



Should I Bridge or Should I Bond? Social Capital Strategies and Contingencies

Evelina Nenkova Atanassova

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Par

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Should I Bridge or Should I Bond? Social Capital Strategies and Contingencies

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To my husband, Tervel,

For always pushing me to overcome my fears and expand my own boundaries.

And to the two joys of my life, my daughter Karina and my son Adrian,

For making me their role model and for inspiring me to never give up on my dreams.

ABSTRACT

My dissertation expands the line of inquiry of the contingent value of social capital to individual performance by raising three novel questions. In the first essay of my dissertation I focus on *“How to bridge and how to bond”* and propose a new theoretical framework for analyzing social capital, which deconstructs its major function beyond bridging or bonding into its substance as social relations versus position in network structure. Considering these two dimensions of social network analysis I propose four distinct sources of social capital that have different predictive value for individual achievements: bridging network, bridging relations, bonding network and bonding relations. The lead question in the second chapter of my dissertation is *“When to bridge and when to bond”*. Joining the research on the contingent value of social capital, I look at organization and individual level factors to predict the value of each social capital source to performance and theorize about the strategies individuals should pursue in order to achieve better performance. In the third essay I ask *“Should one start with bridging or with bonding?”* Building on the categorization proposed in the first chapter I investigate the most successful social capital path to on-the-job performance.

Key words: social capital, meta analysis, job performance, network strategies

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CHAPTER I: INTRODUCTION

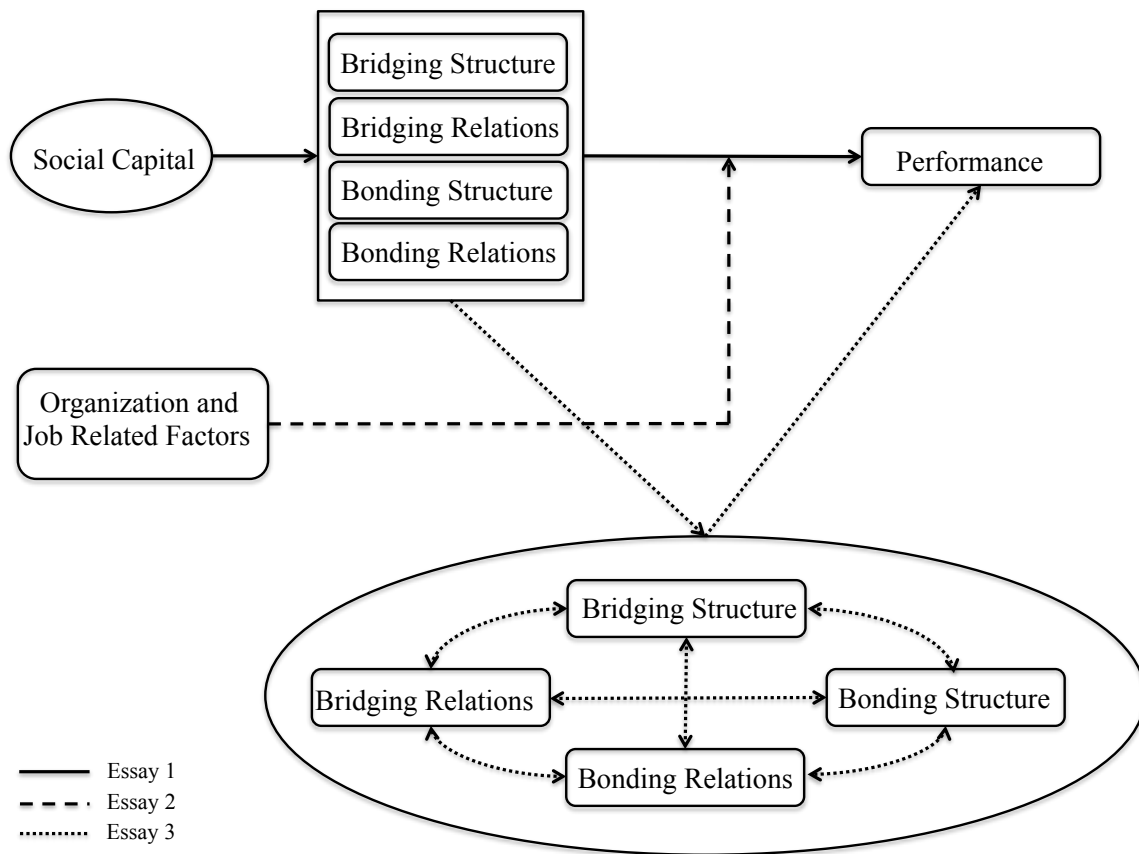
PURPOSE AND RESEARCH QUESTIONS

The main objective of this dissertation is to investigate the available sources of social capital and the mechanisms through which they affect individual performance. The concept of social capital has received much attention from organizational researchers in their effort to deconstruct the effects of social networks and the groups to which people belong and to evaluate their effects on individual outcomes. In the past decade the analyses of social capital development have been the subject of a continuous conversation among scholars on distinguishing between structural characteristics of ego-networks that enhance the development of social capital and those that hinder such opportunities. This conversation started as a debate on whether cohesive or structural holes networks are the source of individual capital (Burt, 1992; Coleman, 1988), and has evolved to the recognition that there is a trade-off between both types of networks (Gargiulo & Benassi, 2000; Ahuja, 2000). The abundance of empirical research has produced intriguing but sometimes contradicting findings that leave business professionals wondering should they bridge or should they bond and invite scholars to further demystify the processes and conditions under which social capital delivers value to actors. In response to Kwon and Adler's (2014) call to expand on specific aspects and mechanisms of social capital, I set two main goals for my dissertation. First, I develop a conceptual framework for a more rigorous analysis of the sources of social capital, one that concomitantly assesses their function and their content, and therefore allows for an in-depth analysis of the opportunities and risks that each source hinders. Second, I theorize about the specific mechanisms and strategies through which each social capital delivers value to actors.

The dissertation is composed of three essays, each addressing the dichotomy between bridging and bonding from a different theoretical angle. In the first essay I raise the question *How to Bridge And How to Bond* and propose a new theoretical framework for analyzing social capital, which deconstructs its major function beyond bridging or bonding into its substance as social relations versus position in network structure. Considering these two dimensions of social network analysis I propose four distinct sources of social capital that have different predictive value for individual achievements – bridging network, bridging relations, bonding network and bonding relations – and examine their value to individual performance. The lead question in the second essay of my dissertation is *When to Bridge And When to Bond?* Joining the research on the contingent value of social capital, I look at how organization and job related factors moderate the relationship between each social capital source to performance and theorize about the strategies individuals should pursue in order to achieve better performance. In the third essay I ask, *Which Source Should I Build On?* I examine the individual power of each source of social capital and the complementarity among the four of them. I demonstrate that while all sources of social capital are expected to have some positive impact on performance, some of them might suppress the evolvement of the other forms. Considering the contingent value of each social capital source this finding has a significant impact as it predicts the best “social capital path” to performance – one that builds on the most powerful source of social capital and still takes advantage of the others. Graphical representation of the three theoretical models of the dissertation is presented in Figure 1.

My dissertation expands the line of inquiry of the contingent value of social capital to individual performance with four theoretical contributions. First, I propose a new conceptual framework for measuring the sources of social capital through four

Figure 1: Graphical Representation of Dissertation Models



general sources - bridging network, bridging relations, bonding network and bonding relations, rather than through the more general bridging and bonding social capitals (Adler & Kwon, 2002). I argue that this framework provides a more rigorous approach to categorizing the various ways social capital could be operationalized, which has important theoretical and methodological implications. From a theoretical standpoint this framework allows for an in-depth analysis of the similarities and differences in the

contents, value and opportunities inherent to each source. From a methodological standpoint this framework allows more focused predictions on the value of social capital to outcomes and improves the variance in outcomes explained by social capital. Second, building on this framework I theorize about three critical characteristics of each source – their inherent value, the strategies to derive their value and their utility in regards to pursued outcome, which together further justify the need for adopting the framework in future analyses. Third, I examine how organizational and job related factors have a different impact on the utility of each source of social capital for individual performance, providing more evidence for the predictive power of the proposed framework. Lastly, instead of further inquiring into the rivalry between the sources of social capital, I look into their complementarity to propose a new approach to measuring their value based not only on their individual affects to an outcome, but also on their relationships to the other sources. My analyses and findings rely on a meta-analytical dataset, which I collected for the purposes of this dissertation. The choice of data and methodology are driven by the research questions of my explanatory theories. Meta-analysis is the only statistically sound method to quantitatively accumulate findings (Schmidt, 2008). It allows me to test my propositions, which are difficult to assess in a single sample primary study (Carney et al., 2013) and to draw definitive conclusions about the degree to which they are supported by the accumulated evidence (Combs, Ketchen, Crook, & Roth, 2010).

THEORETICAL BACKGROUND

Social Capital

Social capital is a broad concept that scholars have studied and attempted to define in terms of its substance, source, effect and utility (Robison, Schmid & Siles,

2002). Source definitions of social capital range from Burt's (1992) focus on social contacts – “friends, colleagues, and more general contacts through whom you receive opportunities to use your financial and human capital” – to Portes' (1998) emphasis on embeddedness in the structure or “the ability of actors to secure benefits by virtue of membership in social networks or other social structures (for a full review of definitions see Adler and Kwon, 2002). It is generally agreed that social capital is comprised of both the social relations actors have and the social structures they are embedded in. Scholars – however – are not unanimous which structural characteristics of ego-networks enhance the development of social capital and which hinder it. The research in the field was motivated by the debate on whether cohesive or structural holes networks are the source of such capital (Coleman, 1988; Burt, 1992) and has led to the affirmation of two general forms: bridging and bonding. Supporters of bridging argue that the source of social capital lies in external connections and structural opportunities for brokering, while advocates of bonding see the source in internal ties and communal support (Oh, Kilduff & Brass, 1999; Adler & Kwon, 2002).

The differences in how scholars define social capital from the perspective of its source are mirrored by the differences in how they operationalize it. Researchers amenable toward the bridging side measure various social network properties, such as spanning one or more boundaries (Fleming & Waguespack, 2007), criticality of network position (Brass, 1985), betweenness centrality (Cross & Cummings, 2004; Li, Liao & Yen, 2013), and weak ties (Korpi, 2001; Seibert, Kraimer & Liden, 2001; Venkataramani, Richter & Clarke, 2014). Generally, scholars on this side of the argument contend that since social capital ultimately arises from the brokering opportunities

between disconnected individuals, control over the flow of resources and information is its key determinant (Burt, 1992). Such opportunities are seen in loosely connected networks, which provide a structural premise for taking advantage of brokering, and in weak or diverse ties, which are viewed as likely sources of nonredundant knowledge that present another opportunity for a competitive action through brokering. Therefore, scholars interested in bridging operationalize social capital by considering both structure and relations.

Similarly, proponents of the bonding form of social capital are interested in the structural measures of closed networks, such as network density (Gabbay & Zuckerman; McFadyen, Semadeni & Cannella, 2009) and network constraint (Bizzi, 2013; Smith & Thompson, 2012), as well as relational measures, such as strong ties (Meverson, 1994; Baer, 2012), kin (Renzulli, Aldrich, & Moody, 2000) and affective ties, e.g. friendship (Mehra, Kilduff, & Brass, 2001; Westphal & Sterns, 2006). They argue that its value resides in the social support actors receive (Coleman, 1988), and look for such support through structural and relational mechanisms. Individuals embedded in dense groups have the competitive advantage of early access to the information and the tangible resources available from the social structure as well as minimized opportunistic behavior (Coleman, 1988). Having strong ties also leads to social support, as it is usually associated with the availability of needed help (Aral & Van Alstyne, 2011). Consequently, scholars investigating bonding social capital also analyze it through both structure and relations. From this observation on the various ways to bridging and to bonding comes my first research question: How to bridge and how to bond?

The Contingency Perspective on Social Capital

The most recent research trend on social capital takes on a contingency perspective, which argues that the value of bridging versus bonding depends on external factors. Gargiulo and Benassi (2000) are one of the first to initiate a discussion about a trade-off that exists in choosing a network structure. They argue that the value of social structure is contingent on the organization environment and conclude that cohesive networks could be instrumental for managers in affirming their status as valuable organization members as well as in gaining group support in times of uncertainty, but they can also be detrimental to their future professional growth and capacity to lead change initiatives (Gargiulo & Benassi, 2000). Another stream of research argues that the optimal structural design for social capital is contingent on the actions that the actors pursue (Ahuja, 2000). A third line of thought is introduced by Ryall and Sorenson (2007) who argue that brokers have competitive advantage only when they meet three conditions concomitantly – they cannot be substituted by anybody else; they intermediate more than two social ties; and they are not locked into a particular pattern of exchanges as a consequence of their brokerage – thus suggesting overall social structure as another contingent factor.

On the topic of job performance, the literature has outlined several critical moderators that predict the relevancy of the sources of social capital. First, the value of bridging is found to be greater for performance on tasks that require novelty generation (Rodan & Galunic, 2004). Second, bridging has a greater impact when job tasks are characterized by ambiguity (Burt, 2005). Third, bonding social capital is more beneficial to actors whose job requires work with highly complex knowledge, while bridging gives

advantage to jobs that do not require transfer of complex knowledge (Aral & Van Alstyne, 2011; Hansen, 1999). Fourth, bonding social capital is more important for work environments in which information changes rapidly (Aral & Van Alstyne, 2011). In sum, the empirical literature is conclusive that the choice between bridging and bonding is contingent on external factors but it is not exhaustive about what those factors are and how they relate to the various sources of social capital. Hence, my second research question *When to Bridge And When to Bond* aims to shed more light on the contingent utility of social capital by investigating the moderating effects of organization and job related factors on its value to performance.

Network Dynamics and Social Capitals

A common denominator of many empirical studies in the field is the focus on a snapshot of the immediate individual network in a particular setting, predominantly on different types of ties and networks within the individual's employer organization (e.g. Seibert, Kraimer, & Liden, 2001; Rodan, 2010; Brass, 1984; Gargiulo & Benassi, 2000). Recent research, however, convincingly demonstrates that social networks are dynamic, which raises the question how network dynamics affects the development of social capital sources. More specifically, the literature suggests that networks with structural holes transform because brokerage positions are dynamic (Zaheer & Soda, 2009; Ryall & Sorenson, 2007). While investigating the effects of collaboration networks on innovation in a longitudinal study of firms in the international chemistry industry Ahuja (2000) found that the mean number of direct ties grew steadily during the investigated period of ten years. His findings are probably applicable on the level of individual networks as actors continuously meet new contacts and the number of their ties, whether active, latent

or potent (Mariotti & Delbridge, 2012) should also increase with time. In such case, new brokerage positions in a network would continuously come up. Similarly, cohesive networks are supposedly evolving too; for example changes in membership and rank might affect the level of embeddedness in a group as well as the number of embedded contacts.

Because individuals derive social capital from their social networks and social relations, an assumption can be made that at any moment they have, at least to some extent, access to all sources of social capital. On the one hand, the number of contacts each individual has is increasing over time (Ahuja, 2000) and this process impacts the relationship dynamics. Weak ties become strong if there are a sufficient number of repeated interactions, while strong ties become weak if they are not maintained. On another hand, individual social networks are not static; triadic closure (Granovetter, 1973) dissolves structural holes and new bridges open as the network expands over time. Given that each source of social capital is potentially beneficial for the actors, I am interested in investigating how all the sources are related to each other and which one assumes the role of founding block of social capital utilization. Hence, my third research question is *Which Source Should I Build On?*

SUMMARY OF THE THREE ESSAYS

The Devil Is In The Detail: Four Routes to Social Capital

In the first essay of my dissertation I answer the question *How to Bridge And How to Bond* by arguing that there are four distinct sources of social capital that have different predictive value for individual achievements: bridging network, bridging relations, bonding network and bonding relations. Building on current and past research on social

networks, agent-centric networking and psychological approach to networking I argue that each source presents unique opportunities and at the same time requires different strategies and abilities to derive those opportunities. My first argument is that the four sources differ in the utility that might be derived from them. *Bridging structure* provides opportunities to exercise entrepreneurship by brokering between disconnected individuals and groups (Burt & Ronchi, 2007), while *bridging relations* allow for the potential of gaining a competitive advantage through the quantity of total gathered information, knowledge and resources (Umphress, et al., 2003), the earlier exposure to a wide range of views and ideas (Balkundi, Kilduff, Barsness, & Michael, 2007; Granovetter, 1973), and the widest choice of interaction partners (Flap & Völker, 2001). *Bonding structure* provides an increased information flow and norms of cooperation that ensure easy access to knowledge and resources within a network as well as group support when needed (Baer, 2012); *bonding relations* are the ones willing to devote time and effort in assisting each other (Coleman, 1988) with the information and resources they have at hand (Aral & Van Alstune, 2011) as well as with any emotional needs (Ibarra & Smith-Lovin, 1997). My second argument is that social capital requires strategies for tie discovery, acts of leverage, targeting resources, and prioritizing (Bensaou, Galunic, & Jonczyk-Sédès, 2014) and these differ from one source to another. My third argument is that because personality affects the social capital strategies that will be activated (Sasovova, Mehra, Borgatti, & Schippers, 2010), the sources of social capital differ in their ease of acquire. Based on those arguments I compare the relative value of each social capital source to individual performance.

I use a meta-analytical dataset with a sample composed of 62 published papers from 20 different journals and a total of 345 effect sizes. I use a likelihood ratio test (LRT) to test my proposed framework by comparing the fit of two contrasting models – one that includes the composite variables bridging and bonding with one that uses the four social capital categories. To test my predictions about the relative value of each source of social capital I used Hedges-Olkin meta-analysis (HOMA), which calculates meta-analytic mean correlations and their corresponding confidence intervals (Hedges & Olkin, 1984; Lipsey & Wilson, 2001). Overall, the results of the study support my prediction that using the four sources of social capital significantly improves the variance in individual performance explained by social capital compared to an analysis based solely on the parameters of bridging and bonding. I also find that for individual goals, bridging by means of network position or through relations is considerably more valuable than bonding.

Should I Bridge or Should I Bond? The Organization And Job Effects On Social Capital Utility

The lead question in the second essay of my dissertation is “*When to bridge and when to bond*”. Joining the research on the contingent value of social capital, I look at organization and job related factors to predict the value of each social capital source to performance and theorize about the strategies individuals should pursue in order to achieve better performance. Because “individual actors are constrained by, make use of, and modify existing structures” (Scott & Davis, 2007, p. 7), I find it important in the context of job performance to look at the organization as such a structure, impacting the social capital of its employees. More concretely, I theorize how organizational size (an

indicator of the range of the structure's boundaries), type of occupied job (an indicator of the functional job location in the structure) and type of job goals (an indicator of structural bounds) impact the utility of each individual social capital source. I also look at the interplay between the organization's structure and the individual networks and theorize how the content of the social capital sources as well as their location vis-à-vis the organizational boundaries also impact their utility for performance.

In this study I use the same meta-analytical dataset with 345 effect sizes. To test the proposed moderating effects on the relationship between social capital sources and performance I use meta-analytical regression analysis (MARA; Lipsey & Wilson, 2001). I find that the size of the organization affects the value of the social capitals derived from structure, but has no impact on the relational social capitals. I also find that technical type of jobs have a strong negative effect on bridging structure and a positive effect on bridging relations and bonding structure. I next find that task interdependence has a negative impact on the value of bridging, and a positive one on bonding. Finally, I find support for my prediction that location of the social capital and types of ties also can impact the utility of the sources. Overall, the results of this study further affirm the differentiation between the four sources of social capital and propose new moderators of the relationship between social capital and performance to be considered by future research.

The Social Capital Path to Performance

In the final essay I seek to find an answer to the question *Should One Start With Bridging or With Bonding?* I argue that the empirical focus on the contingent value of bridging and bonding has left in the shadows the exploration of the complementarity of

the different forms of social capital. However, as networks constantly evolve their structural configuration moves through the spectrum between richness of structural holes and closeness. This allows for different forms of social capital to be derived simultaneously. If individuals are always bridging and bonding to some extent, then a new question arises: What is the strategic starting point of social capital utilization? In this study I first examine the individual power of each source of social capital and next I investigate the complementarity among all of them. I demonstrate that while all sources of social capital are expected to have some positive impact on performance, some of them might suppress the evolvement of the other forms. My goal is to identify the source of social capital that not only positively impacts performance, but also maximizes the subsistence of the other sources. Based on the theorized relationships between bridging structure, bridging relations, bonding structure and bonding relations, I propose three competing models of the relationships between the sources of social capital and individual performance. The bridging relations model tests the well-affirmed proposition that the number and diversity of relations has a positive impact on performance outcomes (e.g. Cross & Cummings, 2004; Zou & Ingram, 2012) but also takes into account the mediating effects of the other sources. The competing, bonding relations model, explores the direct affect of bonding relations on performance, complemented with the mediating effect of the other sources. A third – parallel relations – model, controls for the direct effect of the two relational sources of social capital and the mediating effect of the network derived social capital sources.

My sample for this study consists of 61 published papers from 19 different journals, and a total of 662 effect sizes. I first calculated meta-analytical correlations to

examine the eluded from empirical scrutiny associations between the four sources of social capital. I next used a meta-analysis structural equation modeling (MASEM). This method provides information on the degree of fit of entire models, which allows me to compare the explanatory values of the proposed competing models (Bergh et al., 2014). Arguing that bridging capital can be pursued through either bridging structure or bridging relations and similarly that bonding capital is derived from both bonding structure and bonding relations, I individually examined the four possible bridging-bonding relationships. Starting with bridging structure, I found that it is significantly associated with the two bonding sources and the directionality of both the associations was found to be positive. Moving to bridging relations, I discovered that they are positively associated with bonding relations, but negatively associated with bonding structure. The results of this study demonstrate that bonding relations is the grounding form for achieving better performance and is also the form that is most tolerant toward the other sources of social capital.

CHAPTER 2: THE DEVIL IS IN THE DETAIL: THE FOUR ROUTES TO SOCIAL CAPITAL

ABSTRACT

Social capital has long been recognized as a powerful predictor of individual, job-related achievements. The literature has affirmed two forms of the concept – bridging and bonding – and has piled up significant evidence for the value of both. Our study seeks to refine the literature by suggesting that these two forms of network characteristics need to be further distinguished in terms of their structural and relational dimensions. We propose that the study of the sources of social capital is improved by distinguishing four categories: bridging structure, bridging relations, bonding structure and bonding relations. Building on research on social networks, agent-centric networking and psychological approach to networking we argue that each source presents unique opportunities and at the same time requires different strategies and abilities to capitalize on those opportunities in terms of individual job performance. We test our framework on a meta-analytical dataset. Our results support our prediction that using these four categories in describing the source of social capital significantly improves the variance explained in individual job performance by social capital compared to an analysis of bridging and bonding only. By discussing the content of each source of social capital, the strategies to optimize them, and the psychological predispositions toward those strategies, we offer important implications for future research on the relationship of social capital to individual job performance.

Keywords: social capital, individual performance, meta-analysis

INTRODUCTION

Social capital is a broad concept, which scholars have defined in terms of its substance, source, effect and utility (Robison, Schmid & Siles, 2002). Source definitions of social capital range from Burt's (1992) focus on social contacts – “friends, colleagues, and more general contacts through whom you receive opportunities to use your financial and human capital” – to Portes' (1998) emphasis on embeddedness in the structure or “the ability of actors to secure benefits by virtue of membership in social networks or other social structures (for a comprehensive review see Adler and Kwon, 2002). It is generally agreed that social capital is comprised of both the social relations actors have and the social structures they are embedded in.

Scholars – however – are not unanimous which structural characteristics of ego-networks enhance the development of social capital and which hinder it. The research in the field was motivated by the debate on whether cohesive or structural holes networks are the source of such capital (Burt, 1992; Coleman, 1988) and has led to the affirmation of two general forms: bridging and bonding. Supporters of bridging argue that the source of social capital lies in external connections and structural opportunities for brokering. The advocates of bonding see the source in internal ties and communal support (Adler & Kwon, 2002; Oh, Kilduff & Brass, 1999). The abundance of empirical research in both camps has produced intriguing but sometimes contradicting findings suggesting a need for further inquiry into the sources of social capital.

The differences in how scholars define social capital from the perspective of its source are mirrored by the differences in how they operationalize it. Researchers amenable toward the bridging side measure various social network properties, such as spanning one

or more boundaries (Fleming & Waguespack, 2007), criticality of network position (Brass, 1985), betweenness centrality (Cross & Cummings, 2004; Li, Liao & Yen, 2013), and weak ties (Korpi, 2001; Seibert, Kraimer & Liden, 2001; Venkataramani, Richter, & Clarke, 2014). As a consequence these scholars argue that since social capital ultimately arises from the brokering opportunities between disconnected individuals, control over the flow of resources and information is key (Burt, 1992). Such opportunities are present in loosely connected networks, which provide a structural premise for taking advantage of brokering, and in weak or diverse ties, which are viewed as likely sources of non-redundant knowledge. Scholars interested in bridging thus operationalize social capital by considering both structure and relations.

Similarly, proponents of the bonding form of social capital are interested in the structural measures of closed networks, such as network density (Gabbay & Zuckerman; McFadyen, Semadeni, & Cannella, 2009) and network constraint (Bizzi, 2013; Smith, Menon, & Thompson, 2012), as well as relational measures, such as strong ties (Baer, 2012; Meverson, 1994), kin (Renzulli, Aldrich, & Moody, 2000) and affective ties (Mehra, Kilduff, & Brass, 2001; Westphal & Sterns, 2006). They argue that its value resides in the social support actors receive (Coleman, 1988), and look for such support through structural and relational mechanisms. Individuals embedded in dense groups have the competitive advantage of early access to the information and the tangible resources available from the social structure as well as minimized opportunistic behavior (Coleman, 1988). Having strong ties is another way to get social support, as they are usually available to provide needed help (Aral & Van Alstyne, 2011). Consequently,

scholars investigating bonding social capital also analyze it through both structure and relations.

A review of the operationalization of the sources of social capital reveals a conceptual tendency to uniformly address the structural and relational properties for measuring both bridging and bonding. However upon closer consideration, it is not obvious that structure and relations are interchangeable measures of the sources of social capital. First, structural formation is not limited to individual relations (Rank, Robins, & Pattison, 2010). Second, the mechanisms through which social structure and social relations provide value to the actor are different. We argue that the current way of operationalization of social capital is not capturing sufficiently the variability of the available sources. Every source of social capital can be described with two inherent attributes – ease of acquiring and relevance to pursued outcome, which differ not only across their type (bridging versus bonding) but also across their substance (structure versus relations). Both of those attributes demand different individual strategies and skills, which further justify the need for independent investigation of each.

Our first objective is to contribute to the research on social capital by proposing a new framework for analyzing the sources of social capital – one that looks at structure and relations as two distinct sources for both bridging and bonding. We argue that the source of social capital is an important contributor to its empirically observed influence on various outcomes. Second, we test the proposed framework on a meta-analytical dataset, and verify if it improves the predictive validity of social capital on individual job performance. We conduct two types of analyses to test our predictions – Hedges and Olkins' (1985) meta-analysis (HOMA) and the newly developed likelihood ratio test

(LRT; Viechtbauer, 2010). This new procedure allows us to estimate whether analyzing social capital through the categories we propose reduces the unaccounted heterogeneity in the variance underlying the findings of previous research. The results of both tests support our proposition of analyzing social capital through the four sources. We conclude with a discussion of how our arguments and findings will impact the future research in the field and propose managerial implications.

THE FOUR SOURCES OF SOCIAL CAPITAL

To develop a framework for analyzing the sources of social capital I adopted a deductive reasoning (Babbie, 2010) with the purpose of examining the variance of social capital measures and group them in categories based on common features. The first step in this process was to examine the main literature reviews on social capital (e.g. Adler & Kwon, 2002; Nahapiet & Ghoshal, 1998; Payne et al., 2010). I discovered that there are two main strategies to describe social capitals. Based on their functionality scholars categorize them as either bridging or bonding (e.g. Adler & Kwon, 2002), while based on their contents they are viewed as network derived versus relations derived (e.g. Nahapiet & Ghoshal, 1998). I next moved to studying the empirical articles examining social capital effects on various outcomes. I recorded all measures of social capital from the studies in my sample and assessed them in terms of their functionality and content. This process led to the emergence of four distinct sources of social capital.

Where Does Social Capital Come From?

Social capital is the value of actors' social structure allowing them to access resources, which they can use to secure their interests (Baker, 1990; Coleman, 1988). It is generally agreed that social structure provides a competitive advantage to individuals

who manage to identify and utilize the opportunities it presents and the resources it contains (Burt, 2000; Coleman, 1990; Portes, 1998). Using social networks has been linked to various outcomes for the individuals, ranging from creativity (e.g. Perry-Smith, 2006; Baer, 2012; Sosa, 2011), salary increase and bonuses (e.g. Belliveau, O'Reilly, & Wade, 1996; Geletkanycz, Boyd, & Finkelstein, 2001; Mizuchi, Stearns, & Fleischer, 2011), knowledge creation (McFadyen & Cannella, 2004) and resource exchange (Moran, 2005; Tsai & Ghoshal, 1998). Years of research on these outcomes has led to the formation of two dominant theoretical perspectives on what type of social structure serves as a source of social capital, which Adler and Kwon (2002) describe as the bridging and bonding views.

Bonding and bridging sources of social capital. The bonding view of social capital contends that the source that brings value is network closure. It originates with Coleman's (1988) argument that in dense groups, characterized by network closure, individuals have the competitive advantage of early access to the information and the tangible resources available from such a social structure. Moreover, network closure affects the dynamic of the existing relationships through four mechanisms, which determine their utility. First, in dense networks there is more frequent interaction between the members and therefore stronger social bonding (Granovetter, 1985; Krackhardt, 1992). Second, norms of cooperation and reciprocity are established between densely connected actors (Aral & Van Alstyne, 2011; Blau, 1964). Third, closed networks enhance the trust between the individuals because opportunistic behavior is minimized in the face of the group's control and sanctioning mechanisms (Burt & Ronchi, 2007; Coleman, 1988). Fourth, members of closed networks are motivated to provide support

and resources to each other (Coleman, 1988; Granovetter, 1985). In short, the more embedded individuals are in such groups the more they can rely on access to the information and resources because members will share their knowledge and offer necessary support.

Within the bridging view, closed networks are considered to be more of a disadvantage as all the resources, information and support they could potentially provide are redundant and thus do not offer a competitive advantage to any particular member. Rather, the source of social capital is found in the structural holes. This is the crux of Granovetter's (1973) argument that weak ties, which bridge densely interconnected cliques, are a source of unique information and resources. Following this perspective Burt (1997; 2000) argues that networks rich in structural holes create a competitive advantage for the individuals whose social ties span holes across networks because they have access to non-redundant sources of knowledge, information and resources, and can exercise control over rewarding opportunities. These individuals serve as brokers in their networks and control transactions between the unconnected actors. Therefore, the source of social capital is seen in actors' bridging options, which allow them to exercise a greater degree of entrepreneurship (Aral & Van Alstyne, 2011; Burt, Jannotta, & Mahoney, 1998).

Structural and relational routes to bridging and bonding. As Adler and Kwon (2002) highlight researchers find the source of social capital either in the type of relations actors maintain with other actors, or in their network position and structure of relations. Hence, it is common in the literature to see the proponents of bonding social capital look for it in network cohesiveness or strength of ties, while the supporters of bridging describe social capital in terms of structural holes or non-redundant relations. This trend

in the operationalization of bridging and bonding sources of social capital has led to both camps' parallel use of relations and network position as a source of social capital. Differentiating between relational and positional dimensions of social capital (Flap & Völker, 2001) is crucial for a better understanding of the resources that constitute social capital and the different mechanisms for exploiting them.

Since both the bridging and bonding domains distinguish between the structure and type of social relations, we propose that these two commonly discussed forms of social capital should be further divided into structural and relational categories. From a relational standpoint the “bonding view” of social capital is concerned with the quality of relations among individuals or groups, usually within a collective whole, while the “bridging view” focuses on the quantity and variety of direct ties the focal actor has to actors in social networks (Adler & Kwon, 2002). From a structural standpoint, the former explores the extent of network cohesiveness and how being embedded in a network positively affects individual outcomes. Alternatively, the latter examines how network properties that provide opportunities for brokerage serve as a competitive advantage (Burt, 1992). We therefore propose the following four social capital sources: bridging structure, bonding structure, bridging relations, and bonding relations. *Bridging structure* is defined as an individual position within a network that allows for spanning structural holes. *Bonding structure* is defined as an individual embeddedness in a highly cohesive network. *Bridging relations* is the quantity and versatility of individual contacts. Finally, *bonding relations* is the strong relationships available to the individual.

