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## SOCIAL NETWORKS, INDIVIDUAL ORIENTATIONS, AND EMPLOYEE INNOVATION OUTCOMES: A MULTI-THEORETICAL PERSPECTIVE

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SOCIAL NETWORKS, INDIVIDUAL ORIENTATIONS, AND EMPLOYEE  
INNOVATION OUTCOMES: A MULTI-THEORETICAL PERSPECTIVE

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DISSERTATION

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A dissertation submitted in partial fulfillment of the  
requirements for the degree of Doctor of Philosophy in the  
College of Business and Economics  
at the University of Kentucky

By

Travis James Grosser

Lexington, Kentucky

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## ABSTRACT OF DISSERTATION

### SOCIAL NETWORKS, INDIVIDUAL ORIENTATIONS, AND EMPLOYEE INNOVATION OUTCOMES: A MULTI-THEORETICAL PERSPECTIVE

I examine individual innovation in organizations from a social network perspective. I employ two theoretical lenses to examine innovation outcomes in three separate empirical studies. First, I use a sociopolitical framework to examine how political skill and social network structure interact to predict successful innovation initiation and, ultimately, career success. I find that innovation initiation mediates the relationship between political skill and career success. Moreover, structural holes in employees' social networks moderate the mediated relationship between political skill and career success such that the relationship is stronger for employees with many structural holes in their social network. Second, I use social resources theory to examine how the characteristics of employees' social network contacts affect individual innovation behavior. Results suggest that there is a positive relationship between the average amount of professional experience of one's social network contacts and individual innovation behavior. Similarly, there is a positive relationship between the average creativity level of one's social network contacts and individual innovation behavior. Each of these relationships is moderated by social structure such that the relationships are stronger for those with fewer structural holes in their social networks. Third, I develop and validate a scale to assess employee behavioral orientations toward brokering disconnected social network contacts. The scale is found to demonstrate convergent, discriminant, and criterion-related validity based on data from two field sites and one student sample. Results indicate that the scale is positively related to innovation support behavior.

**KEYWORDS:** social networks, innovation, political skill, social resources, brokerage orientation

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## CHAPTER I: OVERVIEW

This dissertation is concerned with how employees' workplace social networks affect individual innovation behavior in organizations. Individual innovation behavior occurs when employees are able to generate and implement novel and useful ideas in the workplace. As such, individual innovation behavior involves two skills. First, employees must have some measure of creative ability in order to generate novel and useful ideas. Second, employees must be able to exert social influence so as to gain acceptance for their ideas, thereby allowing for successful implementation. Contrary to individualistic notions of the innovation process, an individual's propensity to engage in innovative behavior in an organization is affected by the relationships, or ties, that he or she has with other employees (e.g., Brass, 1995; Burt, 2004; Perry-Smith & Shalley, 2003). Engaging with others interpersonally and obtaining knowledge and information from those in one's social environment is a critical component of the combinatorial process that is at the root of innovation (e.g., Galunic & Rodan, 1998; Hargadon, 2003).

Studies of intra-organizational social networks among employees have begun to shed light on the importance social interaction has for outcomes related to innovation. For example, the degree to which one is central in informal organizational social networks has been positively associated with what can be broadly termed innovative outcomes (Ibarra, 1993; Perry-Smith, 2006). Similarly, the structure of the social network ties surrounding individuals (i.e., the pattern of relationships in which individuals are embedded) has also been shown to affect innovation outcomes. For example, having network connections to individuals who are not connected to each other has been linked to the generation of innovative ideas (Burt, 2004). In addition, the strength of the ties that connect individuals in a social network has ramifications for innovation (Baer, 2010;

Zhou, Shin, Brass, Choi, Zhang, 2009). Weak ties have been conceptualized as being useful for gaining access to diverse information. Strong ties, on the other hand, are more effective for transferring complex, tacit knowledge (Hansen, 1999). Empirical work has also shown that the actions an individual takes to manage the relationships in their immediate social environment (by, for example, actively introducing disconnected individuals who have a common interest) can positively impact one's ability to innovate (Obstfeld, 2005).

In the three papers that comprise this dissertation, I build upon and extend three areas of research that have thus far been conducted on social networks and individual innovation behavior within organizations. In Chapter Two, I examine innovation among a group of research scientists and engineers by taking a sociopolitical perspective. Engaging in innovative activity is thought to be an inherently political undertaking since the nature of innovation is to instigate organizational change and alter the status quo (Frost & Egri, 1991; Kanter, 1988; Pfeffer, 1992). In this first study I examine the effect that political skill has on employees' ability to successfully initiate organizational innovations. Political skill is an individual capability that pertains to how well individuals can understand and influence others at work (Ferris, Treadway, Kolodinsky, Hochwarter, Kacmar, Douglas, & Frink, 2005). I also examine the moderating effect that social network structure has on the relationship between political skill and innovation initiation. I find that the number of structural holes one has in their social network (i.e., being tied to others who are not connected to one another) moderates the relationship such that the political skill--innovation initiation relationship is stronger for individuals with many structural holes. Additionally, I examine innovation initiation as a mediating variable in

the relationship between political skill and career success. This study adds to prior research that has examined how individual characteristics and social network variables interact to predict organizational outcomes (e.g., Mehra, Kilduff, Brass, 2001; Fleming, Mingo, Chen, 2007). I find that, although they do not independently relate to innovation initiation, structural holes amplify the effect that political skill has on this outcome. The results suggest that when considering a politically charged activity such as innovation, one should take into consideration both an individual's personal abilities as well as the characteristics of their social environment.

In Chapter Three, I use social resources theory (Lin, 1982; 2001) as a guiding theoretical framework to examine the impact that the personal characteristics of one's social network contacts has on the focal individual's innovation behavior. Social resources theory contends that it is the resources / attributes of one's social network contacts that facilitate an individual's ability to attain desired outcomes. This perspective differs from other network perspectives that put emphasis on the importance of the number of social network ties or the structure of the network as opposed to examining whether network contacts have the necessary resources or attributes to help the focal individual succeed (see Borgatti & Foster, 2003 for a review). Although social resources theory has been applied in studies focusing on job search and career success (cf. Lin, 1999; Seibert, Kraimer, & Liden, 2001), this particular social network theory has not been applied to employee innovation. I address this shortcoming in the literature by examining the effect of two attributes: professional experience and creative ability. The sample for this second study consists of employees from a product development organization. I find that individuals whose social network contacts are, on average, more

experienced and more creative tend to engage in higher levels of innovative behavior. I also examine the moderating role of network structure in this study, and again find a moderation effect for structural holes. Specifically, I find that the relationship between the attributes of one's network contacts and innovative behavior is stronger for those individuals with fewer structural holes. This study therefore demonstrates that it is important to examine the characteristics of one's social network contacts as potential facilitators of innovative behavior as opposed to solely focusing on network measures such as centrality.

Chapter Four extends work done on the effect of an individual difference—network brokerage orientation—and innovation. Brokerage orientation refers to a strategic behavioral orientation to manage one's social network contacts in a certain way. Obstfeld (2005) demonstrated that an orientation focused on introducing contacts to one another was positively related to innovation involvement. I examine two alternate brokerage orientations and develop a scale to empirically measure them: the Discrete Brokerage Orientation Scale (DBOS). The discrete brokerage orientation is a strategic behavioral orientation toward either maintaining separation among one's social network contacts (referred to as the *separation strategy*), or toward functioning as an intermediary between parties who cannot, or prefer not to, interact with each other (referred to as the *mediation strategy*). The DBOS therefore has two distinct sub-scales: separation and mediation. Using three separate samples, I find that the DBOS sub-scales have implications for certain roles (i.e., innovation support roles) employees can play in organizational innovation. This third study therefore introduces a new measure and

further our understanding of how various brokerage orientations affect the different roles played by employees in bringing about innovation in organizations.

The three studies reported in this dissertation each contribute uniquely to the organizational literature by applying various social network lenses to a critical phenomenon—innovation—which is necessary for organizations to continue to evolve and survive in competitive business environments. Much of the work on social networks and innovation has thus far examined how the structure of individuals' social networks affect their innovativeness. The studies discussed in the following chapters attempt to go beyond the traditional focus on social network structure by examining social networks from alternate perspectives. These studies' results provide three major conclusions. First, it is important to examine social network structure in conjunction with relevant individual characteristics, such as brokerage orientation or political skill, a conclusion that is in accord with the interactionist view of creativity and innovation (Woodman, Sawyer, & Griffin, 1993). Second, the resources and attributes of an individual's social network contacts play a role in facilitating innovative behavior above and beyond the number of ties that individual has or the pattern by which those ties are connected to one another. Indeed, not all network contacts are created equal and some are more valuable than others for employees attempting to engage in innovation. Finally, the way in which one manages their social network contacts has implications for innovation. While some approaches to managing contacts can facilitate the initiation of innovation, other approaches are related to supporting roles in innovative endeavors. This conclusion underlines the importance of thinking about social network brokerage as a dynamic,



continually evolving process that has important implications for innovation (Obstfeld, Borgatti, & Davis, forthcoming).

## **CHAPTER II: THE EFFECTS OF EMPLOYEE POLITICAL SKILL AND SOCIAL NETWORK STRUCTURE ON INNOVATION INITIATION AND CAREER OUTCOMES**

Organizations have been described as political arenas where parties compete with—and often engage in conflict with—one another over scarce resources and organizational status (Mintzberg, 1985). Positive performance appraisals from workplace superiors (a type of career success) are one such form of organizational status over which employees frequently compete. Given that the performance appraisal process in organizations has been characterized as political in nature (Longnecker, Sims, & Gioia, 1987), it is perhaps no surprise that political skill (i.e., the ability to effectively understand and influence others) has been positively linked to the career success of employees in organizations (Blickle, Schneider, Liu, & Ferris, 2011; Zinko, Ferris, Humphrey, Meyer, & Aime, 2012). Prior research on the effect of employee political skill on career success suggests that employees high in political skill are able to generate positive organizational reputations, and this acts as an explanatory mechanism for the relationship between political skill and career success (Blickle et al., 2011; Zinko et al., 2012). While it appears that positive employee reputation mediates the relationship between political skill and career success, we do not yet know the specific behaviors or competencies that account for such positive reputations. That is, it is not yet clear what actions politically skilled employees are taking to build the positive reputations that lead to their career success. Accordingly, scholars of organizational politics have called for additional research into the intermediate linkages between employee political skill and outcomes such as career success (Ferris, Treadway, Brouer, & Munyon, 2012).

In the study presented here, I propose that one's ability to successfully initiate organizational innovations represents a fundamental competency that acts as an intermediate link in the relationship between employee political skill and career success. Innovation is highly valued in organizations as a driver of competitive advantage and firm performance (e.g., Lengnick-Hall, 1992). Innovative employees are therefore likely to be rewarded for their contributions. Indeed, empirical evidence suggests that innovative behavior leads to positive career outcomes including promotions and salary increases (Seibert, Kraimer, & Crant, 2001). As with performance appraisal, organizational politics also plays a role in innovation. The pursuit of innovation has been characterized as a sociopolitical process (e.g., Frost & Egri, 1991; Van de Ven, 1986), and recent empirical research supports the idea that individuals need to do more than simply come up with a good idea to be a successful innovator. Innovation success requires that employees also effectively engage in social influence (Janssen, 2005) and build social network ties to political supporters (Baer, 2012) to successfully implement innovations within organizations. I therefore take a sociopolitical perspective on the innovation process to argue that employee political skill leads to the successful initiation of innovations, which in turn contributes to career success.

I also adopt the interactionist view of creativity and innovation (Woodman, Sawyer, & Griffin, 1993) to argue that the structure of the workplace relationships in which each employee is embedded moderates the relationship between employee political skill and successful innovation initiation. The interactionist model of creativity and innovation suggests that individual capabilities and contextual characteristics interact to affect creative outcomes in organizations. I therefore integrate the sociopolitical and

interactionist views of innovation to show that political skill (an individual characteristic) and social network structure (a contextual characteristic) combine interactively to predict innovation success, and ultimately career success. This study therefore contributes to the literature on individual innovation by showing that employee innovation mediates the relationship between political skill and career success. It also contributes to the literature on social networks by showing that the opportunities created by certain network positions are more fully realized when individuals also possess certain personal characteristics (e.g., political skill). My theoretical model is depicted in Figure 1 below.

## **THEORETICAL BACKGROUND AND HYPOTHESES**

### **The Sociopolitical Nature of Innovation**

Innovation has been defined as “any idea, practice, or material artifact perceived to be new by the relevant unit of adoption” (Zaltman, Duncan, & Holbek, 1973: 10). The innovation process is often characterized as having two fundamental steps: the first step being creative ideation (i.e., initiating a novel idea) and the second being implementation (i.e., successfully getting an organization or an organizational unit to adopt the idea). Thus, innovation involves both creative ability as well as the ability to implement creative ideas (West & Farr, 1992). In this study I capture the extent to which individuals engage in these two steps by focusing on *successful innovation initiation*. Successful innovation initiation entails generating a novel idea and successfully getting it adopted by the organization. Successful innovation initiation therefore necessitates not only generating an idea but also seeing that it is implemented within the organization. By their very nature, innovations precipitate organizational change (Knight, 1967). Employees who initiate and implement innovations cause organizational change and upset

established organizational systems and routines (Ford, 1996). Because innovation can upset organizational power dynamics (Kanter, 1988) and cause change to established structures and behavioral patterns (Nord & Tucker, 1987), virtually all innovations encounter resistance from certain individuals in the organizational population. Indeed, Mintzberg (1983) argues that major innovations are among the most likely causes of political infighting in organizations. As Frost and Egri (1991) argue, the changes brought about by innovation are likely to engage what Pinchot (1985: 189) called the “corporate immune system,” which is the organizational force that is summoned whenever change is imminent. The purpose of the organizational immune system is to fight against change and maintain the status quo. Pfeffer echoes a similar sentiment: “accomplishing innovation and change in organizations requires more than the ability to solve technical and analytic problems. Innovation almost invariably threatens the status quo, and consequently, innovation is an inherently political activity” (1992: 7).

Because innovation is typically resisted within organizations, initiating and implementing innovations requires a substantial amount of sociopolitical effort. Organizational innovators not only must conceive of novel ideas, they must also rally support for the ideas and apply a sufficient amount of influence to successfully implement them. The ability to influence others is therefore an integral component of the success of employee innovation efforts (Jannsen, 2005, Nutt, 1986). Similarly, the ability to build social relationships with others who will provide political support for innovation initiatives is critical to an employee’s innovation success (Baer, 2012; Kanter, 1983). Due to its political nature, innovative behavior has been linked to interpersonal conflict with

co-workers (Jannsen, 2003) as well as stress reactions among those initiating the innovations (Jannsen, 2004).

Although innovation has long been conceptualized as a sociopolitical process, there has been surprisingly little research on the influence of political skill on the success of individual innovation efforts within organizations. Although it is clear that interpersonal influence is an important element of employees' innovation success, not all influence approaches are created equally. The style one uses when engaging in social influence is a critical determinant of the success of an influence attempt (Ferris, Treadway, Perrewe, Brouer, Douglas, & Lux, 2007) as is the general "savvy" one has for choosing the appropriate influence approach for a given situation (Pfeffer, 1992). It remains an open question, though, as to whether the skill with which one engages in organizational politics affects innovation success. The recent development, however, of a construct that measures employee political skill allows for empirical investigation of this question.

### **Political Skill and Innovation**

Political skill is defined as "the ability to effectively understand others at work and to use such knowledge to influence others to act in ways that enhance one's personal and/or organizational objectives" (Ferris et al., 2005: 127). The political skill construct consists of four distinct sub-domains: social astuteness, interpersonal influence, networking ability, and apparent sincerity (Ferris et al., 2007). *Social astuteness* is related to how well individuals understand social interactions and to how accurately individuals can interpret their behavior as well as the behavior of others. *Interpersonal influence* is one's ability to elicit desired responses from others. *Networking ability* is concerned with

one's effectiveness at forging friendships as well as building coalitions and alliances with others. *Apparent sincerity* has to do with the degree to which an individual appears to be authentic, sincere, and genuine in his or her social interactions with others.

The psychological resources and social abilities associated with political skill are of great use in endeavors to both initiate and implement innovation. In the following paragraphs I argue that political skill equips individuals to effectively engage in the two stages of innovation, idea generation (i.e., initiation) and implementation. I propose that political skill indirectly facilitates idea generation by mitigating the effects of stress, and I propose that political skill facilitates implementation by improving the effectiveness of interpersonal influence efforts.

First, politically skilled individuals are more effective at dealing with high stress levels (cf. Ferris, Treadway, Brouer, & Munyon, 2012), which has been shown to inhibit creativity. Although there have been mixed findings regarding the effects of stress on creativity, recent meta-analytic work demonstrates that there is a negative relationship between uncontrollable situations and creativity (Byron, Khazanchi, Nazarian, 2010). Uncontrollable situations arise when individuals perceive that a behavioral response will not affect the outcome of a given situation (Dickerson & Kemeny, 2004). Creativity researchers have reasoned that the lack of perceived personal control generated in uncontrollable situations negatively impacts creativity by inhibiting intrinsic motivation (Oldham & Cummings, 1996). For example, if an employee feels that—no matter what she does—there is no possibility that her co-workers will adopt her innovative idea, this perception of uncontrollability is likely to inhibit her from attempting to generate innovative ideas.

A number of studies have shown, however, that political skill is an effective ameliorator of stress. Perrewe and colleagues have found that political skill moderates the relationship between role conflict and job stress outcomes (Perrewe, Zellars, Ferris, Rossi, Kacmar, & Ralston, 2004) as well as the relationship between role overload and strain outcomes (Perrewe et al., 2005). The nature of the moderation in both cases was such that higher levels of political skill reduce the negative effects of job stressors. Research has also found that political skill moderates the relationship between job tension and job performance, with high levels of political skill reducing the negative performance effects of job tension (Hochwarter, Ferris, Gavin, Perrewe, Hall, & Frink, 2007). Political skill has also been found moderate the relationship between perceptions of politics and strain such that perceptions of politics increases strain for those low in political skill and decreases strain for those high in political skill (Brouer, Ferris, Hochwarter, Laird, Gilmore, 2006). Importantly, the reason for the moderating effects of political skill is often explained in terms of control. Political skill is thought to increase perceptions of interpersonal control in the workplace, which enables employees to react more constructively to stressful situations (Perrewe, et al., 2004, 2005). As Perrewe, Ferris, Frink, and Anthony (2000: 117) argue “Executives high in political skill are more confident about their ability to control images, interactions, and impressions at work; thus they are less likely to see their situation as stressful.”

Provided that political skill imbues employees with a greater sense of control over their interpersonal situations, and given that uncontrollable situations have been shown to consistently inhibit creative thought, it is logical to assume that political skill plays a role in facilitating creativity. Although political skill may not directly enhance the creative



abilities of individuals, it—at the very least—guards against the debilitating effects of stress, which individuals engaged in innovation pursuits often encounter, especially in environments with low levels of organizational justice (Janssen, 2004). There is therefore indirect evidence to support the notion that political skill plays a positive role in facilitating creative ideation, which is the first step in the journey toward successfully initiating an innovation.

Second, politically skilled employees are more effective at interpersonal influence, which is a crucial skill for the second step in the innovation process—implementation. Several studies have found that political skill enhances the effectiveness of influence tactics in the workplace. For example, in one study the ingratiating behavior of employees with low levels of political skill was perceived by supervisors to be more manipulative than ingratiating behavior displayed by employees with high levels of political skill (Treadway, Ferris, Duke, Adams, & Thatcher, 2007). Harris, Kacmar, Zivnuska, and Shaw (2007) found that political skill moderated the relationship between five different impression management tactics and supervisor-rated performance, such that those high in political skill were rated more positively when employing each tactic. Similarly, employees employing the influence tactic of rationality were evaluated more favorably by supervisors when they had high levels of political skill (Kolodinsky, Treadway, and Ferris, 2007). These three studies together suggest that individuals with high levels of political skill are more effective in their interpersonal influence attempts than are individuals with low levels of political skill. It appears that politically skilled individuals are skilled at choosing the proper influence tactic for a given situation and then effectively executing the tactic so as to maximize its effect (Ferris et al., 2012). The

probability that an individual will be able to successfully implement an innovative initiative is highly dependent on the individual's ability to successfully exercise influence tactics (Baer, 2012; Frost & Egri, 1991; Janssen, 2005; Nutt, 1986). Empirical findings suggest that employees with high levels of political skill will be highly effective in exercising a wide range of influence tactics. Moreover, politically skilled employees are socially astute, which suggests they will exercise good judgment as they build support for their innovation. Knowing who to approach and who not to approach at the early stages of an innovation initiative is a key determinant of whether or not an initiator will be able to rally support for his or her innovation (Brass & Krackhardt, 2012). It therefore follows that political skill will be an important factor in the implementation of innovations.

In summary, political skill will contribute to the successful initiation of innovations because it plays a role in the two critical steps required for successful innovation—creative idea generation and idea implementation. First, political skill plays an indirect role in facilitating conditions for idea generation because it mitigates the stress caused by perceptions of uncontrollability, which is a consistent inhibitor of creative thought (Byron et al., 2010). Second, political skill plays an important role in facilitating innovation implementation by enhancing the effectiveness of the influence efforts that are necessary for effective implementation. Taken together, these arguments suggest the following:

*Hypothesis 1 – Employee political skill will be positively related to the successful initiation of innovations.*

## **Innovation and Career Success**

Ford's (1996) theory of individual creative action posits that, for employees to be motivated to engage in innovative, non-routine behavior, they must believe that they will be rewarded for their creative actions. Empirical findings confirm that expected positive performance outcomes motivate employees' innovative behavior (Yuan & Woodman, 2010). Effectively rewarding employees for their contributions to firm innovations is a crucial component of effective performance management systems, especially for firms that consider the pursuit of innovation to be a primary goal (Ligon, Graham, Edwards, Osburn, & Hunter, 2012), such as product development organizations or organizations in the technology sector. Thus—provided that the pursuit of innovation holds importance for a firm, and assuming the firm's performance evaluation system isn't ineffectual—one would expect the relationship between employee innovation success and employee career success to be not only positive, but quite strong.

Although theoretical models of employee innovation (e.g., Rank, Pace, & Frese, 2004) include career success as an ultimate outcome, scholars have noted that the relationship between employee creativity / innovation and employee career success is rarely examined empirically (Shalley, Zhou, & Oldham, 2004). The sociopolitical view of innovation assumes a strong relationship between innovative success and career success. It is the strong relationship between these two variables that creates the high stakes that drive the political behaviors surrounding the innovation process. Indeed, the pursuit to successfully devise and implement innovation would not be the cutthroat political endeavor that it is if one's career success didn't depend upon successful innovation. Recent empirical work provides some indication that the relationship between employee innovation and career success operates in this way. For example, Seibert,

Kraimer, and Crant (2001) find that employees who engage in innovative behavior get promoted more often and receive more monetary rewards. Similarly, Janssen and Van Yperen (2004) find a positive and significant correlation between employee innovation performance and task performance. Given that innovation is a crucial activity for the viability of most organizations (Cefis & Marsili, 2005; 2006), I expect those who are successfully able to initiate innovations for the firm to be rewarded, and therefore to enjoy higher levels of career success. Thus:

*Hypothesis 2 – The successful initiation of innovations will be positively related to career success.*

*Hypothesis 3 – The successful initiation of innovations will mediate the positive relationship between employee political skill and career success.*

### **The Moderating Role of Structural Holes**

Innovation is a relational process that involves social coordination (cf. Garud, Tuertscher, Van de Ven, 2013), and social structure can play an important role in whether or not innovation pursuits are successful. Scholars have argued that the structure of social networks in organizations has implications for 1) the number of new ideas individual employees are able to generate (Burt, 2004), 2) for the ease with which innovations are implemented (Obstfeld, 2005), and 3) for the success with which innovations are diffused (Krackhardt, 1997). Burt's (1992) structural hole construct has gained traction as one of the most important social structure concepts to consider when examining the social networks of individual actors.

