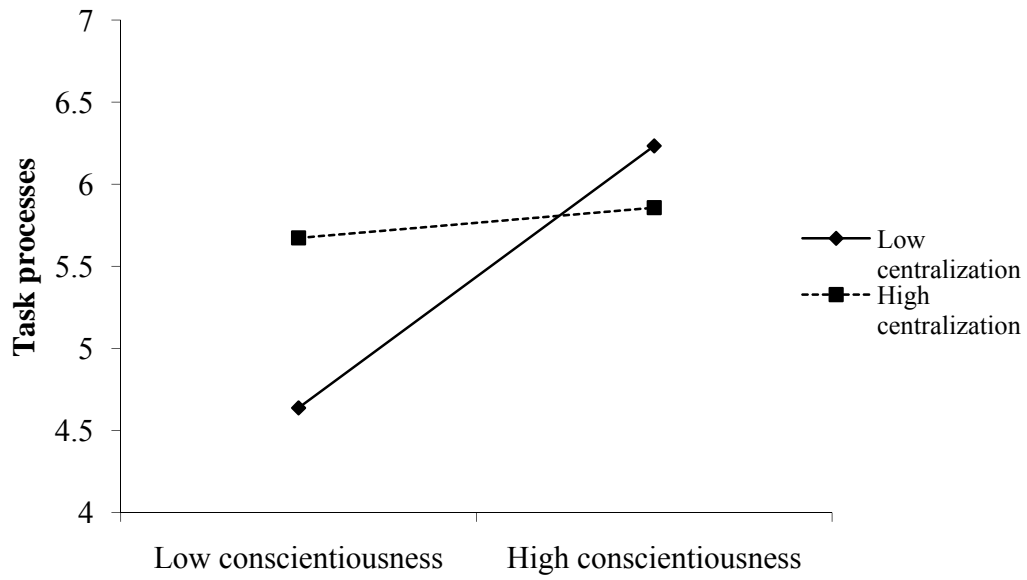
Central Member's Conscientiousness and Task Processes