Bringing together social network, agent-centric, and psychological research we next develop three complementary arguments for the need to apply the proposed four sources

of social capital in order to improve our understanding of the impact of social capital on individual job performance. First, building on social network research we look at the content of relations and network position and argue that neither bonding relations equal bonding structure, nor bridging relations equal bridging structure; rather there are some differences in the available opportunities within each source. Second, we look at the agent-centric network research (Ozcan & Eisenhardt, 2009; Stevenson & Greenberg, 2000) to outline the strategic differences in making use of each of the four sources of social capital. Finally, we draw on empirical findings for psychological predispositions to networking (Kalish & Robins, 2006) in order to demonstrate that individual level variables affect the actors' choice and extent of utilization of the different social capital sources. A summary of the theoretical propositions we discuss in the next sections is presented in Table 1.

The Utility of The Social Capital Sources

Generally, social relations indicate the number of contacts an actor has and the type and intensity of the relationships with those contacts. This relational dimension of social capital describes the details of each tie, the variability of directly reachable sources of knowledge, information, and resources, and the willingness and ability of contacts to provide such resources (Bourdieu, 1985). On the other hand, network position indicates the overall pattern of relationships actors are embedded in and the general properties of their networks. This structural dimension of social capital goes beyond direct contacts in order to consider the indirect sources available in a personal network as well as the network level opportunities presented through the overall connectivity between ties, control over transfers in the network, and structural similarities (Gibbons & Olk, 2003;

Rank, et al., 2010). Moreover, relations are usually of a particular type – advice, work, or friendship - and therefore serve specific goals. Network structure consists of all contacts and thus visualizes the arrangement of different types of ties (Lazega & Pattison, 1999) and the overall connectivity of the actors. Therefore, at every point in time structure and relations provide different sources of both bonding and bridging social capital.

The power of bonding social capital lies in the support actors can receive, while its weakness is seen in the redundancy of the available resources. A bonding type of network gives the ego the comfort of trusting other members and predictability of their behavior because deception and opportunistic behavior are minimized in the face of established norms and control mechanisms (Chua, Ingram, & Morris, 2008; Coleman, 1988). Actors embedded in closed networks can derive social capital from gathering all types of knowledge and resources from network members (Hansen, 1999) and from acquiring group support for selling or implementing ideas and projects (Obstfeld, 2005). The downsides of a bonding structure are several. First, all members have similar access to the available social capital, which diminishes everyone's opportunity to gain a competitive advantage. Second, the access to resources and information is redundant as all members in the network share similar knowledge (Burt, 1992). While a focus on the degree of density in a network can measure the level of interconnectedness to support the redundancy argument, the number of strong ties cannot. Strong ties in an actor's network, a measure of bonding relations, could also be non-redundant contacts, despite their tendency to become redundant over time due to pressures of triad closure processes (Burt, 1992), to the extent that they point to different knowledge and opportunities (Hansen, 1999). Network analysis however focuses predominantly on a static snapshot of the

Table 1: Summary of Theoretical Propositions

BRIDGING STRUCTURE	Utility <i>high</i>	Contents: - Overall pattern of direct and indirect relationships, characterized with low level of interconnectivity - General network properties – size of network, members reachability, indirect contacts availability Opportunities: - Brokerage between disconnected groups/ individuals (Burt & Ronchi, 2007) - Access to diverse information - Entrepreneurship Potential weaknesses: - Relevancy of available brokerage opportunities to individual goals	Social Networks approach
	Ease of acquire <i>difficult</i>	Strategies: - Accurate estimation of overall network connectivity (Janicik & Larrick, 2005) - Discovering brokerage positions (Flap & Völker, 2007) - Preserving the conditions that make the position an exclusive brokerage (Ryall & Sorenson, 2007)	Agent-centric approach
		Abilities and skills: - Constant attention to the interaction between the network members - Accurate perception of existing relations (Casciaro, 1998) - Dealing with ambiguity and conflicting demands (Burt, Jannotta, & Mahoney, 1998) - Engaging in calculated filtering of information (Baer & Iyer, 1992) - Personality of independent outsider in search of authority (Burt, Jannotta, & Mahoney, 1998)	Psycho-dynamic approach
BRIDGING RELATIONS	Utility <i>high</i>	Contents: - Number of contacts - Type of available ties - Variability of directly reachable sources of information Opportunities: - Quantity of total gathered information and resources (Umpress et al., 2003) - Earlier exposure to new information and novel ideas (Balkundi et al., 2007; Granovetter, 1973) - Widest choice of interaction patterns (Flap & Völker, 2001) Potential weaknesses: - Redundancy and relevance of gathered information (Hansen, 1999)	Social Networks approach
	Ease of acquire <i>moderate</i>	Strategies: - Maintaining a large pool of contacts - Reaching out to contacts (Burt, 2002; Mariotti & Delbridge, 2012) - Keeping exchange offers at hand (Blau, 1964; Uzzi, 1997)	Agent-centric approach
		Abilities and skills: Collecting and combining seemingly unrelated views, information and resources (Burt, 2005)	Psycho-dynamic approach

		Lasega & Pattison, 1999) - General network properties – size of network, type of network, members reachability Opportunities: - Easy and early access to network resources and knowledge - Access to network level opportunities - Group support (Obstfeld, 2005) Potential weaknesses: - The same knowledge and information available to all network members - Redundancy of available information (Burt, 1992)	
	Ease of acquire <i>moderate</i>	Strategies: - Recognition of network embeddedness - Utilizing membership benefits - Active participation in the network - Discovering and responding fast to arising opportunities - Staying up to date with the network context	Agent-centric approach
		Abilities and skills: - Constant attention to the interaction between the network members - Accurate perception of existing relations (Casciaro, 1998) - Personal need for security (Burt, Jannotta, & Mahoney, 1998)	Psycho-dynamic approach
BONDING RELATIONS	Utility <i>moderate</i>	Contents: - Number and type of strong relationships - Willingness and ability of contacts to provide help (Bourdieu, 1985) - Variability of directly reachable sources of information	Social Networks approach
		Opportunities: - Quality of total gathered information (Aral & Van Alstyne, 2011; Westphal, 1999) - Emotional support (Coleman, 1988; Uzzi, 1996) - Goal-oriented knowledge and resources (Aral & Van Alstyne, 2011; Bowler & Brass, 2006)	
		Potential weaknesses: Relevancy of accessible information	
	Ease of acquire <i>moderate</i>	Strategies: - Building strong relationships - Maintaining the strong relationships through frequent interaction and exchange of support	Agent-centric approach
		Abilities and skills: - Providing emotional and goal-related support to strong contacts - Ability to extract information	Psycho-dynamic approach

network; therefore measures of strong ties are measures of current existing relations not of the potential of these relations to interconnect and form a bonding structure. Actors can derive social capital value from such relations by searching for both knowledge and resources from these contacts as well as for emotional support.

While the resources available through bonding relations overcome the problem with redundancy, they face the challenge of utility. Such relations come from different social circles, such as family, friends, colleagues, and school. They are characterized with affectivity, mutual confiding and emotional investment (Coleman, 1988; Uzzi, 1996). They will provide support, offer comfort, encouragement, and even help with the accomplishing of goals (Aral & Van Alstyne, 2011; Bowler & Brass, 2006). However not all of them will have the resources needed by the ego to address a specific challenge. To sum up *bonding structure* provides an increased information flow and norms of cooperation that ensure easy access to knowledge and resources within a network as well as group support when needed (Baer, 2012); *bonding relations* are the ones willing to devote time and effort in assisting each other (Coleman, 1988) with the information and resources they have at hand (Aral & Van Alstune, 2011) as well as with any emotional needs (Ibarra & Smith-Lovin, 1997).

The power of bridging social capital lies in the opportunity to reach out to diverse resources and sources of information and to exercise entrepreneurship. Actors can derive social capital from bridging structure by serving as brokers between disconnected groups and individuals and thus securing for themselves an important position in the network. Bridging structure also provides access to disconnected contacts, which might serve as diverse sources of information and resources. The absence of ties among the contacts in a

focal actor's network, measured through structure, is the actual indicator for non-redundant access (Hansen, 1999).

Bridging ties gauge the weak, potential and latent ties (Mariotti & Delbridge, 2012) actors can access. Actors can leverage this social capital by reaching out to an assorted group of people to gather various information and resources needed for the advancement of their personal agenda. While some of the bridging contacts could be characterized with redundancy (Hansen, 1999), especially if they are located in the same network, others will not be. Therefore the number and versatility of such reachable sources becomes a potential advantage. In summary, *bridging structure* provides opportunities to exercise entrepreneurship by brokering between disconnected individuals and groups (Burt & Ronchi, 2007), while *bridging relations* allow for the potential of gaining a competitive advantage through the quantity of total gathered information, knowledge and resources (Umphress, et al., 2003), the earlier exposure to a wide range of views and ideas (Balkundi, Kilduff, Barsness, & Michael, 2007; Granovetter, 1973), and the widest choice of interaction partners (Flap & Völker, 2001).

We have presented arguments for the need of a more thorough categorization of the sources of social capital that goes beyond the simplified division between bridging and bonding to also include a structural and relational dimension to both. We therefore argue that together, bridging structure, bridging relations, bonding structure, and bonding relations provide a more comprehensive look at the available sources of social capital and therefore should present a more rigorous explanation of the variability in studied outcomes.

Hypothesis 1: Compared to bridging and bonding only, bridging structure, bridging relations, bonding structure, and bonding relations will explain more of the variation in the relationship between social capital and individual job performance.

Further, because all four social capital categories offer assets, we predict that:

Hypothesis 2: The social capital accumulated through each source is positively related to individual job performance.

Strategies For Deriving Social Capital

All four sources of social capital present an opportunity to acquire assets but are not assets in their own right (Burt et al., 1998). The extent to which the available capital will be realized depends solely on the individual actions. Given that each source of social capital can provide competitive advantage to the focal actor, there are two important characteristics to consider: ease of deriving capital and utility for pursued goals. To further clarify the distinction between bonding structure and bonding relations and between bridging structure and bridging relations as well as to better understand how each of these social capitals could be realized we next discuss the strategies for taking advantage of each of them. We argue that utilizing a position in a network requires different actions compared to making use of relations. We also look at the differences between bonding and bridging structure on one side, and bonding and bridging relations on another in order to demonstrate that making use of the different types of structure and ties also requires different approaches. To do so we build on the agent-centric research, which argues that social capital is as much about network position and relations as it is about network strategies and activities (Reinholt, Pedersen, & Foss, 2011; Stevenson & Greenberg, 2000; Vissa, 2012). Social capital requires strategies for tie discovery, acts of

leverage, targeting resources, and prioritizing (Bensaou, Galunic, & Jonczyk-Sédès, 2014) and these differ from one source to another.

Taking advantage of a network position is contingent upon the actors' ability to recognize it correctly. This awareness should go beyond the simple consideration of one's own contacts in order to estimate the overall connectivity that exists in the network. As Lincoln and Miller (1979) demonstrate even friendship networks in organizations are not purely a set of connected friends, but systems for making decisions, mobilizing resources, and managing information. Recognition of one's location within this tie interplay is the foundation for utilizing network social capital. Such calculations are expected to be more precise for small and closed networks, and more challenging as the network size and the number of structural holes increases.

Actors who are aware of their embeddedness in a bonding structure can build on the available social capital: an easier access to network level information and group support. While it is generally assumed that closed networks provide equivalent benefits to all members, this assumption misses an important moderating variable in the equation – the proactiveness of the actors in the network. Active participation in a network provides members with exclusive access to benefits. Although these benefits are available to all in the network, the actors who are highly involved in network activities would benefit more from them compared to less active members. First, active members are regularly checking for new information, and thus are more likely to discover and respond quicker to new opportunities. Second, these members are frequently involved in activities, which include other members and thus are more likely to collect information about different resources available through the network. Consequently, they are expected to be more

knowledgeable about the context of the network, and thus better utilize membership benefits and discover early opportunities. We therefore argue that active participation in a bonding structure is the most important strategy for utilizing the available social capital.

Actors who find themselves embedded in a bridging type of structure should devote their efforts to discover the brokerage positions they can build on. To become network entrepreneurs they have to make use of the structural holes they bridge by making the linkages of different groups dependent on them (Flap & Völker, 2001). Brokerage opportunities however are difficult to spot because people have a tendency to see ties that do not exist (Janicik & Larrick, 2005). Even when spotted, they are difficult to actualize because brokers have a competitive advantage only when they meet three conditions: they cannot be substituted by anybody else; they intermediate more than two social ties; and they are not locked into a particular pattern of exchanges as a consequence of their brokerage (Ryall & Sorenson, 2007). In addition, structural holes are difficult to maintain (Zaheer & Soda, 2009; Ryall & Sorenson, 2007) because of network level processes, such as triad closure (Granovetter, 1973) and continuous increase of direct ties between network members (Ahuja, 2000), which ultimately makes them vulnerable to decay (Burt, 2002). Therefore, to maximize the capital from bridging structure actors need to focus on discovering positions for bridging structural holes and preserving the conditions that make them exclusive brokers (Sasovova, et al., 2010).

As argued above, the value of each source of social capital is contingent on two parameters: ease of acquisition and relevance to the pursued outcome. In terms of the former, social capital's ubiquity in a bonding structure, and scarcity in a bridging structure, cause bonding structure to have a greater value than a bridging structure.

However in the context of individual performance where gaining a competitive advantage is critical, bridging structure should be more valuable. We therefore propose two competing hypotheses. The first predicts value based on ease of deriving the social capital, and the second – based on relevance.

Hypothesis 3a: The social capital from a bonding structure will be more positively related to individual performance compared to that of a bridging structure.

Hypothesis 3b: The social capital from a bridging structure will be more positively related to individual performance compared to that of a bonding structure.

Actors with bonding relations can receive emotional and goal-related support (Bowler & Brass, 2006) and still access valuable information and knowledge (Aral & Van Alstyne, 2011; Westphal, 1999). While bridging relations require immediate pay-off in the form of offering exchange or a promise for future exchange, bonding relations do not. There is a high level of established trust between them as well as norms of reciprocity (Marsden & Campbell, 1984), which together guarantee that the information and support will flow both ways. Because these are contacts with whom the focal actor interacts often they are characterized with high levels of familiarity and exchanges on a variety of topics, which leads to fast and efficient access to relevant information and support (Aral & Van Alstyne, 2011). Overall, bonding relations are always available and motivated to provide assistance (Granovetter, 1983) but they also come with a high maintenance cost in the form of frequent interactions and exchange of support (Hansen, 1999). This maintenance is the single most important strategy for utilizing the social capital from bonding relations.

Finally, actors with bridging relations have the potential for early access to novel information, diverse knowledge and resources. However, they are difficult to create. As a study by Ingram and Morris (2007) demonstrated, presented with the opportunity people tend to avoid the difficulties of building new contacts or find them less rewarding compared to the comfort of hanging out with friends. Once established such ties are usually selfishly cooperative (Uzzi, 1997), which means that the mechanisms to take stock of bridging relations are largely dependent on social exchange. In order for an actor to provide help there should be a value that the focal actor can offer in exchange – either now, in the past or in the future (Blau, 1964; Flap & Völker, 2001). This type of relations is also characterized with low interaction and social distance, which limits the ability of the actors with such social capital to screen effectively for information (Aral & Van Alstyne, 2011). Considering all these, there are three strategic actions to leverage bridging relations. First, actors should maintain the available pool of contacts, including latent and potential ties (Mariotti & Delbridge, 2012). Second, they should constantly reach out to as many contacts as possible in order to avoid tie decay due to long inactive periods (Burt, 2002; Mariotti & Delbridge, 2012) and to increase the chances of collecting relevant valuable information. Third, they should keep exchange offers at hand.

Given that both types of relations require high maintenance in terms of time investment and returns, the effort for deriving social capital from each is expected to be similar. Therefore, the value of one over the other should be based on relevance. In the context of individual job performance, we predict that actors who cultivate numerous or

diverse ties will – on average – obtain more social capital compared to actors who focus on nurturing a determined set of ties. Therefore,

Hypothesis 4: The social capital from bridging relations will be more positively related to individual job performance compared to that of bonding relations.

Psychological Predispositions to Deriving Social Capital

Burt (1992) made the important observation that research on social capital generally assumes that opportunity equals motivation, meaning that individuals will pursue the most beneficial social capital opportunities. Research on the psychology of individuals however reaches a different conclusion, namely that personality affects the social capital strategies that will be activated (Sasovova, et al., 2010). There are two lines of inquiry that help predict which actors and under what circumstances will use the four social capital sources: research on cognition and research on personality factors. Both of these shed light on the ease and attractiveness of the strategic actions, associated with the four sources of social capital.

To understand how one's environment is structured, an important strategic action for benefitting from any network, an actor needs to pay constant attention to the interaction between the individuals in their network (Casciaro, 1998). Accurate perception is more likely for a bonding than for a bridging type of network. First, in a bonding structure members communicate and interact more frequently. This makes the ties more easily observable. Second, information about existing ties is collected more easily through direct contacts. In this process some personality characteristics play a role. For example, Casciaro (1998) found that the need for achievement positively affects the accuracy of perceived friendship and advice networks, while the need for affiliation impacts

positively only the perception of friendship networks. Overall, accurate perception of bridging structures, which is crucial for making use of its social capital, is more challenging. This further supports the prediction that bonding structure will have higher positive impact on individual achievements compared to bridging structure because of the easier strategies for utilizing it (Hypothesis 3a).

In addition to accurate perception of the existing network, building bridges – the second strategic action in gaining competitive advantage through bridging structure – requires motivation and skills that not everyone has (Sasovova et al., 2010). First, individuals who pursue the benefits of structural holes should be able to deal with ambiguity and conflicting demands (Burt, Jannotta, & Mahoney, 1998). Second, brokers should be able to engage in calculated filtering and distortion of the information and knowledge they gather (Baker & Iyer, 1992; Burt, 1992). They are people who claim the personality of independent outsiders, in search of authority, and thriving on change (Burt, Jannotta, & Mahoney, 1998). These individuals are found to be more neurotic (Kalish & Robins, 2006).

Compared to bridging structure, bridging relations provide a less stressful path to social capital as the strategy is not focused on spanning structural holes per se, but on collecting and combining diverse and seemingly unrelated views, information and resources (Burt, 2005) in pursuit of personal agenda. While not all individuals will feel comfortable with the ambiguity and stress, associated with creating and maintaining bridges, some will have the skills and motivation to pursue the bridging relations strategies. Some examples are people with high need for cognition (Anderson, 2008),

high status individuals (Smith, et al., 2012), high self-monitors (Sasovova et al., 2010), and individuals with innovative cognitive style (Carnabuci & Dioszegi, 2015).

Because both bridging structure and bridging relations could serve as sources of non-redundant information, knowledge and resources, the value of one over the other is expected to depend on the ease of acquiring the social capital. Therefore,

Hypothesis 5: The social capital from bridging relations will be more positively related to individual performance compared to that of bridging structure.

The strong identification with a group, which usually occurs in bonding structures, tends to consolidate the group's boundaries in a way that makes individual members resistant to searching cross-boundary ties (Lomi, Lusher, Pattison, & Robins, 2014). This is not a surprise given that actors who thrive in bonding structures are ones that have personal need for security and stability (Burt, Jannotta, & Mahoney, 1998), have a more adaptive cognitive style (Carnabuci & Dioszegi, 2015) and value their own social identity (Kalish & Robins, 2006). Similarly, actors who rely on the social capital of bonding relations also have a need for security. For example Smith et al. (2012) found that low status people who need to protect themselves from environmental uncertainty tend to do so by reaching out to their familiar close contacts. Because both bonding structure and bonding relations are suited for similar personalities and require similar effort to successfully utilize (investing time in network activities versus investing time in maintaining strong ties), the value of one over the other should be based on relevancy. In the context of job achievements, we expect that social capital from a bonding structure carries the risk of redundancy but provides job-relevant information and resources. Bonding relations however not only reduce the risk of redundancy but also raise the odds

of relevance as strong ties increase the ego's ability to effectively search for relevant information (Aral & Van Alstyne, 2011). Therefore:

Hypothesis 6: The social capital from bonding relations will be more positively related to individual achievements compared to that of bonding structure.

METHODS

Sample

The sampling frame of our study consists of all articles examining the relationship between social capital and individual job performance, published in peer-reviewed scholarly journals between 1973, when Granovetter's weak tie theory was published, and 2015. We performed a comprehensive search to identify all empirical studies that use social capital to predict individual job performance. First, we explored three electronic databases: (1) EBSCO, (2) ScienceDirect, and (3) Google Scholar, using "social capital", "social relations" and "social network" as search terms. Second, we manually searched the top management journals, expected to include studies on the topic of interest, more specifically *Academy of Management Journal*, *Administrative Science Quarterly*, *Journal of Applied Psychology*, *Journal of Management*, *Journal of Management Studies*, *Organization Science*, and *Strategic Management Journal*. Finally, we consulted the references of major review articles in the field (e.g. Adler & Kwon, 2002; Nahapiet & Ghoshal, 1998).

Studies were included in our sample only if they fit a set of criteria. First, the study should be business related and examine the social capital of business professionals. Research on social capital in communities for political, health, criminal or immigration inquiries, was excluded from the sample. Second, social capital variables should be

measured at the individual level. Third, studies should include an empirical estimation of the relationship between individual level social capital variables and individual level job performance variables that fit at least one of our categories. Finally, studies should not focus only on negative type of social relations and networks, e.g. adversarial ties. Our goal was to have a fuller representation of the available research on the relationship between social capital and individual performance and therefore we adopted an inclusive approach to the study selection and did not limit our search to first-tier journals only (Lipsey & Wilson, 2011). After applying the above criteria, our final sample is composed of 62 published papers from 20 different journals (see Table 2), and a total of 345 effect sizes.

Table 2: List of Journals Included in the Meta-analytic Study

1. American Journal of Sociology (1)
2. Academy of Management Journal (17)
3. Administrative Science Quarterly (5)
4. Group and Organization Management (2)
5. Human Resource Management (1)
6. Journal of Applied Psychology (7)
7. Journal of Management (4)
8. Journal of Management Studies (3)
9. Journal of Organizational Behavior (1)
10. Journal of Small Business Management (1)
11. MIS Quarterly (1)
12. Organization Behavior and Human Decision Processes (1)
13. Organization Science (8)
14. Personnel Psychology (1)
15. Research Policy (3)
16. SAM Advanced Management Journal (1)
17. Social Forces (1)
18. Strategic Management Journal (3)
19. Social Networks (1)
20. The Information Society (1)

Variable Coding

The coding was performed according to a protocol with definitions. The independent variables were assigned to a category based on the information provided for their operationalization and the developed coding instructions (refer to Appendix A). For example, a study variable “number of contacts” will fall in the bridging relations categories if it is operationalized by the authors as number of contacts in different departments, or in the bonding relations category if it is measured as number of friendship ties. An independent second coder was used to test the coding validity. The results from the two coding processes were compared using correlation analysis (LeBreton & Senter, 2007). The inter-rater reliability coefficient was 97%, which is deemed as very strong by different benchmarks (e.g. Landis & Koch, 1977). Lastly, for each article the relevant effect size – correlation coefficient and/or t-statistic – as well as the associated sample size was recorded.

Independent variables. Social capital is measured through four categories. Within the *bridging structure* category fall variables that look at structural opportunities for bridging, such as betweenness centrality, spanning boundaries, structural holes, and connections to different groups. These are measures of the extent to which ego’s network position allows for spanning structural holes and they require data not only on ego’s contacts but also on contacts of all network members. *Bridging relations* is measured through number of ego’s contacts, non-redundant contacts, weak ties, and ties that reach out to different networks. This variable measures the direct and potentially diverse relations of ego, disregarding ego’s network position. *Bonding structure* includes

variables that measure the level of connectedness within ego's network – e.g. closeness and eigenvector centrality, embeddedness and network density. It is a measure of the extent to which ego is embedded within a closed network and also requires data not only on ego's contacts but also on contacts of all network members. *Bonding relations* is comprised of variables that look at frequency and closeness of relations, such as kin, strong ties or frequency of interaction. It is a measure of ego's direct strong type of ties. Examples for each category are provided in Table 3. The full list of variable coding is available in Appendix B. Finally, to test our first hypothesis we created two composite variables: *bridging*, which is a combination of bridging structure and bridging relations, and *bonding* – a combination of bonding structure and bonding relations.

Dependent variable. The dependent variable in the study is *individual job performance*, which measures the accomplishment of work related tasks (Campbell, 1990). Performance tasks differ across job functions and hierarchical levels. Because we are interested in the overall affect social capital has on individual performance we included in our study various measures of job performance, such as creativity, sales, annual reviews, and quality of outcomes. Full list of the variables considered as measures of individual performance is also available in Appendix C.

Analytical Procedures

Many studies in our sample reported more than one effect size between an operationalization of an independent variable and job performance. We decided to treat each effect size as independent following research findings that “nonindependence of the data does not affect the estimation of the population parameter” (Tracz, Elmore, & Pohlmann, 1992, p.886). Following Hunter and Schmidt's (2004) guidelines we first

Table 3: Example Measures of the Sources of Social Capital

Forms	Authors	Variable Name and Operationalization
Bridging structure	Batjardal et al., 2013	<i>structural holes</i> : 1 - Burt's (1992) measure of network constraint
	Fleming, Mingo & Chen, 2007	<i>component network size</i> : the number of inventors in the inventor's direct and indirect collaborative network
	Perry-Smith, 2005	<i>non-redundancy</i> : betweenness centrality
	Carboni & Ehrlich, 2013	<i>betweenness centrality</i> : "the number of times a person lies on the shortest path between two other people, divided by the number of possible paths to eliminate differences due to the size of the team"
	Morrison, 2002	<i>network range</i> : the number of different industry groups represented within an ego network
Bridging Relations	Brass, 1985	<i>contacts with others</i> : the number of direct relationships between the focal person and persons who were not members of the focal person's immediate workgroup nor persons with whom the focal person was required to interact in performing normal work functions, p. 332
	Baer, 2010	<i>network size</i> : the number of contacts listed in the name generator "people who have provided you with new information or insights about work-related problems or issues", p. 595
	McFadyen, Semadeni, & Cannella, 2009	<i>percent new coauthors</i> : new partners into the person's ego network during the previous three years, p. 557
	Rotolo & Petruzzelli, 2012	<i>cross-community ties</i> : number of direct ties a scientist has with other academic scientists in the community, p. 658
Bonding structure	Brass, 1985	<i>closeness centrality</i> : the minimum distance between a focal person and all other persons in the reference group measured by counting the number of links between the focal person and each other person; the sum of all distances is divided by n-1 and the scored is transformed using the formula $1 - [(d-1)/d_{max}]$, such that higher scores reflect greater access, p. 332
	Burt, 2007	<i>network constraint</i> : the sum of squared proportions of i's relations, directly or indirectly invested in connection with contact j, p. 125
	McFadyen, Semadeni, & Cannella, 2009	<i>network density</i> : the number of actual ties divided by the maximum number of pairs, p. 557
	Fleming, Mingo & Chen, 2007	<i>cohesion</i> : a density measure of the ties between each of the others in the focal inventor's network, where density is the unique number of pairwise collaborations between a focal inventor's collaborators that did not include the focal inventor, divided by the total possible pairwise collaborations
	James, 2000	<i>tie strength</i> : each person in the respondent's network is identified using a 4-point social distance scale ranging from 1 (distant) to 4 (very close); close (3) and very close (4) responses are recoded as representing a strong tie relationship
Bonding Relations	Gonzales, Claro & Palmatier, 2014	<i>multiplexity</i> : the number of concurrent ties an RM has with contacts in his or her informal and formal networks, divided by the total number of ties the RM has in both networks to account for differences in network size
	Gargiulo, Ertug & Galunic, 2009	<i>reciprocated ties</i> : the proportion of exchange relationships in which the focal actor acted as both acquirer and provider of information
	Mehra, Kilduff & Brass, 2001	<i>friendship network size</i> : total number of friends, "people with whom you like to spend your free time, people you have been with most often for informal social activities"

extracted bivariate correlations (r) between social capital categories and individual performance, where the correlation effect size (ES_r) is defined as the Pearson product-moment correlation coefficient. We also included one study that reported standard deviations and standard errors; we first calculated the respective t -statistics and then applied Lipsey and Wilson's (2001) approximation formula to compute the ES_r in those cases, where $ES_r = \frac{t}{\sqrt{t^2 - df}}$. We next computed meta-analytically derived mean correlations and, following current conventions, we weighted each mean effect size by its inverse variance weight (w , Hedges & Olkin, 1985) and used these weights to compute the standard errors of the mean effects and their corresponding 95% confidence intervals.

Likelihood ratio test. To test hypothesis 1 we used a likelihood ratio test (LRT) to compare the fit of two contrasting models – one that includes the composite variables bridging and bonding with one that uses the four social capital categories. LRT compares the likelihoods between two nested models, evaluated at their maximum likelihood estimates (Kowalski & Hutmacher, 2001). The procedure is designed to compare a submodel, in which one or more covariate parameters are removed, to the full model with all covariate parameters (Kowalski & Hutmacher, 2001). A significant LRT would be an indicator that the full model, consisting of bridging structure, bridging relations, bonding structure and bonding relations, accounts for additional residual heterogeneity compared to the reduced model that uses the composite variables only (Bosco, Aguinis, Field, Pierce, & Dalton, 2016).

HOMA. To test hypothesis 2 through 6 we used Hedges-Olkin meta-analysis (HOMA), which calculates meta-analytic mean correlations and their corresponding confidence intervals (Hedges & Olkin, 1984; Lipsey & Wilson, 2001). HOMA estimates

the effect sizes, which measure the strength of the relationship between two variables in a given sample, such as Pearson product-moment correlations (r). We report random-effects models to estimate the bivariate relationships between social capital sources and individual achievements as both the Q and I^2 rejected the theoretical assumption of sample homogeneity (Hunter & Schmidt, 2004). Contrary to fixed-effect models, random-effects models assume that the studies are not drawn from the same population, which allows us to make general inferences (Hedges & Vevea, 1998).

RESULTS

Likelihood Ratio Test

We conducted the LRT using the ANOVA function with Hunter-Schmidt estimator in the metaphor package for R. To test our first hypotheses we estimated two models. In Model 1 we assess the effects of bridging and bonding social capital on individual performance by using a dummy variable social capital (1 = bridging, 0 = bonding). The total amount of heterogeneity in the model is estimated to be $\tau^2 = 0.02$. The I^2 statistics (98.33%) measures the percent of total variability in the effect size estimates, composed of heterogeneity and sampling variability, which can be attributed to heterogeneity among true effects, while the H^2 statistics (59.71) shows the ratio of the total amount of variability in the observed outcomes to the amount of sampling variability (Viechtbauer, 2010). The test for Model 1 is significant but accounts only for 11.20% of the heterogeneity in outcomes explained. It implies that dividing generally the sources of social capital into bridging and bonding forms accounts for some variance in the outcomes. In the second model we enter the dummy variable source (1 = network measures, 0 = relational measures). The model is significant and increases the percentage

of heterogeneity explained to 22.90% with $\tau^2 = 0.02$, $I^2 = 98.01\%$, and $H^2 = 50.26$.

Summary of the two models is presented in Table 4.

Table 4: Summary of Models

	Reduced Model				Full Model			
	estimate	SE	zval	pval	estimate	SE	zval	pval
Intercept	0.05	0.01	4.35	<.0001	0.05	0.01	3.49	0.0005
Social capital	0.16	0.02	9.10	<.0001	0.16	0.02	9.55	<.0001
Source of SC					0.0013	0.02	0.08	0.93
LogLik	50.215				38.482			
τ^2	0.019				0.0167			
I^2	98.33%				98.01%			
H^2	59.71				50.26			
R^2	11.20%				22.90%			
QE	21923.50 (df = 341), p-val < .0001				19123.78 (df = 340), p-val < .0001			
QM	82.86 (df = 1), p-val < .0001				92.00 (df = 2), p-val < .0001			

Note: τ^2 is the estimated amount of total heterogeneity. I^2 is the percent of total variability due to heterogeneity. H^2 is the unaccounted variability/ sampling variability. R^2 is the amount of heterogeneity accounted for. *QE* is a test for residual heterogeneity. *QM* is a test of moderators/ coefficients.

To compare the two models we look at the LRT results (see Table 5). R^2 , which is 13.18%, is the proportional reduction in τ^2 , where tau squared is the estimated amount of residual heterogeneity for the model with the additional predictor structure and relations versus the model without it (Viechtbauer, 2010). Therefore, our full model, which includes bridging structure, bridging relations, bonding structure and bonding relations, accounts for 13.18% of the residual heterogeneity in the reduced model – the one with only bridging and bonding as a predictor). In other words, introducing network derived and relations derived dimensions of bridging and bonding social capital accounts for 13.18% of the total heterogeneity in the true effects. To test whether the added predictor network/relations is actually significant, we look at the LRT value from the likelihood ratio test. The results confirm it is significant ($LRT = 59.15$, $df = 1$, $p < .0001$), which is an indicator that the addition of the network/relations predictor significantly improves the fit of the model (i.e. significantly reduces the residual/unaccounted for heterogeneity).