A structural hole exists in an individual's network when a focal individual (*ego*, in social network terminology) is connected to two individuals (known as *ego's alters*) who are themselves not connected to one another. Being connected to others who are themselves not connected to one another (i.e., having a social network rich in structural holes) confers benefits on *ego*. Burt (1992) argues that the primary benefits gained from structural holes are *unique information* and *control*. *Unique information benefits* accrue to the individual with a network rich in structural holes because this person has ties to "non-redundant" alters. Having ties to non-redundant alters connects *ego* with disconnected and potentially diverse social worlds. These non-redundant ties provide *ego* with access to diverse information and opportunities from disparate regions of a social network. In contrast, an individual with few structural holes is only subjected to the repetitious information that is re-circulated within his or her closed social circle. Structural holes also provide *control benefits* by giving *ego* the opportunity to broker between disconnected alters. The disconnection between alters provides *ego* with a source of power. Individuals with networks rich in structural holes often find themselves in the advantageous position of controlling resources that others do not have access to. For example, an individual who spans a structural hole between the design function and the engineering function of a firm is in a position to charge rents for the transfer of information between these two separated groups.

Structural holes therefore appear to provide the raw materials necessary for both creativity and interpersonal influence. Structural holes on their own, however, may not be enough to enable innovation. Empirical findings on the relationship between structural holes and innovation outcomes have been mixed. Burt (2004) found that employees with

many structural holes were more likely to generate ideas that top managers considered valuable. Research has similarly found that inventors possessing many structural holes have a higher tendency to creatively combine novel knowledge elements to generate patents (Fleming, Mingo, & Chen, 2007). In contrast to these findings, however, other research has found that structural holes negatively affect innovation outcomes. Obstfeld (2005) found that structural holes were negatively related to an employee's involvement in successfully implemented innovations, presumably because structural holes make it difficult for employees to mobilize a cohesive group of supporters to assist with implementation. Similarly, Fleming et al. (2007) found that—although they facilitated the generation of unique patents—structural holes inhibited the future use of those patents. Others have found that being embedded in relationships where both parties have ties to common third parties (i.e., “Simmelian ties”) facilitates the effective transfer of nonredundant knowledge and leads to innovation (Tortoriello & Krackhardt, 2010). These mixed findings have led innovation researchers to call for a more nuanced approach that incorporates network structure with the individual attributes and capabilities of employees (Fleming et al., 2007). The notion that structural holes should be examined in the context of individual attributes is also in line with models that express the value of social structure as being contingent upon human capital (e.g., Burt, 1997).

I argue that political skill is an individual capability that is relevant to examine in conjunction with social capital (i.e., structural holes). This is so for two reasons. First, politically skilled individuals have high levels of social astuteness, which is likely to make them keenly aware of the informational benefits of the structural holes in their network. This idea is supported by recent research that suggests employees high in

political skill are astute observers of their social environment (Treadway, Shaughnessy, Breland, Yang, & Reeves, 2013). Second, their competence at networking with people—coupled with their interpersonal influence abilities—makes it likely that politically skilled employees will make effective use of the control aspects of structural holes as well.

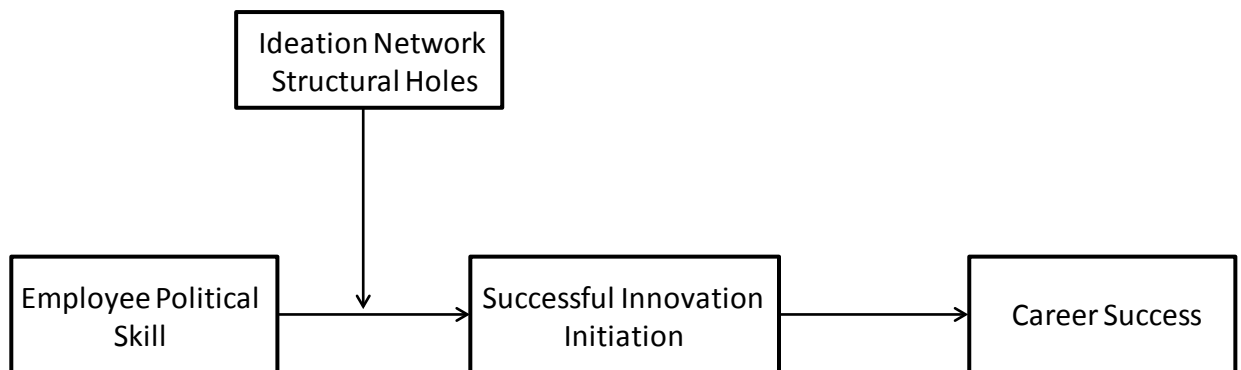
The interactionist perspective on creativity and innovation suggests that creative outcomes are a function of contextual factors and individual characteristics (e.g., Woodman & Schoenfeldt, 1990; Woodman, Sawyer, & Griffin, 1993; Zhou et al., 2009). Based upon theory and empirical findings, political skill is a relevant individual characteristic to consider as an antecedent to innovation initiation and network structure is a relevant contextual factor. Following the interactionist model of creativity, I expect these two factors to multiplicatively affect innovation initiation. Thus, while they may not be predictive of innovation on their own, structural holes combine interactively with political skill such that structural holes provide greater value to those with high levels of political skill.

A final question to address when considering the effects of social network variables such as structural holes is what type of network tie to examine. The type of network relationship one chooses has implications for the types of “flows” one expects in the network (Borgatti & Halgin, 2011). For example, a common resource to flow through friendship relationships would be social support. Innovation is often driven by the social ties that lead to unique knowledge and ideas (e.g., Hargadon, 2003; Rodan & Galunic, 2004), therefore the ties most relevant to innovation should transmit ideas and foster creative collaboration. I refer to the network composed of such ties as the *ideation network*. Structural holes in the ideation network will provide employees with

nonredundant information that is highly relevant to sparking novel ideas. Moreover, structural holes in this network provide employees with the potential to broker information, which can be a source of influence (Burt, 1997; Hargadon & Sutton, 1997), especially in the hands of a politically skilled employee. These arguments therefore suggest that structural holes in the ideation network will moderate the relationship between political skill and innovation initiation. Stated formally:

*Hypothesis 4 – Ideation network structural holes will moderate the relationship between employee political skill and the successful initiation of innovations such that the relationship will be stronger for those with more structural holes.*

**Figure 1: Theoretical Model**



## **METHOD**

### **Sample**

The sample consists of 114 employees working within one division of a large organization in the semi-conductor industry headquartered in the Western United States. All respondents were responsible for generating technological innovations in support of the design and manufacture of computer microchips. The average age of respondents was 42.2 (SD = 8.4 years) and the average length of tenure was 13.3 years (SD = 6.3). The



majority of respondents were male (80%). Twenty six percent (26%) of the respondents were in a managerial position and nearly 24% had a PhD degree.

### **Procedure**

The study was conducted in two phases. In Phase 1 I conducted a series of 22 semi-structured interviews with division managers and senior division engineers. The purpose of these interviews was to exhaustively catalog all of the significant changes to product or process that had occurred within the division during the preceding 3 years. From these interviews I identified a total of 146 innovations, each of which was either a newly introduced product/process or a significantly changed or updated version of a previously existing product/process. Each department manager reviewed the innovations associated with his or her unit to ensure completeness and to verify that each item warranted inclusion on the list. The unit managers reduced the list to 140 innovations.

In Phase 2, an online survey was sent to 523 employees within the division via e-mail. Department heads within the division sent e-mails to the relevant subordinates in each area. Along with a link to the survey, each e-mail contained assurances that all employee responses would remain anonymous. Based on guidance from senior management at the company, the survey was only sent to employees that met a certain grade minimum within the organization. Discussions with division managers revealed that only employees at or beyond the established grade minimum would have more than trivial involvement in innovation initiatives within the organization. Usable surveys were returned by 114 employees for a 22% response rate. No significant differences between respondents and non-respondents were found on the basis of gender ( $\chi^2 = .81, p = .37$ ) or

career success ( $\chi^2 = .72, p = .40$ ). Those in managerial positions, however, were found to be more likely to respond ( $\chi^2 = 4.41, p < .05$ ).

The survey itself consisted of two sections. In the first section, employees rated their level of involvement in each of the 140 innovation projects that occurred within the division over the preceding 3 years. The second part of the survey gathered data used for my independent and control variables and elicited each employee's social network. I gathered social network data via an *egocentric* research design, which exclusively focuses on the direct social network ties of each survey respondent (Marsden, 1990). Egocentric research designs consist of two parts: 1) a *name generator*, which is designed to help respondents generate a list of social network contacts; 2) a *name interpreter*, which asks the respondent to report on the nature of his/her relationship to each named contact as well as on the relationships that exist among contacts. Thus, the social network portion of the survey consisted of several sub-sections.

Following prior egocentric network studies conducted within organizations (e.g., Podolny & Baron, 1997), I used multiple question prompts in the name generator portion of the survey. The questions are listed in Appendix 1 and generally conform to those used in prior research (e.g., Burt, 1992; Podolny & Baron, 1997). Respondents could list up to seven contacts in response to each name generator question, meaning that a maximum of 28 total contacts could have been listed<sup>1</sup>. Respondents were permitted to list individuals multiple times in response to the four name generator questions. The maximum number of contacts listed was 13 ( $\bar{x} = 5.49, SD = 2.31$ ). In the name interpreter sub-section, respondents were asked about the specific nature of their relationship to each of the

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<sup>1</sup> Respondents were told that they could use initials or "nicknames" in lieu of writing the full name of each of their contacts. This option was provided to allay concerns about confidentiality among respondents.

contacts they listed (e.g., they indicated whether or not they brainstormed and problem solved with each contact), and they were asked about the strength of each relationship. Respondents were asked to characterize the strength of each relationship as “especially close,” “close,” “less than close,” or “distant.” Based upon this assessment, each tie was weighted in equal increments between 0 and 1 (e.g., “distant” = 0, “less than close” = .33, “close” = .67, “especially close” = 1). In the final part of this sub-section, respondents were asked about the nature of the relationship between each of their contacts.

Respondents were provided with the following instructions:

[In this section] we ask you to describe the nature of the ties between the different people in your network. Some people may have no relation at all, some may have a weak tie and some might be quite close or strong. Please describe the nature of these relationships.

Respondents then rated the nature of each pairwise relationship by characterizing it in one of the following ways: “unacquainted,” “distant,” “less than close,” “close,” or “especially close.” These ratings were used to generate numerical weightings for each alter-to-alter tie. Each tie was given a numerical strength ranging between 0 and 1 (“unacquainted” = 0, “distant” = .25, “less than close” = .50, “close” = .75, “especially close” = 1). The final portion of this sub-section therefore provided information on the *structure* of each respondent’s immediate social network by indicating the way in which all of ego’s alters were (or were not) connected to each other.

The firm’s Human Resources Department provided archival data pertaining to employees in the department. These data included information on each employee’s rank, gender, functional role, and the department in which they worked. Also included were data on the performance of each employee. This performance data was used for the dependent variable (see below).

## Measures

*Career Success.* This measure was obtained from archival performance evaluation data provided by the Human Resources Department. Performance evaluations were conducted on an annual basis by employees' direct managers. Employees were rated on a 5-point scale (the categories, in ascending order, are: *improvement required*, *below expectations*, *successful*, *exceeds expectations*, and *outstanding*). The organization bases evaluations on a management-by-objectives model and provides managers with training on how to properly conduct employee evaluations. An interview with the division's human resources manager confirmed that evaluations closely reflect the results produced by employees. Moreover, the strength of an employee's evaluations is the single greatest predictor of outcomes including promotions and pay increases. Career success was measured as a binary outcome in this study. I operationalized career success in the following way: an employee was considered to have career success if he/she received an *exceeds expectations* or *outstanding* evaluation at least twice during the previous three evaluation periods. This is a metric tracked by the human resources department within the organization. Internally, the company refers to these individuals as "repeat high performers." Employees who obtain "exceeds expectations" or "outstanding" evaluations over at least two of the previous three evaluation periods (i.e., individuals classified by the organization as repeat high performers) demonstrate a pattern of excellence that is likely to be rewarded by the organization. As seen in Table 1, 28.1% of the employees in the sample achieved career success. The three evaluation periods considered correspond to the three years during which the 140 innovations occurred.

*Political Skill.* I assessed political skill using the 18-item Political Skill Inventory (PSI, Ferris et al., 2005). The political skill construct comprises four dimensions: interpersonal influence, networking ability, social astuteness, and apparent sincerity (Ferris et al., 2005; 2007). The factor structure of the PSI has been replicated over a number of studies, with data indicating that the scale also results in a single higher-order factor solution (cf. Ferris et al., 2012; Ferris, Blickle, Schneider, Kramer, Zettler, Solga, et al., 2008). The PSI has been widely used in organizational research and has been shown to be robust against the effects of social desirability bias (Ferris et al., 2012). Example items include: “I have good intuition or savvy about how to present myself to others,” “I am able to communicate easily and effectively with others,” and “I have developed a large network of colleagues and associates at work who I can call on for support when I really need to get things done.” Respondents answered on a Likert-type scale ranging from 1 (strongly disagree) to 7 (strongly agree). The coefficient alpha for this scale was .93.

*Successful Innovation Initiation.* Following prior innovation studies (e.g., Ibarra, 1993; Obstfeld, 2005), I measured innovation involvement by asking respondents to rate the role they played in each of the division’s 140 innovations. Respondents reported their involvement in each innovation based upon 4 categories. The question stem and category choices were worded in the following way:

On the next page you will find a list of innovations that occurred during the last three years. Please look at the list and indicate the extent of your involvement in each innovation. Choose "initiator" if you, along with or in conjunction with others, were the initiator of the innovation--that is, if its introduction and use was in large portion your idea. This is the option to choose if the innovation would not have happened without you. (It is expected that initiators will be very rare). Choose "major role" if you were not the initiator but played a major role in the development of the innovation as a whole. This is the option to choose if you played an important role in shaping the innovation--it would

not exist in its present form without your contribution. Choose "minor role" if you were associated with the development of the innovation in a more limited capacity, for example, providing advice to the initiator on specific aspects of the innovation. This is the option to choose if you played a minor role in bringing the innovation to the organization. Choose "Don't recognize / Not involved" if it is an innovation you know nothing about and/or were not involved with at all. This will be the default answer for each innovation.

I summed the number of times each respondent indicated that they acted as an “initiator” for the listed innovations to measure successful innovation initiation. Each of the innovations on the survey was implemented in the organization, so playing an initiator role in any one of the listed innovations equates to successful innovation initiation. On average, respondents reported initiating .62 ( $SD = 1.16$ ) innovations. Self-report measures of creativity and innovation are an established and accepted approach to assessing employee innovation outcomes, with a number of recent studies making use of this approach (Axtell, Holman, Unsworth, Wall, Waterson, & Harrington, 2000; Carmeli & Schaubroeck, 2007; Janssen, 2004; Ng, Feldman, & Lam, 2010; Shalley, Gilson, & Blum, 2009).

*Ideation Network Structural Holes.* Each respondent indicated who was in their ideation network by indicating which of their contacts is “Somebody to brainstorm or problem solve with.” The average number of ties in respondents’ ideation networks was 4.01 ( $SD = 2.56$ ). Structural holes in the ideation network were calculated using Burt’s (1992) measure of constraint. The formula for constraint is:

$$c_i = \sum_j \left( P_{ij} + \sum_q P_{iq} P_{qj} \right)^2, \quad q \neq i, j.$$

Where  $P_{ij}$  is the proportion of focal actor  $i$ 's network time and energy directly invested in alter  $j$ , and  $\sum_q P_{iq} P_{qj}$  is the sum of  $i$ 's indirect investment in  $j$  via all alters  $q$ . Thus, a high level of constraint indicates that actor  $i$  is strongly tied to alters who are themselves

strongly tied to each other. Constraint therefore measures a focal actor's *lack* of structural holes. Constraint was calculated using E-Net software for the analysis of ego-network data, Version 0.41 (Borgatti, 2006). I subtracted each respondent's constraint score from 1 to derive their number of structural holes in the ideation network. The values of this variable range from 0 to 1 with larger numbers indicating the presence of more structural holes in a focal actor's ideation network.

*Controls.* I controlled for a number of demographic variables that have been shown to affect innovation and / or performance outcomes. The following variables were entered into all regression models as covariates: *rank* (0 = non-manager, 1 = manager), *gender* (0 = female, 1 = male), *education* (0 = non-PhD, 1 = PhD), *functional role* (0 = non-technical role, 1 = technical role), *department* (dummy variables created for each of the 5 departments within the division), *age* (in years), and *tenure* (in years). I also controlled for each employee's level of *intrinsic motivation* as this has been shown to impact creativity and innovation outcomes (Amabile, 1996; Grant & Berry, 2011) and job performance (e.g., Zapata-Phelan, Colquitt, Scott, & Livingston, 2009). Intrinsic motivation was measured with four items adapted by Grant and Berry (2011). Respondents were asked to rate how much they agreed with the following reasons for why they do their work: "because I enjoy the work itself," "because I find the work engaging," "because it's fun," and "because I enjoy it." Respondents answered on a Likert-type scale ranging from 1 (strongly disagree) to 7 (strongly agree). The coefficient alpha for this scale was .91. In addition, I controlled for the amount of change that respondents reported experiencing in their social network during the preceding three years. This was done to address the fact that respondents retrospectively reported on

innovation involvement up to three years in the past. Controlling for *network change* mitigates the concern that network structure may not have remained stable during the time period in which the innovations occurred. The scale was developed specifically for this study and consists of five items that address change to both the size and structure of respondents' social networks. Example questions include: "the relationships among the work associates around me at [Company X] have changed substantially in the last three years," and "my number of work contacts (i.e., the number of people with whom I formally work and/or with whom I informally interact) is relatively stable over the past three years" (reverse-coded). Respondents answered on a Likert-type scale ranging from 1 (strongly disagree) to 7 (strongly agree). The coefficient alpha for this scale was .83. Data on rank, gender, functional role, department, and tenure was obtained through archival records provided by the firm's Human Resources Department. Education level, age, intrinsic motivation, and network change was assessed via self-reports obtained from the online survey.

## **Analysis**

I used negative binomial regression analysis to test Hypotheses 1 and 4, as the dependent variable in these hypotheses is the successful initiation of innovation. Negative binomial regression is appropriate for modeling count outcomes of a relatively rare occurrence, such as instances of successful innovation initiation (e.g., Tortoriello & Krackhardt, 2010). I used negative binomial regression over Poisson regression due to evidence of over-dispersion in my data (Cohen, Cohen, West, & Aiken, 2003). The dependent variable for Hypotheses 2 and 3 was employee career success—a binary outcome. I therefore used binary logistic regression to test these two hypotheses. Listwise



deletion due to missing data reduced the final number of observations to 103. To minimize the effects of multicollinearity and aid in model interpretation, I centered predictor variables prior to calculating the cross-products for the interaction terms (Aiken & West, 1991).

## RESULTS

**Table 1: Summary Statistics**

Variable	n	Percentage	Mean	Std. Deviation
Rank (Percent Manager)	111	26.3%		
Gender (Percent Male)	111	79.8%		
Education (Percent PhD)	113	23.7%		
Functional Role (Percent Technical)	114	72.8%		
Department				
Department 1	50	43.9%		
Department 2	15	13.2%		
Department 3	20	17.5%		
Department 4	15	13.2%		
Department 5	11	9.6%		
Career Success				
High Performers	32	28.1%		
Non High Performers	82	71.9%		
Age (Years)	108		42.21	8.41
Tenure (Years)	111		13.27	6.39
Network Change	113		4.15	1.38
Intrinsic Motivation	110		5.54	1.09
Ideation Network Structural Holes	114		0.43	0.25
Employee Political Skill	110		5.06	0.90
Number Innovations Successfully Initiated	114		0.62	1.16

Table 1 contains summary statistics and Table 2 contains the correlation coefficients for the variables in this study. Table 3 contains the results of the negative binomial regression analyses with successful innovation initiation as the dependent variable, and Table 4 contains results of the logistic regression analyses with career success as the dependent variable.

**Table 2: Bivariate Correlations**

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Rank (1 = manager)	-												
2. Gender (1 = male)	0.07	-											
3. Education (1 = PhD)	0.00	0.15	-										
4. Functional Role (1 = Technical Role)	-0.57**	0.07	0.07	-									
5. Department	-0.13	0.23*	0.18	0.18	-								
6. Age	0.05	0.06	0.07	-0.22*	-0.20*	-							
7. Tenure	0.15	0.07	-0.15	-0.28**	-0.26**	0.68**	-						
8. Network Change	0.24*	0.15	0.09	-0.13	0.04	-0.03	0.03	-					
9. Intrinsic Motivation	0.20*	-0.02	0.08	-0.01	-0.10	0.10	0.17	0.18	-				
10. Ideation Network Structural Holes	0.03	0.11	-0.12	0.05	-0.02	-0.08	0.03	-0.10	-0.03	-			
11. Employee Political Skill	0.36**	-0.06	-0.09	-0.35**	-0.17	0.20*	0.23*	0.28**	0.36**	0.20*	-		
12. Successful Innovation Initiation	0.16	0.21*	-0.02	-0.01	0.39	-0.16	-0.04	0.09	0.02	0.27**	0.31**	-	
13. Career Success	0.24*	0.40	-0.03	-0.28**	0.04	-0.18	-0.13	0.01	-0.01	0.00	0.23*	0.22*	-

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

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

Hypothesis 1 states that employee political skill will be positively related to the successful innovation initiation. Model 2 of Table 3 shows that there is a positive and significant relationship between employee political skill and successful innovation initiation ( $\beta = .64, \chi^2 = 11.05, p < .01$ ), providing support for Hypothesis 1. Hypothesis 2 posits that successful innovation initiation will be positively related to career success. This hypothesis is tested in Model 3 of Table 4. There is a positive relationship between successful innovation initiation and career success ( $\beta = 1.10, \chi^2 = 10.68, p < .01$ ), therefore providing support for Hypothesis 2. Hypothesis 3 states that successful innovation initiation will mediate the positive relationship between employee political skill and career success. I tested this mediation effect using the causal steps procedure outlined by Baron and Kenny (1986). The results of this stepwise procedure are as follows: first, there is a significant relationship between employee political skill and career success ( $\beta = .85, \chi^2 = 6.69, p < .05$ ; See Model 2 of Table 4); second as demonstrated in Hypothesis 2, successful innovation initiation is significantly related to career success ( $\beta = 1.10, \chi^2 = 10.68, p < .01$ ); third, successful innovation initiation is significantly related to career success while controlling for employee political skill ( $\beta = .93, \chi^2 = 6.71, p < .05$ ; See Model 4 of Table 4); fourth, when successful innovation initiation was added to the model along with employee political skill to predict career success (Model 4 of Table 4), employee political skill was no longer statistically significant ( $\beta = .66, \chi^2 = 3.69, p > .05$ ). This pattern of results suggests that successful innovation initiation completely mediates the relationship between employee political skill and career success. Thus, Hypothesis 3 is supported. Hypothesis 4 states that ideation network structural holes will moderate the relationship between employee

political skill and the successful initiation of innovations such that the relationship will be stronger for those with many structural holes. The test for this hypothesis is found in Model 4 of Table 3. A positive and significant coefficient for the product term ( $\beta = .38$ ,  $\chi^2 = 5.73$ ,  $p < .05$ ) indicates support for hypothesis 4. A plot of regression lines with values of the moderator set one standard deviation below the mean and one standard deviation above the mean is found in Figure 2. Inspection of the plot confirms that the nature of the interaction is as hypothesized. Political skill has a stronger positive effect for employees with many structural holes.