Figure 4-3

The Moderating Effect of Team Member Centrality on the Relationship between Team

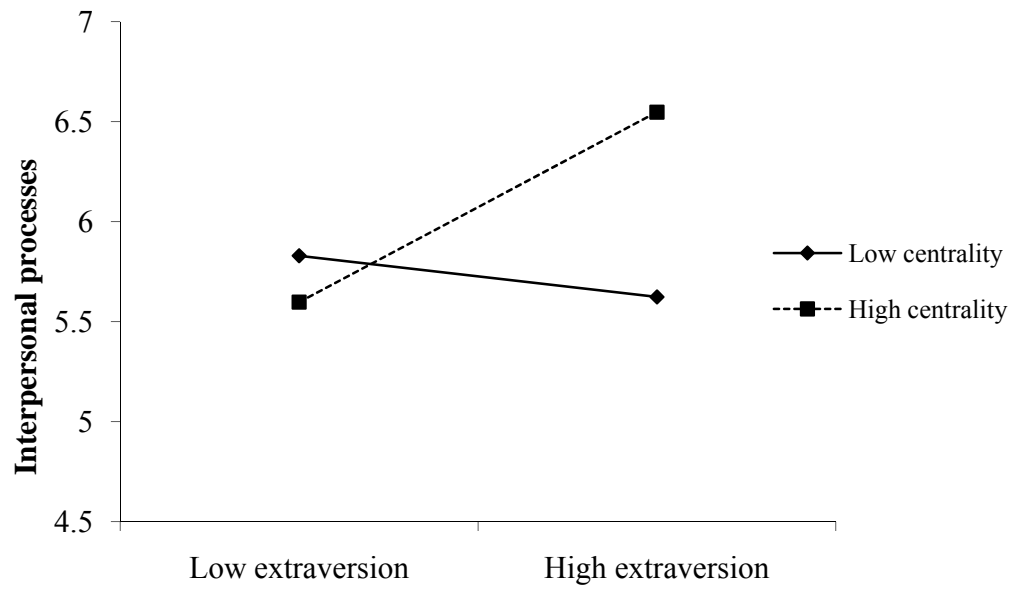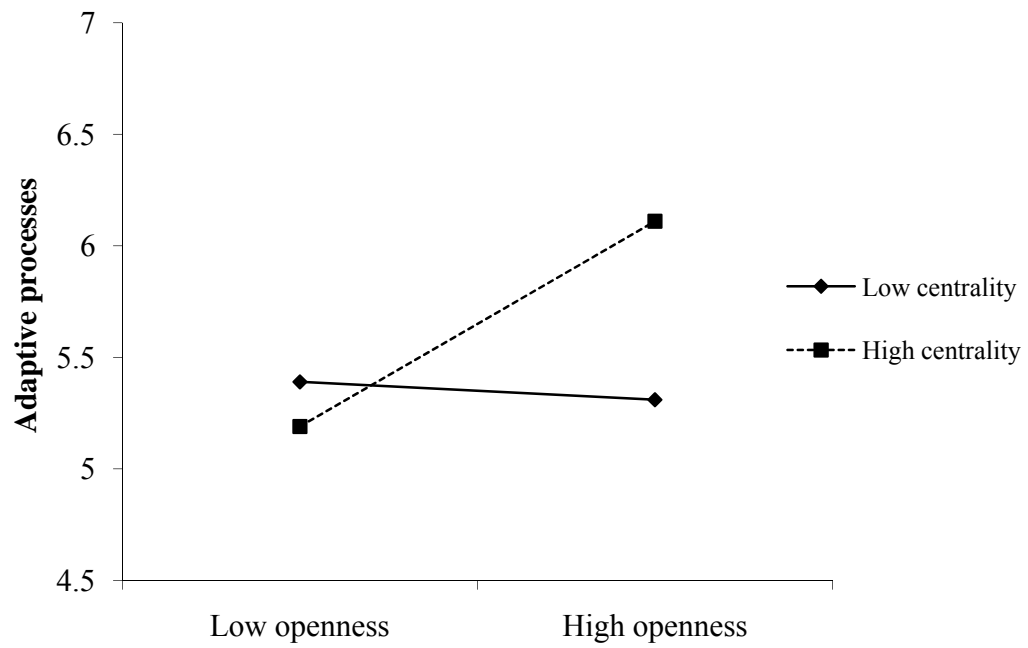Maximum Extraversion and Interpersonal Processes

Figure 4-4

The Moderating Effect of Team Member Centrality on the Relationship between Team

Maximum Openness and Adaptive Processes

APPENDIX B

SURVEY ITEMS

Team Member Survey

Part One: Employee Self Report Personality Traits and Team Processes

Personality – The FFM

The purpose of this inventory is to obtain a picture of the characteristics you believe you possess and to see how you describe yourself. There are no right or wrong answers, so try to describe yourself as accurately and honestly as you can. Do not worry about duplications, contradictions, and so forth. You are to select either "Strongly Disagree", "Disagree" "Neither", "Agree" or "Strongly Agree". Read each question in turn, think what your opinion or your behavior has usually been, and choose the answer that best describes your behavior or opinion. Some questions may seem to be asking the same thing, but please answer each item as honestly and frankly as possible. The redundancy is necessary for accurate measurement of the responses. Keep in mind there are no right or wrong answers. Thank you for your cooperation.

Don't spend too much time thinking over any one item. Give the first, natural answer that comes to you. This should be the answer that describes you as you really are (and not as you would like to be). Answer every item; please don't skip any.

Strongly Disagree	Disagree	Somewhat Disagree	Neither	Somewhat Agree	Agree	Strongly Agree

1.   I am very thorough in any work I do.

2.   I like initiating conversations with people I do not know.

3.   I like working with difficult concepts and ideas.

4.   I give my best effort every time I come to work.

5.   I get a lot done at work.
6.   I can always be counted on to get the job done.

7.   At times I just do not care much about anything.

8.   I am genuinely interested in other people.

9.   I am very sociable.

10.   I wish I could have more respect for myself.
11.   I would like to be in charge of an important project.

12.   I can become easily annoyed with people.
13.   I do not like to express my opinion to others.
14.   Complex problems rarely interest me.
15.   I am a very persistent worker.
16.   I often feel uncomfortable in the presence of those in authority.