Table 5: Log Likelihood Ratio Test

	df	AIC	BIC	logLik	LRT	pval	QE	τ^2	R ²
Full	4	-	-	31.2199			19823.5571	.017	
Reduced	3	54.4397	39.0656	43.7872	25.1346	<.001	22781.0204	.020	13.18%
		-	-						
		81.5743	70.0437						

Note: LRT is the likelihood ratio test statistic. Pval is the p-value for the likelihood ratio test. QE represents the test statistic for the test of residual heterogeneity. The estimated value from each model is given by τ^2 . R² is the amount of residual heterogeneity in the reduced model that is accounted for in the full model.

Together, these results provide support for Hypothesis 1. Compared to bridging and bonding only, bridging structure, bridging relations, bonding structure, and bonding relations explain more of the variation in the relationship between the sources of social capital and individual performance.

Main Effects

Each main effect size is reported in Table 6. The mean rhos of the relationships between bridging structure, bridging relations, bonding structure, and bonding relations on individual job performance are positive: .23, .19, .02, .09, respectively, based on 70, 86, 99, and 90 effect sizes. These results provide support for Hypothesis 2. All four social capital sources have a positive impact on individual performance; for bonding structure however we didn't find significant results, just attenuating positive direction.

An important caveat to be made is that the mean effect sizes we found are considered small by conventional standards (Cohen, 1988), implying that the effect of the bonding sources of social capital on individual performance is weak, while the effect of the bridging sources is modest at best. We next examined the confidence intervals around the mean rho to examine statistical significance. The associated confidence intervals for bridging structure, bridging relations and bonding relations does not include zero,

Table 6: Main Effects of the Social Capital Sources on Individual Performance

	SNum	k	N	$\bar{r}$	WSD (r)	95% CI ($\bar{r}$)	Q	I ²
Bridging	41	156	487407	.21	.15	.18: .23	10424.94***	98.51%
Bonding	53	189	606924	.05	.12	.03: .07	8822.17***	97.87%
Bridging Structure	25	70	289225	.23	.12	.20 : .27	4031.52***	98.29%
Bridging Relations	31	86	198182	.19	.18	.14 : .23	6187.40***	98.63%
Bonding Structure	33	99	339435	.02	.12	-.01: .05	4482.88***	97.81%
Bonding Relations	38	90	267489	.09	.08	.07 : .12	1604.96***	94.45%

Note: SNum represents the number of studies. K represents the number of effect sizes. N is the number of observations. Q is a measure of heterogeneity, calculated as the weighted sum of squared differences between individual study effects and the pooled effect across studies. We provide an additional measure of heterogeneity $I^2 = 100\% \times (Q - df)/Q$ and measures the percentage of the variability in effect estimates that is due to heterogeneity rather than sampling error.

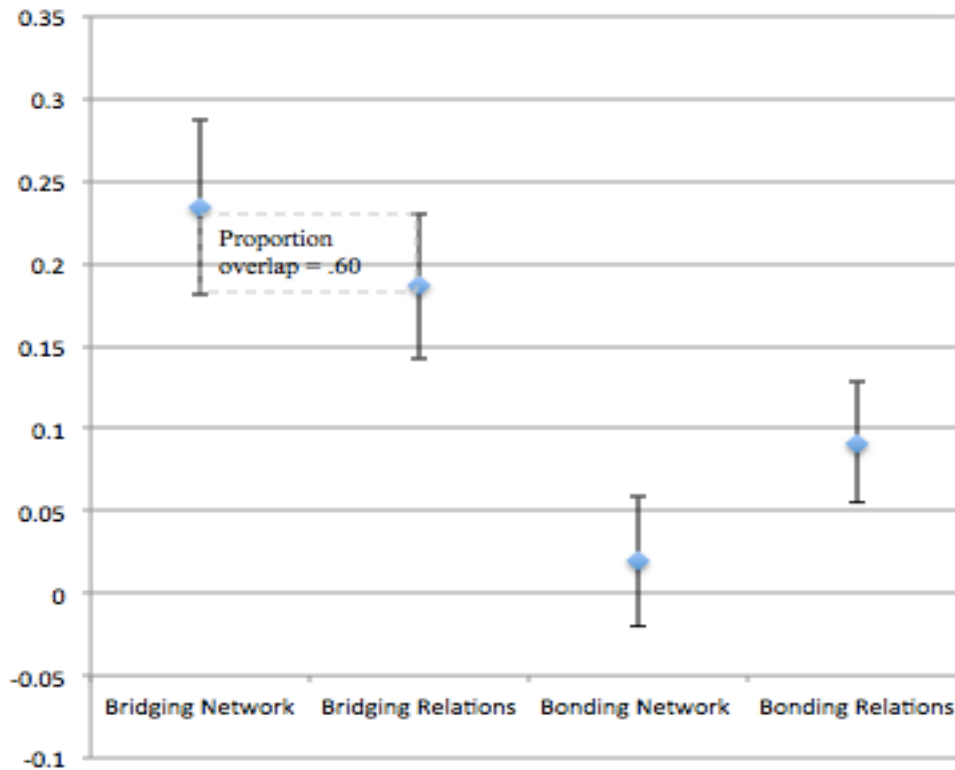
which means that the effects of these three sources are significant. The confidence interval for bonding structure includes a zero, and therefore the results are not conclusive. We further examined the homogeneity tests and the results indicate significant heterogeneity in all effect size distributions (bridging structure: $Q = 4031.52$, $p < .001$, $I^2 = .98$; bridging relations: $Q = 6187.40$, $p < .001$, $I^2 = .99$; bonding structure: $Q = 4482.88$, $p < .001$, $I^2 = .98$; bonding relations: $Q = 1604.96$, $p < .001$, $I^2 = .94$). Together, these results further indicate the need for future research on the sources of social capital to incorporate moderator analyses.

A comparison of the effects sizes of each social capital category supports Hypotheses 3b and rejects Hypothesis 3a. We proposed two competing hypotheses about the value of bridging structure versus bridging relations, one based on the ease of acquiring the inherent social capital, and the other based on relevancy. The results convincingly indicate that relevance is a better determinant of the value of social capital than easiness is, and bridging structure is more positively related to individual performance than bonding structure is ($\bar{r} = .23$ for bridging structure versus $\bar{r} = .02$ for bonding structure with no overlap in the confidence intervals). Hypothesis 4 is also supported. The effect of

bridging relations on individual performance is significantly higher compared to the effect of bonding relations ($\bar{r} = .19$ for bridging relations versus $\bar{r} = .09$ for bonding relations, again with no overlap in the confidence intervals). Hypothesis 5, which stated that within the bridging social capital realm bridging relations will be more positively related to individual performance than bridging structure, is not supported with $\bar{r} = .19$ for bridging relations and $\bar{r} = .23$ for bridging structure. Because these two sources of social capital were found to be comparatively equally relevant to the explored outcome, the prediction was built based on ease of deriving social capital. Similar to the results for Hypothesis 3a, our analysis suggests that easiness is not a critical factor describing the value of a source of social capital to the actors. The result however should be treated with caution. The confidence intervals of bridging structure and bridging relations overlap by 0.03 points. Following Cummings and Finch (2005) we analyzed the overlap as a proportion of the average margin of error (see Figure 2). The CIs of the two bridging sources of social capital overlap by a little over half the average margin of error (proportion overlap = .60) and the p value for the difference between the means is .06, which makes the result significant at $p < .10$. Finally, Hypothesis 6 received support. Bonding relations with $\bar{r} = .09$ have a higher effect on individual performance compared to bonding structure with $\bar{r} = .02$.

We also conducted two robustness checks to control for the outliers in our sample. There are 8 studies in our paper, yielding a total of 52 effect sizes, in which the level of analysis is the individual, but the unit of analysis is not (e.g. patents and publications). In many of those studies the sample size is significantly larger than the number of individuals participating in the study. To check if these outliers affect the reported results

Figure 2: Means with 95% Confidence Intervals of the Social Capital Sources



we conducted separate HOMA analysis for which we substituted the reported N with the reported number of participants in the study. The additional analysis did not reveal significantly different statistics. Overall, all of the mean effect sizes went slightly up suggesting that studies, which use unit of analysis different than the individual, produce smaller effect sizes.

Second, we ran the outlier and influence diagnostics available in the metafor package in R (Viechtbauer, 2010). More specifically, we examined the studentized deleted residuals, Cook's distances and covariance ratios. The studentized deleted residuals show the difference between the observed effect size and the predicted average true effect when the i th study is excluded from the model fitting and are indicator of outliers

(Viechtbauer & Cheung, 2010). Influential cases are identified by Cook's distances, which examines the effect the deletion of the i th study has on the fitted values of all other studies, and by the covariance ratios, which indicate the effect of the removal of the i th study on the estimates of the model coefficients (Viechtbauer & Cheung, 2010). The influence diagnostics shows that two effect sizes are identified as both outliers and influential cases (see Appendix D). The covariance ratio for these two effect sizes also indicates that their removal may yield more precise estimates of the model coefficients (Viechtbauer & Cheung, 2010). Both of these effect sizes measure the effect of bridging relations on performance. After removal of these two effect sizes we refitted the mixed effects model and rerun the LRT test. The results of the HOMA after the removal of the two outliers provide further support for the rejection of hypothesis 5. The mean effect size of bridging relations drops from .19 to .17 with CI (.12, .22). After applying Cummings and Finch's (2005) analysis we estimated the overlap between the CIs of bridging structure and bridging relations to be less than half the average margin of error (proportion overlap = .40) with a p value of .02, significant at $p < .05$. In regards with the LRT, removing the two outliers slightly reduced the fit of the model from 13.18% to 12.97% of the total heterogeneity in the true effects explained by network and relations derived social capital ($LRT = 23.46$, $df = 3$, $p < .0001$). The results indicate that the presence of these potentially influential outliers does not impact the conclusions made.

DISCUSSION

The main purpose of our paper was to advance research by developing and testing a theoretical framework that encourages attention to the structural and relational roots of social capital. More specifically, we argued that simply distinguishing between bridging

and bonding social capital does not fully account for the different sources for deriving social capital available to the actors. Dividing both bridging and bonding into network derived and relations derived sources allows for a more rigorous investigation of the content and utility of all available sources of social capital, the necessary strategies for leveraging them, and the individual predisposition toward utilizing them.

Overall, the results of our study provide empirical support for our proposition to analyze social capital through four sources – bridging structure, bridging relations, bonding structure, and bonding relations. Social capital can be derived both from making use of the structure in which actors are embedded or through the relations with other actors they have. Although we expect these measures to be correlated, they capture important differences in the essence of social capital available and the “acts of agency” (Bensaou et al., 2014) needed to utilize it. The LRT analysis confirms that when those sources are applied, there is a significant improvement in the variance in individual performance explained by social capital compared to an analysis through the lenses of bridging and bonding only (from 11.02% to 22.56%). This finding emphasizes the methodological value of the proposed framework – its application can narrow down predictions and improve the variance in outcomes explained by each specific source. The theoretical value of this framework is that it provides conceptual foundation for researchers to address not only the questions of when and why each source of social capital will positively impact an outcome, but also how and by whom.

Our study provides solid support for the value of bridging type of social capital when it comes to individual job performance. For individual goals, bridging by means of network position or through relations is considerably more valuable than bonding.

Although bonding social capitals play some role too, both bridging structure and bridging relations have a much more significant impact on individual performance. Thus, our results support the argument that non-redundant access to resources, knowledge and information is the ultimate way to stand out among competitors (Burt, 1992).

Our study champions bridging for performance but we take side with the contingency perspective on social capital (e.g. Aral & Van Alstyne, 2011) and warn that it should not be taken as a one-size-fits-all strategy. Our study shows that while bridging social capital has notably higher effect on performance compared to bonding, a closer look reveals that bonding relations have an impact that should not be left for granted. This source of social capital has a lower but significant impact on individual performance, which could be further demystified through moderator analysis. This finding reconciles with the literature on goal-specific social capital (Aral & Van Alstyne, 2011; Flap & Völker, 2001; Hansen, 1999) by looking not only at the task at hand but also at the career goals individuals have within their job.

The results of our study also support our prediction that looking at the four sources of social capital will shed more light on the contingent effect of social capital on individual goals. We argue that the distinction between network derived and relationship derived bridging and bonding social capital will provide additional explanation on when and how bonding outweighs bridging in pursuit of individual outcomes and vice versa. This has two important implications for future research. On one side, attention to the specific source will clarify scholars' efforts to further our understanding on the factors under which bridging and bonding social capital deliver value to the actors. On another – adopting the four social capital categories opens the door for crossover strategies, such as

bridging with strong ties or bonding with weak ties. Because both bridging and bonding forms of social capital could bring value to the individual it might be assumed that social capital sources that allow crossover between the two sides would be most valuable, e.g. being embedded in a closed network and having bridging relations to other network (bonding structure supplemented with bridging relations) or spanning structural holes between diverse but strong contacts (bridging with strong ties). This idea has already been raised by Tortoriello and Krackhardt (2010) and could be further developed with the use of the four social capital sources.

Building on the notion that “opportunities do not by themselves turn into achievement” (Burt et al., 1998, p. 65) we theorized about the specific characteristics of each social capital source that can affect actors’ motivation to pursue them. More specifically, we focused on two attributes: ease of acquiring and utility, and argued that it is the interplay between the two that will impact the value of each source. The results of the study conclude that the ease of deriving social capital is not a factor determining the value of the social capital, but utility is. While we were able to evaluate the total value of each social capital source, our methodology did not allow us to account for the motivation of actors to choose one. As the value of all forms of social capital has received a wide research interest, we invite future research to focus on the needed efforts to acquire them and how those efforts impact their overall value.

From an agent-centric perspective scholars have advanced our current knowledge on the networking strategies individuals have and choose (Bensaou et al., 2014; Vissa, 2012). We theorize that each source of social capital demands specific strategies, which might or might not reconcile with the individual, thus trying to bring together agent-

centric research and research on the psychological predispositions toward networking. More specifically, we propose that active participation in network activities is the most important strategic action to utilize the full potential of a bonding structure. The strategies to maximize the capital from a bridging structure are discovering positions for bridging structural holes and preserving the conditions that make the actors exclusive brokers. Finally, to manage bonding relations actors need to maintain them through frequent interactions and exchange of support. Alternatively, in order to manage bridging relations they need to maintain the available pool of contacts, constantly reach out to as many contacts as possible and keep pay-back offers at hand. Future research should address the question whether adopting social capital source specific strategies improves their utility for pursued outcomes.

At the core of our theorizing is the argument that the utilization of the source-specific strategies as well as the psychological predispositions to those strategies moderates the relationship we investigate. As we could not test, solely theorize about the effects of this moderator, our theoretical propositions should be addressed in future research. An idea worth investigating is the extent to which actors derive their potential social capital by analyzing the match between individual strategies and the strategies necessary for utilizing the sources available to the actors. Another idea is to analyze actors' awareness of what strategic actions lead to efficient use of social capital and whether that awareness triggers informed decisions for networking. This is an important research question that will address another Gordian knot in network research: the question of agency and endogeneity (Ahuja, Soda, & Zaheer, 2012; Bensaou et al., 2013). From a psychological perspective strategies for making use of relations versus network

position might allow for some flexibility and better fit with personality, such that individuals who do not feel comfortable managing the pressure of structural holes (Baker & Iyer, 1992; Burt et al., 1998), might find it more manageable to derive bridging social capital from maintaining bridging relations. Future research could test this proposition.

Managerial Implications

Our study has some important implications for business professionals. First, we raise the awareness about the different social capital sources and the potential opportunities that they can bring. Second, we focus their attention on the specific mechanisms for deriving the maximum value of the social capital they have. Third, we join previous research, which argues that bridging social capital is the source to be pursued by business professionals faced with competitive situations (Burt, 1992; Granovetter, 1973). Bonding forms of capital seem to be easier to acquire and manage but they do not deliver the results that bridging capital does. However, while previous studies have demonstrated that not everyone feels comfortable pursuing the benefits of structural holes by playing the role of a broker, our study advocates that bridging relations provide an alternative and more accessible solution for bridging.

CONCLUSION

While there is no longer need to prove the value of social capital to individual outcomes, there is a call for investigating the specific aspects and mechanisms of social capital (Kwon & Adler, 2014). The purpose of our research was to respond to this call by offering a more narrowed down focus on the sources of social capital that distinguishes between bridging and bonding value on one side, and structure and relations on another. By bringing together research on social networks, agent-centric networking and

psychological approach to networking we outline conceptually four sources of social capital: bridging structure, bridging relations, bonding structure and bonding relations. Overall, our results demonstrate that this framework improves the variance in outcomes explained by social capital and they provide support that the four categories are conceptually distinct. We therefore encourage future research to adopt this framework to further our knowledge of the contingent value of the social capital sources.

**CHAPTER 3: SHOULD I BRIDGE OR SHOULD I BOND? THE
ORGANIZATION AND JOB EFFECTS ON SOCIAL CAPITAL UTILITY**

ABSTRACT

Following the contingency perspective on social capital we argue that organizational, job and network related variables might influence the observed effects of the sources of social capital on performance. We focus on five moderators – organizational size, functional position of job, goal interdependence, location of the social capital and type of ties – and theorize about their effects on bridging structure, bridging relations, bonding structure, and bonding relations. Taking stock of a rich meta-analytical dataset we are able to explore their influence across multiple samples from 62 published papers on a dataset of 345 effect sizes. Overall the results of our study confirm that all of the proposed moderators play a role in determining the value of social capital and their impact differs across the sources. We conclude with a discussion of the theoretical implications of our study and ideas for future research.

Key words: social capital, performance, organization size, job function, goal interdependence, location of social capital, types of ties, meta-analytical regression analysis

INTRODUCTION

The past decade has witnessed a surge in the research on the effects of social capital on individual outcomes (Kwon & Adler, 2014). What started as a quarrel between bridging and bonding supporters has evolved into a productive discussion, that has significantly expanded our knowledge of the effects of social capital (e.g. Aral & Van Alstyne, 2011; Burt, 2005). Three areas of agreement have emerged from this research inquiry. First is the consensus that both sources of social capital present opportunities but also hide risks. Bridging social capital has been linked to various performance outcomes, such as creativity (Baer, 2010; Perry-Smith, 2005), revenue growth (Batjardal et al., 2013) and management performance (Rodan, 2010). The underlying assumption for the power of bridging is that disconnected contacts are more likely to provide diverse, novel and ultimately useful information and knowledge (Burt, 1992), and as a result can serve a wider range of needs. Bridging however can take a bad turn. As maintaining social ties is time consuming, choosing to keep weak ties can lead to an abundance of irrelevant and perfunctory information (Aral & Van Alstyne, 2011) as well as insufficient investment in developing strong ties that carry their own benefits. Alternatively, bonding social capital has also been linked to performance benefits (Carnabuci & Dioszegi, 2015; McFadyen & Cannella, 2004; Moran, 2005). The theoretical explanation of its value is premised on the assumption that strong connections are more likely to provide support based on norms of obligation and reciprocity (Coleman, 1988) and this support is more likely to be useful and profound (Aral & Van Alstyne, 2011). Bonding however can also be detrimental as it leads to decreased networking efforts (Zaheer & Soda, 2009) and reduced human capital

development (Ng & Feldman, 1995), and can ultimately have a negative impact on performance.

A second point of agreement is that in general, everything else being equal, bridging social capital has a higher positive impact on individual outcome, including performance, than bonding does. Since Burt (2004) demonstrated that managers in a large American electronics company, who spanned structural holes, had disproportionately higher compensation, performance evaluations and promotions compared to the managers with network constraint, more research has accumulated in favor of bridging for performance (e.g., Cross & Cummings, 2004; Moran, 2006). Delving deeper into the argument, Rodan (2010) found empirical evidence that the impact of structural holes on management performance is caused by the ability of such networks to enhance innovativeness through heterogeneous contacts' knowledge.

The third, most recent consensus, reached by scholars is that a trade-off exists in the choice between bridging and bonding, which shifted their attention to the contingent factors that impact the effects of each source. On the topic of job performance, the literature has outlined critical moderators that predict the relevancy of the sources of social capital. First, the value of bridging is found to be greater for performance on tasks that require novelty generation (Rodan & Galunic, 2004). Second, bridging has a greater impact when job tasks are characterized by ambiguity (Burt, 2005). Third, bonding social capital is more beneficial to actors whose job requires work with highly complex knowledge, while bridging gives advantage to jobs that do not require transfer of complex knowledge (Aral & Van Alstyne, 2011; Hansen, 1999). Fourth, bonding social capital is more important for work environments in which information changes rapidly

(Aral & Van Alstyne, 2011). The list of conditions that predict whether bridging outweighs bonding or vice versa is constantly growing. The contingency perspective on social capital aims at providing a framework for making a calculated decision between bridging and bonding given the specific circumstances actors find themselves in.

The purpose of this study is to expand on the contingency perspective by shedding light on additional moderators to the relationships between the sources of social capital and performance. First, following the structuralism tradition (Burt, 2000a; Giddens, 1984) we examined the actor's organization, as an exogenous factor that not only impacts the formation of social capital (Burt, 2000b) but also affects the usefulness of the sources of social capital. Organizations are a special type of network, comprised of jobs connected through authority and information exchange ties (Scott & Davis, 2007). Because actors are embedded by terms of employment in the organization's network, the characteristics of that network as well as those of the job they occupy, are expected to influence the availability and demand for social capital. More concretely, we are interested in how organizational size (an indicator of the range of the structure's boundaries), type of occupied job (an indicator of the functional location in the structure) and type of job goals (an indicator of structural bounds) impact the utility of individual social capital sources. Second, we look at the interplay between the organization's structure and the individual networks and theorize how the content of the social capital sources as well as their location vis-à-vis the organizational boundaries also impact their utility for performance.

Following Eden (2002), who emphasized that meta-analysis is a useful tool for theory extension, we performed a research-synthesizing meta-analysis to examine the

mixed empirical findings on the affects of social capital on individual performance. We then employed meta-analytic regression analysis to evaluate hypotheses that examine the moderating effects of the proposed organization, job and social networks variables on the relationship between social capital sources and individual performance. Taking stock of a rich meta-analytical dataset we are able to explore the influence of the proposed moderators across multiple samples.

THEORY AND HYPOTHESES

The Moderating Effects of Organization Factors

In general, there are four sources of social capital available to the actors. *Bridging structure* is an individual position within a network that allows for spanning structural holes. *Bonding structure* is an individual embeddedness in a highly cohesive network. *Bridging relations* is the quantity and versatility of individual contacts. Finally, *bonding relations* is the strong relationships available to the individual. Scholars interested in social capital are preoccupied with discovering which source of social capital is the driving force of performance and under what circumstances. The research findings have led to a complex revelation that many factors influence the value of social capitals to individual performance. This line of inquiry has generated useful information on job related contingencies, such as need for novelty generation (Rodan & Galunic, 2004), job ambiguity (Burt, 2005) or type of knowledge used on the job (Aral & Van Alstyne, 2011; Hansen, 1999). It however is not exhaustive on what those factors are. One, that has eluded the attention of research, is the organization in which the actors are employed. Generally, “individual actors are constrained by, make use of, and modify existing structures” (Scott & Davis, 2007, p. 7). In the context of job performance, the

organization presents as such a structure, which influences the social capital of its employees and should not be ignored. It has already been recognized that formal structure can affect the formation of informal networks and ties (for a review of current research finding see McEvily, Soda, & Tortoriello, 2014). As a further inquiry into the affects of the organization on the value of social capitals, we next theorize about the impact of organization size, functional position of the job within the organization and the type of goals assigned to the job by virtue of its position in the organization.

Organization size. From a social networks perspective the organization is a whole network, within which actors are embedded by reason of their employment contract. The very basic, yet critical, property of whole networks is their size, which impacts the structure and complexity of the relations that form within the boundaries of the network, such that the larger the network, the more opportunities there are for structural configurations and the higher the complexity of those configurations is (Hanneman & Riddle, 2011). Consequently, the size of the organization should also impact the ease of acquisition of each source of social capital and the demand for the more difficult to acquire sources.

In general, the larger the organization's size, the larger the pool of potential contacts is. In such environments, the bridging sources of social capital can flourish because there are numerous opportunities to establish diverse relations and to take a brokerage position. Bridging social capital however is a powerful source to the extent that it provides a competitive advantage to the actor through access to diverse resources and sources of information (Granovetter, 1973; Umphress, et al., 2003) as well as entrepreneurship freedom (Burt & Ronchi, 2007). However, in large organizations many

actors can exercise bridging, which from a resource dependence perspective decreases the total value of both bridging structure and bridging relations as a competitive source of social capital, suggesting that they will be in higher demand in smaller organizations. Furthermore, organization management research has linked larger organizational size to greater division of labor and work specialization (Durkheim, 1947; Whyte, 1949). Greater departmentalization of work leads to conflicting interests and reduction in informal communication (Talacchi, 1960) and less adequate formal interactions (Indik, 1965), which increases the demand for bonding structure in order to better information flow and norms of cooperation (Baer, 2012) and bonding relations in order to improve information and resources sharing (Aral & Van Alstune, 2011).

Contrarily, the smaller the organization, the less the number of members is and the more repeated interactions between them occur. Organization members are predisposed to building bonding social capital because of increased informal interaction and communication (Talacchi, 1960), which will make it a less scarce resource compared to bridging. Furthermore, when bonding social capital prevails actors may become liable to group conformity and homogeneity of ideas, thus restricting their exposure to diverse working methods, information and approaches (Hansen, Mors, & Løvås, 2005). In such cases both bridging structure and bridging relations emerge as sources that can bring competitive advantage to the actors. Research has also found that in small organizations employees have more autonomy on how to perform their job because the content and the functional responsibilities of the jobs are broader (Talacchi, 1960) and are less dependent on coordination with other employees (Kalleberg & Van Buren, 1996). Therefore,

entrepreneurship and novelty through bridging will be more acceptable and applicable for jobs in small compared to large organizations. To summarize, we predict that:

H1a/1b: The relationship between bridging structure and performance (a) and between bridging relations and performance (b) is positively moderated by smaller organizational size.

H1c/1d: The relationship between bonding structure and performance (c) and between bonding relations and performance (d) is negatively moderated by smaller organizational size.

Type of job. The pragmatic and efficient use of social capital is also contingent on the specificity of the occupied job. As previous research has outlined how job task characteristics, such as need for novelty generation (Rodan & Galunic, 2004), dealing with ambiguity (Burt, 2005), or transfer of complex knowledge (Aral & Van Alstyne, 2011; Hansen, 1999) predict which source of social capital will improve performance on the task, so should general attributes of the job. Every job position constitutes a node in the formal organizational network and the occupants of those nodes are faced with predetermined conditions, which might impact their need of social capital sources. One such condition is the functional location of the job.

On a broad level the functions in an organization can be divided into two major groups: technical and administrative. The first group refers to “the physical combined with the intellectual or knowledge processes by which materials in some form are transformed into outputs” (Hulin & Roznowski, 1985, p. 47). The second is concerned with the general management of people and resources in the organization. The importance of distinguishing these two organizational functions is reflected in the

literature on innovation, which emphasizes the different factors and processes concerned with technological versus administrative type of innovation (Damanpour, 1987; Ibarra, 1993). Because actors have limited capabilities to build and maintain social capital (Hanneman & Riddle, 2011), to improve their performance they need to target the utilization of their social capital in congruence with the demands of their job.

Technical jobs differ from administrative in the need for “a specific combination of machines and methods employed to produce a desired outcome” (Sproull & Goodman, 1990, p, 225). Technical jobs are concerned with the use of tools, techniques, devices and systems for the purpose of producing products and services (Damanpour, 1987), which require the use of complex but at the same specific to the organizational systems knowledge (Grant, 1996). In general, performance on this type of jobs is not completely independent, but relies on collaboration with other organization members, who specialize in different tasks or stages of the working process. From a social capital perspective technical jobs, which deal with continuous circulation and utilization of complex knowledge, will benefit more from bonding social capital. Bonding network supports the fast and easy flow of communication (Flap & Völker, 2001), while bonding relations ensure the necessary advice and help for assimilating non-codified knowledge (Hansen, 1999; Polanyi, 1966). Technical jobs are much more likely than administrative ones to require the exchange of knowledge and information that is holistic and embedded in multiple interdependent subjects. Those job demands could not be served efficiently by bridging sources of social capital (Aral & Van Alstyne, 2011).

On the other hand, administrative jobs are concerned with the basic activities of the organization for the purposes of maintaining its structure and administrative processes

(Damanpour, 1987). Performance on such jobs is usually less dependent on the work of others and deals with codified into organizational policies and procedures information, which is easily accessible by employees. In some cases, such as in professional service firms, administrative functions may rely on intellectually skilled workforce (von Nordenflycht, 2010; Starbuck, 1992), whereby access to knowledge holders becomes important. Overall, the demands on administrative type of work are concerned with quick resolution of issues and improvement of individual efficiency. Access to diverse knowledge, resources, ideas, working methods and practices, as well as key stakeholders, associated with bridging relations (Aral & Van Alstyne, 2011), should come in handy for improving the performance on administrative jobs, and entrepreneurship through bridging structure could provide a competitive advantage by exercising control over information and resources flow (Burt, 1992). The bonding sources of social capital, which constrain action and exposure to disparate views (Aral & Van Alstyne, 2011; Hansen, 1999), will be less effective for the needs of administrative jobs. Given that social capital is goal specific (Flap & Völker, 2001) we predict that:

H2a/2b: The relationship between bridging structure and performance (a) and between bridging relations and performance (b) is negatively moderated by technical type of job.

H2c/2d: The relationship between bonding structure and performance (c) and between bonding relations and performance (d) is positively moderated by technical type of job.

Goal interdependence. Another characteristic of the job that could impact the value of the sources of social capital is goal interdependence. This measures whether the

performance on the job is treated as an individual effort or as a collective effort between few or more employees. Goal interdependence is different than task interdependence, discussed earlier as a characteristic of technical jobs, because it does not require the employees to collaborate to accomplish the task, but to share a common goal, whether or not they work together to achieve it (Mitchell & Silver, 1990). Goal interdependence is also expected to have an impact on the individual performance strategies, as it requires higher levels of collaboration and lower levels of competitiveness in order to affect the efficiency of the sources of social capital, which we discuss next.

The value of bridging structure, exercised through spanning structural holes depends on the competition around the individual (Burt, 1997). When the actor's performance is gauged not individually, but collectively, gaining competitive advantage through brokerage entrepreneurship will have little impact on the collective achievement of a goal. Moreover, such an opportunistic behavior may be perceived negatively by the other actors working on the same goal, resulting in sanctioning through isolation (Coleman, 1986). Actors who utilize bridging network for interdependent tasks risk taking the position of an outsider (Burt, Jannotta, & Mahoney, 1998), which will have a negative impact on their performance in regards with collective goals. Alternatively, utilizing bridging relations could prove to be beneficial. Oh, Labianca and Chung (2006) proposed that in group settings members with non-redundant relations will increase the overall group social capital. Building on this proposition we argue that actors with bridging relations can gather more information, knowledge and resources (Umphress, et al., 2003) and will have earlier exposure to a wide range of views and ideas (Balkundi, Kilduff, Barsness, & Michael, 2007; Granovetter, 1973), which could be beneficial not

only for their own performance, but also for the performance of the other actors involved in the pursuit of the collective goals.

Bonding social capitals should both have a positive impact on performance in contexts of interdependent job goals. When actor's goal achievement depends on the goal achievement of other actors, high collaboration and support between members becomes an important resource. Actors utilizing bonding structure participate in a working environment characterized with decreased competitive environment (Reagans & McEvily, 2003) and increased information flow and norms of cooperation (Baer, 2012), which will ensure that challenges met by any member of the group surface quickly and timely support is provided to address them (Coleman, 1986). Similarly, actors relying on bonding relations have the comfort of strong, supporting ties, which are willing to go the extra mile to provide help, information and knowledge on a wide variety of topics (Aral & Van Alstyne, 2011). Such support could be utilized by the focal actor not only for their individual challenges but also for the challenges experiences by other group members on the interdependent goal.

In sum, because the value of each source of social capital depends on the extent to which they facilitate specific tasks and actions needed to achieve the actor's performance goals (Flap & Völker, 2001; Kaplan, 1984), we predict that:

H3a: The relationship between bridging structure and performance is negatively moderated by goal interdependence.

H3b/3c/3d: The relationship between bridging relations and performance (b), bonding structure and performance (c) and between bonding relations and performance (d) is positively moderated by goal interdependence.

The Moderating Effects of Network Measurement Variables

Social network methodology, or the way social capital is measured might influence the observed in the literature results. When it comes to performance bridging social capitals outweigh bonding because of their power to provide access to diverse knowledge, information and job opportunities (e.g. Balkundi, Kilduff, Barsness, & Michael, 2007; Burt, 1997). The non-redundancy in bridging is neither inherent to the bridging structure and bridging relations characteristic, nor is the redundancy for bonding structure and bonding relations. To better understand this critical factor, impacting the utility of social capitals, it is important to pay closer attention to network measurement variables used to estimate the sources of social capital. More specifically, because the access to resources and information is redundant to the extent that all members in the network share similar knowledge (Burt, 1992), it is critical to control how the location of the social capital is measured vis-à-vis the organizational boundaries. Similarly, focus on the type of ties used by scholars to measure social capital might provide further insight on the utility of each source. We next discuss these two moderators.