**Table 3: Results of Negative Binomial Regression Analysis**

Variable	Successful Innovation Initiation							
	Model 1		Model 2		Model 3		Model 4	
Control Variables								
Rank (Manager)	0.57	(0.39)	0.39	(0.41)	0.38	(0.40)	0.32	(0.41)
Gender (Male)	1.98*	(0.89)	2.00**	(0.75)	1.97**	(0.75)	1.96**	(0.72)
Education (PhD)	-0.10	(0.48)	0.28	(0.44)	0.28	(0.45)	0.10	(0.44)
Functional Role (Technical Role)	0.06	(0.40)	0.40	(0.46)	0.37	(0.46)	0.46	(0.46)
Department 2†	1.00	(0.52)	1.10*	(0.48)	1.12*	(0.48)	1.11*	(0.46)
Department 3	-0.90	(0.48)	-0.55	(0.47)	-0.51	(0.45)	-0.76	(0.50)
Department 4	0.66	(0.54)	0.60	(0.47)	0.65	(0.48)	0.64	(0.50)
Department 5	-1.05	(0.68)	-1.12	(0.64)	-1.10	(0.63)	-1.04	(0.60)
Age	-0.69**	(0.22)	-0.79**	(0.23)	-0.78**	(0.23)	-0.66**	(0.21)
Tenure	0.11	(0.23)	0.07	(0.22)	0.07	(0.22)	0.01	(0.23)
Network Change	-0.24	(0.17)	-0.30	(0.16)	-0.29	(0.16)	-0.25	(0.15)
Intrinsic motivation	0.18	(0.18)	-0.05	(0.21)	-0.05	(0.21)	-0.09	(0.21)
Independent Variable								
Employee Political Skill			0.64**	(0.19)	0.62**	(0.19)	0.65**	(0.20)
Moderator Variable								
Ideation Network Structural Holes					0.09	(0.16)	0.18	(0.15)
Interaction								
Political Skill X Ideation NW Structural Holes							0.38*	(0.16)
Intercept								
	-2.74**	(0.79)	-3.19**	(0.19)	-3.16**	(0.73)	-3.23**	(0.72)
Log Likelihood								
	-92.46		-89.08		-88.99		-87.05	

Note . Standard errors in parentheses,  $n = 103$ . † Department 1 = contrast group.

\*  $p < .05$  (2-tailed).

\*\*  $p < .01$  (2-tailed).

**Table 4: Results of Binary Logistic Regression Analysis**

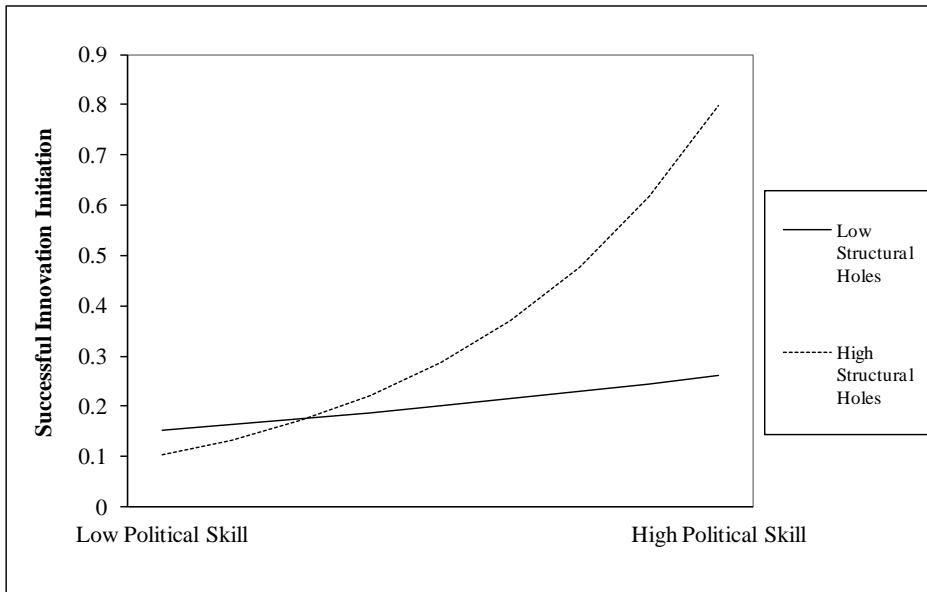
Variable	Career Success									
	Model 1		Model 2		Model 3		Model 4		Model 5	
Control Variables										
Rank (Manager)	0.75	(0.63)	0.47	(0.64)	0.56	(0.69)	0.40	(0.68)	0.14	(0.71)
Gender (Male)	0.18	(0.72)	0.35	(0.65)	-0.38	(0.75)	-0.16	(0.73)	0.05	(0.73)
Education (PhD)	-0.12	(0.80)	0.12	(0.84)	-0.03	(0.74)	0.18	(0.75)	-0.42	(0.89)
Functional Role (Technical Role)	-1.63*	(0.65)	-1.40*	(0.67)	-1.88*	(0.75)	-1.67*	(0.75)	-1.91**	(0.73)
Department 2†	1.73*	(0.85)	2.04*	(0.83)	1.45	(0.86)	1.77*	(0.90)	1.64	(0.87)
Department 3	0.35	(0.68)	0.82	(0.70)	0.73	(0.68)	1.00	(0.68)	0.81	(0.70)
Department 4	0.56	(1.09)	0.61	(1.10)	0.07	(1.02)	0.18	(1.00)	0.35	(1.08)
Department 5	0.20	(0.76)	0.13	(0.86)	0.79	(0.88)	0.67	(0.95)	0.79	(1.07)
Age	-0.60	(0.36)	-0.78*	(0.36)	-0.42	(0.39)	-0.69	(0.38)	-0.63	(0.38)
Tenure	-0.57	(0.34)	-0.61	(0.35)	-0.67	(0.37)	-0.71	(0.39)	-0.69	(0.40)
Network Change	-0.08	(0.26)	-0.30	(0.28)	0.02	(0.29)	-0.15	(0.31)	-0.17	(0.33)
Intrinsic motivation	0.19	(0.24)	0.06	(0.28)	0.15	(0.24)	0.04	(0.27)	0.10	(0.26)
Independent Variable										
Employee Political Skill			0.85*	(0.33)			0.66	(0.34)	0.72	(0.38)
Mediator Variable										
Successful Innovation Initiation					1.10**	(0.34)	0.93*	(0.36)	1.31**	(0.40)
Interaction (Post Hoc Analysis)										
Political Skill X Successful Innovation Initiation									-0.77**	(0.28)
Intercept	-0.62	(0.90)	-1.08	(0.84)	0.06	(0.93)	-0.41	(0.90)	-0.13	(0.88)
Log Likelihood	-51.19		-47.89		-46.87		-45.15		-43.32	

Note. Standard errors in parentheses,  $n = 103$ . † Department 1 = contrast group.

\*  $p < .05$  (2-tailed).

\*\*  $p < .01$  (2-tailed).

**Figure 2: Interaction Plot of Political Skill and Structural Holes Predicting Successful Innovation Initiation**



### **Auxiliary Analyses**

The causal steps mediation procedure (Baron & Kenny, 1986) used to test Hypothesis 3 supports the notion that successful innovation initiation mediates the relationship between employee political skill and career success. This piecemeal causal steps approach, however, has been criticized by methodologists in recent years who note that it—among other things—lacks statistical power (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002). The use of bootstrapping methods to test indirect effects models (i.e., mediation models) has been suggested as a preferred alternative to the causal steps approach (Shrout & Bolger, 2002). Accordingly, I also tested Hypothesis 3 using a bootstrapping test outlined by Preacher and Hayes (2004). Bootstrap results based on 5000 resamples also support Hypothesis 3. This analysis indicates that there is a significant indirect effect of employee political skill on career success through successful innovation initiation (confidence interval = .02, .84;  $\alpha = .05$ ).

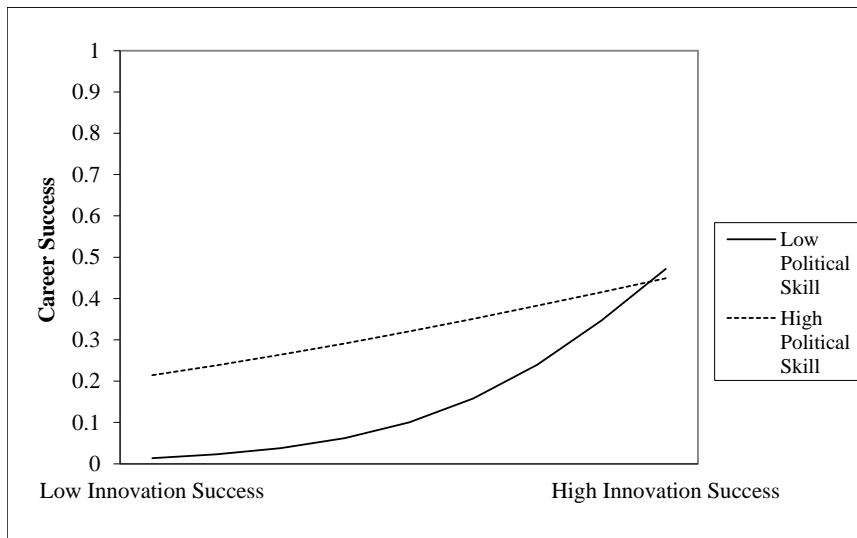
Hypotheses 3 and 4 together suggest that the mediated effect of employee political skill upon career success is moderated by structural holes in the ideation network. This is referred to as a moderated mediation model or as a conditional indirect effects model. The test for Hypothesis 4 above shows that structural holes moderate the relationship between political skill and successful innovation initiation. It does not, however, test whether the indirect effect of political skill upon career success is moderated by structural holes (cf. Edwards & Lambert, 2007). In order to adequately test the full moderated mediation model depicted in Figure 1, it is necessary to test for both the mediation (Hypothesis 3) and moderation (Hypothesis 4) effects in an integrated model that examines the indirect effect of employee political skill upon career success at

differing levels of the moderator. To do this, I used the bootstrapping approach to moderated mediation outlined by Preacher, Rucker, and Hayes (2007). Results based on 5000 resamples indicate that the indirect effect of employee political skill on career success significantly differs as a function of the level of the moderator. Specifically, the indirect effect was positive and significant at high levels of structural holes in the ideation network (.07,  $p < .05$ , +1 *SD*) but not significant at low levels (.01,  $p > .05$ , -1 *SD*). This suggests that the indirect effect of employee political skill on career success (through successful innovation initiation) is stronger with many structural holes compared to few structural holes. Overall, these results provide integrative support for the model in Figure 1.

### **Post-Hoc Analysis**

Because political skill has proven to be an effective moderating variable in a number of studies (cf. Ferris et al., 2012), I examined the moderating effect of political skill in a post-hoc analysis. I tested the moderating effect of employee political skill on the relationship between successful innovation initiation and career success. This analysis can be found in Model 5 of Table 4. The interaction term was negative and significant ( $\beta = -.77$ ,  $\chi^2 = 7.35$ ,  $p < .01$ ), suggesting that employee political skill does act as a moderator. The interaction plot (with values of political skill set at +/- one standard deviation) is found in Figure 3. The nature of the interaction is such that the relationship between innovation success and career success is stronger for those lower in political skill than for those higher in political skill. This analysis suggests that the career success of those high in political skill is not as adversely affected by a lack of innovation success as it is for individuals low in political skill.

**Figure 3: Interaction Plot of Innovation Success and Political Skill Predicting Career Success**



## **DISCUSSION**

The results of this study provide further support for a sociopolitical perspective on innovation. Although qualitative research has suggested that certain political tactics are an important part of the innovation process (Howell & Higgins, 1990; Kanter, 1983), and empirical findings show that political support relationships (Baer, 2012) and expectations of image improvement (Yuan & Woodman, 2010) help to enable innovative behavior, research has yet to examine whether the skill with which one engages in political behaviors impacts innovation outcomes. I find that political skill does have a strong positive effect on the success employees have in initiating and implementing innovations. Politically skilled individuals are more likely to build relationships to powerful others and are effective in their attempts at interpersonal persuasion. Such abilities enable them to be effective at innovation implementation, which requires the ability to exercise influence and sell influential others on innovative ideas (Dutton & Ashford, 1993; Howell &



Higgins, 1990). Moreover political skill imbues individuals with a sense of interpersonal control (Perrewe et al., 2004; 2005), which helps combat the deleterious effects that stress has on the ability to think creatively. In this way, political skill indirectly contributes to creative ideation, which is commonly conceptualized as an early step in the innovation process. The finding that political skill contributes to innovation success adds to the impressive volume of political skill research, which has shown it to also affect outcomes including leadership effectiveness (Douglas & Ammeter, 2004) and job performance (e.g., Ferris et al., 2005; Semadar, Robins, & Ferris, 2006).

This study also finds that successful innovation initiation completely mediates the relationship between political skill and career success. Prior research has found personal reputation to mediate the relationship between political skill and career success (e.g., Blickle et al., 2011). Reputation in organizations is thought to be comprised of an employee's personal characteristics and behavior, past accomplishments, and projected social image (Ferris, Blass, Douglas, Kolodinsky, & Treadway, 2003). The findings in this study extend the prior work on the relationship between political skill and career success by identifying a specific accomplishment—innovation success—that functions as a mediator. This suggests that, at least in certain contexts, innovation success is a critical component of an employee's organizational reputation. This finding therefore answers calls to shed additional light on the intermediate linkages between political skill and career success (Ferris et al., 2012).

Also in line with the sociopolitical view on innovation, I find that the number of structural holes an employee has in the ideation network moderates the relationship between employee political skill and innovation success such that the relationship is

stronger for those who have many structural holes. This suggests that those employees with higher levels of political skill are in a better position to take advantage of the innovation-enhancing information and control benefits provided by structural holes. This finding also supports an interactionist view of the innovation process (Woodman & Schoenfeldt, 1990; Woodman, Sawyer, & Griffin, 1993), which argues for the importance of jointly considering both the personal characteristics of an innovator as well as the context in which he or she operates. This finding extends prior social network research that has explored individual characteristics in conjunction with social network structure (e.g., Mehra, Kilduff, & Brass, 2001; Oh & Kilduff, 2008; Zhou et al., 2009). In addition, bootstrap tests of the conditional effects of this moderator also suggest that it affects the strength of the relationship between employee political skill and career success (which operates through innovation success), supporting the moderated mediation model presented in Figure 1.

The results of my post-hoc analysis indicate that employee political skill does moderate the relationship between innovation success and career success. The nature of the moderation effect was such that individuals with low levels of political skill benefited more from innovation success than did those with high levels of political skill. This finding is somewhat different from prior research (e.g., Treadway, Breland, Williams, Cho, Yang, & Ferris, in press; Treadway, Adams, Hanes, Perrewe, Magnusen, & Ferris, in press), which suggests that politically skilled individuals will capitalize on positive past accomplishments and earn a higher rate-of-return on them than those low in political skill. Instead, the effect I find suggests that politically skilled individuals are better at protecting themselves against the negative career effects that come from low amounts of

innovation success than are employees with low levels of political skill. Although different, these two sets of findings are not incompatible. Rather, they represent the two sides of impression management: *assertive* impression management and *defensive* impression management (Gardner & Martinko, 1988; Tetlock & Manstead, 1985). While the findings of Treadway and colleagues suggest that politically skilled employees excel at assertive impression management (i.e., using impression management to enhance one's image), the post-hoc finding of this study suggest that politically skilled employees also employ defensive impression management (i.e., impression management aimed at defending against possible image degradation) in certain circumstances. One avenue of future research will be to improve our understanding of the conditions under which politically skilled individuals use assertive versus defensive forms of impression management.

### **Limitations**

This study is not without its limitations, one of which is the fact that each of the 140 innovations gathered for this study are treated as being equal in scope and novelty; although this is an assumption that has been made in similarly-designed studies (e.g., Ibarra, 1993), future research should consider the scope / novelty of each innovation as an additional factor. Prior innovation research suggests that innovations of greater scope and / or novelty entail a great deal of change and will therefore be more difficult to successfully initiate and implement than more incremental innovations (Nord & Tucker, 1987; Zaltman et al., 1973). This suggests that the successful initiation of large and novel innovations might be a more politically charged endeavor, and future research might examine whether political skill is more useful with those types of innovations. An

additional limitation is the cross-sectional nature of this research. It is possible, for example, that career success leads to employees believing that they have high levels of political skill. A number of studies on political skill and career outcomes, however, indicate that this is not the causal direction (Blickle et al., 2011; Wei, Liu, Chen, & Wu, 2010).

### **Future Directions**

One potential direction for future research will be to examine political skill as an antecedent to social capital. As seen in the results of this study, political skill is positively related to having structural holes in one's social network. Politically skilled employees are likely to spend much of their time networking with others and assessing the social environment (Ferris et al., 2007). This would suggest that politically skilled employees are effective at building social networks that facilitate desired outcomes. This could, for example, mean that politically skilled individuals forge ties to others with important resources (e.g., power, status, intelligence, information, etc.). One promising avenue of future research will be to determine if politically skilled employees have access to more resources via their social ties than less politically skilled employees do.

An additional avenue of research will be to continue to explore how social network structure relates to innovation outcomes. Some scholars have concluded that structural holes are positively related to creative ideation while dense networks are more effective for the implementation of innovations (Obstfeld, 2005; Oldham & Baer, 2012). This conclusion, however, may not apply when specific social network ties are considered. For example, dense networks in general may facilitate the implementation of innovations, and a dense network of political support ties may facilitate innovation

implementation, but when we consider the network of individuals from whom an employee gets “strategic information,” a sparse network (i.e., a network rich in structural holes) may actually be more beneficial for facilitating innovation implementation. Future research on social networks and innovation should examine the differing effects that networks of various specific ties (e.g., ideation ties, political support ties, strategic information ties, social support ties, etc.) have on innovation outcomes.

Finally, future research should examine the implications of the relationship between political skill and innovation success. For example, does this relationship mean that politically skilled individuals have the ability to initiate and implement innovations that are inferior to the innovations of rival employees who lack political skill? Innovation scholars have suggested that the attributes of an innovation aren’t necessarily the most important determinants of whether or not it gets implemented; political maneuvering is instead the critical factor (Kanter, 1988). If this is the case, political skill may be facilitating the implementation of inferior innovations at the expense of superior innovations that lack politically skilled champions. Examining this issue will be an important line of future research.

## **Conclusion**

This study examines the relationship between political skill and both innovation success as well as career success. Drawing upon a socio-political perspective on innovation as well as an interactionist framework, the model tested here provides insight into how politically skilled individuals achieve career success. This research also contributes to an emerging stream of research that considers the joint effects of individual characteristics and social network context on organizational outcomes. Hopefully this

study spurs additional research into the sociopolitical nature of individual innovation within organizations.

### **CHAPTER III: A SOCIAL RESOURCES PERSPECTIVE ON EMPLOYEE INNOVATION: THE EFFECTS OF ALTER CREATIVITY AND PROFESSIONAL EXPERIENCE**

Innovation within organizations is not typically carried out in isolation. Individual innovation behavior—defined as an employee’s generation and implementation of new ideas within an organization (Van de Ven, 1986; West & Farr, 1992)—is often the result of social interaction with others rather than an individualistic endeavor. A growing number of studies have found that employees’ social networks have important ramifications for the achievement of innovation outcomes (e.g., Baer, 2012; Burt, 2004; Ibarra, 1993; Obstfeld, 2005; Perry-Smith, 2006). Social network researchers in management have traditionally taken one of two perspectives when examining how social networks lead to various outcomes (Borgatti & Foster, 2003). The first is a structural perspective, which examines how the pattern of ties in a network affect an outcome (e.g., does having a dense network or a sparse network lead to better knowledge transfer?). The second is a resource perspective, which concentrates on the attributes of the individuals in the network (e.g., does the level of education or experience of one’s social network contacts provide one with better access to knowledge?). Most of the work that examines how social networks affect employee innovation outcomes has taken a structural perspective, meaning that the independent variables examined pertain to the structure of the social ties connecting actors in the network without regard for the attributes of the actors themselves. This exclusive focus upon social network structure in studies of employee innovation is reflective of a more general tendency for social network studies in the field of management to focus predominately on the structural properties of

networks, to the detriment of understanding the importance of the resources made available by the nodes in the network (Adler & Kwon, 2002), as I will do here.

Social network studies of innovation that take a structural view have uncovered a number of important phenomena. For example, empirical work has shown that employees' network centrality is positively related to their creativity (Perry-Smith, 2006) and innovation involvement (Ibarra, 1993). Similarly, studies suggest that personal network sparseness facilitates idea generation (Burt, 2004; Fleming, Chen, & Mingo, 2007) while density facilitates innovation implementation (Obstfeldt, 2005). In contrast, we know very little about whether the attributes of one's social network contacts impact employee innovation outcomes. Are there certain attributes that individuals should seek out when forming social relationships in order to maximize their chances of being innovative, or is social network structure the only important relational factor for facilitating employee innovation? Social resources theory (Lin, 1982; 2001) suggests that the attributes of the nodes in a network do matter. As opposed to focusing on network structure, social resources theory asserts that the attributes of others to whom one has network ties are predictive of success because they are indicative of the types and amounts of resources a focal individual can potentially access. This theory therefore suggests that the attributes of individuals in a social network should not be ignored.

This study employs a social resources theory perspective to examine the effect that employees' social network contacts have on individual innovation behavior. That is, I examine whether the resources made available through the attributes of a focal employee's social network contacts are associated with that employee's ability to generate and implement novel ideas in the workplace. Specifically, I look at whether the



creative abilities and the professional experience of one's problem solving contacts are positively associated with employee innovation behavior. Moreover, I also incorporate the structuralist network perspective by examining social network structure as a moderator of the relationship between social resources and individual innovation behavior.

## **THEORETICAL BACKGROUND AND HYPOTHESES**

### **Social Resources Theory**

Social resources theory addresses social capital, which is generally defined as the ability of actors to secure benefits by virtue of their social network connections (Portes, 1998). While social capital has at times been conceptualized as either an individual or a group property (cf. Adler & Kwon, 2002), my focus here is exclusively on social capital as an individual property. That is, I am concerned with how individuals' social capital affects their performance / success. Within this individual perspective on social capital, there are two fundamental approaches (Lin, Cook, & Burt, 2001). The first approach focuses on the benefits gained by actors as a result of being in a central position in the social network or by having a network with a certain structure (e.g., dense or sparse). The second approach focuses on the benefits gained by virtue of the quality and / or quantity of resources controlled by one's network contacts (Borgatti & Foster, 2003). Social resources theory is associated with this second approach. Social resources theory argues that the resources controlled by individuals in a social network will be distributed such that not all actors have equal amounts. Actors will individually possess certain resources (i.e., individuals will have a certain amount of human capital, such as creativity and experience), but other resources will be possessed by others to whom the individual may

have a social tie. The amount of resources that an individual can potentially access through his or her social ties therefore constitutes the amount of social capital he or she has access to (see Lin, 2001 for a detailed discussion).

Social resources theory therefore focuses on the nature of resources one has access to via social ties. The theory takes an instrumental view of social relationships in that it asserts that having ties to individuals with more resources is more desirable and increases the chances for beneficial outcomes more than having ties to individuals with few resources. For example, a researcher with social ties to other researchers who are, on average, highly published will have greater social capital than another researcher who has an equal number of ties to others who are, on average, new to publishing. This researcher's greater social capital enables her to call upon highly experienced contacts to get advice and input on matters related to research and publication. All other things being equal, this researcher, by virtue of having access to better social resources, will be more successful than the researcher with connections to research neophytes. A number of empirical studies on job search processes have taken a social resources perspective and have shown that having social connections to high status others is predictive of job search success (see Lin, 1999 for a review). Similarly, Siebert, Kraimer, and Liden (2001) found support for a social resources view on employees' career outcomes such as promotions and career satisfaction.

Because the success of innovation efforts is often predicated upon effective problem solving (e.g., Hargadon & Bechky, 2006; von Hippel, 1994), this study focuses on the resources potentially available to the employee through their problem solving relationships. Using social resources theory as a guiding framework, I argue that

individuals whose problem solving network contacts (hereafter referred to as *alters*) have more resources (i.e., have more creative ability and professional experience) will be better equipped to engage in innovative behavior than individuals with less resource-laden alters.

### **The Importance of Creative Problem Solving Alters**

Creativity has been defined as the production of novel and useful ideas or solutions to problems (Amabile, 1996; Weisberg, 1988). As this definition suggests, creativity and problem solving are closely linked. Some theorists have characterized creativity as a special class of problem solving that is associated with novelty, persistence, and unconventionality (Newell, Shaw, & Simon, 1962). The close linkage between creativity and problem solving is summarized by Ward (2012: 169): “A broad range of situations that call for creative behavior can be characterized as ‘problems,’ and the thought processes that lead to new and useful outcomes in those situations can be characterized ‘problem solving.’” As Ward points out, it is not only difficult problems that require creativity. Indeed, even mundane problems can be profitably approached in a creative way. For example, the everyday “problem” of what to cook for dinner can be approached in a creative way by combining novel ingredients in an attempt to produce a novel dish. This is contrasted with the decidedly uncreative (although perhaps safer) alternative of cooking a dish from an often-used recipe.