17.   I tend to avoid complicated problems that call for creative solutions.

18.   People tell me I am a cheerful person.

19.   I often lose interest in things soon after starting them.
20.   I tend to have frequent ups and downs in mood, sometimes without any apparent cause

21.   I like helping strangers even if there isn't anything in it for me.

22.   I hardly ever take time out just to think about things.
23.   I tend to take a rather unimaginative approach to solving problems.
24.   I am a very conscientious person.

25.   I usually see the good side of people.

26.   I keep trying even when things get difficult at work.

27.   I sometimes avoid others for fear of doing or saying the wrong thing.
28.   Others have described me as a very disciplined person.

29.   I do not have a strong desire to be rich or famous.
30.   I am the kind of person who goes out of my way to help others.

31.   I enjoy working on things that require a lot of thought.

32.   I am not easily amused.

33.   I do not have much interest in being a leader.

34.   I put a great deal of effort into my work.

35.   I like to laugh aloud and be joyful.

36.   People tend to think of me as a very creative and inventive person.

37.   Sometimes the cost of being the most successful person is just too high.
38.   I am so self-conscious that it bothers me.
39.   At work, I am cheerful most of the time.
40.   I enjoy trying new and different things.

41.   It bothers me when I do not complete a project on time.
42.   I tend to get impatient easily.
43.   Helping others is very gratifying to me.

44.   I tend to be somewhat shy.
45.   I do not like problems that require a great deal of reasoning.
46.   I like to do the best I can, even if it requires a lot of extra effort.

47.   I like to experiment with new and different ways of doing things.

48.   Other people tend to be more reliable than I am.
49.   Sometimes I blame others when things go wrong.
50.   I am a very agreeable person.

51.   There are times when hard work is not worth the effort.
52.   I am usually considerate of other people's feelings.

53.   I have more energy than most people.

54.   I believe in helping others who are down on their luck.

55.   At work, I tend to see the bright side of things.

56.   On the whole, I am satisfied with myself.

57.   I like to seek and maintain the role of a leader in a group.

58.   I find it difficult to keep at routine tasks.
59.   I tend to be trusting of others.
60.   Before beginning my work, I like to plan and organize it.

Team Processes

The following questions ask your current team experience. Please rate each item as

Strongly Disagree	Disagree	Somewhat Disagree	Neither	Somewhat Agree	Agree	Strongly Agree

Team Interpersonal Processes
1. In this team we actively work to deal with personal conflicts in fair and equitable ways
2. In this team we actively work to show respect for one another
3. In this team we actively work to maintain group harmony
4. In this team we actively work to take pride in our accomplishments
5. In this team we actively work to develop confidence in our team's ability to perform well
6. In this team we actively work to encourage each other to perform our very best
7. In this team we actively work to share a sense of togetherness and cohesion
8. In this team we actively work to manage stress
9. In this team we actively work to keep a good emotional balance in the team

Team Task Processes
10. In this team we actively work to regularly monitor how well we are meeting our team goals
11. In this team we actively work to use clearly defined metrics to assess our progress
12. In this team we actively work to seek timely feedback from stakeholders (e.g., customers, top management, other organizational units) about how well we are meeting our goals
13. In this team we actively work to monitor and manage our resources (e.g., financial, equipment, etc.)
14. In this team we actively work to monitor important aspects of our work environment (e.g., inventories, equipment and process operations, information flows)
15. In this team we actively work to monitor events and conditions outside the team that influence our operations
16. In this team we actively work to develop standards for acceptable team member performance
17. In this team we actively work to balance the workload among our team members
18. In this team we actively work to assist each other when help is needed
19. In this team we actively work to communicate well with each other
20. In this team we actively work to smoothly integrate our work efforts
21. In this team we actively work to coordinate our activities with one another

Team Adaptive Processes

22. In this team we actively work to change how teamwork is executed in order to be more effective
23. In this team we actively work to bring about improved procedures for the work team
24. In this team we actively work to institute new work methods that are more effective for the team
25. In this team we actively work to correct a faulty procedure or practice
26. In this team we actively work to introduce new structures, technologies, or approaches to improve efficiency
27. In this team we actively work to link ideas that originate from multiple sources
28. In this team we actively work to search for novel approaches not required at the time
29. In this team we actively work to come up with new ways of doing things

Team Interdependence

1. I cannot accomplish my tasks without information or materials from other members of my team.
2. Other members of my team depend on me for information or materials needed to perform their tasks.
3. Within my team, jobs performed by team members are related to one another.
4. My work goals come directly from the goals of my team.
5. My work activities on any given day are determined by my team's goals for that day.
6. I do very few activities on my job that are not related to the goals of my team.
7. Feedback about how well I am doing my job comes primarily from information about how well the entire team is doing.
8. My performance evaluation is strongly influenced by how well my team performs.
9. Many rewards from my job (e.g., pay, promotion, etc.) are determined in large part by my contributions as a team member.