Location of the social capital. The network boundary specification problem has been a concern in social networks theory for a long time (see Laumann et al., 1983). Researchers interested in theorizing about the effects of social capital on individual performance in an organization can adopt one of three approaches to measuring the social network variables that constitute social capital: within the boundaries of the organization, outside the boundaries of the organization, and both within and outside the boundaries of the organization. While the choice of location of social capital is driven by the research questions of the respective explanatory theory (Borgatti & Halgin, 2011), it needs to be

considered as it has implications on the observed effects of each source of social capital because of its influence on the level of non-redundancy and relevance to pursued outcomes captured by the designed measure.

Bridging structure. The power of bridging structure lies in the opportunity to reach out to diverse resources and sources of information and to exercise entrepreneurship through brokerage between disconnected groups and individuals (Burt, 2004; Burt & Ronchi, 2007). Zou and Ingram (2012) already suggested the location of the structural holes as a contingency variable and argued that the optimal network structure for achieving higher job performance is to create structural holes across the organization boundary and to close structural holes within the organization. Bridging only within the boundaries of the organization will have a negative impact on the value of this source. First, bridging opportunities in an organization are limited. Second, there is a competition from other organizational members to take the brokerage positions and to avoid such positions, which makes them unstable (Ryall & Sorenson, 2007). Third, inside brokering will have higher chances for redundancy because all organization members have access to similar resources and information. Bridging structure outside the organization boundaries decreases the risks for stability but faces the challenge of relevancy. Therefore, we propose:

Hypothesis 4a: The value of bridging structure to performance is positively moderated by mixed location.

Bridging relations. The power of bridging relations is in gaining a competitive advantage through the quantity of total gathered information, knowledge and resources (Umphress, et al., 2003), the earlier exposure to a wide range of views and ideas

(Balkundi, Kilduff, Barsness, & Michael, 2007; Granovetter, 1973), and the widest choice of interaction partners (Flap & Völker, 2001). To maximize each of these opportunities actors will benefit most from building bridging relations outside of the organization because relations with insiders will bring a degree of redundancy. Therefore,

Hypothesis 4b: The value of bridging relations to performance is positively moderated by external location.

Bonding structure. The value of bonding structure is found in an increased information flow and norms of cooperation that ensure easy access to knowledge and resources within a network as well as group support when needed (Baer, 2012). For the purposes of individual performance in an organization, this source will have value to the actor only if it is located within the organization because it will be relevant to the pursued performance outcomes. Contrary, utilizing bonding structure outside of the organization hinders the risk of low utility as the norms of cooperation in the outside network are not applicable to the internal network and the group support provided is not necessarily relevant to the performance goals. Thus,

Hypothesis 4c: The value of bonding structure to performance is negatively moderated by external location.

Bonding relations. Bonding relations are the ones willing to devote time and effort in assisting each other (Coleman, 1988) with the information and resources they have at hand (Aral & Van Alstune, 2011) as well as with any emotional needs (Ibarra & Smith-Lovin, 1997). Bonding relations inside the organization will bring solid relevant support in regards with task needs, while bonding relations outside the organization will

bring diversity in the total gathered information and support. Therefore, having a mix of the two should optimize the derived value from this source. Therefore,

Hypothesis 4d: The value of bonding relations to performance is positively moderated by mixed location.

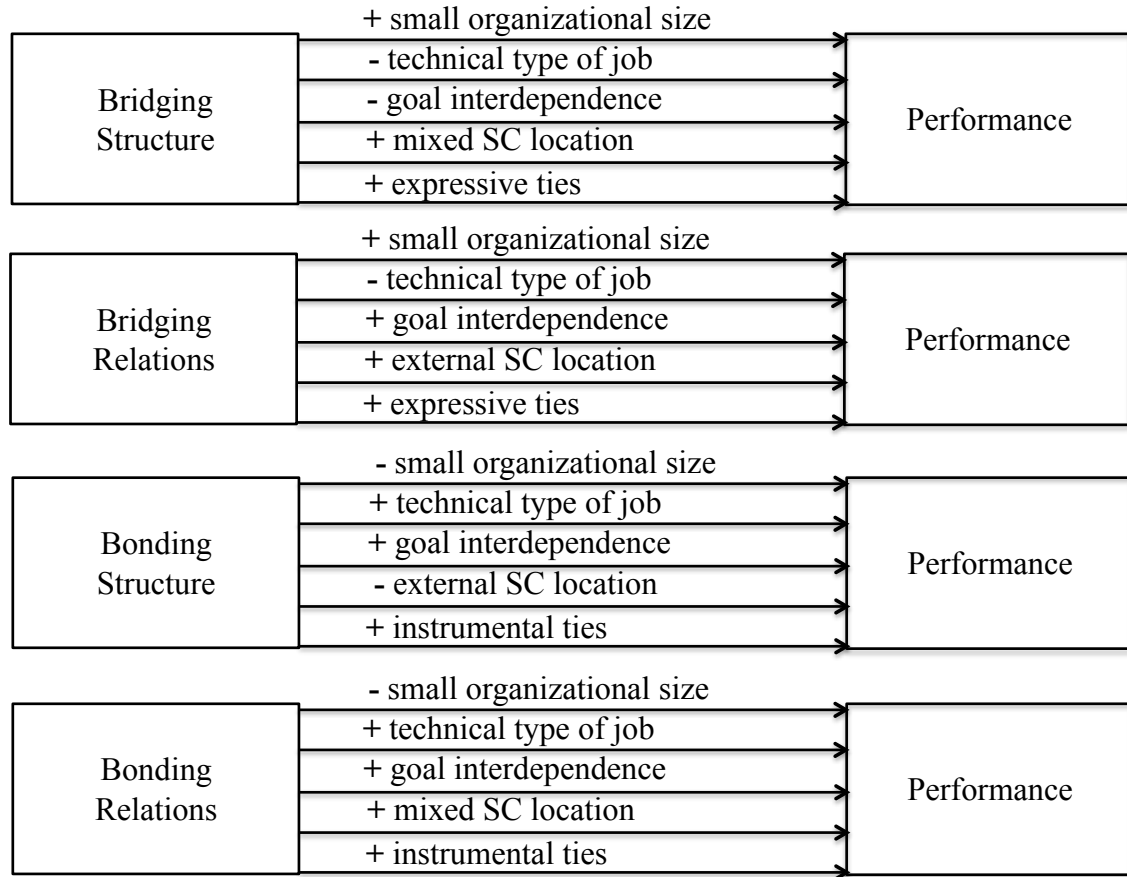
Type of ties. The literature on social capital discusses two main types of social ties: instrumental, which are useful for gathering information, advice and resources necessary for goal achievements, and expressive – associated with social support, emotional closeness and affection (Hayton, Carnabuci, & Eisenberger, 2012; Umpruss et al., 2003). Research usually associates instrumental ties with bridging and expressive ties with bonding (e.g. Ingram & Zou, 2008) because of the similarity in their utility. Both bridging social capitals and instrumental ties are used for gathering information and resources, while bonding social capitals and expressive ties are used for social and personal support. If the power of the two camps can be combined, then the value of each source should increase. More precisely, bridging sources of social capital built on expressive ties will be a source of non-redundant opportunities and information, as well as a source that will deliver strong support in pursuing those opportunities and maximizing the use of gathered information. Similarly, bonding sources of social capital built on instrumental ties will not only be a reliable support system, but also one that provides non-redundant opportunities. We therefore predict the following:

H5a/5b: The value of bridging structure to performance (a) and the value of bridging relations to performance (b) will be positively moderated by expressive ties.

H5a/5b: The value of bonding structure to performance (c) and the value of bonding relations to performance (d) will be positively moderated by instrumental ties.

Graphical summary of all study hypotheses is presented in Figure 3.

Figure 3: Study Hypotheses



METHODOLOGY

Sampling Procedure

The sample for the study consists of all articles examining the relationship between social capital and individual job performance, published in peer-reviewed scholarly journals between 1973, when Granovetter's weak tie theory was published, and 2015. We performed a comprehensive search to identify all empirical studies that use social capital to predict individual job performance. First, we explored three electronic databases: (1) EBSCO, (2) ScienceDirect, and (3) Google Scholar, using "social capital", "social

relations” and “social network” as search terms. Second, we manually searched the top management journals, expected to include studies on the topic of interest, more specifically *Academy of Management Journal*, *Administrative Science Quarterly*, *Journal of Applied Psychology*, *Journal of Management*, *Journal of Management Studies*, *Organization Science*, and *Strategic Management Journal*. Finally, we consulted the references of major review articles in the field (e.g. Adler & Kwon, 2002; Nahapiet & Ghoshal, 1998). Studies were included in the sample only if they fit a set of criteria, which is described in detail in the previous chapter. The final sample is composed of 62 published papers from 20 different journals and a total of 345 effect sizes.

Coding and Variable Operationalization

We performed the coding according to a protocol with definitions. An independent second coder was used to test the coding validity for the independent variables. The results from the two coding processes were compared using correlation analysis (LeBreton & Senter, 2007). The inter-rater reliability coefficient was 97%, which is deemed as very strong by different benchmarks (e.g. Landis & Koch, 1977).

Independent variables. The independent variables in the study are the four sources of social capital measured as dichotomous variables. For *bridging structure* 1 is assigned if the social capital variable in the primary study looks at structural opportunities for bridging, such as betweenness centrality, spanning boundaries, structural holes, and connections to different groups, and 0 otherwise. *Bridging relations* is assigned 1 if the social capital variable in the primary study looks at the number of ego’s contacts, non-redundant contacts, weak ties, and ties that reach out to different networks, and 0 otherwise. *Bonding structure* is assigned 1 if the social capital variable in the primary

study measures the level of connectedness within ego's network – e.g. closeness centrality, embeddedness and network density, and 0 otherwise. *Bonding relations* is assigned 1 if the social capital variable in the primary study frequency and closeness of relations, such as kin, strong ties or frequency of interaction, and 0 otherwise. The full list of variable coding is available in Appendix B.

Dependent variable. The dependent variable in the study is *individual job performance*, which measures the accomplishment of work related tasks (Campbell, 1990). Performance tasks differ across job functions and hierarchical levels. Because we are interested in the overall affect social capital has on individual performance we included in the sample studies with various measures of job performance, such as creativity, sales, annual reviews, and quality of outcomes. Full list of the variables considered as measures of individual performance is also available in Appendix C.

Moderators. To examine the moderating effects of organization and job related factors we collected data from the sample descriptions in the primary studies in our sample. To test Hypotheses 1a to 1d we recorded the size of the organization, from which the primary authors collected their data, as a category variable, operationalized as three dummy variables: *Small Organization* (1 if the organization had less than 500 employees, 0 otherwise); *Big Organization* (1 if the number of employees was above 500, 0 otherwise); and *Size Unknown* (1 if no data was provided on the size of the organization, 0 otherwise). We set the “big organization” category as a reference category. We measured *organizational function* as a category variable, operationalized as three dummy variables: *Technical* (1 if the data was collected by the primary authors only from employees working in operations, information and communication technologies,

engineering, mechanics, or technical support services, 0 otherwise); *Administrative* (1 if the data was collected from employees involved in any other job not listed under the technical category, 0 otherwise); and *Mixed Function* (1 if the data was collected from a sample that had individuals engaged in both functions, 0 otherwise). We used the “administrative” category as reference. To measure *task interdependence* we created a category variable, again operationalized as three dummy variables: *Collective goals* (1 if the sample consisted of individuals engaged with shared goals, such as movies, patents, publications, projects and team work, and 0 otherwise); *Individual goals* (1 if the sample consisted of individuals engaged with individual goals, and 0 otherwise); and *Goals Unknown* (1 if the primary study does not provide enough detail to categorize the task interdependence of the actors, 0 otherwise). We used the “individual category” as a reference.

To assess the moderating effects of social network variables we collected data from the methods descriptions in the primary studies in our sample. We measured *location of the social capital* by looking at how the authors collected social network data vis-à-vis the organizational boundaries. The variable is operationalized with three dummy variables: (1) *Internal* (1 if the data was collected only for connections inside the organization the respondents were working in, 0 otherwise); (2) *External* (1 if the data was collected for connections outside the organization the respondents were working in, 0 otherwise); and (3) *Mixed* (1 if the data was collected for connections both inside and outside the employing organization, 0 otherwise). As a reference category for this variable we used “internal”. Lastly, we measured *type of ties* through three dummies: (1) *Instrumental Ties* (1 if network data was collected by the primary authors based on

advice, work, information or resource type of ties, and 0 otherwise); (2) *Expressive ties* (1 if network data was collected by the primary authors based on friendship, support and social ties, and 0 otherwise); and (3) *Mixed ties*, (1 when any mix of the two type of ties was used for collecting the network data by the primary authors, and 0 otherwise).

Controls. Lin, Ensel, and Vaughn (1981) introduced the concept of social resources and argued that individual outcomes are expected not from having a particular network configuration but from having access to social resources embedded in those networks. Social resource theory has gained empirical support with variables, such as contacts with status (Kilduff & Krackhardt, 1994; Cross & Cummings, 2004) and professional affiliation (Ibarra, 1993; Baer, 2010) found to be significantly correlated with individual outcome variables. We therefore control for *social resources* and measure it as a dichotomous variable (1 = if the primary study used in the analyses a measure of social resources, 0 = otherwise). Because the choices individuals make to enact their social capital are strongly conditioned by their location in the organization structure (Hanneman & Riddle, 2011), we also control for *position in the organization hierarchy* with three dummy variables: *Manager* (1 if the sample in the sample of the primary study consists only of managers and executives, 0 otherwise); *Employee* (1 if the sample of the primary sample consists only of individuals with no managerial responsibilities, and 0 otherwise); and *Mixed* (1 if the primary sample consists of a mix of managers and employees as respondents, and 0 otherwise). The non-redundancy in bridging and the redundancy in bonding could be dependent on the number of networks in which it occurs, so that bridging within one network should be less advantageous compared to bridging in multiple networks. And vice versa, the weakness of bonding social capitals, observed in

redundancy, should be reduced with the number of networks in which it is developed. We therefore control for the *number of networks* the primary authors used to measure each source of social capital by standardizing the values. The studies in our sample adopted one of two approaches to collecting social network data: either by examining ego network structure or by adopting a whole network approach. We control for this with a dichotomous variable *network feature* (1 = ego network approach, 0 = whole network approach). We also control for *age* by collecting data on the mean age in the primary studies samples; we substituted missing values for the studies that did not report mean age with the mean value of the nonmissing values (Schlomer, Bauman, & Card, 2010) and standardized the values. Lastly, we also control for gender as research suggests that social networking is gender specific (e.g. Benenson, 1990; Brass, 1985). To construct this variable we first collected data from the primary studies on the percent of males in the samples, such that a value of 1 indicates only male respondents and a value of 0 – only female respondents. We next applied the same mean substitution and standardization procedures as described for age.

Meta-analytical Data

We use meta-analysis, which is a useful tool to extend theory by testing hypotheses that are difficult to evaluate within the boundaries of a single sample primary study (Carney et al., 2011). We first collected meta-analytical data from the sample studies. Many of them reported more than one effect size between an operationalization of an independent variable and job performance. We decided to treat each effect size as independent following research findings that “nonindependence of the data does not affect the estimation of the population parameter” (Tracz, Elmore, & Pohlmann, 1992,

p.886). Following Hunter and Schmidt's (2004) guidelines we first extracted bivariate correlations (r) between social capital categories and individual performance, where the correlation effect size (ES_r) is defined as the Pearson product-moment correlation coefficient. We also included one study that reported standard deviations and standard errors; first, we calculated the respective t -statistics and then applied Lipsey and Wilson's (2001) approximation formula to compute the ES_r in those cases, where $ES_r = \frac{t}{\sqrt{t^2 - df}}$.

We also recorded the associated sample size and the other study variables.

MARA Procedure

To test the proposed moderating effects on the relationship between social capital sources and performance we use meta-analytical regression analysis (MARA; Lipsey & Wilson, 2001). Through this analytical procedure the relationship between effect size and moderating variables can be evaluated by modeling the heterogeneity in the effect size distribution (Lipsey & Wilson, 2001). We used weighted regression to account for the fact that the effect sizes in our dataset are based on different sample sizes. Because effect sizes associated with larger sample sizes offer more precise estimations of the mean rho compared to those based on smaller samples, Hedges and Olkin (1985) suggest to use weights that are inversely proportional to the variance in each study. For the estimation we chose the mixed-effects approach, which has lower statistical power in identifying moderating effects (Overton, 1998), but assumes that the variability between effect sizes is due not only to sampling error but also to unique differences in the true population effect sizes (Lipsey & Wilson, 2001), thus reducing the risk of type I error. Therefore, the formula we used for inverse variance weight is $w_i = 1/(se_i^2 + \nu)$, where se_i is the standard error of the mean effect size and ν is the random effects variance component (Lipsey &

Wilson, 2001). For each moderator we ran four separate analyses – one for each source of social capital. Therefore, the results for each source should be interpreted in reference to the other three.

RESULTS

Moderating Effects of the Organization

Table 7 presents the first meta-analytic regression analysis results. Models 1a through 1d present the baseline models with control variables only and show some meaningful effects. The presence of social resources has a positive and significant impact on each of the sources of social capital, which provides additional support for the claim that the value of social capital is not in obtaining a certain network position or developing specific ties, but in the resources that could be reached through those positions and relations (Lin, Ensel, & Vaughn, 1981). Another interesting finding is that the relationship between each of the sources and performance is significantly weaker for managers as compared to employees. This finding suggests that employees can improve their individual performance more with the use of social capital than managers can. We also found a significant negative relationship between ego network data and effect size. This indicates that data collected from whole-network approach leads to larger effect sizes compared to data collected from ego network approach. This effect size might be attributable to the fact that the whole network approach uses predominantly name rosters for primary data collection or complete network data for secondary data collection (e.g. patents and publications), which both are biased toward more exhaustive social network data collection, compared to the name generator, distinctive for the egocentric approach

Table 7: Meta-analytic Regression Analysis Results for the Effects of the Organization

Variables	Model 1a Bridging Structure	Model 1b Bridging Relations	Model 1c Bonding Structure	Model 1d Bonding Relations	Model 2a Bridging Structure	Model 2b Bridging Relations	Model 2c Bonding Structure	Model 2d Bonding Relations
Social Capital (SC) source	.10 (.02) ***	.08 (.02) ***	-.13 (.02) ***	-.02 (.02)	.03 (.04)	.08 (.03) *	-.09 (.03) **	-.04 (.03)
Organizational size								
Small					-.03 (.03)	.02 (.03)	.02 (.03)	.03 (.03)
Size unknown					-.03 (.02)	-.02 (.02)	-.01 (.02)	.03 (.02)
Small size X SC source					.19 (.06) ***	-.00 (.05)	-.10 (.05) *	-.03 (.04)
Size unknown X SC source					.07 (.05)	.00 (.05)	-.06 (.04)	-.16 (.03) ***
Type of job								
Technical								
Mixed								
Technical job X SC source								
Mixed jobs X SC source								
Goals								
Collective								
Goals unknown								
Collective X SC source								
Goals unknown X SC source								
Location of social capital								
External								
Mixed								
External location X SC source								
Mixed Location X SC source								
Type of ties								
Expressive ties								
Instrumental ties								
Mixed ties								
Expressive ties X SC source								
Instrumental ties X SC source								
Mixed ties X SC source								
Controls								
Social Resources	.10 (.02) ***	.08 (.02) ***	.08 (.02) ***	.09 (.02) ***	.09 (.02) ***	.08 (.02) ***	.09 (.02) ***	.10 (.02) ***
Managers	-.08 (.02) ***	-.09 (.02) ***	-.07 (.02) ***	-.09 (.02) ***	-.09 (.02) ***	-.10 (.02) ***	-.08 (.02) ***	-.09 (.02) ***
Mixed Employees	-.03 (.03)	-.01 (.03)	-.04 (.03)	-.02 (.03)	-.05 (.03)	-.02 (.04)	-.05 (.03)	-.04 (.03)
Number of networks	.01 (.01)	.01 (.01)	.01 (.01) *	.01 (.01)	.00 (.01)	.01 (.01) +	.01 (.01) *	.01 (>.01)
Network data	-.07 (.02) ***	-.11 (.02) ***	-.10 (.02) ***	-.10 (.02) ***	-.07 (.02) ***	-.11 (.02) ***	-.10 (.02) ***	-.09 (.02) ***
Age	.00 (.00) **	.00 (.00) **	.01 (.00) **	.00 (.00) **	.00 (.00) **	.00 (.00) *	.00 (.00) **	.00 (.00) +
Gender	-.00 (.06)	-.03 (.06)	-.03 (.06)	-.02 (.06)	.01 (.06)	-.04 (.06)	-.04 (.06)	-.05 (.06)
Constant	.16 (.02) ***	.19 (.02) ***	.24 (.02) ***	.20 (.02) ***	.19 (.03) ***	.19 (.02) ***	.24 (.02) ***	.21 (.02) ***
k	345	345	345	345	345	345	345	345
R2	.18	.17	.22	.15	.20	.18	.23	.20
Q (model)	107.57 ***	105.91 ***	153.03 ***	90.52 ***	110.45 ***	107.82 ***	159.29 ***	126.29 ***
Q (residual)	485.07 ***	504.56 ***	540.95 ***	510.74 ***	473.45 ***	500.79 ***	533.58 ***	527.34 ***
v	.02	.02	.02	.02	.02	.02	.02	.02

Note: Social capital differs across models with the source indicated in the heading. The coefficient for each source should be interpreted in references to the other three sources. Unstandardized regression coefficients are presented with standard errors in parenthesis; k is the total number of effect sizes; Q is the homogeneity statistics; v is the random-effects variance component.

+ p < .10
* p < .05
** p < .01
*** p < .001

(Brewer, 2000; Marin, 2004). Number of networks is significant only for bonding structure, suggesting that embeddedness in a network that serves more than one purpose increases the value of this social capital source. Lastly, we did not find any significant

impact of gender on the value of the social capitals, but age shows a significant positive sign, which signals that with age actors learn to utilize their social capital better.

Models 2a to 2d add the size of the organization to test respectively Hypotheses 1a to 1d. In Model 2a we find a strong positive interaction effect ($p < .001$) supporting Hypothesis 1a: bridging structure is more likely to deliver value to performance in small organization. We also find a significant negative effect ($p < .05$) in Model 2c, which provides support for Hypothesis 1c – small organization size lowers the value of bonding structure. We did not find support for Hypotheses 1b and 1d. Together, the results suggest that the size of the organization impacts the value of network derived social capitals, but does not affect the value of the relations derived ones.

Moderating Effects of the Job

Table 8 presents the next meta-analytic regression analysis results, which explores the moderating effects of job specificity. In models 3a to 3d we tests the second set of hypotheses. The results provide support for Hypotheses 2a with strong negative interaction effect ($p < .001$), confirming that for technical type of jobs the value of bridging network to performance, compared to the value of the other sources, goes down. Contrary to the predictions in Hypothesis 2b, there is a positive effect of technical jobs on bridging relations. We also find support for Hypothesis 2c, which suggested that the value of bonding structure is stronger in technical than administrative jobs but we find no effects of job function on bonding relations, thus Hypothesis 2d is rejected. Similar to the findings for organization size, job functions seems to have a more significant impact on network derived social capital, than on relations derived.

In models 4a to 4d we test the moderating impact of goal independence on the

Table 8: Meta-analytic Regression Analysis Results for the Effects of the Job

Variables	Model 3a Bridging Structure	Model 3b Bridging Relations	Model 3c Bonding Structure	Model 3d Bonding Relations	Model 4a Bridging Structure	Model 4b Bridging Relations	Model 4c Bonding Structure	Model 4d Bonding Relations
Social Capital (SC) source	.24 (.03) ***	.04 (.03) ***	-.17 (.02)	-.00 (.03)	.12 (.03) ***	.10 (.02) ***	-.16 (.02) ***	-.05 (.02) *
Organizational size								
Small								
Size unknown								
Small size X SC source								
Size unknown X SC source								
Type of job								
Technical	.07 (.02) **	-.00 (.03)	-.02 (.02)	.03 (.03)				
Mixed	-.04	-.13 (.04) ***	-.10 (.03) **	-.06 (.04) +				
Technical job X SC source	-.27 (.05) ***	.07 (.04) +	.11 (.04) **	-.04 (.04)				
Mixed jobs X SC source	-.21 (.07) **	.15 (.07) *	.05 (.06)	-.10 (.08)				
Goals								
Collective					-.05 (.02) *	-.02 (.02)	-.09 (.02) ***	-.09 (.03) ***
Goals unknown					-.06 (.05)	-.05 (.05)	-.09 (.06)	-.13 (.05) *
Collective X SC source					-.07 (.05)	-.18 (.06) **	.12 (.04) ***	.10 (.05) *
Goals unknown X SC source					-.19 (.16)	-.15 (.13)	.13 (.08) +	.15 (.11)
Location of social capital								
External								
Mixed								
External location X SC source								
Mixed Location X SC source								
Type of ties								
Expressive ties								
Instrumental ties								
Mixed ties								
Expressive ties X SC source								
Instrumental ties X SC source								
Mixed ties X SC source								
Controls								
Social Resources	.08 (.02) ***	.07 (.02) **	.07 (.02) ***	.08 (.02) ***	.11 (.02) ***	.10 (.02) ***	.08 (.02) ***	.11 (.02) ***
Managers	-.06 (.02) **	-.07 (.02) **	-.05 (.02) **	-.07 (.02) **	-.08 (.02) ***	-.08 (.02) ***	-.07 (.02) ***	-.09 (.02) ***
Mixed Employees	-.03 (.04)	.01 (.04)	-.03 (.03)	.00 (.01)	-.02 (.03)	-.01 (.03)	-.02 (.03)	-.01 (.03)
Number of networks	.00 (.01)	.01 (.01) *	.01 (.01) *	.01 (.01)	.00 (.01)	.01 (.01)	.01 (.01) *	.00 (.01)
Network data	-.05 (.02) *	-.11 (.02) ***	-.10 (.02) ***	-.10 (.02) ***	-.06 (.02) **	-.11 (.02) ***	-.09 (.01) ***	-.09 (.02) ***
Age	.01 (.00) **	.01 (.00) **	.01 (.06) ***	.01 (.00) **	-.00 (.00) *	.00 (.00) *	.00 (.00) ***	.00 (.00) *
Gender	-.02 (.07)	-.10 (.07)	-.06 (.06) ***	-.09 (.07)	-.04 (.06)	-.08 (.06)	-.03 (.05)	-.08 (.06)
Constant	.12 (.02) ***	.20 (.02) ***	.25 (.02) ***	.20 (.02) ***	.16 (.02) ***	.18 (.02) ***	.24 (.02) ***	.21 (.02) ***
k	345	345	345	345	345	345	345	345
R ²	.25	.20	.24	.17	.20	.20	.24	.18
Q (model)	156.66 ***	119.81 ***	199.39 ***	99.98 ***	127.44 ***	121.15 ***	215.81 ***	103.96 ***
Q (residual)	478.45 ***	479.25 **	633.95 ***	492.61 ***	503.97 ***	479.03 ***	672.28 ***	489.42 ***
v	.02	.02	.01	.02	.02	.02	.01	.02

Note: Social capital differs across models with the source indicated in the heading. The coefficient for each source should be interpreted in references to the other three sources. Unstandardized regression coefficients are presented with standard errors in parentheses; k is the total number of effect sizes; Q is the homogeneity statistics; v is the random-effects variance component.

+ p < .10
* p < .05
** p < .01
*** p < .001

value of social capitals and relations. We find strong support for the positive effect of collective goals on both bonding sources (.12, $p < .001$ for bonding structure and .10, $p < .05$ for bonding relations), which confirms Hypotheses 3c and 3d. When the performance goals of individuals are intertwined with those of other individuals, then the value of both bonding sources significantly increases compared of that of the bridging. We did not find

however support for Hypothesis 3a. Although the directionality of the interaction term between bridging structure and collective goals is negative, as predicted, the result is not significant. Hypothesis 3b is rejected. Contrary to our prediction that bridging relations can serve collective goals too, the results convincingly indicate that compared to the other social capital sources bridging relations have a negative influence on performance for collective goals. Apparently, the effort to maintain bridging relations through constantly reaching out to as many contacts as possible in order to avoid tie decay due to long inactive periods (Burt, 2002; Mariotti & Delbridge, 2012), presents as a distraction, not advantage for collective goals.

Moderating Effects of Social Network Variables

Table 9 presents the analyses on the moderating effects of social network variables. In models 5a-5d we test the moderating effects of the location of social capital. Hypothesis 4a is supported – there is a positive effect of exercising brokerage concomitantly inside and outside the organization boundaries ($p < .10$), while brokering outside only is not significantly related to performance. Hypothesis 4b received strong support with significant positive interaction ($p < .001$), proving that bridging relations outside the organization improves their value to performance. The interaction term between bridging relations and mixed location is not significant, which implies that bridging relations inside the organization increase the overall redundancy in this source of social capital and consequently reduce its “bridging” value. We also find support for our prediction that bonding structure is relevant to performance only when it is within the organization boundaries. The interaction term for bonding structure and performance is negative and significant (supporting Hypothesis 4c), while the interaction term with

Table 9: Meta-analytic Regression Analysis Results for the Effects of Social Networks

Variables	Model 5a Bridging Structure	Model 5b Bridging Relations	Model 5c Bonding Structure	Model 5d Bonding Relations	Model 6a Bridging Structure	Model 6b Bridging Relations	Model 6c Bonding Structure	Model 6d Bonding Relations
Social Capital (SC) source	.06 (.03)*	.06 (.03)*	-.11 (.02)***	.00	.04 (.03)	.09 (.02)***	-.59 (.08)***	.04 (.09)
Organizational size								
Small								
Size unknown								
Small size X SC source								
Size unknown X SC source								
Type of job								
Technical								
Mixed								
Technical job X SC source								
Mixed jobs X SC source								
Goals								
Collective								
Goals unknown								
Collective X SC source								
Goals unknown X SC source								
Location of social capital								
External	-.16 (.05)***	-.21 (.05)***	-.06 (.05)	-.11 (.04)**				
Mixed	-.05 (.02)*	-.02 (.02)	-.02 (.02)	-.02 (.02)				
External location X SC source	.18 (.16)	.29 (.07)***	-.12 (.06)+	-.20 (.09)*				
Mixed Location X SC source	.08 (.05)+	-.02 (.04)	-.03 (.04)	-.02 (.04)				
Type of ties								
Expressive ties					-.07 (.05)	-.04 (.05)		
Instrumental ties							-.03 (.03)	.04 (.05)
Mixed ties					.00 (.03)	.07 (.03)**	.05 (.04)	.12 (.05)*
Expressive ties X SC source					.16 (.08)*	.00 (.08)		
Instrumental ties X SC source							.49 (.04)***	-.05 (.09)
Mixed ties X SC source					.25 (.05)***	-.04 (.06)	.42 (.08)***	-.11 (.10)
Controls								
Social Resources	.11 (.02)***	.08 (.02)***	.09 (.02)***	.11 (.02)***	.07 (.02)***	.06 (.02)**	.07 (.02)***	.08 (.02)***
Managers	-.07 (.02)***	-.07 (.02)**	-.06 (.02)**	-.09 (.02)***	-.09 (.02)***	-.10 (.02)***	-.09 (.02)***	-.10 (.02)***
Mixed Employees	-.02 (.04)	-.01 (.03)	-.02 (.03)	-.01 (.04)	-.09 (.04)**	-.04 (.04)	-.07 (.03)*	-.04 (.04)
Number of networks	.00 (.01)	.00 (.01)	.01 (.01)+	.00 (.01)	.00 (.01)	.01 (.01)	.01 (.00)*	.01 (.01)
Network data	-.06 (.02)**	-.09 (.02)***	-.09 (.02)***	-.08 (.02)***	-.08 (.02)***	-.12 (.02)***	-.11 (.02)***	-.11 (.02)***
Age	.01 (.00)***	.01 (.00)**	.01 (.00)***	.01 (.00)***	.00 (.00)*	.01 (.00)**	.01 (.00)***	.01 (.00)**
Gender	-.03 (.06)	-.07 (.06)	-.06 (.06)	-.04 (.06)	.01 (.06)	-.05 (.06)	-.03 (.05)	-.04 (.06)
Constant	.18 (.02)***	.19 (.02)***	.24 (.02)***	.20 (.02)***	.18 (.02)***	.10 (.02)***	.27 (.03)***	.16 (.04)***
k	345	345	345	345	345	345	345	345
R ²	.21	.22	.24	.18	.22	.19	.27	.16
Q (model)	121.81***	135.14***	167.36***	107.47***	142.45***	112.31**	260.33***	96.99***
Q (residual)	470.05***	474.97***	527.29***	492.90***	490.43***	487.71***	707.41***	495.00***
v	.02	.02	.02	.02	.02	.02	.01	.02

Note: Social capital differs across models with the source indicated in the heading. The coefficient for each source should be interpreted in references to the other three sources. Unstandardized regression coefficients are presented with standard errors in parenthesis; k is the total number of effect sizes; Q is the homogeneity statistics; v is the random-effects variance component.