Given that creative ability plays a central role in effective problem solving, it logically follows that creativity is a valuable resource in problem solving activities. According to the social resources perspective, therefore, having alters who are highly creative can be an important resource from which to draw upon when one encounters

organizational problems that need to be tackled. This is so for two reasons. First, creative alters are adept at divergent thinking. Divergent thinking (also known as ideational flexibility or ideational fluency) is a hallmark of creative behavior that refers to the ability to generate multiple alternative problem solutions. Training methods to improve creative problem solving skills emphasize the importance of divergent thinking (Basadur, Graen, & Green, 1982; Basadur & Hausdorf, 1996). Being connected to creative problem solving contacts therefore ensures that an individual will receive many potential solution ideas when facing a problem.

Second, creative alters provide individuals with constructive models on which to base their future problem solving behavior. Social cognitive theory suggests that individuals can acquire new patterns of behavior by observing others—a process termed the observational learning effect (Bandura, 1969; 1986). Individuals who have the opportunity to observe creative others are provided with effective role models from whom they can learn styles of thinking, methods of working, and standards for judging performance (Amabile, 1996; Zuckerman, 1977). Modeling effective others also imbues individuals with self-efficacy for accomplishing similar tasks (Bandura, 1986). Having creative social network alters provides a focal individual (henceforth referred to using the social network term *ego*) with the opportunity to learn effective heuristics for creatively solving problems and thereby avoiding costly trial-and-error problem solving approaches. Thus, having a creative set of social network alters not only means that ego has access to individuals with the resources to help one solve an immediate problem, it also means that ego has the opportunity to learn creativity skills that can be applied independently to problems that he or she may encounter in the future.

A number of experimental studies have shown that the presence of creative models promotes creative problem solving among both children (Belcher, 1975; Gary & Glover, 1975; Mueller, 1978) and adults (Harris & Evans, 1973; 1974; Shalley & Perry-Smith, 2001). Case studies of creative scientists and artists have also shown that role models can be important facilitators of creativity, particularly at the early stages of one's career (Simonton, 1975; Zuckerman, 1977). Some studies, however, have failed to find direct modeling effects (e.g., Halpin, Halpin, Miller, & Landreneau, 1979; Landreneau & Halpin, 1978; Zhou, 2003), suggesting that modeling effects do not occur universally. It is important to note that all of the studies noted above have examined the presence of models who were not specifically sought out. This may be one reason for the mixed results found across studies. Social cognitive theory suggests that observational learning only occurs when one is motivated to learn from others (Bandura, 1986). For example Zhou (2003) found that social models only had a positive effect on employees who had high levels of intrinsic motivation. My approach will be to examine who ego is specifically choosing as alters in his or her problem solving network, as this more directly captures who ego is motivated to learn from in their personal network. I expect that this approach will overcome the limitations that led to mixed findings in prior research and that having highly creative problem solving alters will positively impact ego's own innovativeness by providing him or her with the opportunity to model effective problem solving behaviors and heuristics.

In summary, individuals who seek out highly creative alters for problem solving help will benefit in two ways. First, creative alters are likely to be effective problem solvers due to their tendency for divergent thinking, which will help ego generate

potential solutions to the immediate problem at hand. Second, creative alters function as an effective model for ego. By modeling and adopting the behaviors and problem solving strategies of creative alters, ego is better prepared to face future problems in an innovative manner, thereby facilitating innovative behavior.

*Hypothesis 1 – The average creative ability of one’s problem solving alters will be positively related to individual innovation behavior.*

### **The Importance of Experienced Problem Solving Alters**

Theory and empirical findings from cognitive psychology offer insight into why experienced alters will be effective problem solving contacts. Research on cognition suggests that the amount of experience an individual has in a given domain greatly influences how that person represents (i.e., categorizes) and retrieves information. In general, the knowledge of more experienced individuals is organized according to deep structural relationships and principles while less experienced individuals organize their knowledge based upon surface features (cf. Ward, 2012). For example, experimental research shows that physics students categorize physics problems in different ways according to their level of experience in the domain. Chi, Feltovich, and Glaser (1981) gave undergraduate students (novices) and graduate students (experts) a series of 24 physics problems to sort into groups based on common characteristics. The undergraduate students tended to sort the problems based on the surface characteristics of the problems (e.g., these are problems that all have something rotating). Graduate students, on the other hand, sorted the problems based on more meaningful underlying scientific principles (e.g., these problems can be solved by Newton’s Second Law). Research has also shown that experience similarly affects the way in which executives

categorize ill-defined organizational problems (Day & Lord, 1992). Thus, experience helps individuals to categorize problems according to abstract, functional representations.

Organizing knowledge according to abstract, functional representations facilitates problem solving. Indeed, experienced individuals are able to more rapidly access a large repertoire of general problem solving heuristics and algorithms that enable them to quickly diagnose problems and generate solutions (Larkin, McDermott, Simon, & Simon, 1980). Such a repertoire enables experienced individuals to quickly arrive at effective solutions without exerting significant mental energy (Simon, 1987). Thus, consistent with Kolb's experiential learning theory (1984), experience allows individuals to generate a storehouse of abstract representations that can be quickly accessed and applied to novel problems.

The importance of experience in organizational problem solving is illustrated by Hargadon and Bechky (2006). They suggest that experience is the crucial element in problem solving exchanges. Experience is instrumental in generating cascades of what they call "reflective reframing" during group problem solving efforts (Hargadon & Bechky, 2006: 487). Reflective reframing occurs when the participants in a problem solving interaction attend to, and build upon, the comments of others. Such cascades of reflective reframing lead to groups recombining existing ideas into creative new problem solutions. It has also been suggested that professional experience is beneficial in organizational problem solving because it helps a decision maker choose a course of action that is the most viable. In other words, professional experience assists in the process of solution selection (Amabile, 1996). For example, Cross and Sproull (2004) found that seeking information from individuals with higher levels of expertise helped

individuals to, among other things, validate viable solutions and re-think potentially problematic solutions.

The above arguments suggest that experience endows one with the cognitive representations necessary to quickly and efficiently diagnose and generate solutions to problems. Experience is therefore a valuable resource for one's social network contacts to have. Having a network of experienced alters means that ego has access to a group of individuals who can quickly provide valuable problem solving advice, thereby facilitating innovative behavior. The fact that it takes relatively little effort for experienced alters to solve problems means that it will not be costly for them to provide help, also making it easier for ego to elicit help. In addition, in much the same way that creative alters provide a model for ego to follow, experienced alters might also do the same. Given that the knowledge possessed by experienced individuals is often tacit in nature, however, ego may find it somewhat more difficult to model the behavior of experienced alters. Taken together, however, these arguments suggest that the resources of experienced alters will enable ego to more effectively solve problems, thereby facilitating higher levels of innovation behavior.

*Hypothesis 2 – The average professional experience of one's problem solving alters will be positively related to individual innovation behavior.*

### **Social Resources and Social Network Structure**

As discussed in the previous chapter, the structure of ego's social network has implications for his or her potential opportunities. As before, I will concentrate here on structural holes as a measure of social network structure (Burt, 1992). An individual with many structural holes (i.e., an individual with a sparse network) has ties to alters who



tend not to be tied to one another, whereas an individual with few structural holes (i.e., an individual with a dense network) has ties to alters who are highly interconnected with one another. Structural holes have implications for the information ego has access to in addition to the general level of social cohesion between ego and alters. I will argue that both of these factors plays a role in explaining why the social resources of one's alters affects individuals with fewer structural holes more than individuals with many structural holes.

*Information access.* Individuals with networks rich in structural holes are more likely to have access to non-redundant information as a result of having ties to alters who are themselves disconnected (Burt, 1992). A network rich in structural holes provides individuals with the opportunity to broker knowledge and information across disconnected social worlds that do not have direct linkages to one another. Such information brokering provides individuals having many structural holes with greater opportunity to recombine knowledge, which leads to the development of novel ideas. Indeed, structural holes have been shown to be positively associated with new knowledge creation (McFadyen, Semadeni, & Cannella, 2009) and idea generation (Burt, 2004; Fleming, Mingo, & Chen, 2007). Importantly, however, the information that individuals with many structural holes broker between disconnected entities is not necessarily new knowledge, nor are the ideas necessarily creative. Instead, the creativity lies in the recombination of diverse ideas. Burt (2004: 388) sums this idea up when he says, "An idea mundane in one group can be a valuable insight in another." That is, the power of a sparse network (i.e., a network with many structural holes) is that one can appropriate ideas that are "old" in one domain and creatively apply them in a different domain. This

phenomenon is illustrated in Hargadon and Sutton's (1997) work on "technology brokering," which refers to the process of applying technology that is established in one domain to a domain in which it can be creatively applied. One classic example Hargadon (2003) discusses is the case of the design firm Design Continuum developing the idea for the Reebok "Pump" shoe in the 1980s. In this case, the idea for a shoe with air bladders that a wearer can "pump up" in order to gain greater ankle support came from a designer who had previous experience designing very similar inflatable splints in the medical field. For the designer, this was a process of applying relatively mundane technology from the medical industry to a product in the shoe industry. For Reebok, however, this idea was revolutionary (Hargadon, 2003: 19-22).

The upshot of this is that individuals with many structural holes do not necessarily need access to highly creative ideas. Instead, they can simply take ideas from disconnected worlds and then recombine them in novel ways. This is contrasted with the situation of the individual with few structural holes. The information that this individual has access to is relatively homogeneous (Burt, 1992). Because this individual does not have the opportunity to recombine ideas from disconnected worlds, he or she is more reliant upon the creative abilities of those in his or her interconnected social circle. This is one reason why the resources that one's social network alters have will matter more for individuals with few structural holes than for individuals with many structural holes.

*Social cohesion.* Dense social networks (i.e., networks with few structural holes) tend to promote higher levels of trust as well as stronger social norms (Colman, 1988). This is because individuals who are densely interconnected with one another can more easily impose sanctions upon those who violate group norms or otherwise behave in a

deviant manner. Individuals who are embedded in dense networks with one another are more motivated to share information because the norms of reciprocity are strong in such networks. The higher levels of trust and strong norms in dense social networks are thought to facilitate knowledge transfer (cf. Phelps, Heidl, & Wadhwa, 2012). Indeed, Reagans and McEvily (2003) found that knowledge transfer is eased when individuals are embedded in densely interconnected social networks. Being embedded in a dense network is especially important when the knowledge being transferred is tacit or otherwise difficult to relay (Hansen, 1999; Fleming et al., 2007). Information in sparse networks (i.e., networks with few structural holes), however, does not flow as freely or as easily. Social network theorists have thus come to the general conclusion that social network sparseness generally facilitates the search for unique knowledge while density facilitates knowledge transfer (Aral & Van Alstyne, 2011; Hansen, 1999; Phelps et al., 2012). The upshot of this is that individuals with few structural holes will benefit from their alters' resources to a greater extent than will individuals with many structural holes. This is so because individuals who are embedded in dense networks are better able and more motivated to share knowledge with one another (Adler & Kwon, 2002). An individual in a dense network is therefore more likely to benefit from highly skilled or resourceful alters. The alters of an individual with a sparse network, on the other hand, are less motivated to share resources or provide help to that individual.

In summary, individuals with few structural holes will benefit to a greater degree from having resourceful social network alters for two reasons. First, the problem solving resources of alters are more critical to individuals embedded in dense networks that contain homogeneous knowledge and are less critical to those with sparse networks that

connect diverse social worlds. Second, the norms of trust and reciprocity inherent to dense social networks guarantee that the alters' resources will be shared to a greater extent, thereby providing individuals with dense networks greater access to those socially-derived resources. These arguments therefore suggest the following two hypotheses:

*Hypothesis 3 – Social network structure will moderate the relationship between social resources and individual innovation behavior such that the relationship between the creativity of one's problem solving alters and individual innovation behavior will be stronger for individuals with few structural holes than for individuals with many structural holes.*

*Hypothesis 4 – Social network structure will moderate the relationship between social resources and individual innovation behavior such that the relationship between the professional experience of one's problem solving alters and individual innovation behavior will be stronger for individuals with few structural holes than for individuals with many structural holes.*

## **METHOD**

### **Sample**

An online sociometric survey was sent to 185 employees of a product development firm headquartered in the Southeastern United States. Usable responses were returned by 144 employees, for a 78% response rate. All respondents were knowledge workers directly involved in leading or supporting innovation efforts within the organization. Respondents represented the following functions: Operations (68%),

Sales and Marketing (11%), Information Technology (8%), and Human Resources (13%). The average tenure of respondents was 63.2 months ( $SD = 50.3$ ), and the average age was 43.5 years ( $SD = 8.8$  years). Forty three percent (43%) of the employees in the sample were in a managerial position, 71% were male, 87% were Caucasian, and 80% of them had completed at least a bachelor's degree.

## **Measures**

*Individual Innovation Behavior.* Respondents were asked to rate the innovation behavior of those coworkers with whom they regularly interacted over the previous six months. Respondents were asked to rate each coworker on a 5-point scale (1 = never innovative, 5 = always innovative) in response to the following: "Innovative employees have the ability to effectively *generate* and *implement* novel ideas in the workplace. Please rate how innovative you believe each of your coworkers is." Respondents were provided with a roster of their coworkers as an aid to recall (Marsden, 1990). Individual innovation behavior was operationalized as the average rating provided by each employee's coworkers. On average each employee was rated by 29.3 coworkers.

*Average Alter Creativity.* Respondents indicated who their problem solving alters were by answering the following sociometric question: "Whom do you typically turn to when you need help thinking through a new or challenging problem at work?" They used a 5-point scale (0 = I never turn to this person; 4 = I constantly turn to this person) to indicate how often they turn to each coworker for problem solving help. This produced a valued 144x144 matrix that represented the organization's problem solving network. The creativity of each coworker was assessed by that coworker's direct supervisor. Direct supervisors rated the creativity of their direct reports with Tierney, Farmer, and Graen's

(1999) 9-item employee creativity scale ( $\alpha = .96$ )<sup>2</sup>. The employee creativity scale is designed specifically to measure creative idea generation. Example items include: “Solves problems that have caused others difficulty,” “Tries out new ideas and approaches to problems,” and “Serves as a good role model for creativity.” Ratings were based on a 7-point Likert-type scale (1 = never; 7 = always). I calculated average alter creativity by averaging the creativity ratings of each employee’s nominated problem solving alters. These calculations were computed using the social network analysis program UCINET version 6 (Borgatti, Everett, & Freeman, 2002). The “weighted ties” routine was selected in UCINET in order to produce a weighted average. This had the effect of weighting the influence of each alter according to his / her strength of tie with ego. Thus, the creativity of an alter to whom ego constantly turns for help was given more weight than was the creativity of an alter to whom ego turns infrequently.

*Average Alter Professional Experience.* Problem solving alters were derived the same way they were for average alter creativity. Professional experience was assessed by asking each employee the following question: “How many years of professional work experience do you have in your field?” The same method used to calculate average alter creativity was used to calculate average alter professional experience. Thus, average alter professional experience was based on averaging the self-reported professional experience of each respondent’s problem solving alters.

*Problem Solving Network Structural Holes.* Each individual’s structural holes in their problem solving network were calculated using Burt’s (1992) measure of constraint using UCINET version 6 (Borgatti et al., 2002). The formula for constraint is:

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<sup>2</sup> Creativity ratings were obtained for 129 of the 144 employees in the sample. Alters who did not have a creativity rating were not included in the calculation to compute average alter creativity.

$$c_i = \sum_j \left( P_{ij} + \sum_q P_{iq} P_{qj} \right)^2, \quad q \neq i, j.$$

Where  $P_{ij}$  is the proportion of focal actor  $i$ 's network time and energy directly invested in alter  $j$ , and  $\sum_q P_{iq} P_{qj}$  is the sum of  $i$ 's indirect investment in  $j$  via all alters  $q$ . Thus, a high level of constraint indicates that actor  $i$  is strongly tied to alters who are themselves strongly tied to each other. Constraint therefore measures a focal actor's *lack* of structural holes. As in the study reported in the previous chapter, I subtracted each respondent's constraint score from 1 to derive their number of structural holes in the problem solving network. The values of this variable range from 0 to 1 with larger numbers indicating the presence of more structural holes in a focal actor's network.

*Control variables.* In order to rule out the possibility that the results obtained were due to a spurious association, I controlled for a number of demographic variables that have been shown to affect innovation outcomes, including: *formal organizational rank* (four dummy variables created for ranks ranging from individual contributor to senior manager), *gender* (1 = male, 0 = female), *education* (1 = bachelor's degree or higher, 0 = less than a bachelor's degree), *organizational function* (four dummy variables created for the four major organizational functions in the sample), *location* (four dummy variables created for the four different office locations occupied by members of the sample), and *tenure* (in months). I also controlled for each respondent's own level of *professional experience* and their *creative ability* as rated by their immediate supervisor. Finally, I controlled for the *size of each respondent's problem solving network*. It was important to control for this in order to examine whether or not effects were dependent on network size. For example, it is possible that an average alter creativity rating of 6.0 based on a

total of four alters is different from an average of 6.0 based on a group of 35 alters. I obtained this measure by calculating the outdegree centrality of each respondent based on the dichotomized problem solving network matrix. That is, this measure is a count of the number of coworkers each respondent nominated as a problem solving partner<sup>3</sup>.

## RESULTS

**Table 5: Summary Statistics**

Variable	Percentage	Mean	Std. Deviation
Rank			
Senior Manager	12.5%		
Middle Manager	13.9%		
First Level Manager	16.7%		
Individual Contributor	56.9%		
Gender (Percent Male)	70.8%		
Education (Bachelor's or Higher)	79.2%		
Function			
Sales/Marketing	11.1%		
Human Resources	13.2%		
Information Technology	8.3%		
Operations	67.4%		
Location			
Location 1	31.9%		
Location 2	5.6%		
Location 3	9.0%		
Location 4	53.5%		
Tenure (Months)		63.22	50.31
Professional Experience (Years)		17.33	8.56
Supervisor-Rated Creativity		4.30	1.15
Problem Solving Network Size		32.41	20.28
Average Alter Creativity		4.33	0.30
Average Alter Prof. Experience		16.72	2.05
Problem-Solving Network Structural Holes		0.90	0.09
Individual Innovation Behavior		3.08	0.46

<sup>3</sup> Multicollinearity concerns prevented me from including problem solving network size in a regression model with problem solving network structural holes. Model 5 in Table 7, however, includes a separate regression model that includes problem solving network size as a control variable. The pattern of results found in Model 2 does not change when this additional control variable is added.



**Table 6: Bivariate Correlations**

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
1. Rank - Senior Manager	-																		
2. Rank - Middle Manager	-0.15	-																	
3. Rank - First Level Manager	-0.17*	-0.18*	-																
4. Gender	-0.20*	-0.05	-0.16	-															
5. Tenure	0.06	0.12	0.03	0.03	-														
6. Education	0.19*	0.15	-0.15	0.17*	-0.28**	-													
7. Function - Sales/Marketing	0.33**	0.11	-0.10	-0.06	0.10	-0.04	-												
8. Function - Human Resources	0.16	-0.04	0.05	-0.20*	-0.01	0.09	-0.14	-											
9. Function - Information Technology	0.04	0.10	-0.07	-0.03	0.03	0.03	-0.11	-0.12	-										
10. Location 1	-0.26**	-0.06	0.09	0.18*	0.03	-0.07	-0.24**	-0.14	-0.21*	-									
11. Location 2	0.00	0.08	-0.11	-0.04	0.20*	0.12	-0.09	0.00	0.04	-0.17*	-								
12. Location 3	-0.05	-0.13	-0.01	-0.01	-0.14	0.04	-0.11	0.09	-0.09	-0.22**	-0.08	-							
13. Professional Experience	0.24**	0.16	-0.30**	0.08	0.03	0.03	0.17*	-0.18*	0.19*	0.09	-0.16	0.06	-						
14. Supervisor-Rated Creativity	0.11	0.19*	-0.15	0.03	-0.15	0.00	0.19*	0.06	0.16	0.04	-0.10	-0.09	-0.02	-					
15. Problem Solving Network Size	0.15	0.33**	-0.21*	0.14	0.01	0.25**	-0.09	0.04	-0.07	-0.10	-0.13	-0.05	0.20*	0.06	-				
16. Average Alter Creativity	0.19*	0.02	0.07	-0.12	0.02	-0.14	0.31**	0.22*	0.06	-0.33**	-0.24**	0.02	0.02	0.09	0.00	-			
17. Average Alter Prof. Experience	-0.07	-0.05	0.08	0.09	-0.06	-0.10	-0.28**	-0.01	0.05	0.14	0.13	-0.19*	-0.05	-0.03	-0.11	-0.09	-		
18. Problem-Solving Network Structural Holes	0.13	0.15	-0.06	0.06	-0.03	0.32**	0.06	0.09	0.06	0.10	-0.09	-0.02	0.18*	0.20*	0.47**	-0.01	-0.43**	-	
19. Individual Innovation Behavior	0.32**	0.00	-0.26**	0.12	-0.16	0.13	0.18*	0.02	-0.06	-0.01	0.02	-0.04	0.00	0.42**	0.15	0.13	0.15	-0.05	

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

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

Table 5 contains the means, standard deviations, and frequencies of the study's variables, and Table 6 contains bivariate correlations. All variables were standardized prior to conducting analyses. The results of the stepwise multiple OLS regression analyses are found in Table 7.

Hypothesis 1 states that the average creativity of one's problem solving alters will be positively related to individual innovation behavior. As Model 2 (see also Model 5) of Table 7 indicates, this relationship is not significant at the 95% confidence level but is significant at the 90% confidence level for a two-tailed test ( $\beta = 0.15, p < .10$ ). Thus, Hypothesis 1 is marginally supported. Hypothesis 2 states that the average amount of professional experience of one's problem solving alters will be positively related to individual innovation behavior. As Model 2 (see also Model 5) of Table 7 indicates, there is a significant positive relationship between average alter professional experience and individual innovation behavior ( $\beta = 0.22, p < .01$ ). Hypothesis 2 is therefore supported. Hypothesis 3 posits that problem solving network structural holes will moderate the relationship between average alter creativity and individual innovation behavior such that the relationship will be stronger for those with fewer structural holes. The test for this hypothesis is found in Model 4 of Table 7. The interaction coefficient for this moderation effect is negative and statistically significant ( $\beta = -0.21, p < .05$ ). Figure 4 depicts the interaction plot. A simple slopes test (Aiken & West, 1991) indicates that the relationship between average alter creativity and individual innovation behavior is positive and significant for those with few structural holes ( $-1 SD; b = .11, t = 2.08, p < .05$ ) but not for those with many ( $+1 SD; b = -.02, t = -.40, p > .05$ ). This pattern of results provides support for Hypothesis 3. Hypothesis 4 states that problem solving network structural

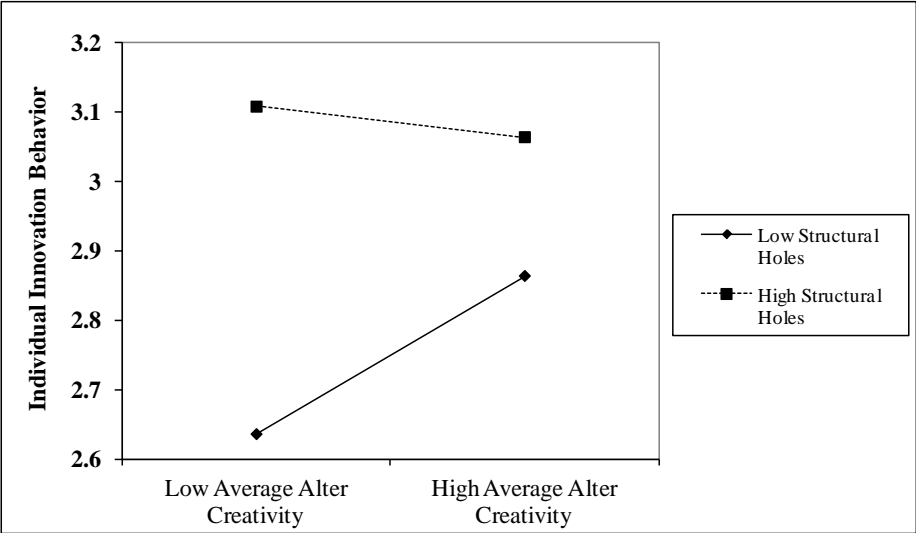
holes will moderate the relationship between average alter professional experience and individual innovation behavior such that the relationship will be stronger for those with fewer structural holes. Model 4 of Table 7 indicates that the coefficient for this moderation effect is negative and statistically significant ( $\beta = -0.39, p < .05$ ). The interaction is plotted in Figure 5. A simple slopes test confirms that the relationship between average alter professional experience and individual innovation behavior is positive and significant for those with few structural holes ( $-1 SD; b = .12, t = 3.67, p < .01$ ) but not for those with many ( $+1 SD; b = -.01, t = -.17, p > .05$ ). Hypothesis 4 is therefore supported.