Part Two: Team Network Measures

Team members will be provided with a list of their teammates and asked to answer, for each team member:

not at all   a few   some   often   very much

Advice Network

1. To what degree do you go to this person for work-related advice?

Friendship Network
2. To what degree is this person a good friend of yours, someone you socialize with during your free time?

Workflow network
1. To what degree does this person provide you with inputs to your job?
2. To what degree do you distribute the outputs from you work to this person?

Communication network
1. To what degree do you talk frequently with this person about work-related topics?

Team Supervisor Survey

Team Performance Ratings

The following statements ask you to evaluate your team's job performance. It is critical that you respond as frankly and accurately as possible. Please rate each statement on the following 5-point scale:

This team's job performance:

[1]	[2]	[3]	[4]	[5]
Consistently Somewhat Exceeds Below Requirements Requirements	Frequently Exceeds Requirements	Somewhat Exceeds Requirements	Just Meets Requirements	Is

Rating

_____ 1.   JOB KNOWLEDGE: Understands work responsibilities, scope of job tasks, and routines to be performed.
        * Aware of correct procedures, methods, and facts pertinent to the job and its objectives.
        * Keeps informed of routine, normal follow-up.

_____ 2.   QUALITY OF WORK: Completes work thoroughly, accurately, and according to specifications.

* Produces output with a minimum number of errors.
* Maintains economy of materials and cost consciousness.
* Completes the work thoroughly without requiring constant correction or revision.

_____ 3. QUANTITY OF WORK. Maintains steady, acceptable level of work output.
* Completes assigned work within acceptable time frame.
* Increases work pace, when necessary, to meet a deadline.

_____ 4. INITIATIVE. Willing to seek out solutions to problems and learn more of the various functions involved.
*Suggests job, team, or organizational improvements.
* Works extra hard when requested and takes on additional responsibilities readily.
* Initiates actions independently and requires minimal supervision and support.

____ 5. INTERPERSONAL SKILLS: Practices basic communication skills, maintains good interpersonal relations with customers, managers, and other employees.
* Maintains smooth working relationship with associates in other organizational units.
* Knows when and how to listen and how to give good feedback.
* Maintains self-control (controls emotions and handles difficult situations).

____ 6. PLANNING & ALLOCATING: Planning-forming goals and allocating resources to meet them.
* Monitors progress toward objectives and adjusts plans as necessary to reach them.
* Allocates and schedules resources according to priority.
* Takes into account all available information to make timely decisions.

____ 7. COMMITMENT TO TEAM: Demonstrates a consistent, dependable work effort, and a positive work attitude.
*Supports the team even under difficult circumstances.
*Always willing to help others out and enjoys being at work.
*Endorses and defends team and organizational objectives.

____ 8. OVERALL JOB PERFORMANCE: A summary evaluation of overall performance against work expectations.
* Consider extent to which objectives were achieved.
* Assess team contributions towards objectives.
* Recognize difficulty of objectives.

Employee Role Importance

In a team context, team members hold different work roles. Certain roles have greater impacts on team performance than others. Please rate the importance of each member's *role (not the person who holds the role)* in the team based on the following questions.

Strongly Disagree	Disagree	Somewhat Disagree	Neither	Somewhat Agree	Agree	Strongly Agree

This position…
1. encounters more of the problems that need to be overcome in the team
2. has a greater exposure to the tasks that the team is performing
3. is more central to the workflow of the team

VITA

Name: Ning Li

Address: 4221 TAMU
                 Department of Management
                 Mays Business School
                 Texas A&M University
                 College Station, TX 77843-4221

Email Address: nli@mays.tamu.edu

Education: B.B.A., Management, Shanghai Jiaotong University, 2005
                 Ph.D., Management, Texas A&M University, 2012