+ p < .10
* p < .05
** p < .01
*** p < .001

mixed location is not significant but with negative directionality. Hypothesis 4d does not find support. We predicted that having bonding relations both inside and outside the organization will provide a mix of strong, yet diverse, relations that will increase the utility of this source, but the results of the analysis convincingly demonstrate that

compared to internal strong relations, both external and mixed ties have a negative impact on this source of social capital.

Models 6a-6d test our final predictions about the affects of ties. We find support that expressive ties increase the value of bridging network (Hypothesis 5a). The interaction term is positive and significant ($p < .05$) and so is the one with mixed ties. This finding suggests that adding expressive ties in a bonding structure increases the value derived from it for performance. Hypothesis 5b however is rejected; there is no effect of expressive ties on bridging relations. Apparently, the value of this source lies only in the diversity of accessible information, knowledge and resources and mixing it with social support in accessing those resources does not increase their utility. On the bonding side we find similar findings. As predicted in Hypothesis 5c, instrumentality of ties in bonding structure significantly increases its value to performance and so does a portion of instrumental ties; both interaction terms – with instrumental ties and with mixed ties – are positive and significant at $p < .001$. Bonding relations however are not affected by instrumentality, thus Hypothesis 5d is rejected. It seems that strong ties are strong for a reason; whether instrumental or not, they are motivated to deliver support (Aral & Van Alstyne, 2011; Bowler & Brass, 2006; Westphal, 1999).

Finally, in table 10 we present the full regression models. In the full model the moderating effects of small organizational size do not hold, except for bonding relations. Technical type of job is still significant for the bridging sources with negative effect on bridging structure and positive effect on bridging relations. The effects of collective goals are still not significant for bridging structure, but also for bonding relations; they are still significant for bridging relations and bonding structure. The location of the social capital

Table 10: Meta-analytic Regression Analysis Results for the Full Models

Variables	Model 7a Bridging Structure	Model 7b Bridging Relations	Model 7c Bonding Structure	Model 7d Bonding Relations
Social Capital (SC) source	.16 (.06)**	-.02 (.05)	-.47***	.16 (.10)
Organizational size				
Small	-.01 (.03)	.02 (.03)	.02 (.02)	.03 (.03)
Size unknown	.01 (.03)	-.04 (.03)	.04 (.02)+	.01 (.03)
Small size X SC source	-.11 (.07)	-.05 (.06)	-.10 (.04)*	-.01 (.07)
Size unknown X SC source	-.00 (.06)	.17 (.06)**	-.22 (.06)***	.04 (.08)
Type of job				
Technical	.08 (.03)**	.02 (.03)	.02 (.02)	.05 (.03)+
Mixed	-.01 (.04)	-.14 (.04)***	-.11 (.03)**	-.08 (.04)*
Technical job X SC source	-.29 (.06)***	.10 (.05)*	.04 (.04)	-.06 (.05)
Mixed jobs X SC source	-.24 (.08)**	.03 (.08)	-.03 (.06)	-.00 (.09)
Goals				
Collective	-.09 (.03)**	-.03 (.03)	-.11 (.02)***	-.15 (.03)***
Goals unknown	-.07 (.05)	-.06 (.06)	-.11 (.06)	-.17 (.06)**
Collective X SC source	-.01 (.06)	-.30 (.08)***	.13 (.05)**	.09 (.06)
Goals unknown X SC source	-.52 (.19)+	-.14 (.14)	.23 (.09)**	.14 (.13)
Location of social capital				
External	-.17 (.05)***	-.20 (.05)***	-.02 (.05)	-.09 (.05)+
Mixed	-.03 (.03)	.02 (.03)	-.01 (.02)	.07 (.03)*
External location X SC source	.45 (.17)**	.43 (.09)***	-.15 (.06)**	-.23 (.10)*
Mixed Location X SC source	.16 (.06)**	.02 (.06)	.09 (.05)+	-.15 (.06)*
Type of ties				
Expressive ties	-.04 (.05)	-.04 (.05)		
Instrumental ties			-.01 (.04)	.11 (.06)*
Mixed ties	-.01 (.05)	.04 (.03)	.06 (.05)	.20 (.07)**
Expressive ties X SC source	-.08 (.10)	-.07 (.09)		
Instrumental ties X SC source			.41 (.09)***	-.12 (.10)
Mixed ties X SC source	.31 (.07)***	.01 (.06)	.36 (.10)***	-.23 (.11)*
Controls				
Social Resources	.11 (.02)***	.08 (.03)**	.07 (.02)***	.11 (.03)***
Managers	-.05 (.02)+	-.03 (.03)	-.05 (.02)*	-.06 (.03)*
Mixed Employees	-.04 (.04)	-.00 (.04)	-.02 (.03)	-.01 (.04)
Number of networks	-.01 (.01)	.01 (.01)	.00 (.01)	-.00 (.01)
Network data	-.03 (.03)	-.11 (.02)***	-.10 (.02)***	-.11 (.03)***
Age	.01 (.00)***	.01 (.00)**	.01 (.00)***	.01 (.00)***
Gender	-.07 (.08)	-.20 (.08)**	-.18 (.06)**	-.19 (.08)*
Constant	.14 (.03)***	.19 (.03)***	.23 (.04)***	.06 (.06)
k	345	345	345	345
R2	.34	.31	.34	.25
Q (model)	216.88***	185.20***	335.87***	148.43***
Q (residual)	422.33***	416.18***	653.93***	445.09***
v	.02	.02	.01	.02

Note: Social capital differs across models with the source indicated in the heading. The coefficient for each source should be interpreted in references to the other three sources. Unstandardized regression coefficients are presented with standard errors in parenthesis; k is the total number of effect sizes; Q is the homogeneity statistics; v is the random-effects variance component.

+ p < .10
 * p < .05
 ** p < .01
 *** p < .001

keeps a steady significant effect, as discussed in the separate models, and so does the type of tie with the exception of the effects of expressive ties on bridging structure, which are not significant anymore. A final observation from the full model is that except for bridging structure, there is a significant negative effect of gender, which suggests that men might be making a better use of social capital compared to women.

DISCUSSION

Social network research has convincingly demonstrated that social capital can be a valuable resource for various outcomes related to performance. It can affect positively individual job performance (e.g. Brass, 1985), creativity (e.g. Baer, 2010), the completion of projects (Aral & Van Alstyne, 2011), and the performance reputation of an actor (Kilduff & Krackhardt, 1994) to name a few. Despite the quarrel between bridging and bonding, both have been found to impact positively performance. Even more interestingly, both have been found to have positive effects on the same type of outcomes. For example, bridging social capital has been positively linked to creativity (e.g. Baer, 2010; Perry-Smith, 2005) and knowledge creation (Wang, Rodan, Fruin, Xu, 2014); similarly, bonding social capital has also been linked to creativity (Madjar, Oldham, & Pratt, 2002; Perry-Smith, 2006) and knowledge creation (McFadyen & Cannella, 2004).

To understand how these opposing sources, with their different value and utility, have similar effects on the same outcomes scholars have turned their attention to explore moderating factors. One stream of research argues that the optimal structural design for social capital is contingent on the actions that the actors pursue (Ahuja, 2000). Another is introduced by Ryall and Sorenson (2007) who suggest overall social structure as another contingent factor. On the topic of job performance, an important line of inquiry has focused on task characteristics and their effect on the utility of the sources of social capital, such as novelty generation required on the job (Rodan & Galunic, 2004); task ambiguity (Burt, 2005); type of knowledge (Aral & Van Alstyne, 2011; Hansen, 1999); and speed of information changes (Aral & Van Alstyne, 2011).

The contingency perspective of social capital has advanced our thinking on social capital by emphasizing that each source has its own value and unique properties that are instrumental in some contexts and neutral or even detrimental in others. Therefore, the more we understand what contextual elements impact the utility of the sources, the better we can predict their efficiency. In this study we continue to explore this line of inquiry by focusing on three groups of factors that have not received much scholarly attention. The first group is factors related to the organization. Because organizations are a special type of network (Scott & Davis, 2007), which actors enter by terms of employment, their properties should affect the properties of individual networks, and consequently – the utility of the individual social capital resources. To test this proposition we explore the most general network property – organizational size.

A second group of factors that should impact the utility of social capital are ones that describe the job from the perspective of a node in the organizational network. Every job comes with a formal position in the organization and formal requirements for performance, which are not voluntarily chosen by actors (Podolny & Baron, 1997). Important variables that have eluded scholarly attention are position of the job in the organization hierarchy (Ibarra, 1992), in a team versus on an individual assignment, one departmental versus cross-departmental, etc. In this study we focus on two job-related characteristics – job function and job interdependence.

Lastly, a third group of factors that needs further attention is related to social networks methodology. Social network researchers have been very creative in operationalizing social networks from different methodological angles. Their interest in what constitutes the boundaries of the network, the types of ties or the number of

networks to consider at the same time varies significantly. However, there are some tendencies to measure particular variables through the same methodological approach, which might contribute to the observable effects of the social capital sources. A typical example is measuring bonding relations by looking at expressive type of ties (e.g. Carnabuci & Dioszegi, 2015; Perry-Smith, 2005), which neglects the option of having such ties in other networks. We find two methodology related variables of particular interest – location of social capital in regards with the organization boundaries and the type of ties used to measure the sources.

Organization, job and methodology moderators are challenging to explore within a single sample study. In such cases meta-analysis is a useful tool to extend theory by testing hypotheses that are difficult to evaluate within the boundaries of a single sample primary study (Carney et al., 2011; Eden, 2002). Taking stock of a rich meta-analytical dataset we are able to investigate their influence across multiple samples (62 published papers and a total of 345 effect sizes). In pooling estimates across studies, meta-analytical procedures produce estimates with significantly more statistical power than single studies because they increase the likelihood for discovering meaningful relationships upon which studies agree as well as differential results related to study differences (Lipsey & Wilson, 2001).

First, we find that the size of the organization affects the value of the social capitals derived from structure, but has no impact on the relational social capitals. In small organizations bridging network comes in handy, while bonding network is more of an inconvenience for performance goals. We conducted a robustness check on the effects of large organizations and found that they have a significant negative impact on bridging

structure, but no effects on bonding structure. Together, these results demonstrate that the low utility of bonding network for performance transforms into disadvantage as the size of the organization becomes smaller. At the same time, bridging structure, one of the most praised social capital ways to improve performance, loses its value as the size of the organization grows. The value of bridging relations with their access to diverse information, knowledge and resources (Umphress, et al., 2003) and wider range of views and ideas (Balkundi, Kilduff, Barsness, & Michael, 2007; Granovetter, 1973) as well as the bonding relations with their access to devoted and supportive contacts (Aral & Van Alstyne, 2011; Coleman, 1988) remains constant as the size of the organization changes.

Next we found that technical type of jobs have a strong negative effect on bridging structure. This comes as no surprise because these jobs are characterized with complex (Grant, 1996) and continuously re-codified knowledge, which previous research has already associated negatively with bridging (Aral & Van Alstyne, 2011; Hansen, 1999). The interesting discovery however is that bridging structure should not be confused with bridging relations, which we found to have significant positive value to performance even for technical jobs. Even though weak and diverse ties are not the ones to invest time and effort in assisting with complex technical challenges (Aral & Van Alstyne, 2011), their power to expose the actor to diverse views, novelties and pieces of information is beneficial for technical performance. Further, technical jobs significantly increase the value of bonding structure to performance but have no impact on bonding relations, which value seems to be steady across functions.

The presence of task interdependence is another instance in which bonding structure strikes as a competitive advantage. It has a negative impact on the value of

bridging (although not significant for bridging structure), and a positive one on bonding. Apparently, bridging may distract the pursuit of such performance goals, and there are two plausible explanations for that. One is that the diversity through bridging might lead to too much superficial and irrelevant information (Aral & Van Alstyne, 2011), which can have confounding and stagnating effects on performance as it drifts the actor away from the collectively agreed action steps. Another is that the search for diversity and entrepreneurship through bridging can be perceived as opportunistic and self-centered activity, which might invoke group's control and sanctioning mechanisms (Burt & Ronchi, 2007; Coleman, 1988) and distract the attention from the tasks at hand. Overall, the results of our study are convincing that when it comes to interdependent tasks actors would benefit more from bonding than from bridging.

Controlling for number of networks and approach to collecting network data, we found support for our prediction that bridging structure is maximized when it crosses the organizational boundaries. Bridging structure inside the organization will face competition and risk of continuous closure of structural holes (Ryall & Sorenson, 2007), while bridging outside will not necessarily be relevant to job performance. Therefore, it is not a surprise that the most value extracted from linkages between different groups dependent on the focal actor (Flap & Völker, 2001) occurs when some sides of the structural holes are inside the organization, and others – outside. We found that bridging relations are maximized when they are located outside of the organization. Because information and resources circulating within the organization are redundant, to maximize the diversity of accessible knowledge, views, ideas and resources, actors need to invest in outside networking. The opposite is true for both bonding sources – building relational

and structural support outside the organization decreases significantly their value to performance. The explanation of this finding might be found in the argument of relevancy. Although family members and close friends are the most motivated to help, they might not be able to (Kwon & Adler, 2014). Close relationships inside the organization and embeddedness in an internal structure will overcome the problem of relevancy and therefore increase the utility of these sources.

Lastly, our predictions for the moderating effects of type of ties found partial support. Similarly to the analysis of the moderating effects of organizational size, we found no effect of the type of ties on both relation derived sources, which is another evidence for bridging and bonding relations being more resistant to external factors, then structures are. Bridging across affective ties, however, provides the actor the power of exercising entrepreneurship through the support of strong ties. While such a strategy might be difficult to undertake (Sasovova, et al., 2010), our study confirms that it will impact positively performance outcomes. On the other side, when bonding structure is built with instrumental ties, its value to performance doubles. Enlisting the support and cooperation of a group of instrumental contacts takes the power of bonding structure to a whole new level.

Future Research Directions

Our work adds more knowledge on the contingent factors that affect the value of bridging and bonding. It provides insightful tips not only on when to bridge and when to bond but also on how to bridge and how to bond. Looking at the organization and the occupied job as critical external factors, future research should address more of their properties. Organizational structure is another characteristic of organizations that could

impact the formation of intraorganizational networks in terms of density, reachability and connectivity and consequently interact with individual networks and social capital utility. Future research should also consider how the utility of the social capital sources holds across different organization designs – hierarchical, dispersed, flat, and matrix. Position of the job in the organizational hierarchy is another variable worth attention, previously suggested by Ibarra (1992). We found that social capital has less value for managers and executives than it has for employees, but further analysis is needed to reveal whether this observation can be generalized or it is effective under the bounded conditions of our analysis. Overall, organizations and jobs have specific demands and the more we understand how their properties impact the demands and usefulness of social capital sources, the more we can construct purposeful networking strategies.

Our findings on the moderating effects of social capital location and type of ties raise a red flag for future research and the need for scholars to clearly specify the boundaries and characteristics of the source of social capital they are interested in. Those should be driven by the research questions of their explanatory theories (Borgatti & Halgin, 2011) and the implications of those boundaries on the observed effects should be clearly discussed. A focus on social capital operationalization can also be used by scholars interested in crossover social capital strategies, such as bridging with bonding ties, or bonding with bridging ties.

Our study also suggests that relational sources of social capital have a power of their own, meaning that their value is impacted by a lesser number of external factors compared to the value of structurally derived sources. This finding provides further support for our claim that investigating social capital would be more rigorous if the

analysis is based on four sources, rather than the general bridging and bonding categorization. The clearly outlined differences in the utility of bridging structure and bridging relations under the same external factors as well as the differences in the utility of bonding structure and bonding relations in similar contexts provides evidence for the differences in their value in reference to pursued outcome. This argument has important implications for future research, joining the contingency discussion on social capital, as it should make clear distinction between the four sources of social capital to better understand the mechanisms through which social capital provides value to the actors and how context and external factors impact it. It will also be interesting for scholars to explore whether relations hold a more independent position than structures under other moderating effects.

Our study joins the debate between the structuralism and agency of social capital. From a structuralism point of view actors are restricted by the structures they are embedded in (Burt, 2000a; Giddens, 1984). For social capital analysis this perspective means that each source leads to expected outcomes. From an agent-centric perspective intentional human action builds the structure and relations constituting social capital (Emirbayer & Goodwin, 1994). Therefore, agents can initiate purposeful networking strategies to take advantage and seize opportunities of social capital (Bensaou, Galunic, & Jonczyk-Sédès, 2014). In the context of our analysis the dichotomy between structuralism and agency translates into the concepts of availability and demand of social capital. From a structuralism perspective we can understand how properties of big networks, such as the organization, influence the emergence of specific sources of social capital. Those sources will be in abundance, thus becoming less valuable resources to

individual actors, while the rest will be in demand and the actors who possess them will gain a competitive advantage. The agent-centric perspective argues that actors can pursue the sources of social capital in demand. Future research should further investigate how availability and demand inform us about the formation of social capital and its consequent utility to pursued outcomes. Another interesting research question, yet to be explored, is whether social capital strategies emerge in response to demands and whether availability and demand impact their success rate.

Our findings have practical implications too. A lot of empirical evidence has piled up for the power of social capital to improve performance and to support the achievement of various individual goals. Social capital however is valuable only to the extent that it is goal specific (Flap & Völker, 2001) and our study outlines what are the most beneficial social capital sources to pursue for performance outcomes, given specific contextual factors. Considering the size of the organization and the specificity of their jobs, managers and practitioners could use the results of our study to target their networking strategies.

CONCLUSION

There are four sources of social capital that can support the achievement of performance goals – bridging structure, bridging relations, bonding structure and bonding relations. The organization and job actors are embedded in have demands that can be effectively addressed through the right choice of social capital and through strategies to maximize their utility. Our study outlines how organization and job properties affect the value of each source. Building on the notion that agents are pragmatically using their social capital to improve their productivity and effectiveness (Jonczyk et al., 2016), we

match each source with different contextual factors to outline their predicted utility. Our work also raises important questions in regards with the contingency perspective that need further research attention.

CHAPTER 4: THE SOCIAL CAPITAL PATH TO PERFORMANCE

ABSTRACT

The purpose of this study is to first explore the associations between bridging structure, bridging relations, bonding structure and bonding relations, and second – to compare the value of each source of social capital to the other sources in order to outline the most successful social capital path to individual performance. We use meta-analytical data, which methodology-wise allows us to build a rich dataset that includes variables from all four social capital sources, not feasible within the limits of a single empirical study. Our sample consists of 105 independent studies, each of which investigates the impact of some social capital sources on individual performance. We find that overall on the bridging side a bridging structure has more influence on performance compared to bridging relations, while on the bonding side relations are a more powerful predictor compared to structure. Our results further demonstrate that bonding relations is the grounding form for achieving better performance and is also the source that maximizes the utility of the other sources.

Key words: social capital, performance, MASEM

INTRODUCTION

The concept of job performance is concerned with the extent to which employees achieve their assigned work tasks. Because it is related to the degree to which an individual contributes to the achievement of the organizational goals (Campbell, 1983), it has attracted the attention of management scholars for years. This interest has manifested in proliferant research on strategic human resources management practices which investigate job performance as an outcome of job satisfaction (Petty, McGee & Cavender, 1984; Vroom, 1964), organizational commitment (Larson & Fukami, 1984; Meyer, Paunonen, Gellatly, Goffin & Jackson, 1989), goal setting (Locke, Shaw, Saari & Latham, 1981), turnover (Arnold & Feldman, 1982), and training programs (Bartel, 1994). Recently, focus has shifted from management practices to individual attributes as antecedent of job performance. Of those antecedents, social networks of organization members have received wide attention from scholars and have encouraged profound discussions.

In the past decade, the rise of social network analysis in management research has contributed to the development of an alternative view of the antecedents to successful on-the-job achievements; specifically that the social relations employees have and the social networks they are embedded in jointly constitute their social capital. This stream of inquiry is characterized by the debate between two alternative explanations. The first contends that bridging sources of social capital, which are concerned with the number and diversity of social contacts, serve as a better predictor of performance. When bridging, employees have access to non-redundant sources of knowledge, information and resources that allow them to exploit opportunities in pursuit of their goals (Burt,

1997, 2000a). The second explanation accentuates bonding sources of social capital stemming from strong and reliable contacts. This perspective explores how trust and norms of reciprocity lead to sharing and supportive behaviors (Coleman, 1988) and consequently to superior job performance.

The debate on whether bridging or bonding sources of social capital are more valuable has evolved to the recognition that there is a trade-off between the two (Aral & Van Alstyne, 2011), which channeled the inquiry in the direction of investigating the contingent value of bridging versus bonding. We complement this stream of research in two novel ways by proposing an alternative theoretical approach to evaluating the value of social capital to performance. First, instead of measuring the value of bridging as compared to bonding, we are exploring the complementarity between them. In order to achieve a more comprehensive theorizing, we adopt a theoretical framework for analyzing social capital, which besides evaluating its major function as bridging or bonding, also considers its substance as relations derived versus network position derived capital. This framework proposes four major sources of social capital: bridging structure, bridging relations, bonding structure and bonding relations. We know from previous research that each of those sources is positively related to individual performance, but not what the interplay between them is. Therefore, our first research goal is to explore how they relate to each other and theorize about the value of all sources.

Second, we reframe the prevailing “should I bridge or should I bond” question in the literature to “which source should I build on”. The empirical focus on the contingent value of bridging and bonding has diverted attention from the exploration of the complementarity of the different forms of social capital. Individuals derive capital from

their social networks and relations, and recent research draws attention to their dynamic nature (Ahuja, Soda & Zaheer, 2012) by emphasizing three processes that are constantly at play. First, because the number of alters each individual has is likely to increase over time (Ahuja, 2000), overall social networks grow in size with time. Second, brokerage positions are dynamic and therefore difficult to maintain (Ryall & Sorenson, 2007; Zaheer & Soda, 2009). And third, triadic closures between contacts are likely to develop over time (Granovetter, 1973). As networks are dynamic, their structural configuration moves in the spectrum between richness of structural holes and closeness allowing for different sources of social capital to be derived at every moment. If individuals are always bridging and bonding to some extent, then it is important to understand what the strategic starting point of social capital utilization is. This is our second research goal: to compare the value of each source of social capital to the other sources in order to outline the most successful social capital path to individual performance.

To test our theoretical predictions, we use meta-analytical data, which methodology-wise offers two advantages. First it allows us to build a rich dataset that includes variables from all four social capital sources; this would not be feasible within the limits of a single empirical study. Second, a meta-analysis gives us the power to take stock of the current literature and advance it through re-analyses of the existing studies (Lipsey & Wilson, 2001). Our sample consists of 105 independent studies, each of which investigates the impact of some social capital sources on individual performance. We use meta-analytical structural equation modeling (Viswesvaran & Ones, 1995) to test our theoretical predictions as this method creates an opportunity to test the explanatory value

of our theorized social capital path to performance against other competing paths (Bergh et al., 2014).

Our research makes two significant contributions to the social capital view of individual performance in organizations. First, we respond to Kwon and Adler's (2014) call to expand on specific aspects and mechanisms of social capital by examining the relationship between the four major sources of social capital. We found that overall on the bridging side a bridging structure has more influence on performance compared to bridging relations. Alternatively on the bonding side, relations are a more powerful predictor compared to structure. Second, building on the propositions of social networks dynamics research we demonstrate that while all sources of social capital are expected to have some positive impact on performance, some of them might suppress the involvement of the others. This finding has a significant impact as it predicts the best "social capital path" to performance – one that builds on the most powerful source of social capital and still takes advantage of the others. Our results convincingly demonstrate that bonding relations is the grounding form for achieving better performance and is also the source that maximizes the utility of the other sources.

THEORETICAL BACKGROUND

Job performance can be defined as the extent to which the actions and tasks, specified and required by an employee's job description, are achieved (Janssen & Yperen, 2004). It has been studied as both behavioral inputs into assigned tasks and measurable outputs of performing said tasks (Campbell, 1990). For the purposes of our theory we focus specifically on individual performance as the level of accomplishment of work-related tasks. Because job duties are distributed in such a way that individual tasks are

coordinated and controlled to achieve the overall organizational goals (Janssen & Yperen, 2004), poor performance by individuals may disturb organizational processes and impact negatively the achievement of organizational goals. Therefore, it is not surprising that improving job performance has received wide attention from management scholars who have tried to distill its significant predictors. The most important one that has emerged is the social capital of employees.

Social capital is the value of actors' social structure and relations allowing them to access resources, which they can use to secure their interests (Baker, 1990; Coleman, 1988), including improvement of their performance. It is generally agreed, that social networks provide a competitive advantage to certain members who manage to identify and utilize the opportunities it presents and the resources it contains (Burt, 2000a; Coleman, 1990; Portes, 1998). Building on this notion, the social capital view on performance focuses on the sources of social capital that employees have to predict task achievement. There are two competing views of what constitutes social capital and the mechanisms through which it improves performance, which Adler and Kwon (2002) describe as the bridging and bonding views.

The bridging view sees the source of social capital in the opportunities to connect with disconnected others. It originates with Granovetter's (1973) argument that weak ties, which bridge densely interconnected cliques, are a source of unique information and resources. Expanding on this perspective, Burt (1997; 2000a) argues that networks rich in structural holes create a competitive advantage for the individuals through three mechanisms. First, it allows access to a wider diversity of expertise, which increases the likelihood of obtaining relevant information (Burt, 2005; Cross & Cummings, 2004).

Second, it provides the opportunity for earlier access to novel and important information (Burt, 2005), which can be used to boost work efficiency through different approaches and methods. Finally, it improves control over information diffusion, which can be used for gaining competitive advantage on the job. Social ties that span holes across networks thus provide access to nonredundant sources of knowledge, information and resources, that employees can draw on when faced with task performance challenges. Therefore the power of social capital is directly proportional to the actors' bridging options (Aral & Van Alstyne, 2011; Burt, Jannotta, & Mahoney, 1998).

The bonding view of social capital offers an alternative view, which contends that the value of networks resides in closeness. It originates with Coleman's (1988) argument that in dense groups, characterized by network closure, individuals have the competitive advantage of fast access to the information and the tangible resources available within such a social structure. Bonding social capital can positively impact performance through five mechanisms. First, in dense networks there are more frequent interactions between the members (Granovetter, 1985; Krackhardt, 1992), which encourages continuous communication and discussion of work related issues. Second, norms of cooperation and reciprocity are established between densely connected actors (Aral & Van Alstyne, 2011; Blau, 1964) that boost work cooperation. Third, closed networks enhance the trust between the individuals because opportunistic behavior is minimized in the face of the group's control and sanctioning mechanisms (Burt & Ronchi, 2007; Coleman, 1988). Fourth, members of closed networks are motivated to provide support and resources to each other (Coleman, 1988; Granovetter, 1985). The more embedded individuals are in

such groups, the more they can rely on access to the information resources and support available through those networks resulting in successful job performance.

Early research on social capital started as a debate on whether bridging or bonding is the more valuable capital to pursue for different individual goals. Because individuals derive social capital from their social networks and social relations, an assumption can be made that at any moment they have, at least to some extent, access to all sources of social capital. On the one hand, the number of contacts each individual has is increasing over time (Ahuja, 2000) and this process impacts the relationship dynamics. Weak ties become strong if there are a sufficient number of repeated interactions, while strong ties become weak if they are not maintained. On another hand, individual social networks are not static; triadic closure (Granovetter, 1973) dissolves structural holes and new bridges open as the network expands over time. Given that each source of social capital is potentially beneficial for the actors, we are interested in investigating how all the sources are related to each other and which source is most accepting of the others to thrive. Thus, we reframe the literature's dominant question "should I bridge or should I bond?" to "which source should I build on?" with the goal of identifying the source of social capital that not only positively impacts performance, but also maximizes the subsistence of the other sources. To achieve that we first explore the relationships between the sources and then we explore two competing social capital path models.

Relationships Between the Four Sources of Social Capital

We argue that there are not two major sources of social capital; rather they can be decomposed into four: bridging structure, bridging relations, bonding structure, and bonding relations. *Bridging structure* is derived from an individual position within a

network that allows for spanning structural holes. It provides opportunities to broker between disconnected individuals and groups and secure an important position in the network (Burt & Ronchi, 2007) as well as access nonredundant information. *Bridging relations* depends on the quantity and versatility of individual contacts. This source of social capital allows for the accrual of a competitive advantage through the quantity of total gathered information, knowledge and resources (Umphress, et al., 2003), the earlier exposure to a wide range of views and ideas (Balkundi, Kilduff, Barsness, & Michael, 2007; Granovetter, 1973), and the widest choice of interaction partners (Flap & Völker, 2001). Evidently, both bridging sources are highly correlated. The more structural holes actors have in their networks, the more disconnected and potentially diverse contacts they have. Similarly, the larger the number of individual contacts, the greater the chance they are not connected themselves and thus the greater the opportunity to span structural holes.

The bonding sources of social capital are similarly twofold. *Bonding structure* is based on an individual's embeddedness in a highly cohesive network, and *bonding relations* – on the strong relationships available to the individual. Again, these two sources are highly correlated. Embeddedness in a network with interconnected actors increases interactions between members (Granovetter, 1985; Krackhardt, 1992) as well as the trust between them (Coleman, 1988), both of which improve the strength of the individual relationships within the network. Alternatively, when an actor has two strong ties with two alters, the chance of triadic closure increases and the more strong relations an actor has the more likely triadic closures will occur (Granovetter, 1973). This thus creates network closure.

While the relationship between the two bridging sources as well as between the two bonding sources is evident, the relationship between the bridging and the bonding sources requires further attention.

Bridging structure and bonding structure. Bridging structure is the source of social capital that individuals build by obtaining a network position that spans structural holes. This is probably the most difficult source of social capital to derive and utilize, but at the same time – the most rewarding in terms of performance outcomes. The challenge of building a bridging structure lies in the tension of spanning structural holes. First, actors need to devote time to discover potential structural holes. Next, they need to maximize the number of structural holes in order to make the linkages of different individuals or groups dependent on them (Flap & Völker, 2001). This requires ensuring that they cannot be substituted by anybody else; that they intermediate more than two social ties; and that they are not locked into a particular pattern of exchanges as a consequence of their brokerage (Ryall & Sorenson, 2007). Finally, even when established, brokerage positions are dynamic and difficult to maintain (Ryall & Sorenson, 2007; Zaheer & Soda, 2009) and they are vulnerable to decay (Burt, 2002). In summary, maintaining bridging structure social capital requires continuous focus on discovering positions for bridging structural holes and preserving the conditions that make them exclusive brokers (Sasovova, et al., 2010).

A bonding structure is the opposite of a bridging structure. While a bridging structure requires searching of disconnected parts of the network, bonding structure demands attention to the group and its members. In order to build bonding structure capital actors need to avoid opportunistic behavior and be active participants in the group

processes of sharing knowledge and support under the norms of trust and reciprocity (Chua, Ingram, & Morris, 2008; Coleman, 1988). Ng and Feldman (1995) found that employees who are more embedded in their network over time tend to decrease their endeavors to build social capital at work. Consistent with these results are the findings of Zaheer and Soda (2009) that a team spans less structural holes if its members were previously part of cohesive teams. These conclusions could be explained by the fact that these two sources have different, even conflicting, strategies to develop and maximize their use. Thus, upon cursory examination bridging structure and bonding structure seem mutually exclusive. However, efficient use of a bonding structure requires a high level of participation in network activities, which in turn provides the actor with critical information about the needs and deficiencies in the group and access to decision makers. Based on this information and access, actors can take the initiative to exercise brokerage by searching for agents that can satisfy the identified needs. We therefore do not exclude the possibility that these two sources are not mutually exclusive but rather they complement each other. Such a strategic combination of social capital resources has already been suggested by Zou and Ingram (2013), who argued that the optimal network structure for achieving higher job performance is to create structural holes across organizational boundaries (bridging structure) and to close structural holes within the organization (bonding structure).