**Table 7: Results of Stepwise OLS Regression Analysis**

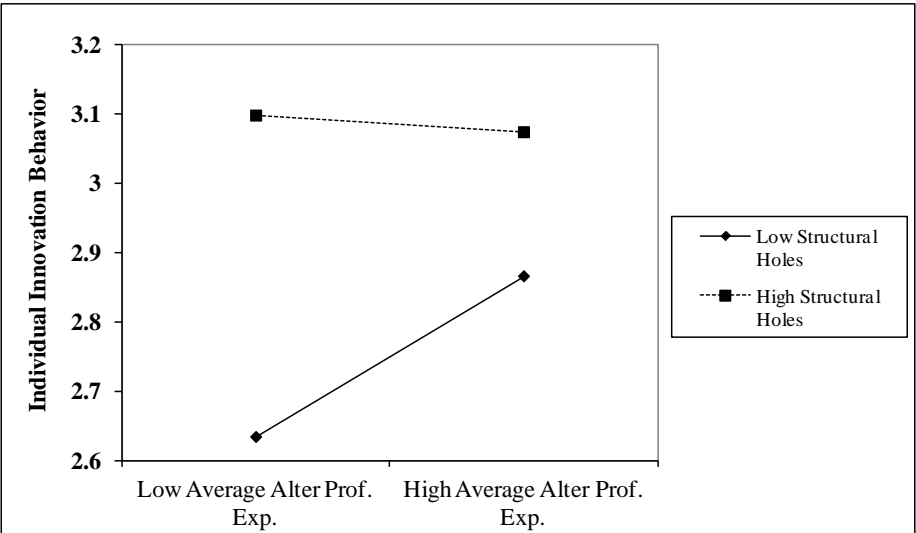
Variable	Individual Innovation Behavior				
	Model 1	Model 2	Model 3	Model 4	Model 5
<i>Control Variables</i>					
Rank - Senior Manager	0.30**	0.28**	0.29**	0.26**	0.26**
Rank - Middle Manager	-0.03	-0.04	-0.03	-0.08	-0.08
Rank - First Level Manager	-0.19*	-0.22*	-0.21**	-0.17*	-0.20*
Gender	0.00	-0.03	-0.03	-0.05	-0.04
Tenure	-0.12	-0.09	-0.09	-0.11	-0.10
Education	0.03	0.09	0.11	-0.12	0.06
Function - Sales/Marketing	0.04	0.06	0.06	0.11	0.12
Function - Human Resources	-0.07	-0.11	-0.09	-0.09	-0.10
Function - Information Technology	-0.11	-0.13	-0.12	-0.09	-0.09
Location 1	0.06	0.09	0.11	0.12	0.13
Location 2	0.06	0.06	0.06	0.14	0.10
Location 3	0.00	0.05	0.04	0.08	0.07
Professional Experience	-0.09	-0.10	-0.08	-0.10	-0.11
Supervisor-Rated Creativity	0.34**	0.34**	0.36**	0.35**	0.33**
Problem Solving Network Size					0.15†
<i>Independent Variables</i>					
Average Alter Creativity		0.15†	0.14†	0.10	0.15†
Average Alter Professional Experience		0.22**	0.17†	0.11	0.23**
<i>Mediator</i>					
Problem-Solving Network Structural Holes			-0.09	0.36*	
<i>Interaction Terms</i>					
Ave. Alter Creativity X Structural Holes				-0.21*	
Ave. Alter Prof. Experience X Structural Holes				-0.39*	
$\Delta R$ -Square		0.06	-	0.05	-
R-Square	0.31	0.37	0.37	0.42	0.38

Note: Table entries are standardized regression coefficients; † $p < .10$ , \* $p < .05$ , \*\* $p < .01$ ;  $n = 144$ .

**Figure 4: Interaction Plot of Average Alter Creativity and Problem Solving Network Structural Holes Predicting Individual Innovation Behavior**



**Figure 5: Interaction Plot of Average Alter Professional Experience and Problem Solving Network Structural Holes Predicting Individual Innovation Behavior**



**DISCUSSION**

This study’s results provide support for a social resources perspective on individual innovation behavior. Although social network studies of innovation have shown that network centrality (e.g., Baer; 2012; Ibarra, 1993; Perry-Smith, 2006) and

network structure (e.g., Burt, 2004; Fleming et al., 2007; Obstfeld, 2005; Uzzi & Spiro, 2005) are important, few studies have examined the role that the social resources of an individual's network contacts play in fostering innovation. The results of this study suggest that the average professional experience level of one's problem solving alters is positively related to an individual's innovation behavior. This is also true—although perhaps to a lesser extent—for the creativity of one's problem solving alters. Results suggest that there is a marginally significant relationship between individual innovation behavior and the average creative ability of one's alters. As social resources theory (Lin, 1982; 2001) would suggest, it appears that social network contacts with greater domain expertise (i.e., experience) and creative ability are more resourceful sources of problem solving assistance. These direct relationships with individual innovation behavior are, in turn, moderated by social network structure. Individuals with fewer structural holes in their problem solving network are affected to a greater extent by both average alter creativity and average alter professional experience. This suggests that two complementary mechanisms may be at work. First, because they have restricted access to nonredundant information, the network alters' resources are more important for those with few structural holes. For example, an employee responsible for product development who has few structural holes in her network will be more dependent upon having resourceful (i.e., creative and experienced) alters who can help her brainstorm and problem solve because she has relatively few opportunities to encounter novel ideas via structural holes. Second, the social cohesion that results from having few structural holes (i.e., a dense network) allows individuals with few structural holes to have greater access to the resources possessed by their network alters. An employee with a densely embedded

relationship to another employee is more likely to effectively extract knowledge and assistance from that person by virtue of their embedded relationship. Individuals with few structural holes have, on average, more of these embedded relationships, making it more likely for them to be the beneficiaries of resources from their alters.

### **Limitations**

One limitation of this study is its cross-sectional research design, which prevents strong inferences about causality. It is possible, for instance, that the causality of the relationships reported here is reversed and that high levels of innovation behavior cause individuals to seek problem solving help from highly experienced and highly creative others. The fact that I controlled for each individual's own level of professional experience and creative ability, however, suggests that the relationship between social resources and innovation behavior holds regardless of an individual's own attributes.

A second limitation of the study is that, due to multicollinearity issues, I was not able to include problem solving network size as a control variable in the analyses that included the measure of structural holes. In order to address this methodological limitation, however, I ran a separate model that did include the network size measure. This separate analysis confirmed that the direct effects of average alter professional experience and average alter creativity still held even when controlling for social network size.

### **Future Directions**

The results of this study suggest that future work on social networks and innovation should incorporate social resources theory to a greater extent than currently done. For example, future work should examine additional resources that may be useful

to the pursuit of innovation. The sociopolitical perspective on innovation discussed in the previous chapter provides a suggestion of additional resources to consider. For example, Baer (2012) found that having ties to others who can provide sponsorship and advocacy (i.e., political support) for one's ideas was, under certain circumstances, positively related to one's ability to implement creative ideas. A useful extension of this work would be to examine whether the resources possessed by one's alters in the political support network is positively related to ego's ability to implement innovations. Social resources theory would predict that it is not the number of political support ties you have that is important, rather it is the amount of resources you have access to through those ties. Having political support ties to high status others is likely to be more beneficial for innovation implementation than having an equal amount of political support ties to lower status individuals. A fruitful avenue of future research, therefore, would be to examine whether having alters with attributes such as power, influence, and charisma enable individuals to more effectively implement innovation within organizations.

A second future avenue of research would be to empirically examine the boundary conditions of the findings presented here. Are employees able to take advantage of their alters' problem solving resources equally in all circumstances? Research demonstrates that environments that are accepting of interpersonal risk-taking are more conducive to collaborative learning (Edmondson, 1999), and this is likely to be the case for taking advantage of alters' resources. It is likely that individuals will only make use of their alters' resources when the organization's norms are conducive to collaboration and knowledge sharing. Thus, future research should examine the environmental conditions (e.g., organizational culture/climate characteristics) that might

strengthen or inhibit the relationship between social resources and beneficial outcomes such as innovation.

### **Conclusion**

This study demonstrates the importance of looking beyond social network structure alone when examining how networks affect innovation outcomes. As seen in this study, the resources possessed by one's social network alters can play a significant role in facilitating innovative behavior. Future work that examines organizational outcomes from a social network perspective should consider the value of incorporating social resources theory.



## **CHAPTER IV: DEVELOPMENT AND VALIDATION OF THE DISCRETE BROKERAGE ORIENTATION SCALE**

Research on social networks within organizations has long recognized the importance of brokerage, which has been defined as “behavior by which an actor influences, manages, or facilitates interactions between other actors” (Obstfeld, Borgatti, & Davis, forthcoming). For example, individuals engage in brokerage when they introduce colleagues from two different departments to one another or when they function as an intermediary between two colleagues who work in different locations. Individuals involved in brokerage have traditionally been thought to occupy bridging positions between disconnected entities in organizational networks. This traditional view of brokerage, with its emphasis on social structure, has led to brokerage being operationalized in structural terms. In this view, brokerage is best measured by looking at the patterns of ties in an individual’s social network. Perhaps the most famous structural measure of brokerage has been Burt’s (1992) measure of structural holes, which captures the extent to which an actor’s network contacts lack connections to one another. The number of structural holes an individual has in their personal social network has been a successful predictor of a variety of organizational outcomes. For example, structural holes and similar structural measures of brokerage have been linked to knowledge creation (Burt, 2004; McFadyen, Semadeni, & Cannella; 2009), faster career promotions (Burt, 1992; Seibert, Kraimer, & Liden, 2001), and better job performance (Cross & Cummings, 2004; Mehra, Kilduff, & Brass, 2001).

In contrast to the traditional view of brokerage as a purely structural phenomenon, an emerging stream of research argues that operationalizing brokerage by measuring the structure of individuals’ social networks fails to capture the processual nature of

brokerage activities. This line of research argues that brokerage should be separated from social network structure and should instead be thought of as a social behavior that can affect network ties in a number of different ways (Obstfeld et al., forthcoming). In this vein, Obstfeld (2005) introduced a measure of an individual's *tertius iungens* orientation, which is a strategic behavioral orientation to introduce network contacts to one another or to stimulate new interaction between previously acquainted contacts. Measures such as the *tertius iungens* orientation scale can offer unique insight into the effects of brokerage processes, which static network measures cannot provide (Spiro, Acton, Butts, 2013).

The purpose of the three studies reported here is to develop a measure that captures an alternative brokerage orientation that has thus far been neglected empirically, the discrete brokerage orientation. The discrete brokerage orientation is a strategic behavioral orientation toward either maintaining separation among one's social network contacts (referred to as separation brokerage), or toward functioning as an intermediary between parties who cannot, or prefer not to, interact with each other (referred to as mediation brokerage). The Discrete Brokerage Orientation Scale (DBOS) therefore has two distinct sub-scales: separation brokerage, where an individual attempts to keep disconnected contacts from meeting one another, and mediation brokerage, where an individual mediates between disconnected contacts who do not directly interact with one another. The development of the DBOS will facilitate further research into the causes and effects of network brokerage processes, which has thus far been limited by a lack of validated measures. This research confirms the factor structure of the DBOS and provides evidence for convergent, discriminant, and criterion-related validity. The following section provides a general theoretical overview of the brokerage construct.

## THEORETICAL OVERVIEW OF BROKERAGE

### Early Theorizing

While the fundamental relationship on which network analysis is built is the dyad, it is only when the dyad is considered in relation to others that one is theorizing using a network perspective. Simmel (1950) noted that the shift that occurs when one moves from a dyadic relationship to a triadic relationship is fundamental because the exclusive dependence and intimacy that exists within a dyad is altered with the introduction of a third party. Introducing a third party into a formerly dyadic relationship creates the opportunity for any one party to operate as an intermediary between the other two parties. This, Simmel notes, can result in either the separation or union of the parties. The introduction of the third, for instance, may strengthen the relationship between the two parties in that the third can function as a mediator to a strained relationship. On the other hand, the introduction of the third can be seen as an intrusion that potentially drives the other two parties further from each other. The introduction of a third party therefore has important implications.

Simmel argues that the triadic configuration can result in three distinct group formations. Each of these configurations concerns the third element in the triad taking a specific role. The first of these is that of the *non-partisan*. In Simmel's terminology, the *non-partisan* is a kind of intermediary who functions in one of two ways. First, he or she brings about the reconciliation or accord of two disconnected or disagreeing parties by drawing them together and creating contact between them, whereupon he or she then withdraws. Second, he or she acts as a mediator who assists in facilitating interaction between parties that have a strained relationship. By virtue of functioning as an

intermediary between two disagreeing parties, the mediator is in a position to mitigate the negative affect that is likely to derail the attempts of the two parties to interact directly. As Simmel argues, “A third mediating social element deprives conflicting claims of their affective qualities because it neutrally formulates and presents these claims to the two parties involved” (1950: 147). Thus, the mediator—by situating him or herself between the two disagreeing parties—is able to mitigate any animosity that exists between the two parties by focusing instead upon commonalities and the objective viewpoints of each party without introducing exacerbating emotion. This action prevents the vicious spirals of negative interpersonal exchange that often transpire between two parties in disagreement or at an impasse (e.g., O’Connor & Arnold, 2001).

The second role specified by Simmel is termed the *tertius gaudens*, which is from the Latin phrase meaning “the third who enjoys” (Simmel, 1950: 154). Burt (1992: 30-31) also notes that there are proverbs in both Italian (*far I due litigante, il terzo gode*, which translates to “between two fighters, the third benefits”) and Dutch (*de lachende derde*, or “the laughing third”) that convey a similar meaning. Each of these dictums describes a phenomenon whereby an individual derives profit from the discord between two parties.

Simmel argues that there are essentially two forms of *tertius gaudens* behavior. The first is the more passive form of *tertius gaudens*, which is the less distinct of the two forms. In this form a third party (i.e., *tertius*) gains an advantage due to the actions of the other parties in the triad. Thus, *tertius* attains advantage as a result of the actions of another party as opposed to his or her own initiative. An example of this passive form of *tertius gaudens* can be seen in the advantages attained by the “office ladies” observed by

Ogasawara (1998) in corporate offices of large Japanese firms. Ogasawara explains that it is customary in Japanese corporations for the, typically male, executives to bring presents back to the administrative assistants in the office (“office ladies”) after having been on a business trip. A kind of one-upmanship can sometimes be seen among the executives as they attempt to outdo their rival coworkers by bringing back a more lavish gift for an office lady than their rival did. To the extent that the office lady does not provoke this behavior in any way, she can be seen as a kind of passive *tertius gaudens* who is benefitting from the rivalry that exists between the highly competitive male executives.

Simmel focuses more upon the active form of *tertius gaudens* behavior. This form occurs when *tertius* attains advantage through more direct action. This is the form of *tertius gaudens* that is more strategic and exploitative in nature. Simmel notes that this form has two main variants: “either two parties are hostile toward one another and therefore compete for the favor of a third element; or they compete for the favor of the third element and therefore are hostile toward one another” (1950: 155). In these instances, *tertius* derives power from his or her position to decide in favor of one of the two parties in conflict. In each case, the *tertius gaudens* in this more active form extracts benefit from his / her position between the two parties. For example, *tertius* might demand certain concessions from one of the parties in exchange for agreeing to make a decision in their favor. Alternately, *tertius* can play each of the parties off of one another in order to maximize his or her advantage. This particular type of *tertius gaudens* behavior can be seen in bidding wars between two buyers or when a job candidate plays two competing employers against one another to extract a higher salary.

It is important to note, however, that Simmel points out there does not have to be a conflict or a “negative tie” (e.g., Labianca and Brass, 2006) between the two parties in order for a third party to engage in *tertius gaudens* behavior. Indeed, Simmel notes that there doesn’t have to be hostility between the two parties but that “A certain general differentiation, mutual strangeness, or qualitative dualism” (1950: 159) can be sufficient for a third party to attain the advantages associated with *tertius gaudens*. This is a point that Burt (1992) emphasizes in his discussion of *tertius* behavior around structural holes.

The third and final role set out by Simmel is the *Divide et Impera*, or “divide and conquer” triadic configuration. This role resembles the *tertius gaudens* role, with one minor difference. In this form the third party intentionally produces conflict between the two parties in order to obtain an advantageous position.

### **Brokerage as Structure**

Burt (1992) uses Simmel’s *tertius gaudens* terminology in his description of the third actor who spans a structural hole. A structural hole is defined as the separation between disconnected contacts (Burt, 1992). In other words, a structural hole exists when a third party is connected to two parties who are themselves not connected. As Burt describes at length, considerable benefits are accorded as a result of the disconnection of actors in *tertius*’s network. The benefits an actor derives from structural holes are a result of the brokerage opportunities that arise from the lack of connection between two network contacts (i.e., *alters*). These benefits include information and control (Burt, 1992).

An actor with a network rich in structural holes derives information benefits due to the diversity of his or her network. Having many structural holes equates to having

many nonredundant connections. These nonredundant connections provide a focal actor (i.e., *ego*) with exposure to diverse pools of information. Having many structural holes provides *ego* with information from a broad range of social clusters, and it limits the amount of information overlap that *ego* receives from each of his or her contacts. In a perfectly efficient network, each of *ego*'s ties would be nonredundant and therefore provide him or her with information from completely distinct clusters. In addition to having access to a broad range of information, the actor with many structural holes also derives a vision advantage in that his or her structural position enables him or her to quickly see and capitalize on opportunities for arbitrage across disconnected groups or individuals (Burt, 1992; 2000). Burt summarizes the vision advantages of structural holes with the following analogies: "like over-the-horizon radar in an airplane, or an MRI in a medical procedure, brokerage across the structural holes between groups provides a vision of options otherwise unseen" (Burt, 2004: 354).

Structural holes also provide the potential for control. Burt (1992) acknowledges that control can come from brokering tensions between parties, but his main focus is on the control benefits that arise from brokering alters that lack a network connection to one another. Indeed, he states that "structural holes are the setting for *tertius* strategies" (Burt, 1992: 33), indicating that his emphasis is on brokerage between disconnected parties. The control benefits enjoyed by *tertius* thus stem from his or her potential to play two disconnected parties against one another. Information can be strategically altered or distorted by *tertius* in order to exact an advantage from the disconnected parties. Being able to strategically distribute information between two disconnected parties is the basis of the control benefit enjoyed by the *tertius gaudens* player.

## Brokerage as Process

In reaction to the purely structuralist approach to social brokerage, scholars have begun to argue that brokerage is more profitably thought of as a social behavior (Obstfeld et al., forthcoming). In this view, the structure of a broker's social network is not as important as how he or she engages with that network. As Obstfeld and colleagues have argued, here are a number of ways in which a broker can engage alters. For example, the broker may coordinate interaction between alters, may mediate between alters who have a negative relationship, or may actively seek to maintain separation between alters (Baker & Obstfeld, 1999; Obstfeld et al., forthcoming; see also Spiro et al., 2013). These scholars argue that brokerage activities can happen even in the absence of structural holes, and that a strict focus on static network structure does not capture many of the important brokerage behaviors that occur within organizations. The development of the *tertius iungens* construct was the first step toward explicating brokerage as a social behavior. The *tertius iungens* orientation is defined as “a strategic, behavioral orientation toward connecting people in one's social network by either introducing disconnected individuals or facilitating new coordination between connected individuals” (Obstfeld, 2005: 102). Obstfeld argues that this orientation is a construct of medium specificity, existing between more general personality traits and more specific attitudes. With this “strategic orientation” construct, Obstfeld (2005) makes the case that *tertius iungens* behavior is the fundamental micro-level behavior at the root of collective action. Individuals employing *tertius iungens* brokerage coordinate and facilitate the social interaction of others in their social environment, thereby knitting together groups of individuals and enabling effective collaboration. The *tertius iungens* broker might, for



example, reinvigorate a stalled project by introducing the members of the stalled project team to members of another project team who successfully overcame similar difficulties in the past.

The *tertius iungens* orientation accounts for one of the two general brokerage strategies that individuals can pursue. Baker and Obstfeld (1999) label these two general brokerage strategies the ‘union’ and the ‘disunion’ strategies. Each strategy is premised upon how an actor manages his or her alters in the presence of a hypothetical structural hole. In the disunion strategy the actor will exploit the structural hole by keeping the two parties separate from one another. In contrast, an actor pursuing the union strategy will close the structural hole by bring the two parties together. Obstfeld (2005) later refined the typology of brokerage strategies by including four possible strategies. The four strategies a broker can pursue are as follows: “(1) coordinate action or information between distant parties who have no immediate prospect for direct introduction or connection, (2) actively maintain and exploit the separation between parties, (3) introduce or facilitate preexisting ties between parties such that the coordinative role of *tertius iungens* subsequently recedes in importance (brief *iungens*), and (4) introduce or facilitate interaction between parties while maintaining an essential coordinative role over time (sustained *iungens*)” (Obstfeld, 2005: 104). Obstfeld notes that the *tertius iungens* orientation refers to the latter two strategies. Although Obstfeld (2005) establishes construct and predictive validity for his measure of the *tertius iungens* orientation, he does not empirically establish a comparable measure to represent the first two strategies. As such, the *tertius iungens* scale accounts for two of the four brokerage strategies in his typology.

## **Content Validity and Dimensionality of the Discrete Brokerage Orientation Scale**

As the foregoing overview suggests, measures for two of the four strategies outlined by Obstfeld (2005) have thus far not been developed. In contrast to the *tertius iungens* strategy, these strategies are not focused on joining social network contacts, but are rather focused on brokering contacts that remain discrete, or disconnected in some way (i.e., completely unacquainted with one another, or “disconnected” in the sense of having a negative tie to one another). The first of the two strategies is focused on functioning as an intermediary for individuals who are not connected, while the second strategy is concerned with maintaining separation between network contacts. Because these two strategies each tend to be concerned with brokering network contacts that do not interact, I term this general strategy “discrete brokerage.” Figure 6, which draws on the typologies set forth by prior brokerage researchers (e.g., Obstfeld, 2005; Obstfeld et al., forthcoming), summarizes the brokerage strategies that comprise both discrete brokerage as well as *tertius iungens* brokerage. The two dimensions associated with the DBOS are described in more detail below.

*Mediation brokerage.* The actor who engages in mediation brokerage functions as an intermediary for parties (e.g., individuals, groups, departments) who do not interact with one another. The reason for the lack of interaction may be due to a strained relationship (e.g., lack of trust, a history of conflict), or it may be due to a barrier that prevents the parties from effectively interacting (e.g., physical separation or diverse backgrounds that inhibit the effective sharing of knowledge). The actor who engages in mediation brokerage acts as a link between otherwise unconnected parties. Mediation brokers assist in the transfer of information between parties, and they facilitate

coordination that may otherwise be impossible. Mediation brokerage is theoretically similar to Obstfeld et al.'s (forthcoming) conduit brokerage, which focuses on the transfer of information between parties. In certain cases, however, mediation brokers could also mirror Simmel's passive *tertius gaudens* if they are gaining benefit from the discord of the two parties.

*Separation brokerage.* The separation broker proactively works to maintain separation between his or her social network contacts. The separation broker sees advantage in having disconnected alters, and he or she seeks to preserve that separation. As Burt (1992) argues, there are information and control benefits associated with disconnected alters, and the separation broker is focused on maintaining that disconnection. This brokerage strategy is rooted in Burt's (1992) structural hole logic, and it reflects Baker and Obstfeldt's (1999) disunion strategy.

Discrete brokerage is an important behavior in the innovation process. Discrete brokerage is a behavior that individuals playing supporting innovation roles must enact. Playing a supporting role in innovation typically entails promoting innovation by providing financial, informational, or political support. As opposed to generating novel ideas, those in supporting roles assist the idea generators in getting the innovation adopted and implemented once it has been conceived of. Mediation brokerage and separation brokerage, however, have distinct relationships to innovation support behavior. I will argue below that mediation brokerage has a direct positive relationship to providing innovation support. Separation brokerage, on the other hand, isn't directly related to providing innovation support, but it does interact with *tertius iungens* brokerage behavior to predict innovation support.

**Figure 6: Brokerage Process Typology**

Brokerage Category	Brokerage Type	Description
<i>Tertius Iungens</i> Orientation	Brief <i>Iungens</i>	To introduce or facilitate preexisting ties between parties such that the coordinative role of <i>tertius iungens</i> subsequently recedes in importance.
	Sustained <i>Iungens</i>	To introduce or facilitate interaction between parties while maintaining an essential coordinative role over time.
Discrete Brokerage Orientation	Mediation Brokerage	To intermediate between parties who cannot, or prefer not to, interact with one another. The mediation broker is theoretically similar to the passive <i>tertius gaudens</i> (Simmel, 1950) and the broker involved in conduit brokerage (Obstfeld, Borgatti, & Davis, forthcoming).
	Separation Brokerage	To actively maintain and exploit separation among network contacts. The separation broker is theoretically similar to Simmel's (1950) active <i>tertius gaudens</i> .

**CONVERGENT AND DISCRIMINANT VALIDITY**

Establishing the convergent and discriminant validity of a new construct is an essential step in the scale development process (Hoyle, Harris, & Judd, 2002). A measure's convergent validity is demonstrated by showing that it covaries with alternate measures of the same construct or with measures of theoretically related constructs. Evidence of discriminant validity is provided by establishing a low or null correlation with measures of unrelated constructs (Hinkin, 1998). Demonstrating convergent and discriminant validity establishes that a measure fits as expected in the theoretically-derived nomological net and generally “Behaves’ like the variable it is supposed to measure” (DeVellis, 2003:53). In the following section, I formulate hypotheses regarding constructs that should and should not correlate with the mediation and separation brokerage sub-scales.

**Networking Ability**

Individuals high in networking ability spend a significant amount of time cultivating relationships, and they are adept at identifying and developing diverse contacts and taking advantage of opportunities presented to them as a result of their network position (cf. Ferris et al., 2007). Individuals who score highly on measures of both mediation and separation brokerage are also likely to spend significant amounts of time and energy developing and managing their network contacts. Functioning as a third party between two others can take a great deal of time-intensive coordination, which suggests that there will be overlap among measures of networking ability and separation and mediation brokerage. Furthermore, individuals who involve themselves in both mediation and separation brokerage behavior must form contacts with others who are often heterophilous with one another. Indeed, the very conception of discrete brokerage involves standing between disconnected or hostile parties. The reason for the disconnection and / or hostility between the two parties is often due to some difference of substantive importance to the parties involved, such as socio-demographic or work-based functional differences (e.g., Jehn, Chadwick, & Thatcher, 1997; Lau & Murnighan, 1998, McPherson, Smith-Lovin, & Cook, 2001). Thus, those occupying separation and mediation brokerage roles must be comfortable connecting to and interacting with diverse others. Those who engage in separation and mediation brokerage will also likely be attuned to the opportunities that accrue as a result of their network position. For these reasons, I expect both mediation brokerage and separation brokerage to be positively correlated with networking ability.

*Hypothesis 1 – The mediation and separation brokerage sub-scales will each correlate positively and significantly to networking ability.*

## **Social Astuteness**

It has been well established that there are a number of biases and individual characteristics that prevent individuals from forming an accurate understanding of their social world (e.g., Kumbasar, Romney, Batchelder, 1994; Krackhardt & Kilduff, 1999). One must, however, have a keen understanding of the social environment in order to effectively function in a brokerage position. The broker often gains benefit by transferring—and perhaps even altering and manipulating—information across gaps in the social structure (e.g., Burt, 1992; Hargadon & Sutton, 1997). To benefit from discrete brokerage, whether the brokerage strategy is that of separation or mediation, one must be able to identify the most advantageous social cleavages to broker across. This requires observational skill and attention to the social interactions of others. Furthermore, because brokers often operate as intermediaries between dissimilar others, they must also be comfortable adapting their self-presentation performances to diverse audiences (Sasovova, Mehra, Borgatti, & Schippers, 2010). The social astuteness construct, as conceived by Ferris et al. (2005), includes these essential social abilities that one would expect a broker to exercise. Individuals high in social astuteness are keen observers of diverse social situations and the individuals who inhabit them. These individuals tend to have an accurate understanding of the social interactions that take place around them. Moreover, socially astute individuals have confidence in their ability to effectively present themselves to others. Because having an accurate understanding of the social environment is of critical importance to the success of the broker, it is reasonable to conclude that individuals high in both the separation and mediation brokerage orientations will also be high in social astuteness. Thus:

*Hypothesis 2 – The mediation and separation brokerage sub-scales will each correlate positively and significantly to social astuteness.*

### ***Tertius Iungens* Brokerage Orientation**

Given that the *tertius iungens* broker is concerned with bringing others together while the broker pursuing a separation strategy is concerned with keeping others apart, one would expect there to be a negative relationship between these two constructs. I expect there to be a significant negative relationship between these two measures. I do not, however, expect the negative relationship to be so high that the two constructs appear to exist on opposite ends of the same continuum. Indeed, I believe these two constructs to be orthogonal. It is conceivable that an individual might engage in both *tertius iungens* and discrete brokerage behavior depending on situational circumstances. The absence of *tertius iungens* behavior does not automatically equate to high levels of separation brokerage, and vice versa.

Although the *tertius iungens* strategy is theoretically distinct from the mediation brokerage strategy, both do share a fundamental concern with coordinating interactions among third parties. In the case of the *tertius iungens* broker interaction is coordinated through facilitating direct interaction among third parties. When third parties cannot interact directly due to a negative tie or another obstacle preventing interaction, coordination can only be achieved indirectly via an intermediary. Thus, although distinct, the *tertius iungens* broker and the mediation broker both—in their own way—facilitate the coordination of two parties who would not otherwise interact. For this reason, I expect a positive relationship between *tertius iungens* brokerage and mediation brokerage.

*Hypothesis 3 – The separation brokerage sub-scale will be negatively and significantly correlated to tertius iungens brokerage, and the mediation brokerage sub-scale will be positively and significantly correlated to tertius iungens brokerage.*

### **Coalition Building**

A coalition can be defined as “a subset of a group that pools its resources or unites as a single voice to determine a decision for the entire group” (Murnighan & Brass, 1991: 285). Building a coalition involves uniting a group of individuals to function as a group in order to achieve a defined goal. Coalition building sometimes involves coordinating interactions and bringing individuals together. It also involves a significant amount of mediation among individuals who don’t directly interact. As Murnighan and Brass (1991) explain, it is often best to work in secret when forming a coalition so as to avoid detection. Being detected by adversaries could cause counter-coalitions to be formed. Such detection early in a coalition’s lifecycle could be disastrous. As a result, coalitions often never meet as a group all at once. These conditions cause a coalition builder to take part in many meetings with small sub-groups of coalition members, which leads to the coalition builder often functioning as a mediator between different sub-groups of the coalition. Because coalition building involves a substantial amount of mediation, I expect it to be positively related to mediation brokerage. In contrast, although coalition builders often have to know who to avoid when recruiting members for their cause, there is no evidence to suggest that coalition builders will often have to actively maintain separation between individuals. Thus, I do not expect the relationship between coalition building to correlate significantly with separation brokerage.



*Hypothesis 4 – The mediation brokerage sub-scale will be positively and significantly correlated with coalition building, and there will be a zero correlation between the separation brokerage sub-scale and coalition building.*

### **Extraversion**

One of the core components of extraversion is affiliation, or the enjoyment of close personal bonds (Depue & Collins, 1999). Extraverts tend to display feelings of warmth and enjoy social interactions (Watson & Clark, 1997). Because extraversion is an established personality construct related to social interaction, it is important to establish that measures of mediation and separation brokerage are not subsumed by this more general tendency towards social interaction. The general tendency to enjoy social interactions is markedly distinct from strategic behavioral orientations toward either mediation or separation brokerage. Extraversion refers to the natural predilection to enjoy socializing, whereas both mediation and separation brokerage refer to narrow social behaviors that may be pursued for instrumental reasons. Extraversion is specified at a generalized level, while mediation and separation brokerage measures are relatively narrow in their specification. Prior empirical work also suggests that extraversion is not related to brokerage orientations. Obstfeld (2005) found the *tertius iungens* orientation to be distinct from extraversion and other Big Five measures, suggesting that extraversion and brokerage orientation are different social constructs. Moreover, in research conducted on personality and social networks, Klein, Lim, Saltz, and Mayer (2004) find that extraversion is positively related to centrality in the “adversarial” network, which suggests that extraverts are perhaps not as socially skilled as previously assumed. I

therefore posit that extraversion will not significantly correlate with either mediation or separation brokerage.

*Hypothesis 5 – The mediation and separation brokerage sub-scales will each demonstrate zero correlations with extraversion.*

### **Machiavellianism**

In order to show that brokerage behavior isn't merely a drive to manipulate others, it is important to demonstrate that mediation and separation brokerage orientations do not excessively overlap with Machiavellianism. Machiavellianism is a construct derived from the writings of Machiavelli that pertains to the manipulative personality type (cf. Christie & Geis, 1970). Individuals high in Machiavellianism have been shown to be more effective liars (Geis & Moon, 1981), to be more apt to defect in trust-based bargaining games (Gunnthorsdottir, McCabe, & Smith, 2002), and to behave in a more manipulative fashion in lab studies (Christie & Geis, 1970). Brokerage behavior is often enacted in order to benefit the broker, and this self-interest can potentially lead to the manipulation of others. This seems to be more relevant to separation brokerage than to mediation brokerage. At most, the mediation broker is doing nothing more than benefitting from the dislike / distrust of two parties, which doesn't ostensibly involve manipulation. Separation brokerage, however, entails actively maintaining the separation of two parties in order to preserve some advantage. This behavior certainly has the air of manipulation about it. I therefore expect Machiavellianism to be unrelated to mediation brokerage and positively related to separation brokerage.

*Hypothesis 6 – The separation brokerage sub-scale will be positively and significantly correlated with Machiavellianism, and the mediation brokerage subscale will demonstrate a zero correlation with Machiavellianism.*

### **General Mental Ability**

Dealing with other people in social interactions can be cognitively demanding (cf. Gottfredson, 1997). Since both mediation and separation brokerage entail complex social interactions, it is important to empirically show that each measure is not highly correlated to General Mental Ability (GMA). By demonstrating that mediation and separation brokerage measures are not significantly correlated with GMA, the alternative explanation that these forms of brokerage are merely a manifestation of GMA will be left unsupported. In order to further establish the discriminant validity of each measure of discrete brokerage, I posit that there will not be a significant relationship between GMA and both separation and mediation brokerage.

*Hypothesis 7 - The mediation and separation brokerage sub-scales will each demonstrate zero correlations with general mental ability.*

### **CRITERION-RELATED VALIDITY**

Criterion-related validity reflects the extent to which a measure has a relationship to some criterion, or variable to which it is hypothesized to relate (DeVellis, 2003). Establishing criterion-related validity for a new measure further develops the nomological network in which the measure is hypothesized to fit (Hinkin, 1998). Thus, I sought to further develop the nomological network for the DBOS by establishing its criterion-related validity. I focus on innovation-related behavior as the criterion to which the DBOS should relate.

Little work has been done on discrete brokerage behaviors, but that which has been done is primarily related to employee innovation. A number of theorists have posited that mediation brokerage behaviors are important for individuals who play a significant supporting role in bringing innovation about within organizations. The support roles that individuals play have been labeled in different ways (cf. Ancona & Caldwell, 1990; Galbraith, 1982; Tushman & Nadler, 1986) but these roles typically entail promoting the innovation by providing financial, informational, or political support. In general, those in supporting roles assist the idea generator(s) (i.e., the individual or individuals who initiated the innovation by either creating it internally or acquiring it externally) in getting the innovation adopted and implemented once it has been conceived of.

The political nature of the innovation process brings with it uncertainty and potential for conflict (Van de Ven, 1986). Once they are conceived, innovations still have to be successfully implemented, which can be a challenging process. Innovations inherently affect the status quo within organizations and, as a result, frequently have detractors who have to be bargained with, avoided, or otherwise circumvented if the innovation is to be successfully implemented (Baer, 2012; Janssen, Van de Vliert, & West, 2004; Pinchot, 1985). Individuals who play such supporting roles are often engaged in mediation brokerage in order to successfully navigate this environment fraught with opponents and political detractors. Kanter (1988:193) speaks of “sending emissaries to smooth the way and plead the case” when idea generators encounter opponents to their innovations. This is very much a mediation brokerage process in that the emissary is acting as an intermediary between two parties with a strained relationship.

In discussing observations derived from their Minnesota Innovation Research Program studies, Schroeder, Van de Ven, Scudder, and Polley (1986:518) discuss how innovation supporters—typically in managerial positions—would “run interference” for innovators in order to counteract forces that might negatively impinge on the innovation project. This language is again evocative of a mediation broker, who acts as a liaison on behalf of two parties who cannot or will not interact with one another. In a similar vein, Ancona and Caldwell (1990) discuss a number of boundary spanning (i.e., mediation brokerage) roles that innovation supporters must play. They describe how innovation supporters on project teams must act as intermediaries with other parties inside and outside the organization in order to acquire information and resources and to act as a buffer to threats. The importance of gatekeepers or boundary spanners is also mentioned by Tushman & Nadler (1986).

Given the complex and competitive nature of the process of innovation implementation within organizations, mediation brokerage is important. Mediation brokers manage the boundaries around a given group of innovators by controlling the information and resources flowing in and out of the group, and by managing the pressures and threats of rivals. Importantly, it is typically individuals in significant supporting roles who engage in such mediation brokerage, leaving the initiators of the innovation to engage in technical tasks and to coordinate others directly involved in the innovation group.

*Hypothesis 8 – Mediation brokerage will be positively related to providing significant innovation support.*

The separation mediation brokerage orientation, with its focus on disunion between parties, has been described in competitive, self-serving terms (Obstfeld, 2005). Such an orientation runs the risk of being associated with knowledge hoarding behavior, as knowledge hoarding is often associated with the egocentric concern of maintaining status and advantage (cf. Hislop, 2003). Given that innovation is heavily dependent on the collaborative combination of knowledge (Brown & Duguid, 1991; Dougherty, 1992; Galunic & Rodan, 1998; Kogut & Zander, 1992; Nonaka, 1994), it is reasonable to assume that individuals with an orientation toward separation brokerage may hinder the flow of knowledge within the organization as a whole and subvert innovations that threaten their structural position (Hargadon, 2003). At the individual level, however, separation brokerage behavior may preserve an individual's position as a bridge across diverse knowledge boundaries, thereby enabling an individual to maintain an informational advantage over others. This suggests that separation brokerage may provide an advantage to the individual at the cost of benefitting the whole organization (Ibarra, Kilduff, & Tsai, 2005). There is also, however, the risk that the self-interest of the separation broker may be recognized by others in their social environment. In this case, the broker with the separation orientation is not likely to be regarded as innovative, but rather as uncooperative and territorial. Thus, it is not clear whether or not separation brokerage will have a direct effect upon innovation outcomes.

Although it is questionable whether an individual who purely pursues a separation brokerage strategy could be considered an innovator (or innovation supporter), there is empirical evidence that separation brokerage coupled with *tertius iungens* brokerage can be a potent combination for managing the innovation process. Long Lingo and

O'Mahony (2010) recently examined the strategies of brokers in creative projects. Specifically, they examined the brokerage behavior of producers in the Nashville music industry. Long Lingo and O'Mahony show that producers, who are responsible for coordinating the actions—and synthesizing the ideas—of diverse groups of creative individuals (e.g., singers, session musicians, engineers, songwriters, and record label executives), use both *tertius iungens* and separation brokerage strategies in the course of a typical recording project. This blend of brokerage strategies enabled producers to navigate the inherent ambiguities, challenges, and tensions associated with managing a group of individuals involved in a creative process. For example, at the early stages of a project producers heavily engage in *tertius iungens* behavior as they bring artists, songwriters, and music executives together in an attempt to create a successful project. At other stages of a project, however, producers often engage in strategic separation brokerage in an effort to keep certain stakeholders (e.g., recording label executives) from unduly influencing the creative process.

Long Lingo and O'Mahony coined the term “nexus work” to describe the dialectic approach to brokerage that makes use of both *tertius iungens* as well as separation brokerage strategies, and they note that the most effective producers engage in both brokerage strategies: “Our research suggests that effective producers developed the capability to identify when particular nexus work practices should be used—and deftly learned to blend *tertius iungens* and [separation brokerage] approaches of brokerage as the creative process unfolded” (Long Lingo and O'Mahony, 2010: 74). The brokerage processes uncovered in their ethnographic work suggest that *tertius iungens* and separation brokerage strategies are not mutually exclusive, but are instead used

synergistically to build trust & legitimacy and manage boundaries as necessary. Given that *tertius iungens* and separation brokerage have been found to operate synergistically, I expect the *tertius iungens* orientation to interact with the separation brokerage orientation such that high levels of *tertius iungens* and high levels of separation brokerage lead to the highest levels of significant innovation support. Stated formally:

*Hypothesis 9 – The separation brokerage orientation will interact with the tertius iungens brokerage orientation to predict significant innovation support such that higher levels of tertius iungens orientation will have a more positive effect on those high in separation brokerage than on those low in separation brokerage.*

## **STUDY 1: SCALE DEVELOPMENT AND INITIAL VALIDATION**

### **Sample**

A sample of 199 undergraduate students with work experience completed an online survey to partially fulfill a college research requirement. The students were all business majors at a large public research university located in the Southeastern United States. The average age of the respondents was 20.98 years (SD = 1.92), and 74.9% were male. The racial/ethnic background of the respondents was Caucasian (82.4%), Black/African-American (8.5%), Asian/Pacific Islander (4.5%), Native American (.5%), Hispanic /Latino (1%), and “other” (3%). All respondents had prior work experience, and reported an average of 3.71 years of experience (SD = 2.14) in a variety of industries, including: food service, retail, finance/banking, marketing/public relations, and professional services.



I administered the online survey to students in groups ranging in size from 10 to 50 at an on-campus computer lab. I briefed students on the general purpose of the research as well as their rights as human subjects prior to administering the survey. Students were given credit for participation whether or not they completed the survey.

## **Measures**

*DBOS Item Pool.* I generated a total of 15 items to represent the separation and mediation dimensions of discrete brokerage behavior. Items were generated by reviewing the literature on social networks, especially work pertaining to individual brokerage and / or agency in the context of social networks (e.g., Baker & Obstfeld, 1999; Burt, 1992; 2005; Gould & Fernandez, 1989; Marsden, 1982; Simmel, 1950). I wrote items to representatively reflect the separation and mediation dimensions of discrete brokerage. In doing so, my approach conformed to the “logical partitioning” approach to deductive scale development (Hinkin, 1995), whereby a theoretically-derived definition and classification typology are used to guide item development (Schwab, 1980). I then submitted the item pool to a panel of five experts with advanced graduate training in the field of social networks for their review and critique. Specifically, I asked the expert panel to rate each of the 15 items on 1) relevance, and 2) item clarity. The ratings were conducted on 5-point Likert-type scales. For the *item relevance* rating the anchors were 1 (*very irrelevant*) to 5 (*very relevant*), and for *item clarity* the anchors were 1 (*very unclear*) to 5 (*very clear*). Based on the feedback I received from this panel of reviewers, I altered the wording of 10 items and dropped 1 item entirely. This process resulted in a final item pool of 14 items, which are included in Table 8. The undergraduate respondents were provided with the following question stem: “The following questions

focus on your experience in your prior work setting. Please answer each of the following items with respect to your social network at your previous job; that is, the range of people with whom you had some form of professional contact, whether at work, conferences, parties, e-mail, or elsewhere. These questions address your interactions with your workplace contacts. This activity might have taken place in person or through e-mail, phone calls, mail, etc.” Respondents indicated the extent to which they agreed with each of the 14 items, using a 1 (*strongly disagree*) to 7 (*strongly agree*) Likert-type scale.

*Networking Ability.* The extent to which an individual is adept at identifying and developing network contacts was captured with the 6-item networking ability subscale developed for the Political Skill Inventory (Ferris et al., 2005). Example items include: “I spend a lot of time at work developing connections with others,” and “I am good at using my connections and network to make things happen at work.” Respondents answered on a scale from 1 (*strongly disagree*) to 7 (*strongly agree*). The coefficient alpha for this scale was .84.

*Social Astuteness.* The extent to which an individual is adept at understanding social interactions and can astutely interpret the behavior of others was assessed with the 5-item social astuteness subscale developed for the Political Skill Inventory (Ferris et al., 2005). Example items include: “I am particularly good at sensing the motivations and hidden agendas of others,” and “I pay close attention to people’s facial expressions.” Respondents answered on a scale from 1 (*strongly disagree*) to 7 (*strongly agree*). The coefficient alpha for this scale was .75.

*Extraversion.* Extraversion pertains to how gregarious one is and how much one enjoys social stimulation (McCrae & Costa, 1999). This construct was measured with the

4-item Mini-IPIP extraversion scale (Donnellan, Oswald, Baird, & Lucas, 2006).

Example items include: “I am the life of the party,” and “I don’t talk a lot” (reverse coded). Respondents answered on a scale from 1 (*strongly disagree*) to 7 (*strongly agree*). The scale demonstrated acceptable internal reliability ( $\alpha = .75$ ).

*Machiavellianism.* Individuals scoring highly in Machiavellianism exhibit manipulative behaviors towards others in order to further their own self interests (Christie & Geis, 1970). Machiavellianism was measured with 17 items from the 20-item Mach IV scale (Christie & Geis, 1970). Three items were removed from the original 20-item scale due to low item-to-total correlations (see Appendix 2). Each of the 3 removed items had item-to-total correlations of less than .20. The 17-item scale used here correlated with the original 20-item scale at  $r = .98$ . Example items include: “Never tell anyone the real reason you did something unless it is useful to do so,” and “It is hard to get ahead without cutting corners here and there.” Some items were re-worded to be gender neutral by replacing the word “men” with “people.” Respondents answered on a 7-point scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). The coefficient alpha was .74.

*General Mental Ability (GMA).* General mental ability was assessed via self-reported composite scores on the American College Test (ACT). ACT scores have been found to correlate highly with traditional IQ measures and are a valid measure of general mental ability (Koenig, Frey, & Detterman, 2008). Studies have shown undergraduate self-reports of Scholastic Aptitude Exam (SAT) scores to be highly consistent ( $r = .88$ ) with actual scores (Cassady, 2001), suggesting that the collection of self-reported ACT scores is an acceptable approach for assessing ACT achievement.

## **Results**

*Item analyses.* I began my analysis of the item pool by examining the item-to-total correlations. Following Nunnally and Bernstein (1994), only those items with an item-to-total correlation of .40 and above were retained. This resulted in the elimination of 7 items (items 5, 6, 7, 8, 11, 12, and 13 in Table 8). I next examined the correlation between each remaining item and the overall mean of the 10-item Social Desirability Scale (Strahan & Gerbasi, 1972), and I eliminated items having a statistically significant ( $p < .05$ ) correlation in keeping with scale development best practices (Devellis, 2003). This resulted in the deletion of 1 additional item (item 1 in Table 8). This item reduction process resulted in a final set of 6 items.

**Table 8: Discrete Brokerage Orientation Scale Item Pool**

<b>Item Pool Items</b>
<p><b>Mediation Brokerage Items</b></p> <p>1. I often function as a “go-between” for two parties rather than introducing them and having them work together themselves.</p> <p>*2. I often work as a “go-between” at work for others who can’t interact directly.</p> <p>*3. I sometimes mediate interactions between coworkers that don’t get along.</p> <p>*4. I sometimes mediate interactions between coworkers that may not trust one another.</p> <p>5. I would never think to look for an opportunity to mediate interactions between two coworkers. (R)</p> <p>6. I look for opportunities to mediate interactions between work contacts that don’t work well together.</p> <p><b>Separation Brokerage Items</b></p> <p>7. Introducing unacquainted individuals isn’t always in my best interest.</p> <p>8. I don’t see any advantage to being connected to two people who don’t know each other. (R)</p> <p>*9. It is often better to keep some people from interacting with one another.</p> <p>*10. I prefer to keep some of my work contacts separate from one another.</p> <p>11. I won’t introduce work contacts to each other unless they specifically ask me to do so.</p> <p>12. It wouldn’t occur to me that it is better if some of my coworkers remain unacquainted. (R)</p> <p>13. I don’t usually bring unacquainted coworkers together unless it is really necessary.</p> <p>*14. It can be advantageous to maintain separation between some of my work contacts.</p>

\* Indicates items retained in the final scales.