Bridging structure and bonding relations. Bonding relations are the source of social capital that resides in strong social ties. Those ties are usually associated with kin and close friends. What distinguished these relations from others is the affective bond that has developed between the contacts, which motivates them to share all type of information

(Westphal, 1999) and to support each other in the pursuit of personal goals (Bowler & Brass, 2006). Previous research has argued that strong ties are not a solid grounding block for building a bridging structure (e.g. Granovetter, 1973). Two arguments in support of this statement have been developed in the literature. From a structural perspective triadic closures between close contacts are very likely to develop over time (Granovetter, 1973), which minimizes the chances to serve as a broker between two contacts. From a relational point of view, brokerage requires control of the flow of information and negotiation of conflicting demands (Burt, Janotta, & Mahoney, 1998), which is not easily exercised when on the two opposite sides sit strong ties. Because actors perceive affective ties to be personal and difficult to replace (Wright, 1984; Krackhard, 1992) they try to protect them and therefore avoid the threats of opportunistic brokering between such ties. However, the relationship is not solely negative. First, strong ties in an actor's network could also be nonredundant contacts to the extent that they point to different knowledge and opportunities (Hansen, 1999) and serve as a potential side in a structural hole. The chance of an actor to span such holes will increase if a strong tie does not exist on the other side. Second, the power of bonding relations social capital lies in the willingness of contacts to devote time and effort in assisting each other (Coleman, 1988) with all the information and resources they have at hand (Aral & Van Alstune, 2011). Such ties can support bridging opportunities in two ways: by agreeing to be a party in the brokerage relation when they also benefit from it and by providing the necessary support to find such party when the relation is either not relevant or not beneficial to them. Thus, we do not exclude the potential of a positive relationship between bridging structure and bonding relations.

Bridging relations and bonding structure. Bridging relations are the source of social capital that is derived from variety and diversity of social relations. Actors can gain a competitive advantage through the quantity of total gathered information, knowledge and resources (Umphress, et al., 2003), the earlier exposure to a wide range of views and ideas (Balkundi et al., 2007; Granovetter, 1973), and the widest choice of interaction partners (Flap & Völker, 2001). There are two main strategies to build and utilize bridging relations. First, actors should maintain a rich pool of contacts, including latent and potent ties (Mariotti & Delbridge, 2012). Second, they should constantly reach out to as many contacts as possible in order to avoid tie decay due to long inactive periods (Burt, 2002; Mariotti & Delbridge, 2012) and to increase the chances of collecting relevant valuable information.

The nature of bridging relations works in completely opposite direction of that of bonding structure, which is to invest in interaction and support within a certain group (Coleman, 1988; Granovetter, 1985) and are as such at odds with each other. Bridging relations are built on relationships characterized with low interaction and social distance (Aral & Van Alstyne, 2011), which does not allow for the emergence of a bonding structure through repeated collaborations with interconnected ties (Reagans & McEvily, 2003). Actors who are maintaining bonding structure would find it challenging to build and maintain bridging relations because the investment of time and effort they require will impact negatively their involvement in the bonding structure. First, their participation in the network will drop as they allocate time for reaching out to outside contacts, which will lower their access to critical information within the group and to decision makers. Second, group members may perceive outside networking as an

opportunistic, individual-centered, behavior and withdraw their support. We therefore expect a negative association between bridging relations and bonding structure.

Bridging relations and bonding relations. Because of the dynamic nature of social networks (Ahuja, Soda & Zaheer, 2012), bridging relations is not necessarily in conflict with bonding relations. Maintaining social ties requires an investment of both time and effort, and therefore individuals have a limited capacity on the number of ties they can maintain at a certain point of time. Research has shown that the number of alters each individual has increases over time (Ahuja, 2000), which means that new, bridging at least in the beginning, ties are constantly build by actors. A bonding type of tie requires more efforts compared to one bridging type of tie. Consequently, once actors reach their tie maintenance limit, a new strong tie will decrease more significantly the time allowed for maintaining all other ties compared to the impact of a new bridging type of tie on other relations. Social ties however are not static. First, they are all vulnerable to weakening and disappearing (Burt, 2002). Second, they are all subjected to transformation, such that weak ties might become strong with repeated interactions and transactions, while strong ties may become latent (Mariotti & Delbridge, 2012). Overall, maintaining strong ties doesn't exclude creating new contacts and maintaining weak ties is not an antidote to building strong relationships. Accordingly, we expect that actors can allocate time for nurturing both type of ties and benefit simultaneously from bridging and bonding relations.

Two Competing Social Capital Paths to Performance

The literature views bridging and bonding as two distinct paths to performance and generally prescribes that in order to perform better actors need to bridge, unless

circumstances dictate otherwise, such as working with complex knowledge (Hansen, 1999) or in work environments characterized with rapid change in information (Aral & Van Alstyne, 2011), in which case bonding social capital comes more handy. These specific circumstances inform us that while bridging social capitals are a must, they are not a one-size-fits-all solution. To ensure that they can rely on their social capital in every work situation, actors need to maximize the development and use of as many sources of social capital as possible. As we have argued so far, these sources are not mutually exclusive – one can bridge and still maintain some bonding and vice versa. Therefore, the strategic question to ask is not “Should I bridge or should I bond?” but “Which source should I build on?” To address this question we explore two competing social capital paths to performance. We start by making an important caveat: before actors take a network position to derive structural sources of social capital they need to develop relationships that will then form the social networks they participate in and the network positions they take in those networks. Relationships usually emerge as a result of random chance and exogenous factors, such as neighborhood, job assignments, or events, and then based on processes of learning and selection they are either nurtured by the actors or left to decay (Burt, 2000b), thus forming the social networks around them.

Based on the theorized relationships between bridging structure, bridging relations, bonding structure and bonding relations, we propose three competing models of the relationships between the sources of social capital and individual performance. The bridging relations model tests the well-affirmed proposition that the number and diversity of relations has a positive impact on performance outcomes (e.g. Cross & Cummings, 2004; Zou & Ingram, 2012) but also takes into account the mediating effects of the other

sources. We argued that building bridging relations social capital does not go hand by hand with building bonding structure social capital, and we therefore exclude a direct relationship between the two. This model questions whether bridging relations are still the more valuable source to build on when the associations with the other sources are taken into account and the overall impact of the combined social capital on performance is evaluated.

The alternative, bonding relations model, explores the direct affect of bonding relations on performance, complemented with the mediating effect of the other sources. The idea that bonding relations could be utilized for achieving work related goals has received mixed support from previous research. Some scholars find a negative relationship between this source of social capital and performance results (e.g. Mehra, Kilduff, & Brass, 2001; Mizruchi, Stearns, & Fleischer, 2011), while others uncover strong positive correlation between them (e.g. Gargiulo, Ertug, & Ganlunic, 2009; McFadyen & Cannella, 2004; Sosa, 2011). We predict however that bonding relations is positively associated with all the other sources of social capital, and therefore expect their overall value to increase when considered as a starting point for nurturing social capital. Accordingly, this model tests how the power of bonding relations as a stepping-stone for social capital utilization compares to that of bridging relations.

We also propose a third – parallel relations – model, which explores the direct effect of the two relational sources of social capital and the mediating effect of the network derived social capital sources. It puts to the test another set of research findings, which demonstrate that both bridging and bonding relations are positively related to performance (e.g. Fleming, Mingo, & Chen, 2007; Perry-Smith, 2006). This model

controls whether the whole (all relational capital) is greater than each of its parts (bridging relations and bonding relations) and evaluates whether building simultaneously on the two types of relations would serve performance interests better.

METHODS

Sample and Data Collected

The sampling frame for our study consisted of all articles examining the relationship between social capital and individual performance, published in peer-reviewed scholarly journals between 1983 and 2015. We performed a comprehensive search to identify all empirical studies that use social capital to predict individual performance. First, we explored three electronic databases: (1) EBSCO, (2) ScienceDirect, and (3) Google Scholar, using “social capital”, “social relations” and “social networks” as search terms. Second, we electronically searched the top management journals, expected to include studies on the interest of topic. Finally, we consulted the reference lists of major review articles in the field (e.g. Adler & Kwon, 2002; Nahapiet & Ghoshal, 1998) in order to uncover missing articles.

Studies were included in our sample only if they fit a set of criteria. First, the study should be business-related and examine the social capital of business professionals. Research, which investigates social capital in communities for political, health, criminal or immigration inquiries, was excluded from the sample. Second, social capital variables should be measured at the individual level. Third, studies should include a bivariate correlation between individual level social capital variables and individual level performance variables that fit at least one of our categories. Finally, studies should not focus only on negative type of social relations and networks, e.g. adversarial ties. Our

goal was to have a fuller representation of the available research on the relationship between social capital and individual performance and therefore we adopted an inclusive approach to the study selection and did not limit our search to first-tier journals only (Lipsey & Wilson, 2011). After applying the above criteria, our final sample consisted of 61 published papers from 19 different journals, and a total of 662 effect sizes.

Variable Coding

Independent variables. The coding was performed using a detailed coding protocol. Following the coding instructions, the independent variables were assigned by the first author to a category based on the information provided by the primary authors for their operationalization. Assignment of the independent variables to a category was based not on the name of the variable, but on a careful examination of the way social capital variables were operationalized in each study. For example, a study variable “number of contacts” will fall in the bridging relations category if it is operationalized by the primary authors as number of contacts in different departments, or in the bonding relations category if it is measured as number of friendship ties. We assessed the reliability of the coding by assigning an independent second coder for the categorization of the sources of social capital. The results from the two coding processes were compared using correlation analysis (LeBreton & Senter, 2007). The inter-rater reliability coefficient was 97%, which is deemed as very strong by different benchmarks (e.g. Landis & Koch, 1977).

Variables, which fall in the *bridging structure* category, describe structural opportunities for bridging, such as betweenness centrality, spanning boundaries, structural holes, and connections to different groups. These are measures of the extent to

which ego's network position allows for spanning structural holes and they require data not only on ego's contacts but also on contacts of all network members. *Bridging relations* is measured through the number of ego's contacts, nonredundant contacts, weak ties, and ties that reach out to different networks. This variable measures the direct and potentially diverse relations of ego, disregarding ego's network position. *Bonding structure* includes variables that measure the level of connectedness within ego's network – e.g. closeness and eigenvector centrality, embeddedness and network density. It is a measure of the extent to which ego is embedded within a closed network and also requires data beyond ego's contacts to the contacts of all network members. *Bonding relations* is comprised of variables that look at frequency and closeness of relations, such as kin, strong ties or frequency of interaction. It is a measure of ego's direct strong type of ties. The full list with variables coding is presented in Appendix B.

Dependent variable. The dependent variable in the study is *individual job performance*, which measures the accomplishment of work related tasks (Campbell, 1990). Performance tasks differ across job functions and hierarchical levels. Because we are interested in the overall effect that social capital has on individual performance our study includes various measures of job performance, such as creativity, sales, annual reviews, and quality of outcomes. A full list of the variables considered as measures of individual performance is presented in Appendix C.

Analytical Procedures

Meta-analysis. We chose the effect size as the unit of analysis in order to retain information about the various combinations between the sources of social capital, operationalized through different measures (Bergh et al., 2014). We decided to treat each

effect size as independent following research findings that “nonindependence of the data does not affect the estimation of the population parameter” (Tracz, Elmore, & Pohlmann, 1992, p.886). Following Hunter and Schmidt’s (2004) guidelines we first extracted bivariate correlations (r) between the social capital sources and individual performance and between the four sources of social capital. For each article the relevant effect size – correlation coefficient – as well as the associated sample size was recorded. We next computed meta-analytically derived mean correlations that were weighted by the respective sample sizes as well as their corresponding confidence intervals. The majority of the articles in our sample used the number of individuals as the sample size. Eight articles however, most of which adopted panel design, used different statistical unit of analysis, such as scientist-year or individual observations in three annual panels.

Meta-analysis is also the only statistically sound method to quantitatively accumulate findings (Schmidt, 2008). It allows us to test propositions that are difficult to assess in a single sample primary study (Carney et al., 2013) and to draw definitive conclusions about the degree to which they are supported by the accumulated evidence (Combs, Ketchen, Crook, & Roth, 2010). We therefore calculated meta-analytical correlations to examine the eluded from empirical scrutiny associations between the four sources of social capital.

Structural equation modeling. While meta-analysis allows researchers to synthesize research findings into a single effect size that reflects the magnitude and directionality of the association between two variables (Hunter & Schmidt, 2004), meta-analysis structural equation modeling (MASEM) goes a step further and provides effect sizes that further reflect the magnitude and directionality of the association between any two variables, and

it does so while controlling for the other variables in the model (Bergh et al., 2014). Additionally, MASEM provides information on the degree of fit of the entire model, which allows comparison between the explanatory values of competing models (Bergh et al., 2014).

We first arranged the meta-analytic findings into a correlation table with the respective confidence intervals (see Table 1). Then we used the meta-analytic data to perform the SEM analyses in LISREL. Following recent research we used the harmonic mean to estimate the significance levels for each of the coefficients (Bergh et al., 2014; Viswesvaran & Ones, 1995). It is calculated as the reciprocal of the arithmetic mean of the reciprocals of each sample size which results in limiting the influence of very large samples and increasing the influence of the smaller ones (Landis, 2013). The outcome of using the harmonic mean is more conservative significance levels in the models. To calculate the harmonic mean for the studies, which used for sample size unit different than individuals, we substituted the reported sample size with the reported number of individuals that were studied. For two studies, which had sample sizes above ten thousand ($n_1 = 35400$ and $n_2 = 11974$), we followed Lipsey and Wilson's (2001) windsorising approach. More specifically, we substituted the reported number with the average plus two standard deviations in order to control for their significantly bigger size. These steps led to a final harmonic mean of 21413 (instead of 223009 before the corrections). We used MASEM to test the fit of each of the proposed models and following Bergh et al. (2014) we report multiple fit indices.

RESULTS

The results of the associations among the four sources of social capital and individual performance, computed as synthesized meta-analytical effect sizes, are presented in Table 11. They indicate that three sources of social capital are significantly and positively associated with individual performance: bridging structure ($\rho = 0.23$), bridging relations ($\rho = 0.19$), and bonding relations ($\rho = 0.10$). Bonding structure also has a small positive association with performance but because the 95% confidence intervals include zero, the results are not significant. The meta-analysis also provides evidence for the observed associations between the sources of social capital. First, there is a significant positive association between bridging structure and bonding structure ($\rho = 0.12$), between bridging structure and bonding relations ($\rho = 0.11$), and between bridging relations and bonding relations ($\rho = 0.10$). Second, the directionality between bridging relations and bonding structure is negative, but the results are not significant. Lastly, as predicted, the two bridging sources are also significantly associated with $\rho = 0.32$ between bridging structure and bridging relations, and so are the two bonding sources with $\rho = 0.20$ between bonding structure and bonding relations.

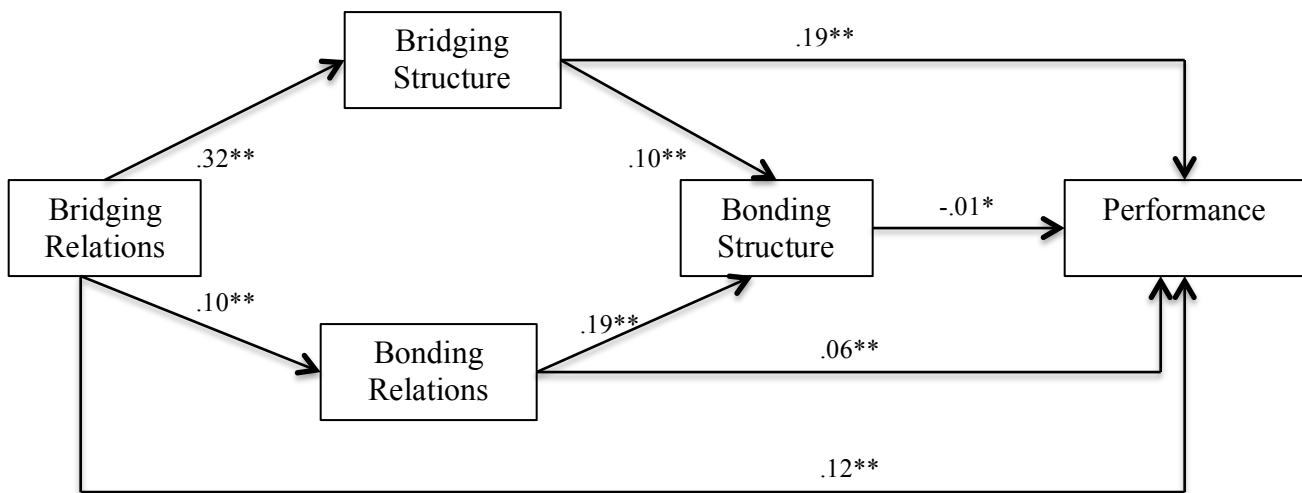
We next discuss the results of the MASEM analyses. First we report the results of the bridging relations model (Figure 4), in which the bridging relations source of social capital serves as the building block for social capital utilization within a MASEM structure. The coefficients for this model are reported in Table 12. The findings indicate that all sources of social capital are positively associated with performance at significant level with the exception of bonding structure, which is negatively associated with performance ($-0.013, p < 0.065$). The bridging relations model fits the data well ($\chi^2(2) =$

Table 11: Meta-analytic Correlations

	1	2	3	4	5
1. Bridging Structure					
2. Bridging Relations	0.32				
ρ	0.26: 0.38				
CI95	83				
k(N)	(188995)				
3. Bonding Structure	0.12	-0.03			
ρ	0.03: 0.20	-0.09: 0.03			
CI95	39	73			
k(N)	(251912)	(166953)			
4. Bonding Relations	0.11	0.10	0.20		
ρ	0.09: 0.14	0.07: 0.14	0.17: 0.24		
CI95	32	51	42		
k(N)	(249609)	(152296)	(262225)		
5. Performance	0.23	0.19	0.02	0.10	
ρ	0.20: 0.27	0.15: 0.23	-0.01: 0.05	0.07: 0.12	
CI95	70	84	99	89	
k(N)	(289225)	(197620)	(339435)	(267243)	

Note: ρ is mean correlation; *CI95* is the 95 percent confidence interval for ρ ; *k* is the number of studies used to compute the ρ ; and *N* is the sample size used to compute the ρ .

Figure 4: The Bridging Relations Social Capital Path Model



** $p < 0.001$, * $p < 0.10$

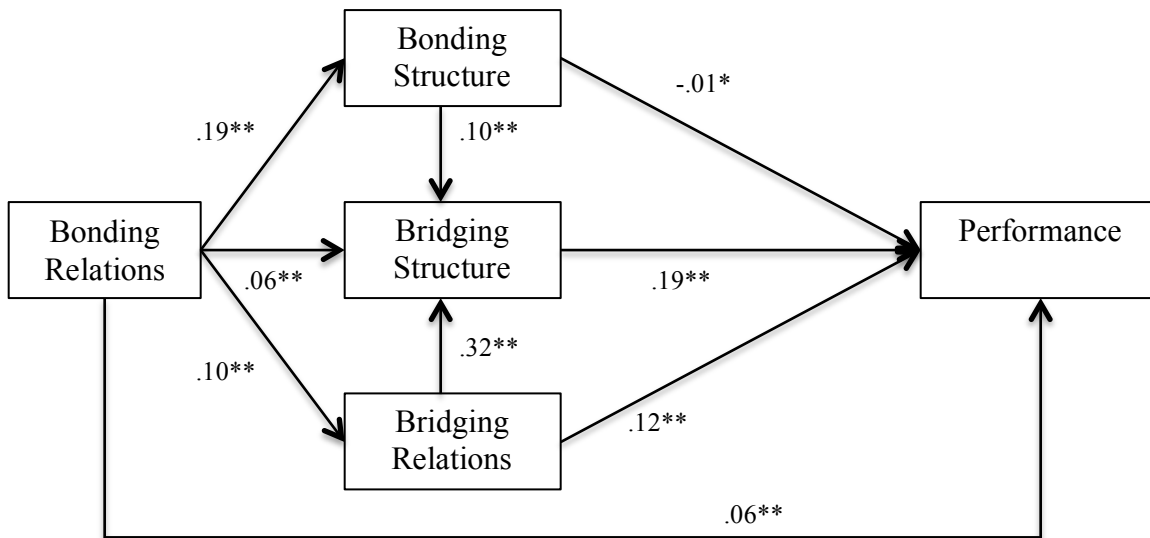
Table 12: Coefficients for the Bridging Relations Model (see Figure 4)

	Coefficient	SE	t value	p value
Bridging relations → Performance	0.122	0.007	17.558	.000
Bridging structure → Performance	0.190	0.007	27.199	.000
Bonding relations → Performance	0.064	0.007	9.430	.000
Bonding structure → Performance	-0.013	0.007	-1.868	.065
Bridging relations → Bridging structure	0.318	0.006	49.098	.000
Bridging relations → Bonding Relations	0.104	0.007	15.316	.000
Bridging structure → Bonding structure	0.096	0.007	14.363	.000
Bonding relations → Bonding structure	0.194	0.007	29.073	.000
Model fit: $\chi^2(2) = 315.03$; $p < 0.001$. CFI = 0.944; GFI = 0.994; NFI = 0.944; RMR = .0297				
SE = standard error; CFI = comparative fit index; GFI = goodness-of-fit statistics; NFI = normed fit index; RMR = root mean square residual				

315.03; $p < 0.001$. CFI = 0.944; GFI = 0.994; NFI = 0.944; RMR = .0297).

We next explore the bonding relations social capital model (Figure 5), which proposes that the best social capital utilization is built on bonding relations. The coefficients for this model are reported in Table 13. The findings in this model are similar to the previous one: all sources of social capital are positively associated with

Figure 5: The Bonding Relations Social Capital Path Model



** $p < 0.001$, * $p < 0.10$

Table 13: Coefficients for the Bonding Relations Model (see Figure 5)

	Coefficient	SE	t value	p value
Bonding relations → Performance	0.064	.007	9.395	.000
Bridging structure → Performance	0.190	.007	27.025	.000
Bridging relations → Performance	0.122	.007	17.554	.000
Bonding structure → Performance	-0.013	.007	-1.864	.065
Bonding relations → Bridging structure	0.057	.007	8.638	.000
Bonding relations → Bridging Relations	0.104	.007	15.316	.000
Bonding relations → Bonding structure	0.204	.007	30.570	.000
Bonding structure → Bridging structure	0.115	.007	17.552	.000
Bridging relations → Bridging structure	0.315	.006	48.947	.000
Model fit: $\chi^2(1) = 57.80$; $p < 0.001$. CFI = 0.990; GFI = 0.999; NFI = 0.990; RMR = .0138				

SE = standard error; CFI = comparative fit index; GFI = goodness-of-fit statistics; NFI = normed fit index; RMR = root mean square residual

performance at significant level with the exception of bonding structure, which is negatively associated with performance (-0.013, $p < 0.065$). This model however revealed much better fit indexes ($\chi^2(1) = 57.80$; $p < 0.001$. CFI = 0.990; GFI = 0.999; NFI = 0.990; RMR = .0138). We do not report RMSEA as recent research argues that this statistics has artificially high values for models with small number of degrees of freedom (Kenny, Kaniskan & McCoach, 2014), such as ours. Both models have strong goodness of fit statistics (GFI), above the .95 (Bollen, 1990; Shevlin & Miles, 1998). The normed fit indexes (NFI) and the comparative fit indexes (CFI) in the bridging relations model provide marginal fitting with NFI and CFI at .944, the bonding relations model provides a good fit with the data with NFI and CFI at .990. Finally, we look at the root mean square residuals (RMR) and while both models obtain values below the .05 threshold, the bonding model again provides better fit with RMR = .0138 compared with RMR = .0297 for bridging relations. Together, these results indicate that the bonding relations model fits the data better than the bridging relations model.

Lastly, we included a third model in our analyses to control for the option of having both bridging and bonding relations as the starting point for building social capital. The two relations are set to co-vary based on our proposition that they are positively associated with each other. This model is illustrated in Figure 6 and the results are presented in Table 14. Surprisingly, this model produces the weakest fit among the three models with $\chi^2(2) = 362.90$; $p < 0.001$. CFI = 0.935; GFI = 0.993; NFI = 0.935; RMR = .0277, thus confirming the bonding relations as the model that fits best the data. Overall, the results suggest that there are two social capital pathways to improving performance. Whether actors build on bridging or bonding relations, they can further develop the rest of the sources to maximize the utility of each. We find substantive differences in the coefficients across the models, which speak for a nuanced variation in the strategic utilization of social capital to improve performance. Building on the power of MASEM to incorporate accumulated research data and to account for the interplay between the four sources of social capital and individual performance, we pitted the

Figure 6: The Parallel Social Capital Path Model

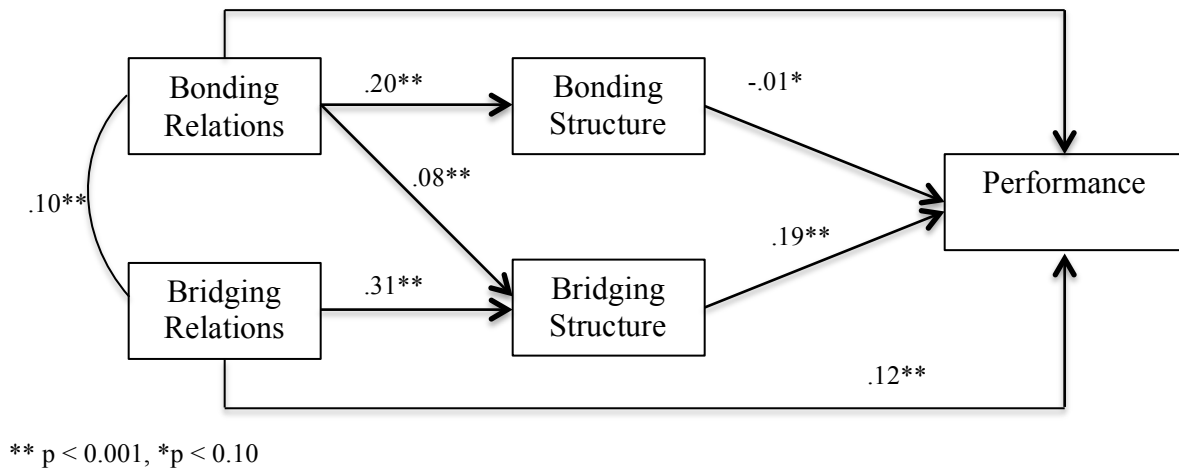


Table 14: Coefficients for the Parallel Model (see Figure 6)

	Coefficient	SE	t value	p value
Bonding relations → Performance	0.064	.007	9.379	.000
Bridging relations → Performance	0.122	.007	17.598	.000
Bridging structure → Performance	0.190	.007	27.218	.000
Bonding structure → Performance	-0.013	.007	-1.877	.063
Bonding relations → Bridging structure	0.081	.006	12.473	.000
Bonding relations → Bonding structure	0.205	.007	30.570	.000
Bridging relations → Bridging structure	0.310	.006	47.708	.000
Bonding relations → Bridging Relations	0.104	.007	15.151	.000
Model fit: $\chi^2(2) = 362.90$; $p < 0.001$. CFI = 0.935; GFI = 0.993; NFI = 0.935; RMR = .0277				

SE = standard error; CFI = comparative fit index; GFI = goodness-of-fit statistics; NFI = normed fit index; RMR = root mean square residual

explanatory power of three competing theoretical models against one another and discovered that the most efficient social capital use is the one that starts with bonding relations.

DISCUSSION

The social capital literature has suggested many ways in which bridging and bonding social capital can serve as an advantage in securing high individual performance. In this paper, we attempt to further this knowledge by exploring the power of social capital from two different angles. First, instead of investigating how the sources of social capital compete with each other in terms of the value they provide to actors, we examine their associations. Previous research has argued that bridging leads to more bridging and bonding decreases bridging (e.g. Ng & Feldman, 1995; Zaheer & Soda, 2009) thus suggesting a negative relationship between the two. To further investigate this proposition we adopt a framework that distinguishes between four sources of social capital (bridging structure, bridging relations, bonding structure and bonding relations) and theorize how the strategies to build and maintain them affect the associations between them. Second, instead of examining which source of social capital has the most

direct impact on performance, we explore which social capital is the “founding” block of social capital utilization or the social capital source that not only directly affects performance but also maximizes the development and use of the remaining sources.

Associations Between the Sources of Social Capital

The results of our study show that – overall – there is a positive association between most of the sources of social capital. We expected a high positive association between the two bridging sources as well as between the two bonding sources based on the similarity of the purpose they serve. The results of our study confirmed this. Next we moved to examine the association between the opposing bridging and bonding sources. We put to test previous research findings, which argue that generally embeddedness in network or bonding social capital will decrease efforts for building bridging social capital (Ng & Feldman, 1995; Zaheer & Soda, 2009). Arguing that bridging capital can be pursued through either bridging structure or bridging relations and similarly that bonding capital is derived from both bonding structure and bonding relations, we individually examined the four possible bridging-bonding relationships. Starting with bridging structure, we found that it is significantly positively associated with the two bonding sources suggesting they are complementary to each other. Moving to bridging relations, we discovered that they are positively associated with bonding relations, but negatively associated with bonding structure.

Implications. These findings have important implications for future research as they open new doors for inquiry. First, we raise awareness that while there is a trade-off in choosing between bridging and bonding, they are not mutually exclusive. Following Tortoriello and Krackhardt (2010) we argue that crossovers between the sources of social

capital are a viable option for making use of social capital and that there is a reward in bridging with bonding and bonding with bridging. More specifically, we identify four crossover strategies: bridging structure – bonding structure, bridging structure – bonding relations, bridging relations – bonding structure and bridging relations – bonding relations. We found empirical support for all of these strategies with the exception of bridging relations – bonding structure. While we could theorize on the mechanisms that influence the associations between the sources, our data does not allow us to test them directly but only to observe their outcome. We invite future research to explore the specific mechanisms and factors that make these crossovers possible. For example, agent-centric research, which emphasizes that actors can manage their networking strategies (Bensaou et al., 2014; Vissa, 2012), could be one perspective to understand the complementarity of the social capital sources and their relative value to performance outcomes through attention to actors' strategies in pursuit of social capital benefits. An alternative perspective could be provided by psychological research through focus on how personality affects the choice of crossover social capital strategies.

Our finding that bridging and bonding structure are associated positively is in disagreement with previous research. At the team level, Zaheer and Soda (2009) found that a team spans less structural holes if its members were previously part of cohesive teams. This finding is not confirmed in our analysis. Our results suggest that either the interplay between the sources of social capital is different at the individual level of analysis or that there are factors that influence the relationship between them. Future research should explore from a longitudinal perspective the affects of bonding relations and bonding structure on the utilization of the bridging sources.

An important finding of our study is that embeddedness in closed network or brokerage position in a network is not a sentence for life. Switching between networks is possible through social relations because bridging relations and bonding relations can coexist. To further elucidate the interconnections between the sources of social capital we suggest future research to focus on the question of causality in the crossover strategies. Our findings suggest that bonding relations affect positively the development of bridging relations. There are several plausible explanations. One is that the repetitiveness of bonding relations might stimulate actors to reach out to new contacts to diversify their networks. Another explanation could be found in the psychological support associated with bonding relations: establishing weak diverse ties is difficult and without immediate pay-offs and therefore individuals tend to avoid them (Ingram & Morris, 2007); however, once they have the support and back up of close relations they might be more willing to take their chance on bridging. Because both of our models provide a good fit with the data we also need to consider the reverse directionality – that bridging relations impact positively the development of bonding relations. Through maintaining various diverse relations actors have a greater chance to start building friendships based on the processes of homophily, attachment and successful tie outcomes (Dahlander & McFarland, 2013). The associations we discovered between the sources of social capital suggest that bonding relations serve as a cause for bridging relations but research would benefit from a longitudinal perspective to relationship development and the cause-effect dynamics and mechanisms between bridging and bonding relations. This is an unexplored arena for new inquiry.

Social Capital Paths to Performance

In this paper we also argue that actors do not need to make a trade-off by choosing to exploit only one source of social capital. Rather, they can make use of the four sources simultaneously. From this perspective we were interested in identifying the source that serves as the “founding block” of social capital utilization for performance, meaning that it not only affects performance results but also allows for the other forms to develop and contribute. We found this source to be bonding relations. Our study shows that while having bridging relations is more valuable in general for achieving performance results, they are best realized through bonding relations. The fact that the bonding relations model provides best fit with the data suggests that bonding relations might serve as a hygiene factor: in the absence of bonding relations bridging structure, bridging relations, and bonding structure deliver value for performance, but the presence of bonding relations impacts positively their utility and value. In order to maximize the use of all sources of social capital actors need to build on bonding relations.

Implications. These results have important implications for future research as they throw a new light on the importance of having bonding relations. One explanation might be that the comfort and encouragement strong ties provide (Ingram & Zou, 2008; Takahashi, 1990) empowers actors to search and exploit opportunities, including opportunities to grow their social capital. Another explanation might be that bonding relations play a more instrumental role than previous research has attributed to them. Because of their availability, willingness to provide needed help (Bowler & Brass, 2006), as well as mutual understanding and effective communication (Uzzi, 1997), these ties can be utilized for the purposes of exploiting every other source of social capital. Bonding

relations lead to trust and likability (Aral & Van Alstune, 2011), which in turn ensures support with performance goals (Bowler & Brass, 2006) and positive performance evaluations. They however have limited capacity for novel information and resources, and therefore, once established and utilized, competitive advantage could be gained by building bridging relations and structure. Actors relying on bridging relations first might be perceived as outsiders (Burt, Jannotta, & Mahoney, 1998) and miss critical for their performance work support. Our study emphasizes the importance of first establishing bonding relations before switching to bridging. We invite scholars to adopt a longitudinal approach to explore the social capital paths to performance in the making. Such research designs are needed to better understand directionality and sequence in making use of social capital. A strategic question that should be addressed is when to start bridging. There seems to be a critical point in social capital development when bridging should be pursued to avoid stagnation and decline in performance, which could be explored through longitudinal analysis.