*Scale dimensionality.* To assess factor structure, I conducted a factor analysis on the remaining 6 items following the best practice procedures for exploratory factor analysis outlined by Conway and Huffcutt (2003). I used the maximum likelihood extraction method and oblique, direct oblimin factor rotation. Two factors emerged with eigenvalues greater than the Kaiser-Guttman criterion of 1.0. As seen in Table 9, the

eigenvalues of the two factors were 2.76 and 1.17. These two factors explained 65.45% of the total variance. Factor 1, which represents the mediation brokerage strategy, accounted for 46% of variance explained. Factor 2, which represents the separation brokerage strategy, accounted for 19.45% of variance explained.

**Table 9: DBOS Scale Factor Structure – Study 1**

Item	Factor 1	Factor 2	Social	
	Mediation Strategy	Separation Strategy	Item-Total <i>r</i>	Desirability <i>r</i>
1. I sometimes mediate interactions between coworkers that don't get along.	<b>0.82</b>	-0.04	0.54	0.02
2. I sometimes mediate interactions between coworkers that may not trust one another.	<b>0.78</b>	-0.04	0.51	0.05
3. I often work as a "go-between" at work for others who can't interact directly.	<b>0.51</b>	0.29	0.61	-0.03
4. I prefer to keep some of my work contacts separate from one another.	-0.04	<b>0.75</b>	0.48	-0.05
5. It is often better to keep some people from interacting with one another.	-0.05	<b>0.60</b>	0.39	-0.11
6. It can be advantageous to maintain separation between some of my work contacts.	0.17	<b>0.50</b>	0.50	0.02
Eigenvalue	2.76	1.17		
Percentage of variance explained	46.00	19.45		
Cumulative percentage of variance explained	46.00	65.45		
Coefficient alpha	0.78	0.66		

*Reliability and factor correlations.* The Cronbach's alpha for the mediation strategy dimension was .78, and it was .66 for the separation strategy dimension. Although the internal reliability of the separation strategy dimension is slightly lower than the commonly used benchmark of .70 (e.g., Nunnally & Bernstein, 1994), it is at a level still considered acceptable (DeVellis, 2003). The correlation between the two dimensions was +0.43.

*Convergent and discriminant validity.* The means, standard deviations, and bivariate correlations among the two DBOS sub-dimensions and networking ability, social astuteness, extraversion, Machiavellianism, and general mental ability are presented in Table 10. As hypothesized, both the mediation brokerage strategy and the separation brokerage strategy constructs were positively and significantly associated with networking ability ( $r = .25, p < .001$ ;  $r = .13, p < .05$ , respectively), providing support for Hypothesis 1. Social astuteness was also positively and significantly related to mediation

brokerage ( $r = .20, p < .01$ ) and separation brokerage ( $r = .16, p < .05$ ), supporting Hypothesis 2. Although not specifically hypothesized, the overall DBOS scale (mediation and separation sub-scales) was also significantly related to both networking ability ( $r = .23, p < .01$ ) and social astuteness ( $r = .22, p < .01$ ). These results therefore establish initial evidence for the convergent validity of each of the DBOS sub-scales.

In order to demonstrate discriminant validity, I examined the correlations between each sub-scale and extraversion, Machiavellianism, and general mental ability.

Hypothesis 5 proposes that there will be a null relationship between extraversion and both of the DBOS sub-scales. The null hypothesis cannot be rejected given that the correlations between extraversion and mediation brokerage ( $r = -.08, p > .05$ ) and separation brokerage ( $r = -.06, p > .05$ ) are not statistically significant. Similarly, Hypothesis 6 predicted that the relationship between the Machiavellianism and mediation brokerage would be non-significant, but the relationship between Machiavellianism and separation brokerage would be positive and significant. In support of this hypothesis, there was a non-significant relationship between Machiavellianism and mediation brokerage ( $r = .05, p > .05$ ) and a positive and significant relationship between Machiavellianism and separation brokerage ( $r = .13, p < .05$ ). Finally, Hypothesis 7 stated that there would be a null relationship between each sub-scale and general mental ability. The relationship between students' ACT scores and mediation brokerage was non-significant ( $r = .07, p > .05$ ), as was the relationship between ACT scores and separation brokerage ( $r = .10, p > .05$ ). Hypothesis 7, therefore, cannot be rejected based upon these results.

**Table 10: Study 1 Variable Means, Standard Deviations, and Bivariate Correlations**

	<i>N</i>	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8
1. Mediation Brokerage	199	4.23	1.21	(0.78)							
2. Separation Brokerage	199	4.43	1.12	0.43**	(0.66)						
3. Combined DBOS	199	4.33	0.99	0.86**	0.83**	(0.76)					
4. Networking Ability	199	5.41	0.87	0.25**	0.13*	0.23**	(0.84)				
5. Social Astuteness	199	5.54	0.78	0.20**	0.16*	0.22**	0.60**	(0.75)			
6. Extraversion	199	4.64	0.75	-0.08	-0.06	-0.08	0.37**	0.29**	(0.75)		
7. Machiavellianism	199	3.74	0.63	0.05	0.13*	0.10	-0.16*	0.01	0.03	(0.73)	
8. General Mental Ability (ACT Score)	188	25.15	4.12	0.07	0.10	0.10	-0.03	-0.01	0.12*	0.10	-

\*\* . Correlation is significant at the 0.01 level (one-tailed).

\* . Correlation is significant at the 0.05 level (one-tailed).

## **STUDY 2: FACTOR STRUCTURE CONFIRMATION AND CONSTRUCT VALIDITY**

The purpose of Study 2 was twofold. The first was to replicate the factor structure derived in Study 1 in order to confirm the stability of the scale. The second purpose was to extend the convergent validity findings reported in Study 1. Specifically, I examine the relationship between the DBOS sub-scales and the following constructs: *tertius iungens* brokerage and coalition building tactics. The results of these analyses further support the convergent validity of the DBOS. Moreover, the sample used in Study 2 is composed of working professionals as opposed to students. The use of a non-student sample for this study helps to establish the generalizability of the DBOS.

### **Sample**

This sample comprises employees of a product development firm headquartered in the Southeastern United States (see also sample description in Chapter 3). Knowledge workers that play a role in the company's product development process were invited to participate in the web-based survey. Of the 185 distributed, 144 usable surveys were returned (for a 78% response rate). Respondents represented the following functions: Operations (68%), Sales and Marketing (11%), Information Technology (8%), and Human Resources (13%). The average tenure of respondents was 63.2 months ( $SD = 50.3$ ), and the average age was 43.5 years ( $SD = 8.8$  years). Forty three percent (43%) of the employees in the sample were in a managerial position, 71% were male, 87% were Caucasian, and 80% of them had completed at least a bachelor's degree.

### **Measures**



*Discrete Brokerage Orientation Scale.* I used the 6 items identified in Study 1 to capture the mediation brokerage and separation brokerage sub-scales. I used the same question stem and response format reported for Study 1. The internal reliability for each of the sub-scales was markedly higher in this study, with coefficient alphas of .87 and .75 for the mediation brokerage sub-scale and the separation brokerage sub-scale, respectively. The coefficient alpha for the combined scale was .72.

*Tertius Iungens Brokerage Orientation.* This construct was measured with the 6-item *tertius iungens* scale developed by Obstfeld (2005). Example items include: “I introduce two people when I think they might benefit from becoming acquainted at work,” and “I forge connections between different people dealing with a particular issue at work.” Responses ranged from 1 (*strongly disagree*) to 7 (*strongly agree*). The coefficient alpha was .80.

*Coalition Building.* Coalition building as an upward influence tactic at work was assessed with the 3-item coalition building sub-scale validated by Schriesheim and Hinkin (1990). Respondents were asked how often they used coalition building tactics to influence the decisions of their superiors in the preceding six months. Example items included: “I mobilized other people in the organization to help me in influencing them,” and “I obtained the support of co-workers to back up my request.” The coefficient alpha for the scale was .78.

## **Results**

*Scale dimensionality.* I conducted a factor analysis of the six DBOS items again using a maximum likelihood extraction method and direct oblimin factor rotation. This analysis uncovered two factors with eigenvalues greater than 1.0, accounting for 73.25%

of the explained variance. Scree plot analysis further supported a two-factor solution. Table 11 presents the results of the Study 2 factor analysis, which replicate the results found in Study 1. Factor 1 represents the mediation brokerage dimension (eigenvalue = 2.58), which accounts for 43.05% of the explained variance. Factor 2 represents the separation brokerage dimension (eigenvalue = 1.81), which accounts for 30.20% of the explained variance.

**Table 11: DBOS Scale Factor Structure – Study 2**

Item	Factor 1	Factor 2	Item-Total <i>r</i>
	Mediation Strategy	Separation Strategy	
1. I sometimes mediate interactions between coworkers that don't get along.	<b>0.81</b>	0.09	0.55
2. I sometimes mediate interactions between coworkers that may not trust one another.	<b>0.91</b>	-0.04	0.49
3. I often work as a "go-between" at work for others who can't interact directly.	<b>0.77</b>	-0.03	0.45
4. I prefer to keep some of my work contacts separate from one another.	0.07	<b>0.57</b>	0.42
5. It is often better to keep some people from interacting with one another.	0.03	<b>0.68</b>	0.44
6. It can be advantageous to maintain separation between some of my work contacts.	-0.12	<b>0.89</b>	0.39
Eigenvalue	2.58	1.81	
Percentage of variance explained	43.05	30.20	
Cumulative percentage of variance explained	43.05	73.25	
Coefficient alpha	0.87	0.75	

*Convergent validity.* Table 12 contains the means, standard deviations, and bivariate correlations among the two DBOS sub-dimensions and the *tertius iungens* brokerage orientation as well as coalition building. Hypothesis 3 states that the *tertius iungens* brokerage orientation will be positively related to the mediation strategy and negatively related to the separation strategy. In support of Hypothesis 3, there was a significant and positive relationship between mediation brokerage and TI ( $r = .52, p < .001$ ), while the relationship between separation brokerage and TI was significant and negative ( $r = -.17, p < .05$ ). Hypothesis 4 proposes that coalition building will be positively related to mediation brokerage and not significantly related to separation brokerage. The relationship between mediation brokerage and coalition building was

positive and significant ( $r = .25, p < .01$ ) while the relationship between separation brokerage and coalition building failed to reach statistical significance ( $r = .01, p > .05$ ).

Thus, Hypothesis 4 is supported.

Taken together, the results of Study 2 add additional support to the notion that the DBOS is a reliable and valid measure of mediation and separation brokerage strategies. The factor analyses replicated its two-factor structure, and the internal reliability of each sub-scale was found to be adequate in a sample of working professionals. Moreover, the relationships found between the DBOS sub-scales and other variables in the nomological network of theoretically relevant constructs provides further evidence of convergent validity.

**Table 12: Study 2 Variable Means, Standard Deviations, and Bivariate Correlations**

	<i>N</i>	<i>M</i>	<i>SD</i>	1	2	3	4	5
1. Mediation Brokerage	143	4.96	1.36	(0.87)				
2. Separation Brokerage	143	3.58	1.40	0.16*	(0.75)			
3. Combined DBOS	143	4.27	1.05	0.75**	0.77**	(0.72)		
4. Tertius Iungens Brokerage Orientation	143	5.67	0.77	0.52**	-0.17*	0.22**	(0.80)	
5. Coalition Building	139	3.11	1.40	0.25**	0.01	0.17*	0.19*	(0.78)

\*\* . Correlation is significant at the 0.01 level (one-tailed).

\*. Correlation is significant at the 0.05 level (one-tailed).

### STUDY 3: CRITERION-RELATED VALIDITY

The purpose of Study 3 was to demonstrate the criterion-related validity of the DBOS subscales. Specifically, I examine how mediation brokerage and separation brokerage uniquely relate to involvement in organizational innovation. I examine how these sub-scales relate to employee involvement in innovation support, which entails playing a supporting role to innovation initiators (or “idea generators”) in order to successfully implement innovative ideas. Providing support for innovations often entails

promoting innovations by providing financial, informational, or political support to those who developed the innovation. Innovation support is thought to involve discrete brokerage behavior. The results of this study provide evidence for the criterion-related validity of the scale.

### **Sample**

The sample consists of 114 employees working within one division of a large organization in the semi-conductor industry headquartered in the Western United States (see also sample description in Chapter 2). All respondents were responsible for generating technological innovations in support of the design and manufacture of computer microchips. The average age of respondents was 42.2 (SD = 8.4 years) and the average length of tenure was 13.3 years (SD = 6.3). The majority of respondents were male (80%). Twenty six percent (26%) of the respondents were in a managerial position, and nearly 24% had a PhD degree.

### **Procedure**

The study was conducted in two phases. In phase 1 I conducted a series of 25 semi-structured interviews with division managers and senior division engineers. The purpose of these interviews was to exhaustively catalog all of the significant changes to product or process that had occurred within the division during the preceding 3 years. From these interviews I identified a total of 146 innovations, each of which was either a newly introduced product / process or a significantly changed or updated version of a previously existing product / process. Each department manager reviewed the innovations associated with his or her unit to ensure completeness and to verify that each item warranted inclusion on the list. The unit managers reduced the list to 140 innovations.

Example innovations included: 1) developing a tool and methodology to identify and quantify waste and bottlenecks in microchip design workflows, 2) enabling the manufacture of smaller microchips by shifting from 22 nanometer to 14 nanometer circuit blocks, and 3) developing knowledge sharing software to facilitate faster collaboration across project groups.

In phase 2, an online survey was sent to 523 employees within the division. Based on guidance from senior management at the company, the survey was only sent to employees that met a certain grade minimum within the organization. Discussions with division managers revealed that only employees at or beyond the established grade minimum would have more than trivial involvement in innovation initiatives within the organization. Usable surveys were returned by 114 employees for a 22% response rate. No significant differences between respondents and non-respondents were found on the basis of gender ( $\chi^2 = .81, p = .37$ ) or performance ( $\chi^2 = .72, p = .40$ ). Those in managerial positions, however, were found to be more likely to be respondents ( $\chi^2 = 4.41, p < .05$ ).

The survey consisted of two sections. In the first section, employees rated their level of involvement in each of the 140 innovation projects that occurred within the organization over the preceding 3 years. The second part of the survey elicited social network data and measured brokerage orientations.

## **Measures**

*Innovation support* (dependent variable). Following prior innovation studies (e.g., Ibarra, 1993; Obstfeld, 2005), I measured innovation involvement by asking respondents to rate the role they played in each of the division's 140 innovations. Respondents

reported their involvement in each innovation based upon 4 categories. The question stem and category choices were worded in the following way:

On the next page you will find a list of innovations that occurred during the last three years. Please look at the list and indicate the extent of your involvement in each innovation. Choose "initiator" if you, along with or in conjunction with others, were the initiator of the innovation--that is, if its introduction and use was in large portion your idea. This is the option to choose if the innovation would not have happened without you. (It is expected that initiators will be very rare). Choose "major role" if you were not the initiator but played a major role in the development of the innovation as a whole. This is the option to choose if you played an important role in shaping the innovation--it would not exist in its present form without your contribution. Choose "minor role" if you were associated with the development of the innovation in a more limited capacity, for example, providing advice to the initiator on specific aspects of the innovation. This is the option to choose if you played a minor role in bringing the innovation to the organization. Choose "Don't recognize / Not involved" if it is an innovation you know nothing about and/or were not involved with at all. This will be the default answer for each innovation.

I summed the number of times each respondent indicated that they played a "major role" in the listed innovations to measure innovation support. The major role function corresponds to the sustained amount of support required by innovation initiators to effectively implement an innovation, and is therefore a representative measure of "significant" innovation support. The dependent variable for this study is therefore a count variable. On average, respondents reported playing major roles in supporting 1.02 (SD = 1.36) of the innovations listed. Self-report measures of creativity and innovation are an established and accepted approach to assessing employee innovation outcomes, with a number of recent studies making use of this approach (Axtell, Holman, Unsworth, Wall, Waterson, & Harrington, 2000; Carmeli & Schaubroeck, 2007; Janssen, 2004; Ng, Feldman, & Lam, 2010; Shalley, Gilson, & Blum, 2009).

*Mediation brokerage.* I used the 3-item mediation brokerage subscale from the DBOS developed in Study 1. Respondents answered on a 7-point scale. The coefficient alpha was .82.

*Separation brokerage.* I assessed separation brokerage with the 3-item separation brokerage subscale from the DBOS. Respondents answered on a 7-point scale. The coefficient alpha was .77.

*Tertius Iungens Brokerage Orientation.* Obstfeld's (2005) 6-item measure was used to tap this construct. Respondents answered on a 7 point scale. The coefficient alpha was .90.

*Controls.* The following variables were entered into all regression models as control variables: *rank* (0 = non-manager, 1 = manager), *gender* (0 = female, 1 = male), *education* (0 = non-PhD, 1 = PhD), *functional role* (0 = non-technical role, 1 = technical role), *department* (dummy variables created for each of the 5 departments within the division), and *ideation network structural holes* (see Chapter Two for details on how this measure was calculated). Data for each of the control variables—with the exception of education and ideation network structural holes—was obtained through archival records provided by the firm's Human Resources Department. Data on education and structural holes was collected on the online survey.

## **Analysis**

I used negative binomial regression analysis to test the hypotheses set forth in Study 3. Generalized linear models such as Poisson regression and negative binomial regression are appropriate for modeling count outcomes of a relatively rare occurrence, such as instances of innovation (e.g., Tortoriello & Krackhardt, 2010). I used negative binomial regression over Poisson regression due to evidence of over-dispersion in my data (Cohen, Cohen, West, & Aiken, 2003). Missing data reduced the final number of observations to  $n = 108$ . To minimize the effects of multicollinearity and aid in the

interpretation of the terms, I centered predictor variables prior to calculating the cross-products for the interaction terms (Aiken & West, 1991).

## Results

Table 13 contains summary statistics and Table 14 contains the correlation coefficients for the variables in this study. Table 15 summarizes the regression results. Hypothesis 8 states that mediation brokerage will be positively related to providing innovation support. Model 2 of Table 15 shows that there is a positive and significant relationship between mediation brokerage and innovation support ( $\beta = .24, \chi^2 = 2.74, p < .05$ ), providing support for Hypothesis 8. Hypothesis 9 states that separation brokerage and the *tertius iungens* orientation will interact such that higher levels of *tertius iungens* orientation will have a more positive effect on high levels of separation brokerage than on low levels of separation brokerage. The separation brokerage and *tertius iungens* interaction term in Model 3 of Table 15 is positive and significant ( $\beta = .33, \chi^2 = 10.28, p < .01$ ). The interaction plot is depicted in Figure 7. Visual inspection of the interaction plot confirms that high levels of separation brokerage are clearly more positively related to increasing levels of *tertius iungens* brokerage than are low levels of separation brokerage. Hypothesis 9 is therefore supported.



**Table 13: Study 3 Summary Statistics**

Variable	n	Percentage	Mean	Std. Deviation
Rank (Percent Manager)	111	26.3%		
Gender (Percent Male)	111	79.8%		
Education (Percent PhD)	113	23.7%		
Functional Role (Percent Technical)	114	72.8%		
Department				
Department 1	50	43.9%		
Department 2	15	13.2%		
Department 3	20	17.5%		
Department 4	15	13.2%		
Department 5	11	9.6%		
Mediation Brokerage Orientation	112		4.50	1.37
Separation Brokerage Orientation	112		3.42	1.38
<i>Tertius lungen</i> Orientation	113		4.86	1.10

**Table 14: Study 3 Bivariate Correlations**

	1	2	3	4	5	6	7	8	9
1. Rank	-								
2. Gender	0.07	-							
3. Education	-0.01	0.15	-						
4. Functional Role	-0.57**	0.07	0.07	-					
5. Department	-0.13	0.23**	0.18*	0.18*	-				
6. Ideation Network Structural Holes	0.03	0.11	-0.12	0.05	-0.02	-			
7. Mediation Brokerage	0.29**	0.13	0.01	-0.29**	-0.15	0.02	(0.82)		
8. Separation Brokerage	0.03	-0.08	0.21*	0.03	-0.09	-0.16*	0.23**	(0.77)	
9. <i>Tertius Iungens</i> Orientation	0.36**	-0.06	-0.12	-0.36**	-0.23**	0.21**	0.45**	-0.04	(0.90)

\*\* . Correlation is significant at the 0.01 level (one-tailed).

\* . Correlation is significant at the 0.05 level (one-tailed).

**Table 15: Results of Negative Binomial Regression Analysis – Study 3**

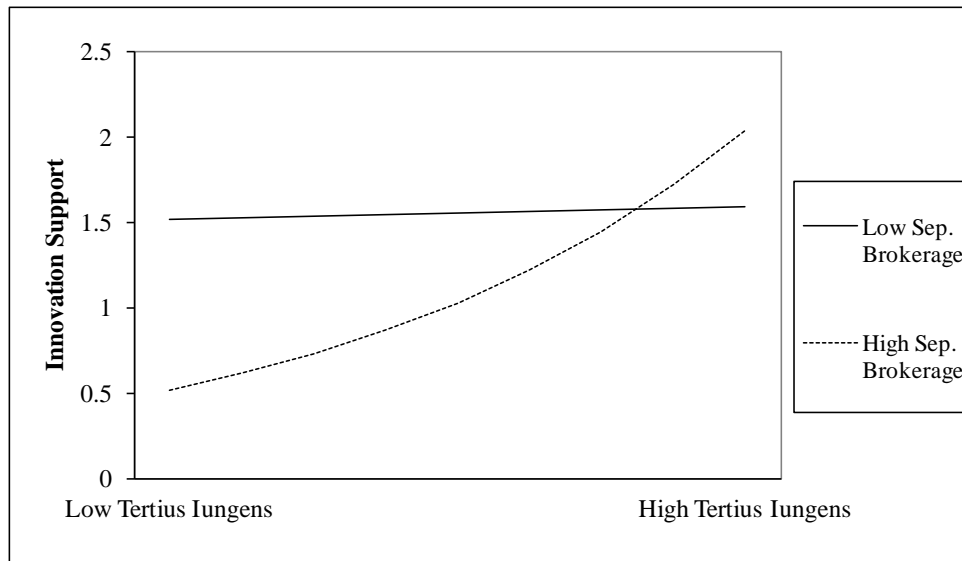
Variable	Major Role Involvement						Minor Role Involvement		Initiator Role Involvement	
	Model 1		Model 2		Model 3		Model 4		Model 5	
Control Variables										
Rank (Manager)	0.35	(0.28)	0.30	(0.28)	0.22	(0.27)	0.57**	(0.20)	0.45	(0.35)
Gender (Male)	0.11	(0.28)	-0.04	(0.25)	-0.01	(0.26)	0.01	(0.25)	1.50*	(0.68)
Education (PhD)	0.19	(0.31)	0.32	(0.31)	0.26	(0.31)	-0.22	(0.24)	-0.15	(0.46)
Functional Role (Technical Role)	0.21	(0.30)	0.49	(0.32)	0.46	(0.33)	-0.02	(0.20)	0.27	(0.43)
Department 2†	1.00**	(0.32)	1.03**	(0.30)	0.97**	(0.30)	0.86**	(0.26)	0.52	(0.48)
Department 3	-0.43	(0.34)	-0.46	(0.30)	-0.52*	(0.30)	-0.07	(0.31)	-0.55	(0.55)
Department 4	-0.46	(0.46)	-0.41	(0.44)	-0.55	(0.45)	0.98**	(0.36)	0.90*	(0.51)
Department 5	-0.21	(0.36)	-0.05	(0.37)	-0.06	(0.34)	0.15	(0.31)	-0.36	(0.65)
Ideation Network Structural Holes	0.07	(0.12)	-0.01	(0.12)	0.00	(0.12)	0.02	(0.12)	0.15	(0.17)
Independent Variables										
Mediation Brokerage Orientation			0.24*	(0.15)	0.28*	(0.15)	0.17	(0.13)	-0.07	(0.18)
Separation Brokerage Orientation			-0.19	(0.13)	-0.21	(0.13)	-0.27*	(0.12)	-0.06	(0.14)
<i>Tertius Iungens</i> Brokerage Orientation			0.19	(0.13)	0.35**	(0.14)	-0.08	(0.15)	0.33*	(0.19)
Interactions										
<i>Tertius Iungens</i> X Separation Brokerage					0.33**	(0.10)				
Intercept	-0.51	(0.34)	-0.68*	(0.35)	-0.64*	(0.37)	0.51*	(0.25)	-2.41**	(0.61)
Log Likelihood	-141.04		-138.40		-136.48		-221.82		-99.56	

Note. Standard errors in parentheses,  $n = 108$ . † Department 1 = comparison group.

\*  $p < .05$  (1-tailed).

\*\*  $p < .01$  (1-tailed).

**Figure 7: Interaction Plot of *Tertius Iungens* Orientation and Separation Brokerage Predicting Innovation Support**



## DISCUSSION

The results of the three studies reported here provide support for the psychometric properties of the 6-item DBOS, which comprises the mediation brokerage and separation brokerage sub-scales. The underlying two-factor dimensionality and internal reliability of the scale was established in Study 1 and again confirmed in Study 2. Studies 1 and 2 also established the convergent and discriminant validity of the scale by examining the relationships among the two sub-scales and other theoretically relevant constructs. Specifically, mediation brokerage was positively related to networking ability, social astuteness, the *tertius iungens* brokerage orientation, and coalition building. In accordance with Hypotheses 5-7, it was not significantly related to extraversion, Machiavellianism, or general mental ability. Separation brokerage was positively related to networking ability, social astuteness, Machiavellianism, and it was negatively related to the *tertius iungens* brokerage orientation. As hypothesized, it was not significantly related to coalition building, extraversion, or general mental ability. This overall pattern of associations demonstrates that each sub-scale fits into the nomological network as expected.

Study 3 reported the criterion-related validity of the DBOS sub-scales, demonstrating that each sub-scale is uniquely predictive of innovation support behavior at the individual level for a sample of professional employees working in a global semiconductor firm. Mediation brokerage had a positive relationship with participation in innovation support roles. Separation brokerage interacted with the *tertius iungens* orientation to predict participation in innovation support roles such that higher levels of *tertius iungens* orientation had a greater positive effect on high levels of separation

brokerage than on low levels. The interaction between separation brokerage and the *tertius iungens* orientation support prior ethnographic work done on brokerage and innovative outcomes (Long Lingo & O'Mahoney, 2010). Although hypotheses were only specified for participation in major innovation support roles, I also included regression models for other innovation roles in Study 3. Specifically, I included models that examine the predictors of minor role innovation involvement as well as innovation initiator involvement. I found the *tertius iungens* orientation to be positively related to the number of innovations an individual initiates, which supports prior work on the *tertius iungens* orientation (Obstfeld, 2005). This supports the notion that innovation initiators are primarily involved in the coordination of work among collaborators who actively work with one another. This contrasts with the role played by the innovation supporter who coordinates with parties who don't interact with one another. I also found separation mediation to be negatively related to participation in minor innovation support roles. One potential explanation for this may be due to the fact that minor innovation support roles often entail activities such as providing advice to innovation initiators, which could be considered an extra-role work behavior (Sparrowe, Liden, Wayne, Kraimer, 2001). For example, minor innovation support might involve providing others with help on technical questions. This type of assistance is rarely recognized formally by the organization. Given that the separation brokerage orientation has a significant relationship to Machiavellianism, it is possible that those high in separation brokerage avoid minor innovation roles due to their voluntary, and perhaps under-rewarded, nature.

Taken together, this pattern of results extends prior research on brokerage and innovation by identifying the importance of the mediation separation brokerage

orientation for innovation support roles. It appears that the joining action of the *tertius iungens* broker is important for the innovation initiator, most likely at the initial stages of the implementation process as the initiator engages in coalition building (Kanter, 1988). Mediation brokerage, on the other hand, appears to be of most use to the innovation supporter who plays a major role in helping to shape and implement the innovation. Innovation supporters have been identified by various names such as “orchestrator” (Galbraith, 1982) or “champion” (e.g., Burgelman, 1983; Howell & Higgins, 1990; Schon, 1963), and they tend to play an important function managing the boundaries around innovative groups (e.g., Ancona & Caldwell, 1990). It is the need for boundary management that makes mediation brokerage important for supporters of innovation. To be a successful supporter of innovation, the results of Study 3 indicate that it helps to have an orientation towards mediating between groups that either have negative relationships with one another or cannot interact easily.

### **Limitations and Future Directions**

As with any study, this research is not without its limitations. One potential limitation that arose in Study 1 was the relatively low internal reliability of the separation brokerage scale. The Cronbach’s alpha of .66 for this scale was below the recommended level (Nunnally, 1978), making it only marginally acceptable. One reason for this may be due to the nature of the Study 1 sample, which was made up of undergraduate students. Although the students all had work experience, it was limited. Individuals with limited work experience may not have sufficient experience with some brokerage activities, which may account for low reliability of the scale in that study. Concerns over internal reliability for this scale are mitigated, however, by Studies 2 and 3. The Cronbach’s alpha

estimates for the scale in these two studies were both within the universally accepted range. Furthermore, the fact that Studies 2 and 3 were both made up of professional employees at organizations in two different industries provides some evidence for the external validity of the scale.

The studies reported here are cross-sectional, so causal inferences cannot be reliably made. In order for to causality to be inferred, potential threats to internal validity would need to be eliminated through alternative research designs (Shadish, Cook, & Campbell, 2002), such as longitudinal designs. Although it is theoretically possible that innovation support involvement in fact predicts brokerage orientation, prior ethnographic work concerning brokerage and innovation demonstrate that this is not the causal order (e.g., Long Lingo & O'Mahoney, 2010; Obstfeld, 2005). Moreover, the purpose of this research was to create a valid and reliable measure of the discrete brokerage orientation. Causality is therefore less of a concern in this case, since criterion-related validity is demonstrated simply by establishing a relationship between the DBOS subscales and the constructs to which they should theoretically relate.

A fruitful future direction will be to explore the relationship the DBOS sub-scales have to other organizationally relevant outcomes. For example, it is possible that the sub-scales have opposite effects on organizational citizenship behaviors. Given that the separation brokerage orientation has an association with Machiavellianism, it is possible that it will be negatively related to organizational citizenship behaviors (OCB), particularly interpersonally oriented citizenship behaviors. Conversely, to the extent that mediating between conflicted parties is seen as an extra-role behavior, it is possible that mediation brokerage would be positively related to OCB.

The DBOS sub-scales may also function as moderators to other constructs that predict organizational outcomes; for example, social networks. Social networks have been shown to relate to a number of important organizational outcomes. Certain network positions (e.g., having a network full of heterogeneous contacts, or having a network rich in structural holes) provide an individual with opportunities, which may or may not be capitalized upon. As an increasing number of social network scholars are positing, however, network structure may be more predictive of organizational outcomes if it is coupled with certain individual abilities or propensities (cf. Kilduff & Brass, 2010). In other words, individual agency is emerging as an important element to consider in the context of network structure. The DBOS sub-scales reflect individual orientations towards engaging social networks in a certain way, and as such they are potentially powerful constructs to examine in conjunction with social network properties. For example, Obstfeld et al. (forthcoming) suggest that high levels of the *tertius iungens* orientation may enable individuals to benefit more from the resources present in a set of heterogeneous social network contacts than individuals with low levels will.

Exploring moderators to the DBOS sub-scales is another research direction that merits attention. The success of brokerage behavior is at least somewhat dependent upon how perceptive individuals are in regard to their social environment. Constructs that reflect social skills may therefore be powerful moderators to the DBOS sub-scales. For example, the political skill construct (Ferris et al., 2005) has been found to be a strong moderator of other socially-oriented work behaviors (e.g., Harris et al., 2007), and this may also be the case for the behaviors measured by the DBOS.



The results of the bivariate correlations between structural holes and separation brokerage were somewhat unexpected. There was a significant negative relationship between ideation network structural holes and separation brokerage ( $r = -.16$ ). In contrast, there was a significant positive relationship between ideation network structural holes and the *tertius iungens* orientation ( $r = .21$ ). These relationships demonstrate that brokerage behavior is indeed distinct from social network structure. Future research might explore the relationship between brokerage orientation and social network structure using a longitudinal design so as to ascertain whether or not individuals with a dominant orientation maintain certain network structures over time.

### **Conclusion**

The studies reported here show the Discrete Brokerage Orientation Scale to be a valid measure of mediation and separation brokerage. This construct has been shown to be important in the organizational innovation process, and it may have consequences for other organizationally relevant outcomes. These studies suggest that the DBOS subscales are independent from theoretically similar constructs (e.g., networking ability, coalition building, extraversion, etc.). Taken together, these results suggest that the discrete brokerage orientation is a construct that merits further research. It is my hope that this scale will enable such research.

## CHAPTER V: CONCLUSION

This research highlights the importance of continuing to examine how the social networks of employees affect innovation outcomes within organizations. As opposed to exclusively focusing on social network structure, I have incorporated several network approaches that have received less attention in the innovation literature. The conclusions to be drawn from the research reported here is that social networks affect innovation in varied ways beyond the effects of network structure. The interactional effects of individual characteristics and network characteristics, the social resources of network alters, and various individual orientations to social network brokerage all have significant impacts on how effectively employees engage in innovative pursuits in organizations.

Engaging in innovative activity is thought to be an inherently political undertaking since the nature of innovation is to instigate organizational change and alter the status quo (Frost & Egri, 1991; Kanter, 1988; Pfeffer, 1992). In Chapter Two I therefore examined innovation among a group of research scientists and engineers by taking a sociopolitical perspective. In this study I examined the relationship between an employee's political skill and his or her ability to successfully initiate organizational innovations. I also examined the moderating effect of social network structure on the relationship between political skill and innovation initiation. I find that the number of structural holes one has in their social network (i.e., being tied to others who are not connected to one another) moderates the relationship such that the political skill--innovation initiation relationship is stronger for individuals with many structural holes. Additionally, I found innovation initiation to be mediating variable in the relationship between political skill and career success. This study adds to prior research that has

examined how individual characteristics and social network variables interact to predict organizational outcomes (e.g., Mehra, Kilduff, Brass, 2001; Fleming, Mingo, Chen, 2007). I find that, while they do not independently relate to innovation initiation, structural holes amplify the effect that political skill has on this outcome. The results of this study suggest the importance of considering both personal abilities as well as the characteristics of the social environment when studying employee innovation.

In Chapter Three, I used social resources theory (Lin, 1982; 2001) as a guiding theoretical framework to examine the effect that the personal characteristics of one's social network contacts had on the focal individual's innovation behavior. Social resources theory posits that the attributes of one's social network contacts can provide resources that facilitate an individual's ability to attain desired outcomes. This perspective differs from other network perspectives that put emphasis primarily on social network structure. Although social resources theory has been applied in studies focusing on job search and career success (cf. Lin, 1999; Seibert, Kraimer, & Liden, 2001), this particular social network theory had not yet been applied to employee innovation. I addressed this shortcoming in the literature by examining the effect of two attributes: professional experience and creative ability. The sample for this study consisted of employees from a product development organization. I found that individuals whose social network contacts were, on average, more experienced and more creative tended to engage in higher levels of innovative behavior. I also examined the moderating role of network structure in this study, and again found a moderation effect for structural holes. Specifically, I found that the relationship between the attributes of one's network contacts and innovative behavior was stronger for those individuals with fewer structural holes.

The results of this study illustrate the importance of examining the characteristics of one's social network contacts as potential facilitators of innovative behavior as opposed to solely focusing on structural social network measures.

Chapter Four extended work done on the effect of an individual difference—network brokerage orientation—and innovation. Building on the work of Obstfeld and colleagues (Baker & Obstfeld, 1999; Obstfeld, 2005; Obstfeld et al., forthcoming), I examined two alternate brokerage orientations and developed a scale to empirically measure them: the Discrete Brokerage Orientation Scale (DBOS). The discrete brokerage orientation is a strategic behavioral orientation toward either maintaining separation among one's social network contacts (referred to as the *separation strategy*), or toward functioning as an intermediary between parties who cannot, or prefer not to, interact with each other (referred to as the *mediation strategy*). I found that, as hypothesized, the DBOS had two distinct sub-scales: separation and mediation. Using two separate samples, I established convergent and discriminant validity for the DBOS. Using a third sample, I demonstrated criterion-related validity by showing that the DBOS sub-scales have implications for certain roles (i.e., innovation support roles) employees can play in organizational innovation. The study reported in Chapter Four therefore introduced a new measure that furthers our understanding of how various brokerage orientations affect the different roles played by employees in bringing about innovation in organizations.

Many questions about the effects of social networks on employee innovation remain unexplored. Innovation is a collaborative social activity that is dependent upon the exchange of knowledge and ideas among individuals. Knowledge and ideas, which are the lifeblood of innovation, are transferred via social networks. Thus, a clear

understanding of the ways in which social networks impact innovation is crucial for a complete understanding of innovation itself. A continued focus on the various ways in which individuals interact with one another and use social networks as they strive to innovate will help to further our understanding of this crucially important phenomenon.

## **APPENDIX 1: Name Generator Questions Used to Elicit Social Network Contact Names**

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"Who do you regularly seek advice from about next steps and issues that arise in the course of working on a project?"

"Suppose you are advocating for a new project. Whose buy-in (e.g., for obtaining approval or resources) would you pursue?"

"Who helps you to brainstorm and think creatively?"

"Who are the people you approach regularly to get candid, 'behind-the-scenes' insight regarding projects and innovations in the organization?"

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## APPENDIX 2: Mach IV Machiavellianism Scale

1. Never tell anyone the real reason you did something unless it is useful to do so.
2. The best way to handle people is to tell them what they want to hear.
- \*3. One should take action only when sure it is morally right. (r)
4. Most people are basically good and kind. (r)
5. It is safest to assume that all people have a vicious streak and it will come out when they are given a chance.
6. Honesty is the best policy in all cases. (r)
7. There is no excuse for lying to someone else. (r)
8. Generally speaking, people won't work hard unless they're forced to do so.
9. All in all, it is better to be humble and honest than important and dishonest. (r)
10. When you ask someone to do something for you, it is best to give the real reasons for wanting it rather than giving reasons which might carry more weight. (r)
11. Most people who get ahead in the world lead clean, moral lives. (r)
12. Anyone who completely trusts anyone else is asking for trouble.
13. The biggest difference between most criminals and other people is that criminals are stupid enough to get caught.
14. Most people are brave. (r)
15. It is wise to flatter important people.
16. It is possible to be good in all respects. (r)
- \*17. P.T. Barnum was very wrong when he said there's a sucker born every minute. (r)
18. It is hard to get ahead without cutting corners here and there.
19. People suffering from incurable diseases should have the choice of being put painlessly to death.
- \*20. Most men forget more easily the death of their father than the loss of their property.

\*Item removed due to low item-to-total correlation (< .20). The final scale used in this dissertation comprised the remaining 17 items.

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# Vita

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### Education

Master of Business Administration (2007), Major Concentration: Management; Minor Concentration: International Business. **University of Kansas**, Lawrence, KS.

Bachelor of Science (1999), Major: Business Administration; Minor: English. **University of Kansas**, Lawrence, KS.

### Refereed Publications

- Venkataramani, V., Labianca, G., and Grosser, T.J. (Forthcoming). Negative relationships, social satisfaction, and workplace attitudes: The role of employees' social prominence as a buffer in the social ledger. *Journal of Applied Psychology*.
- Lopez-Kidwell, V., Grosser, T.J., Dineen, B.R., and Borgatti, S.P. (Forthcoming). What matters when: A multistage model and empirical examination of job search effort. *Academy of Management Journal*.
- Grosser, T.J., Lopez-Kidwell, V., Labianca, G., and Ellwardt, L. 2012. Hearing it through the grapevine: Positive and negative workplace gossip. *Organizational Dynamics*, 41: 52-61. **Media mention: Canadian Broadcasting Corp. Doc Zone, Fall 2012.**
- Grosser, T.J., Lopez-Kidwell, V., and Labianca, G. 2010. A social network analysis of positive and negative gossip in organizational life. *Group & Organization Management*, 35: 177-212. **Media mention: Harvard Business Review, September 2010; NBC Nightly News, September 2010.**

### Book Chapters

- Grosser, T.J., & Borgatti, S.P. (Forthcoming). Network Theory/Social Network Analysis. In R.J. McGee and R.L. Warms (Eds.), *Theory in Social and Cultural Anthropology*. Thousand Oaks, CA: Sage.
- Borgatti, S.P. & Grosser, T.J. (Forthcoming). Structural Equivalence: Meaning and Measures. In *The International Encyclopedia of Social and Behavioral Sciences*, 2nd Edition. Oxford, UK: Elsevier.
- Grosser, T.J., Sterling, C.M., Scott, K.D., and Labianca, G. 2010. Social networks, groups, and social exclusion: Combining sociometric and psychometric approaches

to understanding social exclusion in organizational settings. In L. Neider and C. Schriesheim (Eds.), *Research in Management: The Dark Side of Management*: 143-191. Greenwich, CT: Information Age Publishing.

### **Refereed Proceedings**

- Lopez-Kidwell, V., Grosser, T.J., and Dineen, B.R. 2011. What matters when: A multi-stage examination of factors contributing to job search effort. *Academy of Management Best Paper Proceedings*.

### **Working Papers**

- Grosser, T.J., Lopez-Kidwell, V., Dineen, B.R., and Borgatti, S.P. A turn for the better: The mediating role of interaction for improving network ties. Target: *Organization Science*.
- Grosser, T.J., Sterling, C.M., and Labianca, G. Social networks, formal rank, and interpersonal avoidance behavior in the workplace. Target: *Journal of Applied Psychology*.
- Ofem, B., Lopez-Kidwell, V., Grosser, T.J., Dineen, B.R., and Borgatti, S.P. Good apples and bad apples: The effects of single individuals on student team outcomes. Target: *Journal of Applied Psychology*.
- Sterling, C.M., Grosser, T.J., and Labianca, G. Social network context and supervisors' perceptions of employee deviance. Target: *Journal of Applied Psychology*.

### **Work In Progress**

- Mehra, A., Grosser, T.J., Assudani, R., and Borgatti, S.P. Antecedents and consequences of the perception of social network change. Data collection in progress.

### **Conference Presentations**

- Sterling, C.M., Grosser, T.J., and Labianca, G. 2012. Social network context and supervisors' perceptions of employee deviance. Presented at the *Academy of Management Annual Meeting*, Boston, MA.
- Lopez-Kidwell, V., Grosser, T.J., and Dineen, B.R. 2011. What matters when: A multi-stage examination of factors contributing to job search effort. Presented at the *Academy of Management Annual Meeting*, San Antonio, TX. **Winner of the Best Student Convention Award, 2011 Academy of Management, HRM Division.**



- Grosser, T.J., Sterling, C.M., and Labianca, G. 2011. Social networks, formal rank, and interpersonal avoidance behavior in the workplace. Presented at the *Academy of Management Annual Meeting*, San Antonio, TX.
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- Ofem, B., Lopez-Kidwell, V., Grosser, T.J., Dineen, B.R., and Borgatti, S.P. 2010. Good apples and bad apples: The effects of single individuals on student team outcomes. Presented at the *Academy of Management Annual Meeting*, Montreal, Canada. **Winner of the Barry Armandi Award for Best Student Paper in Management Education Research, 2010 Academy of Management, MED Division.**
- Grosser, T.J., Lopez-Kidwell, V., Dineen, B.R., and Borgatti, S.P. 2009. A Turn for the better: The mediating role of interaction for improving network ties. Presented at the *Academy of Management Annual Meeting*, Chicago, IL.
- Grosser, T.J., Lopez-Kidwell, V., Dineen, B.R., and Borgatti, S.P. 2009. Do first impressions matter? A longitudinal analysis of affective tie formation. Presented at the *29<sup>th</sup> Annual International Sunbelt Social Network Conference*, San Diego, CA.
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- Grosser, T.J., Lopez-Kidwell, V., Labianca, G., and Andrevski, G. 2008. A social network analysis of positive and negative gossip in organizational life. Presented at the *24<sup>th</sup> European Group for Organizational Studies (EGOS) Colloquium*, Amsterdam, Netherlands.
- Grosser, T., Mehra, A., and Borgatti, S.P. 2008. A qualitative inquiry into online ties. Presented at the *28<sup>th</sup> Annual International Sunbelt Social Network Conference*, St. Petersburg, FL.

## Teaching Experience

### Course Instructor

*Negotiation and Conflict Resolution (MGT 450, University of Kentucky)*

- Spring 2012 (3.7/4.0)
- Spring 2011 (3.1/4.0)

*Principles of Management (MGT 301, University of Kentucky)*

- Spring 2009 (3.9/4.0)
- Fall 2008 (3.6/4.0)

### Workshop Instructor

*Links Center Workshop on Social Network Analysis (University of Kentucky)* – A one-week intensive workshop on social network analysis methodology. The workshop is attended by faculty members, graduate students, and practitioners from a variety of disciplines. I served as an instructor on selected introductory topics.

- Summer 2010-2013

### Teaching Assistant

*Social Network Analysis Workshop (University of Kentucky)*

- Summer 2008-2013 (with Stephen Borgatti, Martin Everett, Rich DeJordy, and Dan Halgin)

*Social Network Analysis Workshop (Institute on Systems Science and Health)*

- Summer 2011 (with Stephen Borgatti)

*Social Network Analysis Workshop (University of Essex)*

- Summer 2010 (with Rich DeJordy)

*Negotiation and Conflict Resolution (MGT 450, University of Kentucky)*

- Spring 2008, Fall 2009, and Spring 2010 (Joe Labianca was the primary instructor for each course)

### Teaching Interests

- (1) Organizational Behavior; (2) Human Resource Management; (3) Negotiation and Conflict Resolution; (4) Managing Innovation and Creativity; (5) Power and Politics in Organizations; (6) Social Network Theory and Methodology; (7) Management Skills; and (8) Strategic Management.

### Professional Service and Memberships

- Ad-Hoc Reviewer, *Academy of Management Review*, 2011-present.
- Ad-Hoc Reviewer, *Organizational Behavior and Human Decision Processes*, 2012-Present

- Ad-Hoc Reviewer, *Journal of Management Studies*, 2012-Present
- Ad-Hoc Reviewer, *Human Resource Management Journal*, 2011-present.
- Ad-Hoc Reviewer, *Group & Organization Management*, 2010-present.
- Ad-Hoc Reviewer, *Journal of Occupational and Organizational Psychology*, 2010-present.
- Reviewer, International Conference on Information Systems, 2010-2011
- Reviewer, Academy of Management Annual Meeting, 2009-present.
- Member, International Network for Social Network Analysis, 2007-present.
- Member, Academy of Management, 2006-present.

## Honors and Awards

### Best Paper Awards

- *Best Student Paper Award*, Academy of Management HRM Division, 2011.
- *Best Student Paper Award*, Academy of Management MED Division, 2010.

### Other Research Awards

- *Dissertation Year Fellowship*, University of Kentucky, 2012-2013.
- Selected to attend the *OMT/MOC Doctoral Consortium* at the 2011 AOM Annual Meeting.
- *Research Challenge Trust Fund II Gatton Doctoral Fellowship*, Univ. of Kentucky, 2011.
- *Daniel Reedy Fellowship*, University of Kentucky, 2007-2010.

### Service Awards

- *Outstanding Reviewer Award*, Academy of Management OB Division, 2011.
- *Positive Code of Conduct Award*, University of Kansas School of Business, 2007.
- *Graduate Business Council Award*, University of Kansas School of Business, 2007.

## Previous Work Experience

**28<sup>th</sup> Transportation Battalion (U.S. Army)**, Mannheim, Germany, *Training Officer* (Captain) 2002 – 2004

**70<sup>th</sup> Transportation Company (U.S. Army)**, Mannheim, Germany, *Platoon Leader* (1<sup>st</sup> Lieutenant) 2001 – 2002

**20<sup>th</sup> Area Support Group (U.S. Army)**, Daegu, South Korea, *Plans and Operations Officer* (2<sup>nd</sup> Lieutenant) 2000 – 2001