While our study is based on prior research covering a variety of different job contexts and thus in a sense includes contingencies, their direct impact on our results have not been investigated. Given that contingency factors, such as type of knowledge (Hansen, 1999), speed of information change (Aral and Van Alstune, 2011), task ambiguity (Burt, 2005) or need for novelty generation (Cross & Cummings, 2004) influence which source is beneficial in a given situation, we assume in this study that maximum access to all is the most efficient strategy for making use of social capital to enhance performance. We invite future research shift the attention from the bridging versus bonding conversation to discussions on how to maximize bridging and bonding

together. More specifically, we suggest research to focus on the use and utility of bonding ties to outline the mechanisms through which this source of social capital supports the development of the others.

Practical Implications

Our study has important practical implications. While previous research suggests that practitioners need to bridge if they want to gain a competitive advantage to enhance their performance, we emphasize that the optimal utilization of social capital is one that makes use of all available sources. Having different sources of social capital available is the effective strategy to pursue in order to respond to changing job demands. We found that the most successful utilization of social capital is the one that builds on bonding relations. The results of our study suggest that business professionals first need to secure a strong support system in the form of strong relations and then expand their networking efforts to explore and exploit the other sources of social capital in order to maximize their performance. For organization management our study underscores the importance of having strong work relationships and encourages organizations to invest in teambuilding initiatives and teamwork that will help employees build their support systems within the organization.

CONCLUSION

The purpose of this study is to advance our knowledge on the effects of social capital on performance by taking a step back from the hot discussion on when it is best to bridge and when to bond. We explore the value of the sources of social capital in terms of how they relate to each other and how they complement each other. Building on the acknowledged trade-off between bridging and bonding capital, we are interested to

explore actors' options for developing and maintaining multiple sources of social capital. More specifically, our research goals are first to explore the directionality between the sources of social capital and second – to analyze how directionality explains the total effects of each source. The results of our study show positive associations between three pairs of social capital sources: bridging structure-bonding structure, bridging structure-bonding relations and bridging relations-bonding relations, which signals that bridging and bonding are not mutually exclusive strategies. We also discover that the maximum utilization of social capitals starts with bonding relations. We draw attention to the value of crossover social capital strategies that enable actors to respond to a changing work environment and have a long-term effect on their performance.

CHAPTER 5: CONCLUSIONS

GENERAL CONCLUSION

The main purpose of this dissertation was to expand our knowledge on the mechanisms through which social capital delivers value to actors and on the effects it has on individual performance. While prior research has predominantly focused on the factors that predict when bridging would be more beneficial to actors compared to bonding, and vice versa (e.g. Aral & Van Alstune, 2011; Burt, 1992; Hansen, 1999), my research makes an effort to first conceptualize what the available sources of social capital are, and then to explore their effects and utilities under different contingency lenses. More specifically, in the first essay of my dissertation I argue that in order to better understand where social capital comes from we need to distinguish between network derived and relations derived bridging and bonding social capital, and I propose four general sources of social capital: bridging network, bridging relations, bonding network and bonding relations. I also provide theoretical arguments on the differences between those sources based on the opportunities they provide, the mechanisms to derive value from them and the psychological predispositions toward making use of them, and I test statistically the explanatory power of the proposed framework with four sources of social capital. In the second essay, I expand on the contingency perspective and I research the moderating impact of organization and job related factors on the effects of the four sources of social capital on performance, providing further evidence for the differences between them. In the final essay, I take on a novel stance toward analyzing the value of social capital arguing that their utility should consider not only their direct effects on performance, but also their associations with the other sources.

Together, the three essays of my dissertation provide interesting insights on the social capital strategies and contingencies. First, my research demonstrates that adopting a framework for analyzing social capital through the four sources significantly increases the variance explained by social capital on individual outcomes. Next, it provides evidence that contingency factors can have a different impact on the effects of the two bridging sources as well as on the effects of the two bonding sources, therefore questioning general “bridging versus bonding” conclusions. Finally, my research shows that while in general bridging sources of social capital have more positive impact on performance compared to bonding, bonding relations is a unique source, which allows for other sources to be developed and together to have the most significant positive impact on performance outcomes. The results of my dissertation contribute to the current literature on social capital with new findings on the value and utility of social capital sources and raise interesting theoretical questions for future research, which I discuss next.

CONTRIBUTIONS

The first contribution of my dissertation to the literature on social capital is the framework for analyzing its sources. I argue that looking at social capital as bridging versus bonding sources does not fully account for the variability of opportunities and restrictions inherent to social capital forms, and propose that social capital comes from four distinct sources: bridging network, bridging relations, bonding network and bonding relations. Applying those categories toward describing the source of social capital significantly improves the variance in individual performance explained by social capital compared to an analysis through the lenses of bridging and bonding only. I also

conducted additional meta-analyses to estimate the effects of the four sources on different individual outcomes, namely status, promotion, salary, rank and power (see Appendix F). Those provide further evidence how using the four sources can improve our understanding of the social capitals effects. For example, I found that for status bonding structure has a positive impact, comparable to that of the two bridging sources, but bonding relations have no significant effect on that outcome. I also found that for salary and power bridging relations have a much better utility compared to bridging structure. Together, the results of my dissertation provide solid evidence for the need of future research to adopt the use of the four sources in investigating the social capital impact on various outcomes.

The categorization of social capital that I propose in my dissertation is built on differences in two inherent characteristics of the sources of social capital that I outline – their utility and their ease of acquire. I theorize that the utility of each source is found in the interplay of unique contents, opportunities and potential risks, while their utility depends on strategies and skills required for deriving value out of them. My line of inquiry contributes to the literature a more complex view of social capital that invites for a collaborative effort between social network, agent-centric, and psychological research to demystify the mechanisms and factors under which each source provides value to the actor. From a social networks perspective we can understand the contents and opportunities available in each source (e.g. Burt & Ronchi, 2007; Coleman, 1988; Umpruss et al., 2003), but not when those opportunities are transformed in actual outcomes. My research demonstrates that agent-centric (Ozcan & Eisenhardt, 2009; Stevenson & Greenberg, 2000) and psychological (Kalish & Robins, 2006) perspectives

are needed to understand what type of actors maximize their use and how they are able to do that.

With my dissertation I further Burt et al.'s (1998) argument that "opportunities do not by themselves turn into achievement" (p. 65) by theorizing about the specific strategies for deriving value from each source of social capital. More specifically, I propose that active participation in network activities is the most important strategic action to utilize the full potential of a bonding network. To manage bonding relations actors need to maintain them through frequent interactions and exchange of support. I outline two strategies to maximize the capital from a bridging network are the following: discovering positions for bridging structural holes and preserving the conditions that make the actors exclusive brokers. Finally, I assert that in order to obtain most value from bridging relations actors need to maintain the available pool of contacts, constantly reach out to as many contacts as possible and keep pay-back offers at hand. I further argue that the extent to which the actor pursues the strategies for the social capital source moderates the effects of that source on the observed outcome. This argument has two theoretical implications. On one hand it demands agent-centric focus on the utility of social capital. To understand the effects of each source of social capital it is not enough to evaluate actors' access to it but also the extent to which they are making targeted efforts to derive value from it. For example, I expect that bonding network, which shows lowest levels of affect on individual achievements in my dissertation, would be more useful to actors with higher levels of network participation than to actors with low participation in network activities. On the other hand, the source specific strategies raise awareness about the psychological predispositions toward networking and their effects on the utility of social

capital. Because psychological factors predict whether an actor would take advantage of a specific source of social capital (Sasovova, et al., 2010), personality should also be considered in the overall assessment of the effects of each source.

My research also contributes to the contingency perspective on social capital in two ways. In the first essay I argue that analyses of social capital through the four sources will lead to a more rigorous investigation of when and how external factors affect the value of social capital and will also make a more clear distinction between the utilities of each source under external influences. In the second essay I explored new moderators related to organizational and job characteristics. The contingency approach in my research solidifies the evidence that each of the four sources of social capital has unique properties, which are affected in a different way under the influence of the same contextual variables. This finding has important theoretical implications for previous and future research as it challenges scholars to specify with more details whether each source has a positive, negative, or neutral value to the outcome of interest in a given context. An example from my research is with the moderating impact of technical type of jobs. Previous studies have found that bridging social capital is less valuable for jobs that require the use of complex knowledge (Aral & Van Alstyne, 2011; Hansen, 1999). I found however that for technical jobs, which are associated with such type of knowledge, the value of bridging network to performance, compared to the value of the other sources, goes significantly down, but there is a positive effect of technical jobs on bridging relations. Similar differences between the two bridging sources as well as between the two bonding sources could be outlined both for previously researched contingency factors and for future ones.

In my dissertation I also propose a resource-based perspective toward evaluating the utility of each source of social capital, which provides another contingency perspective yet to be explored by the literature. Robison et al. (2002) argued that social capital has the essential capital-like properties, namely transformation capacity, durability, flexibility, sustainability, decay, reliability, ability to create one capital form from another, opportunities for (dis)investment, and alienability (p. 9). I suggest that context can impact these properties in a way that creates demands for scarce sources of social capital, and consequently can increase their value. A specific example of this mechanism I proposed in the second essay, where I discussed how the larger the organization, the more bridging opportunities there are and the lower the value of both bridging structure and bridging relations becomes as a competitive source of social capital. Overall, the idea that the value of each source of social capital depends not only on their specific utility for the pursued outcome but also on their scarce availability could provide a valuable standpoint for predicting how social capitals translate into competitive advantage.

With my studies I raise awareness that while there is a trade-off in choosing between bridging and bonding, they are not mutually exclusive. Following Tortoriello and Krackhardt (2010) I argue that crossovers between the sources of social capital are a viable option for making use of social capital and that there is a reward in bridging with bonding and bonding with bridging. From the perspective of the framework I propose, there are four possible crossover strategies: bridging structure – bonding structure, bridging structure – bonding relations, bridging relations – bonding structure and bridging relations – bonding relations. In the third essay I found empirical support for all

of these strategies with the exception of bridging relations – bonding structure, which were negatively associated. These findings contribute to the literature the idea that there are mechanisms that influence the associations between the sources of social capital, which research needs to first explore and then observe their outcome.

The last contributions of my dissertation is the argument that, because all sources of social capital have some utility and contingency factors determine which source would be beneficial in a given situation, then the maximum access to all sources would be the most efficient strategy for making use of social capital to enhance performance and pursue other individual outcomes. In the third essay I explored the idea that the actors, who are most effective in utilizing social capital are not those who exploit the most efficient for the context source, but those who make use of the four sources simultaneously. From this perspective I was interested to identify the source that serves as the “founding block” of social capital utilization for performance, meaning that it not only affects performance results but also allows for the other forms to develop and contribute. Surprisingly, I found this source to be bonding relations. These results have important implications for future research as they throw a new light on the trade between bridging and bonding. While having bridging relations is more valuable in general for achieving performance results, actors who rely on this source only might struggle when there is a change in the work environment that has a need for a bonding source of social capital. In order to take advantage of the full range of sources of social capital actors need to build on bonding relations.

To sum up, my dissertation provides evidence that adopting the four sources framework in researching the impact of social capital on various outcomes will allow

scholars to address not only the questions of when and why each source will positively impact an outcome, but also how and by whom. Together, the four sources of social capital provide a more rigorous theoretical base, on which to estimate the mechanisms through which they deliver value, the ways context impacts them and the interplay of multiple-sources utilization. They also serve as a foundation for future research ideas that can tremendously improve our understanding on the strategies and contingencies for managing social capital.

LIMITATIONS

Several limitations of my dissertation merit discussion. First, all the propositions in my study are tested on a meta-analytical dataset. One of the main critiques against meta-analytical data is the aggregation of findings, which are not replications and have differences in the measurement of the outcome and predictor variables (Lipsey & Wilson, 2001). Because social capital is a broad concept, scholars have tried to operationalize it through various measurements. My intention was to capture this diversity and match each measurement to one of the theoretically developed categories, which is possible only through meta-analytical aggregation and comparison of empirical findings. To increase the reliability of our aggregate predictor variable categories we conducted a second independent coding. The average effect sizes we report might hide some variability due to diversity in measurement but they capture the aggregate differences between the sources of social capital, which are the focus of our analysis. Future analysis could investigate which measurements capture most appropriately each source. The framework I propose can next be tested on existing dataset to check if the results I find would hold.

Another limitation of my dissertation is that across the studies I am not able to account for causality in network dynamics. In the first and second study I measure only the individual affects of each source of social capital but I do not control whether other sources are at play too and whether they impact each other's affect on performance. This idea could be advanced by future research. In the third study I am interested in the directionality between the sources but MASEM does not allow me to make causal inferences (Bergh et al., 2014). I could only test the comparative fit of the alternative models but how those paths develop over time and how they explain network dynamics is a question that begs longitudinal analysis.

Lastly, my dissertation faces the issue of agency – that is, to what extent individual choice is responsible for the development of each source of social capital and to what extent agents can build and utilize social capital? While it is reasonable to assume that agency plays a role in the structuration process (Giddens, 1984) and therefore in the development of social capital, I do not have empirical validations to come to conclusions about what that role is. In my dissertation I measure existing social capital and its affect on performance, thus adopting a structuralism perspective. However, I also theorize about the strategic actions actors can take to maximize the development and use of each social capital source. Future research should consider designs that help measure agency in the strategic choice and use of social capital and put to test the propositions I make. Also, in my third study I test different paths to developing social capital and I find that bonding relations is the most successful starting point for building social capital. Whether this result reflects certain structural processes that control the network dynamics based on each configuration of relationships, or it demonstrates the optimal results of strategic

agent actions, is another question worth attention. More research is needed to understand the extent to which structuration (Giddens, 1984) impacts the development of social capital and the boundaries within which agency (Ozcan & Eisenhardt, 2009; Stevenson & Greenberg, 2000) can manage social capital.

IDEAS FOR FUTURE RESEARCH

The main argument in this dissertation – that social capital can be derived from four conceptually different sources – has three general important implications for future research. First, attention to the specific source will clarify scholars' efforts to further our understanding on the bridging versus bonding debate by narrowing down the focus to structure derived and relations derived bridging and bonding. For example, in the additional analyses I ran, I found that overall bonding social capital is negatively related to salary. However, when I further investigated the two sources for bonding – bonding network and bonding relations – I found that only the first has a negative effect, while the second had small but positive impact on this outcome (see Appendix F). Therefore, future research should clearly specify which sources are compared to increase the detail in predictions. Second, adopting the view of the four social capital sources opens the door for crossover strategies, such as bridging with strong ties or bonding with weak ties. Because both bridging and bonding forms of social capital could bring value to the individual it might be assumed that social capital sources that allow crossover between the two sides would be most valuable, e.g. being embedded in a closed network and having bridging relations to other networks (bonding network supplemented with bridging relations) or spanning structural holes between diverse but strong contacts. This idea, raised by Tortoriello and Krackhardt (2010), could be further developed through the

four social capital sources, which outline four possible crossover strategies: bridging structure-bonding structure, bridging structure-bonding relations, bridging relations-bonding structure, and bridging relations-bonding relations. Future research should investigate the individual power of those strategies on individual outcomes. Third, the contingency perspective would greatly benefit from a narrowed down focus on the four sources because, as my study findings demonstrate, external factors have different affect on the relationships between each source and outcome.

At the core of my theorizing about the differences between the social capital sources is the argument that there are source-specific strategies as well as source-specific psychological predispositions. With this argument I first contribute to the agent-centric view on social capital by proposing two directions for future research. One is the analysis of individual strategies and how they match the strategies necessary for utilizing the sources available to the actors. This will shed light on the extent to which actors utilize their potential social capital through targeted actions. Another is measurement of the actors' awareness of what strategic actions lead to efficient use of social capital and whether that awareness triggers informed decisions for networking. This is an important research question that will address the agency and endogeneity problem in social networks (Ahuja, Soda, & Zaheer, 2012; Bensaou, 2014).

I also contribute to the research on psychological predispositions to networking by suggesting that attitudes, skills and abilities should not distinguish only between the pressure of bridging and the comfort of bonding (e.g. Smith et al., 2012). The relational and structural dimensions of these two forms of social capital allow for some flexibility and better fit with personality. Thus, individuals who do not feel comfortable managing

the pressure of structural holes (Baker & Iyer, 1992; Burt et al., 2008), might find it more manageable to derive bridging social capital from maintaining bridging relations. Personality can also be viewed as another contingency factor that moderates the value of social capital sources. These are some questions I invite psychology scholars to look at.

My research provides further visibility into the contingent factors that would impact the choice of bridging versus bonding but also raises new questions to be explored. I have demonstrated that the organization and the occupied job are critical moderators on the relationship between the sources of social capital and performance, but future research should address more of their properties. Organizational structure is another characteristic of organizations that could impact the formation of intraorganizational networks in terms of density, reachability and connectivity and consequently interact with individual networks and social capital utility. Future research should also consider how the utility of the social capital sources holds across different organization designs – hierarchical, dispersed, flat, and matrix. Position of the job in the organizational hierarchy is another variable worth attention, preciously suggested by Ibarra (1992). Overall, organizations and jobs have specific demands and the more we understand how their properties impact the demands and usefulness of social capital sources, the more we can construct purposeful networking strategies.

My research also suggests that social capital analyses should compare and contrast methodological approaches to measuring the sources of social capital, and specify the boundaries and characteristics of the sources they are interested in. Those should be driven by the research questions of their explanatory theories (Borgatti & Halgin, 2011) and the implications of those boundaries on the observed effects should be

clearly discussed. A focus on social capital operationalization can also improve analyses of crossover social capital strategies by investigating the optimal location of the complementing sources.

Building further on the idea that the sources of social capital are interconnected, I hope future research will focus on the question of causality in the crossover strategies. For example, it will be interesting to understand whether bridging relations lead to bonding relations because through maintaining various diverse relations actors start building friendships or because the repetitiveness of the bonding relations stimulates actors to reach out to new contacts. The associations I discovered between the sources of social capital in the third essay do not inform us which source in each relationship serves as cause and which one is the effect, or whether there is a bidirectional correlation between them. This is an unexplored arena for new inquiry, which might produce very interesting findings on how to build and expand social capital.

Finally, I invite future research to scrutinize the assumption I made that maximum access to all sources of social capital is the most efficient strategy for making use of it to enhance performance. This idea shifts the attention from the bridging versus bonding conversation to discussions on how to maximize bridging and bonding together. More specifically, I suggest qualitative analysis of the use and utility of bonding ties to outline the mechanisms through which this source of social capital supports the development of the others. Agent-centric research could further compliment this inquiry with a focus on the different strategies actors use to manage their bonding relations as well as the effects of those strategies on the overall social capital development. Finally, I encourage scholars to adopt a longitudinal approach to explore the social capital paths to performance in the

making. Such research designs are needed to better understand directionality and sequence in making use of social capital.

In conclusion, my research provides a better understanding of the strategies and contingencies that circumscribe the social capital utilization. I believe that my findings provide significant contributions to the structuralism, agent-centric and contingency perspectives on social capital and I hope it will inspire a collaborative effort between these three lines of inquiry to further demystify the mechanisms and strategic actions for deriving goal-specific value from social capital.

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APPENDIX A: Coding Instructions For Measuring the Sources of Social Capital

If the measure describes properties of ego's direct relations, such as number of ties available, frequency of interaction with ties, closeness of ties, type of (interaction) with ties, strength of tie, and multiplexity of tie, but does not include other network members and/or relations between ego's alters, then the measure should be classified as "relations."

- If the relational measure looks at diversity of contacts it should be classified as "bridging relations". Diversity is seen in number of various types of ties (excluding friendship and support), ties that cross boundaries (e.g. to different teams, departments, organizations, etc.), and weak type of ties (e.g. ones with which ego communicates infrequently, new contacts, contacts characterized as acquaintances, etc.).
- If the relational measure looks at the closeness of contacts, then it should be classified as "bonding relations". Closeness is seen in number of friendship and support ties, relations that provide assistance, and strong type of ties (e.g. ones with which ego communicates frequently, with long duration, and characterized with multiplexity).

Note: measures of number of relations with various types of ties, including but not limited to friendship and support, should be classified as bridging relations.

If the measure describes ego's network position, such as centrality measures, boundary spanning, network constraint, and density, and includes other network members and/or their relations, then the measure should be classified as "network." Measures concerned with ego's participation or membership in networks are also classified as "network"

- If the network measure provides information on how ego is positioned to connect disconnected alters or groups, e.g. higher values of the measure are indicative of more opportunities for bridging structural holes, then the measure should be classified as "bridging structure"
 - If the network measure provides information on the embeddedness of ego in the network, e.g. higher values indicate less opportunities for bridging structural holes, then the measure should be classified as "bonding structure".
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APPENDIX B: Operationalization of the Sources of Social Capital

Author/s	Variable name	Variable operationalization
BRIDGING STRUCTURE		
Brass, 1985	criticality	An index of criticality in the workflow is formed by counting the number of alternative routes through which the work could flow, once the focal person is removed from the workflow network; this measure reflects the extent to which the focal person controlled the workflow or the extent to which the organization was dependent on the particular person for the continued flow of work through the organization; the scores are transformed using the $1 - [(c-1)/c_{max}]$ formula so that a high score reflects high criticality. p. 332
Aral & Van Alstyne, 2011	network diversity	The structural diversity of an actor's network is measured as $1 - C_i$, where C_i is Burt's (1992) constraint. p. 119
Batjardal et al., 2013	structural holes	$1 - \text{Burt's (1992) measure of network constraint. p.1034}$
Chollet et al., 2014	structural holes	$1 - \text{Burt's (1992) measure of network constraint. p. 89}$
Cross & Cummings, 2004	betweenness centrality	Flow betweenness centrality. p. 932
Fleming, Mingo & Chen, 2007	In external ties	The number of ties to the focal inventor's collaborators who do not have a direct tie to the focal inventor. p. 454
Fleming, Mingo & Chen, 2007	In component network size	The number of inventors in the inventor's direct and indirect collaborative network. p.454
Gonzales, Claro & Palmatier, 2014	brokerage	"Following Burt (1992), we used the structural holes variable (H) to assess the lack of redundancy or amount of nonoverlapping information in an RM's network". p. 83
Gonzales-Brambila, Veloso & Krackhardt, 2013	structural holes	$1 - \text{Burt's (1992) measure of network constraint. p. 1560}$
Gonzales-Brambila, Veloso & Krackhardt, 2013	centrality	Bonacich's degree centrality. p. 1560
Li, Liao & Yen, 2012	betweenness centrality	Normalized betweenness centrality of the 101 prolific scholars is calculated as the original value of betweenness centrality divided by $(N-1)(N-2)/2$, where $N = 431$ (prolific + peripheral co-authors). p1523
Li, Liao & Yen, 2012	degree centrality	Normalized degree centrality of the 101 prolific scholars is calculated as the original value of degree centrality divided by $(N-1)$, where $N = 431$ (prolific + peripheral co-authors), p1523
Perry-Smith, 2005	nonredundancy	Measured as betweenness centrality. p.92
Rodan & Galunic, 2004	network sparseness	$1 - \text{Burt's (1992) measure of network constraint. p. 549}$
Rotolo & Petruzzelli, 2012	centrality	Bonacich's degree centrality. p. 657
Venkataramani, Richter & Clarke, 2014	betweenness centrality	Measure of betweenness centrality. p.4
Vissa, 2012	structural holes	Measured as $1 - \text{constraint. p. 502}$
Wang, Rodan, Fruin & Xu, 2014	collaboration network structural holes	The level of structural holes of researcher in firm's collaboration networks of researchers 1991-1995. p.496
Barsness, Diekmann &	network centrality	Centrality in familiarity network is calculated as direct

Seidel, 2005		centrality by aggregating the number of ties to other organization members that a subordinate reported and dividing this score by the total number of possible network ties. p. 408
Carboni & Ehrlich, 2013	indegree centrality	The sum of incoming communication ties divided by the maximum possible degree in the team to eliminate differences due to availability of communication partners. p. 520
Carboni & Ehrlich, 2013	outdegree centrality	The sum of outgoing communication ties divided by the maximum possible degree in the team to eliminate differences due to availability of communication partners. p. 521
Carboni & Ehrlich, 2013	betweenness centrality	The number of times a person lies on the shortest path between two other people, divided by the number of possible paths to eliminate differences due to the size of the team. p. 519
Hirst, Van Knippenberg, Zhou, Quintane & Zhu, 2015	reach efficiency	First, the number of non-redundant alters that can be reached within a certain number of steps is computed. Second, the number of nonredundant alters that can be reached in a given number of steps is divided by the total number of alters that ego could reach in two steps, based on the number of direct contacts of each ego's direct contacts excluding ego himself/herself. Third, this proportion is divided by the number of actors ego has a direct link to. p. 570-571.
Hirst, Van Knippenberg, Zhou, Quintane & Zhu, 2015	2-step reach	The proportion of actors that ego can reach within two steps. p.571
Hirst, Van Knippenberg, Zhou, Quintane & Zhu, 2015	3-step reach	The proportion of actors that ego can reach within three steps. p.571
Hirst, Van Knippenberg, Zhou, Quintane & Zhu, 2015	4-step reach	The proportion of actors that ego can reach within four steps. p.571
Ibarra, 1993	centrality	Bonacich's (1987) degree centrality. p. 480
Ibarra, 1993	combined centrality	Combined Bonacich's (1987) degree centrality of five different networks. p. 480
Mehra, Kilduff & Brass, 2001	workflow betweenness centrality	Freeman's (1979) betweenness centrality. p. 131
Mehra, Kilduff & Brass, 2001	friendship betweenness centrality	Freeman's (1979) betweenness centrality. p.131
Pappas & Wooldbridge, 2007	boundary spanning	Measure based on functional descriptions of subunit and formal organizational roles as boundary spanning or not. p. 331
Sparrowe, Liden & Kraimer, 2001	advice centrality	Freeman's (1979) centrality measure in UCINET. p. 320
Tortoriello & Krackhardt, 2010	bridging non-Simmelian ties	The difference between the number of external non-Simmelian ties and the number of internal non-Simmelian ties or $E-I \text{ index} = (E_i - I_i) / (E_i + I_i)$. p. 172-173
Tortoriello & Krackhardt, 2010	bridging Simmelian ties	The difference between the number of external Simmelian ties and the number of internal Simmelian ties or $E-I \text{ index} = (E_i - I_i) / (E_i + I_i)$. p. 172-174
Tortoriello & Krackhardt, 2010	bridging weak non-Simmelian ties	The difference between the number of external weak non-Simmelian ties and the number of internal weak

		non-Simmelian ties or E-I index= $(E_i - I_i)/(E_i + I_i)$. p. 172-173
Tortoriello & Krackhardt, 2010	bridging strong non-Simmelian ties	The difference between the number of external strong non-Simmelian ties and the number of internal strong non-Simmelian ties or E-I index= $(E_i - I_i)/(E_i + I_i)$. p. 172-173
Tortoriello & Krackhardt, 2010	bridging weak Simmelian ties	The difference between the number of external weak Simmelian ties and the number of internal weak Simmelian ties or E-I index= $(E_i - I_i)/(E_i + I_i)$. p. 172-173
Tortoriello & Krackhardt, 2010	bridging strong Simmelian ties	The difference between the number of external strong Simmelian ties and the number of internal strong Simmelian ties or E-I index= $(E_i - I_i)/(E_i + I_i)$. p. 172-173
Tortoriello & Krackhardt, 2010	structural holes	Burt's (1992) measure of existence of structural holes. p. 172
Tortoriello & Krackhardt, 2010	degree of alters located outside ego-s lab	The degree centrality of the alters located in other labs to which each ego is connected. p. 173
Dahlander & Frederiksen, 2012	spanning multiple internal communities	The number of other online communities in which respondents most actively spend time in, as reported by each respondent (general social network communities such as Facebook are excluded). p. 995
Dahlander & Frederiksen, 2012	spanning multiple internal communities (technical)	The number of other technical online communities in which respondents most actively spend time in, as reported by each respondent. p. 995
Dahlander & Frederiksen, 2012	spanning multiple internal communities (artistic)	The number of other artistic online communities in which respondents most actively spend time in, as reported by each respondent. p. 995
Ross, 2011	structural holes	Measured by the size and the constraint in patent collaboration networks. "The size of patent collaboration networks measures how many different inventors a person collaborated with via patents from 1991 to 2002. The measurement was standardized so that the maximum was one. I counted the reverse value of constraint (the higher numbers indicate networks without constraint) and standardized the new variable so that the maximum was one. Finally I built a new additive measurement of structural holes where the maximum of one indicates large networks without constraint. p. 596.
Carnabuci & Dioszegi, 2015	brokerage	Calculated with the structural hole routine in UCINET where 0=maximal closure and 1=maximal brokerage. p. 888

BRIDGING RELATIONS

Brass, 1985	contacts with others	The number of direct relationships between the focal person and persons who were not members of the focal person's immediate workgroup nor persons with whom the focal person was required to interact in performing normal work functions. p. 332
Mizruchi, Stearns & Fleischer, 2011	network size	Number of contacts shared in response to: "Name up to 8 people whom they consulted for either information about the customer or the deal (information networks) or to whom they went to gain either support or confirmation for the deal (approval networks)". p. 49
Renzulli, Aldrich &	heterogeneity score	Probability that each alter in the network will have a

Moody, 2000		different relation from that of all alters= $1 - [(\#kin/total)SQRT + (\#business\ associates/total)SQRT + (\#coworkers/total)SQRT + (\#consultants/total)SQRT + (\#friends/total)SQRT + (\#group\ members/total)SQRT]$. p. 536
Renzulli, Aldrich & Moody, 2000	total number in network	Total number of people with whom respondents discuss business at wave 1. p. 536
Aral & Van Alstyne, 2011	network size	The number of contacts with whom i exchanges at least one message (email). p. 117
Baer, 2010	network size	The number of contacts listed in the name generator "people who have provided you with new information or insights about work-related problems or issues". p. 595
Baer, 2010	network diversity	Index of heterogeneity = $1 - \sum \pi_i^2$, where π_i is the proportion of contacts in the i -th category (e.g. Processing, Marketing). p.595
Batjardal et al., 2013	network size	The number of contacts listed in three name generators: obtained business advice, business resources, and emotional support in the last six months. p.1035
Cross & Cummings, 2004	ties outside the organization	Number of ties outside the organization. p. 932
Cross & Cummings, 2004	ties outside the department	Number of ties outside either in the engineering function or in the consulting office but inside the respective organization. p. 932
Cross & Cummings, 2004	ties outside physical barriers	Number of relationships outside the respondent's office floor. p. 932
Cross & Cummings, 2004	ties higher in hierarchy	The number of ties an individual has to those higher in the hierarchy. p.932
Fleming, Mingo & Chen, 2007	degree of collaboration	Logarithm of the number of unique inventors with whom the focal inventor collaborates over the time period. p.456
Gonzales-Brambila, Veloso & Krackhardt, 2013	direct ties	The number of unique coauthors during the relevant 3-year period. p.1559
Gonzales-Brambila, Veloso & Krackhardt, 2013	internal-external index	The number of ties external to the group minus the number of ties that are internal to the group divided by the total number of ties. p. 1560
Li, Liao & Yen, 2012	collaboration diversity index	$(\sum coauthor_i - \sum duplicate_i) / \sum relation_i$, where $\sum coauthor_i$ - $\sum duplicate_i$ stands for the total of non-duplicated, unique co-authors and $\sum relation_i$ refers to the total collaborative relations of all published journal articles. p.1254
McFadyen & Cannella, 2004	number of relations	The sum of the scientist's coauthors during the previous five years. p.739
McFadyen, Semadeni & Cannella, 2009	percent new coauthors	The number of new partners into the person's ego network during the previous three years. p. 557
Moran, 2005	direct ties	The number of key contacts the managers identify as their task-advice (support in work), social support (friendship), and idea-generation (support with formulating new ideas) networks. p. 1137, 1139
Obstfeld, 2005	number of alters	The number of people in the respondent's network (those with whom they discuss important matters, with whom they communicate to get the work done, who were influential in getting new projects approved, with whom the socialized informally, and to whom they turned for advice). p. 112, 115
Mors, 2010	network size	The number of ties identified by 7 name-generator questions. p.852

Perry-Smith, 2005	weak ties (closeness)	The number of acquaintances, distant colleagues and friendly colleagues. p. 91
Perry-Smith, 2005	weak ties (duration)	Ties less than 10 years old. p.91
Perry-Smith, 2005	weak ties (frequency)	Ties that involve several times a month or less interaction. p.91
Perry-Smith, 2005	outside ties	Number of ties the respondent has outside the lab, p.91
Rodan & Galunic, 2004	network size	Combining all ties reported by ego-network data, e.g. for i - all outbound ties reported by i to j plus all inbound ties reported from j to i. p.548
Rodan & Galunic, 2004	number of key contacts	The number of key contacts, reported by the respondent for social support, innovation, buy-in, and task-advice, p. 548
Rotolo & Petruzzelli, 2012	cross-community ties	The direct ties an academic scientist established with other scientists outside the community. p. 658
Rotolo & Petruzzelli, 2012	community ties	The number of direct ties a scientist has with other academic scientists in the community. p. 658
Sosa, 2011	tie duration	Dichotomous variables, measured by respondents indicating if they went to the source "for any type of important interactions BEFORE the development of the radical product kicked off". p.9
Thompson, 2005	network building	6-item scale which assesses the extent to which individuals develop and use networks of people to increase their influence. p.1013
Venkataramani, Richter & Clarke, 2014	weak ties	Count of the number of contacts, listed as acquaintances, distant colleagues or casual friends. p.5
Vissa, 2012	network broadening	Two component variables, measuring reaching out to new alters and establishing interpersonal knowledge of new alters. p.502
Wang, Rodan, Fruin & Xu, 2014	percentage new contacts	The extent to which a researcher's network contacts are new to the firm. p. 499
Wang, Rodan, Fruin & Xu, 2014	collaboration network degree centrality	The number of researcher's network contacts in firm's collaboration networks of researchers 1991-1995. p. 496
Wang, Rodan, Fruin & Xu, 2014	collaboration network degree centrality 2000	The number of network contacts in researchers collaboration network 1996-2000. p. 497
Wang, Rodan, Fruin & Xu, 2014	geographical diversity of network contacts	The percentage of researcher's network contacts who are from regional offices different than that of a researcher. p. 497
Zhou, Shin, Brass, Choi & Zhang, 2009	weak ties	The number of advice ties which the respondent classifies as "a little bit" or "somewhat" important source of professional advice to work-related problems. p. 1547
Zou & Ingram, 2012	number of alters inside the organization	The number of alters working in ego's organization. p.107
Zou & Ingram, 2012	number of alters outside the organization	The number of alters not working in ego's organization. p.107
Zou & Ingram, 2012	number of alters with higher rank	The number of alters with higher rank than ego. p.107
Zou & Ingram, 2012	number of additional contacts	Measured with the question: "The list of individuals above comprise your contact network. Look the list over. These are people who are critical for getting things done today, but they may not be critical for getting things done tomorrow. Who is notably absent

		from the list, in the sense that they were critical for getting things done last year, but did not make the list this year? Approximately, how many names come to mind?" email from Zou
Gargiulo, Ertug & Galunic, 2009	acquirer network size (ln)	The number of people evaluated by ego which corresponds to ego's out-degree in the information exchange network. p. 313
Gargiulo, Ertug & Galunic, 2009	provider network size (ln)	The number of people who evaluated ego which corresponds to ego's in-degree in the information exchange network. p. 313
Hirst, Van Knippenberg, Zhou, Quintane & Zhu, 2015	advice size	The total number of seeking and receiving advice ties of ego. p.571
Mehra, Kilduff & Brass, 2001	workflow network size	The number of work contacts, "people that provide you with your workflow inputs and people to whom you provide your workflow output". p. 130, 132
Morrison, 2002	information network size	Measured by the response to the question: "The number of people who have been regular and valuable sources of job-related and firm-related information to you". p. 1153
Morrison, 2002	network range	The number of different industry groups represented by ego's contacts. p. 1153
Seiber et al., 2015	network heterogeneity	$1 - \sum p_i^2$, where p is the proportion of authoring with a particular coauthor and i represents each unique coauthor. p. 13
Seiber et al., 2015	total number of coauthors	The total number of coauthors on all the papers the focal subject had published during the period 1995-2002. p. 12
Tortoriello & Krackhardt, 2010	total ties	The number of information ties ego has. p. 172-173
Tortoriello & Krackhardt, 2010	bridging direct raw ties	The difference between the number of all external ties and the number of all internal ties or E-I index= $(E_i - I_i)/(E_i + I_i)$. p. 173
Tortoriello & Krackhardt, 2010	bridging weak ties	The difference between the number of external weak ties and the number of weak internal ties or E-I index= $(E_i - I_i)/(E_i + I_i)$. p. 172-173
Tortoriello & Krackhardt, 2010	bridging strong ties	The difference between the number of external strong ties and the number of internal strong ties or E-I index= $(E_i - I_i)/(E_i + I_i)$. p. 172-173

BONDING STRUCTURE

Brass, 1985	closeness centrality	The minimum distance between a focal person and all other persons in the reference group measured by counting the number of links between the focal person and each other person; the sum of all distances is divided by n-1 and the scored is transformed using the formula $1 - [(d-1)/d_{max}]$, such that higher scores reflect greater access. p. 332
Burt, 2007	network constraint	The sum of squared proportions of i's relations that are directly or indirectly invested in connection with contact j. p.125
Burt, 2007	indirect network constraint	Weighted average of constraint on ego, measured by average constraint on alters. p.125
Burt, 2007	direct network constraint	Weighted average of constraint on ego in the immediate network of direct contacts. p.126
Kilduff & Krackhardt,	actual friend's	Advice in-degree centrality of person j's most central

1994	indegree centrality	friend, based on aggregate (LAS) friendship and advice networks (p.95) by identifying the actual friend with the highest indegree centrality rating and recording that value. p. 96
Mizruchi, Stearns & Fleischer, 2011	density	$D_i = (\sum S_{jk}) / (N_i^2 - N_i)$, where S_{jk} equals the strength of each of the alter-to-alter ties; mean alter network density is computed for each the banker's deals and mean is taken. p. 49
Ahearne et al, 2013	district network density	Network density in the whole district (sales + DMs), based on in-coming advice ties. (email confirmation from author Lam)
Aral & Van Alstyne, 2011	structural equivalence of alters	Friedkin's (1984) measure of structural equivalence as the Euclidean distance of the actors' contact vectors. p.119
Batjardal et al., 2013	network density	Calculated by dividing the total number of identified relationships between the alters by the total number of ties. p. 1035
Fleming, Mingo & Chen, 2007	cohesion	The cohesion of the focal inventor's network is measured by calculating a density measure of the ties between each of the others in the focal inventor's network, where density is the unique number of pairwise collaborations between a focal inventor's collaborators that did not include the focal inventor, divided by the total possible pairwise collaborations. p.453-454
Fleming, Mingo & Chen, 2007	strength of indirect ties	The number of repeated indirect ties by collaborators divided by the number of unique indirect ties, p. 456
Gonzales, Claro & Palmatier, 2014	density	Borgatti, Everett and Freeman's (2002) measure, which is the ratio of the number of ties in an RM's network to the maximum possible number of ties. p. 83
Gonzales-Brambila, Veloso & Krackhardt, 2013	density	Local density of researcher - for researcher i who has co-authored papers with k others in the network M, the authors extract the KxK subgraph S consisting only of those k co-authors and calculate density as the density in S. p. 1260
Li, Liao & Yen, 2012	closeness centrality	Normalized closeness centrality of the 101 prolific scholars equals the original value of closeness centrality divided by $1/(N-1)$, where $N = 431$ (prolific + peripheral co-authors). p.523
McFadyen, Semadeni & Cannella, 2009	network density	Calculated as the number of actual ties divided by the maximum number of pairs. p. 557
Moran, 2005	indirect ties	Proportional density measure, which calculates the number of indirect ties among contacts as the proportion of all possible ties; an indirect tie is said to exist if respondents indicate that the relationship between any two of their contacts was closer than simply "arm-strength" or 2 or higher on a 5-point closeness scale. p.1139
Moran, 2005	network closure	A binary variable with 1=fully closed network, 0=otherwise. p. 1140
Obstfeld, 2005	density	The ratio of existing ties between those in a subject's network out of all possible ties. p.113
Obstfeld, 2005	constraint	$C_{ij} = \sqrt{P_{ij} + \sum P_{iq}P_{qj}}$, where P_{ij} is the proportion of the total relational strength that ego devotes to a given alter in proportion to the sum of relational strength of all other of ego's alter ties, and $\sum P_{iq}P_{qj}$ captures the degree of triadic closure between i, j, and third parties q. p.113

Mors, 2010	egocentric density	The number of ties between alters in ego's network, weighted by strength, and divided by the total number of alters. p.854-855
Mors, 2010	density within internal-local	The number of ties within this group, weighted by strength, and divided by the total number of ties in the group which equals $(n(n-1)/2)$. p.854-855
Mors, 2010	density within internal-global	The number of ties within this group, weighted by strength, and divided by the total number of ties in the group which equals $(n(n-1)/2)$. p.854-856
Mors, 2010	density within external-local	The number of ties within this group, weighted by strength, and divided by the total number of ties in the group which equals $(n(n-1)/2)$. p.854-857
Mors, 2010	density within external-global	The number of ties within this group, weighted by strength, and divided by the total number of ties in the group which equals $(n(n-1)/2)$. p.854-858
Mors, 2010	density between internal and internal-global	The number of ties within this group, weighted by strength, and divided by the total number of possible ties between these two groups which equals the product of the number of ties in each group or $n(i,l) \times n(e,g)$. p.855-856
Mors, 2010	density between external and external-global	The number of ties within this group, weighted by strength, and divided by the total number of possible ties between these two groups which equals the product of the number of ties in each group or $n(i,l) \times n(e,g)$. p.855-857
Mors, 2010	density between internal and external-global	The number of ties within this group, weighted by strength, and divided by the total number of possible ties between these two groups which equals the product of the number of ties in each group or $n(i,l) \times n(e,g)$. p.855-858
Mors, 2010	density between internal-global and external-global	The number of ties within this group, weighted by strength, and divided by the total number of possible ties between these two groups which equals the product of the number of ties in each group or $n(i,l) \times n(e,g)$. p.855-859
Mors, 2010	density between internal and external-local	The number of ties within this group, weighted by strength, and divided by the total number of possible ties between these two groups which equals the product of the number of ties in each group or $n(i,l) \times n(e,g)$. p.855-860
Mors, 2010	density between internal-global and external-local	The number of ties within this group, weighted by strength, and divided by the total number of possible ties between these two groups which equals the product of the number of ties in each group or $n(i,l) \times n(e,g)$. p.855-861
Perry-Smith, 2005 Sosa, 2011	closeness centrality dyadic network cohesion	$C_j = 1/(n-1) \sum d(p_i, p_k)$. p.91 The involvement of recipient i on common third parties (q) with source j is assessed using a measure of indirect constraint $C_{ij} = \sum P_{iq} P_{qj}$. p.9
Sosa, 2011	structural equivalence	The Euclidean distance between the network patterns of i and j with reversed sign to capture the similarity of the social networks of the interacting individuals. p.10
Sykes, Venkatesh & Johnson, 2014 Zhou, Shin, Brass, hoiZhang, 2009	employee embeddedness network density	Eigenvector centrality. p.59 The number of ties between ego's direct-tie alters divided by the total number of possible ties. p. 1547

Zou & Ingram, 2012	network constraint within organization	Network constraint for an ego is the sum of the constraint index from all alters, where alters j and mutual contacts q are all in ego's organization. p.103
Zou & Ingram, 2012	network constraint across organizational boundary	Network constraint for an ego is the sum of the constraint index from all alters, where either alters j or mutual contacts q are not in ego's organization. p.103
Zou & Ingram, 2012	network constraint outside organization	Network constraint for an ego is the sum of the constraint index from all alters, where alters j and mutual contacts q are all not in ego's organization. p.103
Baldwin, Bedell & Johnson, 1997	friendship centrality	Measured with Stephenson & Zelen's (1979) closeness centrality index which takes into account not only the shortest path between individuals but also all possible paths and considers a person who is both a friend of another individual and a friend-of-a-friend as somewhat closer to that individual than a person who is only a friend. p. 1379 & 1384
Baldwin, Bedell & Johnson, 1997	communication centrality	Measured with Stephenson & Zelen's (1979) closeness centrality index which takes into account not only the shortest path between individuals but also all possible paths and considers a person who is both a friend of another individual and a friend-of-a-friend as somewhat closer to that individual than a person who is only a friend. p. 1379 & 1384
Bizzi, 2013 Briscoe & Tsai, 2011	network constraint referral network closure	Burt's network constraint index. p. 1565 Burt's structural hole constraint formula applied on the referral network, built by defining a tie as a focal partner's project billings to other partners' clients where the ties are directional and weighted by the total amount he or she billed during the period to each alter partner's clients. p. 421
Carboni & Ehrlich, 2013	coreness	The correlation between any one individual and the centroid of a cloud of points in Euclidean space (Borgatti & Everett, 1999). p. 519
Cattani & Ferriani, 2008	coreness	The degree of closeness of each node to a core of densely connected nodes (nine affiliation matrices) through the coreness measure in UCINET VI. p. 832
Cattani & Ferriani, 2008	team coreness	The extent to which the team to which a professional belongs consists of members that are closer to the core or the periphery; the variable ranges from zero (a professional worked on movies in which all team members are peripheral) to one (a professional worked on movies in which all team members were core); first the authors identified professionals as peripheral or core depending on whether their coreness value is below or above the median, then they compute the ratio between team members who are closer to the core of the network to the total number of team members working on the same movie. p. 833
Cattani & Ferriani, 2008	structural holes	Burt's network constraint index. p. 833 (Cattani confirmed by email that they measure constraint, not structural holes)
Gargiulo, Ertug & Galunic, 2009	acquirer network density	The ratio of existing ties to the maximum number of possible ties between alters in the banker's acquirer network, multiplied by 100, where all ties between alters are considered. p.313-314
Gargiulo, Ertug &	provider network	The ratio of existing ties to the maximum number of

Galunic, 2009	density	possible ties between alters in the banker's provider role, multiplied by 100, where all ties between alters are considered. p.314
Gargiulo, Ertug & Galunic, 2009	acquirer-provider network density	The ratio of existing ties to the maximum number of possible ties cutting across exclusive (i.e., nonreciprocated) acquirer and provider relationships, multiplied by 100. p.314
Morrison, 2002	network density	The number of actual links between the members of a network (information and friendship) relative to the total number of possible links. p. 1153
Pappas & Wooldbridge, 2007	closeness centrality	UCINET closeness centrality measure. p. 331
Pappas & Wooldbridge, 2007	eigenvector centrality	UCINET eigenvector centrality measure. p. 331
Rodan, 2010	network density	The number of ties between alters divided by the number of all possible alter-alter ties. p. 174
Seiber et al., 2015	professional support network density	The number of ties among alters divided by the potential number of ties among alters. p. 14
Tortoriello & Krackhardt, 2010	simmelian ties	Tie between i and j when both i and j are connected to k. p. 172
Dahlander & Frederiksen, 2012	core/periphery	UCINET core/peripheral function. p. 995
Ross, 2011	ego network closure	Measured by ego network size and exchange multiplexity: "Ego network size indicated how many Alter i were named by ego. I counted the reverse value, that is, higher numbers indicate smaller networks, and I standardized the new variable so that the maximum was one. Exchange multiplexity counts how often Alter i is named by ego in different exchanges, that is the different name generators. For each Ego I calculated the average multiplexity of the relationships, indicating the average number of exchange contents that are shared with an Alter. Exchange multiplexity again was standardized with a maximum of one. Finally I built a new additive measurement of ego network closure where a maximum of one indicates small, multiplex networks. p. 695

BONDING RELATIONS

James, 2000	tie strength	Each person in the respondent's network is identified using a 4-point social distance scale ranging from 1 (distant) to 4 (very close); close (3) and very close (4) responses are recoded as representing a strong tie relationship; the proportion of strong ties within each respondent's network is calculated as a ratio of strong to total ties. p. 499
James, 2000	career-related support	3 items on a scale of 1=not at all to 5=a great deal "To what extent does each network member provide you with career direction and guidance/access to resources to do your job/help in learning the ropes?" The responses were summed and divided by the number of advice network members identified for each respondent. p. 499-500
James, 2000	psychological support	3 items on a scale of 1=not at all to 5=a great deal "To what extent does each network member provide you

		with trust and respect/emotional support/affirmation of ideas?" The responses were summed and divided by the number of friendship network members identified for each respondent. p. 500
Mizruchi, Stearns & Fleischer, 2011	average tie strength	Average tie strength of a banker's network was computed by summing the values on the 1 to 4 scale for each alter and dividing them by 4N, where N is the number of alters; the mean tie strength for each of their deals is computed and the mean of those is taken. p. 49
Renzulli, Aldrich & Moody, 2000	proportion of kin	Number of kin mentioned divided by the total number of alters at wave 1. p. 536
Ahearne et al, 2013	sales person peer network in-degree centrality	We asked salespeople and district sales manager to identify an exhaustive list of individuals in the company who were representative of the coworkers they go to for advice about work related matters and measured the strength of the advice-seeking ties by asking respondents to indicate how often they interact with the nominated colleagues about work-related matters (1-seldom, 7-very often). We calculated weighted in-degree centrality. p.47 (email confirmation from author Lam)
Baer, 2010	network strength	"To construct an index of network strength I averaged responses to the three items assessing closeness, duration, and frequency across all contacts in an actor's network and then averaged these scores (standardized) across items". p. 595
Baer, 2012	strong ties	Name generator asked for "all people whose support you can count on to move your ideas forward". Name interpreter asks for "How close are you with each person?" (1=acquaintance; 2 = distant colleague; 3 = friendly colleague; 4=close colleague; 5=very close colleague). Ties are categorized as strong (4&5) and weak (1,2&3) and then the number of strong ties is counted. p. 1109
Batjardal et al., 2013	family ties	The percentage of kin in an entrepreneur's network. p. 1035
Chollet et al., 2014	tie strength	The average of the scores ("distant" to "especially close") obtained for all the contacts listed. p.90
Chow, 2009	family ties	The proportion of family members or close relatives in the respondent's network size. p. 49
Chow, 2009	strong ties	The proportion of colleagues with whom the respondent reported a high degree of closeness. p.49
Delmestri et al., 2007	strength of vertical economic ties	The average of the tie strength of the dyads director-producer and director-distributor in the five-year moving window by standardizing and summing into a single factor two measures - frequency of collaboration and exclusiveness of collaboration. p.990-991
Delmestri et al., 2007	strength of horizontal artistic ties	The average of the tie strength of the dyads director-screenwriter(s), director-director of photography, and director-leading actor/actress in the five-year moving window by standardizing and summing into a single factor two measures - frequency of collaboration and exclusiveness of collaboration. p.991
Fleming, Mingo & Chen, 2007	repeated collaboration ratio	The number of current collaborators with whom the focal inventor has worked previously, divided by the total number of collaborators. p.456

Fleming, Mingo & Chen, 2007	strength of direct ties	The number of repeated collaborative ties, divided by the number of unique ties. p.456
Gonzales, Claro & Palmatier, 2014	multiplexity	The number of concurrent ties an RM has with contacts in his or her informal and formal networks, divided by the total number of ties the RM has in both networks to account for differences in network size. p. 83
Gonzales-Brambila, Veloso & Krackhardt, 2013	strength of ties	Sum of the row (or column) values in Q (valued network in which cells Q_{ij} =the total number of papers co-authored by researchers i and j over the 3 year window), divided by the corresponding row in M (matrix indicating co-authorship). p.1559-1560
Li, Liao & Yen, 2012	prolific co-author count	The relations with prolific scholars with whom the focal author co-authored at least twice. p. 1523
McFadyen & Cannella, 2004	strength of relations	The average number of times that the scientist published with the same coauthor during the previous five years. p. 739
McFadyen, Semadeni & Cannella, 2009	average tie strength	The number of publications with a given coauthor during the previous three years. p 556
McFadyen, Semadeni & Cannella, 2009	number of long-term coauthors	The number of collaboration relationships that lasted six years or more. p. 557
Moran, 2005	closeness	The average level of closeness across a manager's key contacts. p. 1140
Moran, 2005	relational trust	The average level of trust across contacts, where relational trust is measured through three Likert-type items, asking for (1) perceptions of honesty and truthfulness in exchange; (2) perceptions of competence in ongoing interactions; and (3) alignment of goals and values, based specifically on direct interpersonal exchange and history. p. 1140.
Perry-Smith, 2005	strong ties (closeness)	The number of very close friends and good friends. p. 91
Perry-Smith, 2005	close ties (duration)	Ties over 10 years old. p.91
Perry-Smith, 2005	strong ties (frequency)	Ties that involve daily or several times per week interaction. p.91
Sosa, 2011	tie strength	The proportion of the recipient's total interactions invested in the relationship with source j, both as a result of i's seeking out j and of being sought out by j. p.9
Venkataramani, Richter & Clarke, 2014	strong ties	Count of the number of contacts, listed as good friend or close personal friend. p.5
Vissa, 2012	network-deepening	Three component variables that measure time-based interaction pacing, relational embedding, and network preserving. p. 502
Yuan, Gay & Hembrooke, 2006	network ties	The level of correlation between instrumental and expressive network ties at a given point in time, p.30
Yuan, Gay & Hembrooke, 2006	multiplexity	The frequency of task-related communication with other students within the group. p.29-30
Yuan, Gay & Hembrooke, 2006	within group (instrumental)	The frequency of non-task-related communication with other students within the group. p.29-31
Yuan, Gay & Hembrooke, 2006	within group (expressive)	The frequency of task-related communication with other students in the same university. p.29-30
Yuan, Gay & Hembrooke, 2006	within location (instrumental)	The frequency of non-task-related communication with other students in the same university. p.29-31
Yuan, Gay & Hembrooke, 2006	within location (expressive)	The frequency of task-related communication with other students outside own group. p.29-30
Yuan, Gay & Hembrooke, 2006	across group (instrumental)	The frequency of non-task-related communication with other students outside own group. p.29-31
Yuan, Gay & Hembrooke, 2006	across group (expressive)	

Yuan, Gay & Hembrooke, 2006 Yuan, Gay & Hembrooke, 2006 Zhou, Shin, Brass, hoiZhang, 2009	across location (instrumental) across location (expressive) strong ties	The frequency of task-related communication with other students in the other university. p.29-30 The frequency of non-task-related communication with other students in the other university. p.29-31 The number of advice ties which the respondent classifies as "to a large degree" or "extremely" important source of professional advice to work-related problems. p. 1547
Brandes, Dharwadakar & Wheatley, 2004	relationship with employees outside work area	Measured with 3-items: (1) I often count on at least one employee outside my work group to help me with work-related problems; (2) I am in frequent contact at work with employees outside my group; (3) I frequently consult employees outside my work group to help me on work problems, with high scores indicating willingness and motivation of employees to form bonds with employees outside of their own department. p.284-285
Carmeli, Ben-Hador, Waldman & Rupp, 2009	bonding social capital	Measured with 4-items: the employees were asked to indicate the extent to which they (1) felt close to their colleagues at work; (2) could count on their colleagues at work; (3) got help from their colleagues at work; and (4) felt a sense of caring for each other at work. p. 1556
Erdogan, Bauer & Walter, 2015 Evans, Hendron & Oldroyd, 2014	advice network centrality social support	In-degree centrality or the frequency with which other employees seek advice from the focal actor. p. 195 In-degree centrality score based on the number of coworkers indicating that they socialize with the individual. p. 7
Gargiulo, Ertug & Galunic, 2009	reciprocated ties	The proportion of exchange relationships in which the focal actor acted as both acquirer and provider of information. p. 313
Mehra, Kilduff & Brass, 2001	friendship network size	The total number of friends, "people with whom you like to spend your free time, people you have been with most often for informal social activities, such as visiting each other's homes, attending concerts or other public performances". p. 130, p.132
Metz & Tharenou, 2001	external network	The number and the degree of closeness of social and family contacts that respondents had outside the organization with whom to discuss important matters. p. 324
Metz & Tharenou, 2001	internal network	The number and the degree of closeness of work contacts that respondents had inside the organization with whom to discuss important matters. p. 324
Morrison, 2002	friendship network size	The number of people who ego considers as friends. p. 1153
Morrison, 2002	information network strength	Averaging responses to the question about the frequency with which ego talked with each alter. p. 1153
Morrison, 2002	friendship network strength	Averaged responses to the question about the degree of closeness to each alter. p.1153
Pappas & Wooldbridge, 2007	network degree	The number of colleagues with whom ego frequently communicated. p.331
Seiber et al., 2015	professional support strong ties	The number of relationships the respondent described as close. p. 14
Tortoriello & Krackhardt, 2010	strong ties	Strong ties are categorized using the dichotomy 4 and above versus 3.5 and below on the questions "How often you generally go to this person for information or knowledge on work-related topics" and "How often tis person generally comes to you for information or

Madjar, Oldham & Pratt, 2002	work support	knowledge on work-related topics) with scales ranging from 1=seldom to 5=very frequently, and the average of the two individual responses is taken. p. 172 7 items on a scale from 1=strongly disagree to 7=strongly agree: (1) My supervisor discusses with me my work-related ideas in order to improve them; (2) My coworkers other than my supervisor are almost always supportive when I come up with a new idea about my job; (3) My supervisor gives me useful feedback about my ideas concerning the workplace; (4) My supervisor is always ready to support me; (5) My coworkers other than my supervisor give me useful feedback about my ideas concerning the workplace; (8) My coworkers other than my supervisor are always ready to support me if I introduce an unpopular idea or solution at work. p. 760
Madjar, Oldham & Pratt, 2002	nonwork support	7 items on a scale from 1=strongly disagree to 7=strongly agree: (1) My family and friends outside the organization discuss with me my work-related ideas in order to improve them; (2) My family and friends outside the organization give me useful feedback about my ideas concerning the workplace; (3) My family and friends outside the organization are really critical every time I come up with a new idea or suggestion about my work (reverse-coded); (5) My family and friends outside the organization are always ready to listen to my ideas or thoughts about my workplace; (6) My family and friends outside the organization value my ideas and suggestions about my workplace; (7) My family and friends outside the organization are almost always supportive when I come up with a new idea about my job. p. 760
Mueller & Kamdar, 2011	help-seeking behavior	Each employee rated his or her own help-seeking behavior on 7 items, e.g. "I often approach teammates for advice when I don't understand how to solve a problem", "I frequently ask other teammates for assistance in creative problem solving", "I often request help from teammates when struggling to solve problems creatively". p. 267
Mueller & Kamdar, 2011	help-giving behavior	8 item scale, e.g. "I assist teammates with difficult problem-solving assignments, even when assistance is not directly requested", "I go out of my way to help teammates refine their creative ideas", and "I take on extra responsibilities in order to help teammates solve problems creatively". p. 268
Rost, 2011	strengths of ties	8 items that describe the relationship quality between ego and each alter: contact frequency, emotional closeness, whether alter keeps promises, cognitive closeness, the overlap of technological knowledge, subjective evaluations of creativity, the hierarchical position of each alter and the level of training and education; the mean value of the eight items is calculated and standardized so that the maximum amount is 1. p. 595
Carnabuci & Dioszegi, 2015	number of friends	Employees were asked to indicate the colleagues they regard as friends and to indicate the strength of their friendship relations, which were coded to indicate tie

Carnabuci & Dioszegi, 2015	collaboration from supervisor	strengths (1=weak, 2=strong, 3=very strong). p. 889 Measures whether the supervisor indicated a collaborative relation with the focal employee with tie strength based on indications of collaboration frequency, phrased as "a few times over the whole year" (weak tie), "a few times a month" (medium tie), and "daily or almost daily" (strong tie). p.889
Carnabuci & Dioszegi, 2015	friendship from supervisor	Measures whether or not the supervisor rating the focal employee indicated a friendship relation to the employee, and if so, the strength of this tie (1=weak, 2=strong, 3=very strong). p. 889

APPENDIX C: Operationalization of Individual Performance

Author/s	Variable name	Variable operationalization
Brass, 1985	performance	Immediate supervisors rate the effort, quality and quantity of performance of each of their employee. p. 333 "Managers were assigned in their annual performance evaluation to one of three categories: "outstanding", "average", or "poor"...For comparison with the salary metric, I computed from integer values and the distribution of managers a Z-score for each level of evaluation (1.88 for "outstanding", 0.06 for "average", and -1.58 for "poor". p.130-131
Burt, 2007	annual evaluation	The average evaluation reported for a banker in that year's annual peer evaluation. p.133
Burt, 2007	peer evaluation	Overall supervisory performance rating obtained from personnel records, measuring the employee's performance in meeting customer needs, maximizing quality, people skills, integrity and teamwork on a scale from 1 (not effective) to 5 (exceptionally effective). p. 500
James, 2000	performance	Supervisors' ratings of subordinates' performance on a 7-point scale, where 7=performs job extremely well and 1=not performing job at all well. p. 98
Kilduff & Krackhardt, 1994	job performance	Each respondent provided his or hers perception of the job performance of every person in the organization on a seven point scale, where 7=performs job extremely well and 1=not performing job at all well. p. 97
Kilduff & Krackhardt, 1994	performance reputation	A dummy variable with 1 indicating that the banker performed above expectations. p. 50
Mizruchi, Stearns & Fleischer, 2011	performance evaluation	Interaction term reflecting the product between the proportion of the bankers' deals in our data that they successfully closed and the average level of dollar exposure to the bank for those deals (where exposure refers to the amount of the bank's capital that would be at risk during the course of the deal). p. 50
Mizruchi, Stearns & Fleischer, 2011	closure rate	Dichotomous variable indicating whether the respondents from wave 1 (1990-1991) had started a business by wave 2 (1992). p. 532
Renzulli, Aldrich & Moody, 2000	business start-up	Measured as percentage of quota, which equals dollar sales in a given month divided by the period's sales quota. p. 44
Ahearne et al, 2013	performance	The number of projects completed per month by a recruiter. p. 117
Aral & Val Alstyne, 2011	projects completed	The revenue generated by a recruiter per month as recorded in the firm's accounting records. p. 117
Aral & Val Alstyne, 2011	revenue generated	The average project duration as a quality-controlled measure of productivity. p. 117
Aral & Val Alstyne, 2011	average project duration	3 items measure: (1) Ideas that imply substantial departures from existing products and service lines; (2) Breakthrough ideas - not minor changes to existing products/services; and (3) Ideas that make existing knowledge about current product/services obsolete. p. 596
Baer, 2010	creativity	

		On a scale from 1 (never) to 7 (always) supervisors rated the frequency with which an employee's ideas had reached certain stages of implementation: (1) have been approved for further development; (2) have been transformed into usable products, processes or procedures; (3) have been successfully brought to market or have been successfully implemented in the organization. Responses are averaged to create an indicator of idea implementation. p. 1109
Baer, 2012	implementation of ideas	
Batjardal et al., 2013	revenue growth	The sum of revenue growth percentages divided by the number of revenue years. p.1034
		3 items measure: (1) People recommend my company to customer, (2) People strongly advise other firms to do business with my company; and (3) My company obtains contracts thanks to favorable word of mouth. p. 89
Chollet et al., 2014	business referrals	
		Measured by seven self-reported items on a 7-point Likert scale, ranging from (1) strongly disagree to (7) strongly agree, adapted from Babin and Boles (1998). A sample item included the statement "Relative to other staff members, I am a top performer". p.48
Chow, 2009	job performance	(1) At the conclusion of a project, the manager in charge of the work evaluated each employee's performance in terms of quality of output, efficiency, innovativeness, and ability to work well with peers. (2) Where a project involved more than one employee, the HR collected peer feedback from relevant team members and occasionally from customers to obtain different perspectives on employee's performance. (3) Objective measures appropriate to the project were also tracks during the course of the year. An overall rating was given, on a five-point scale, and this rating formed the DV. p. 931
Cross & Cummings, 2004	job performance	
Delmestri et al., 2007	commercial success	Data about movies' box office rentals. p. 987
Delmestri et al., 2007	artistic merit	Standardized critics' judgments plus cultural awards garnered. p. 989
Fleming, Mingo & Chen, 2007	new combinations	The models use the number of new subclass pairs within each of a focal inventor's patents as a measure of generative creativity. p.453
Fleming, Mingo & Chen, 2007	future use	The number of times other inventors used the focal inventor's new combinations. p. 453
Gonzales, Claro & Palmatier, 2014	RM performance	An index of sales growth, which equals each RM's six month sales at time t divided by sic=month sales at time t-1 and then multiplied by 100. p. 83
Gonzales-Brambila, Veloso & Krackhardt, 2013	publications	Number of publications. p.1559
Gonzales-Brambila, Veloso & Krackhardt, 2013	citations	Number of citations. p.1559
Li, Liao & Yen, 2012	citation count	The number of citations for an article five years after its publication. p.1521
McFadyen & Canella, 2004	knowledge created	The Institute of Scientific Information's "impact factor" as a measure of knowledge creation represented by a given scientist's publications in a given year. p.739
McFadyen, Semadeni	knowledge created	The sum of the impact factors for all journal articles

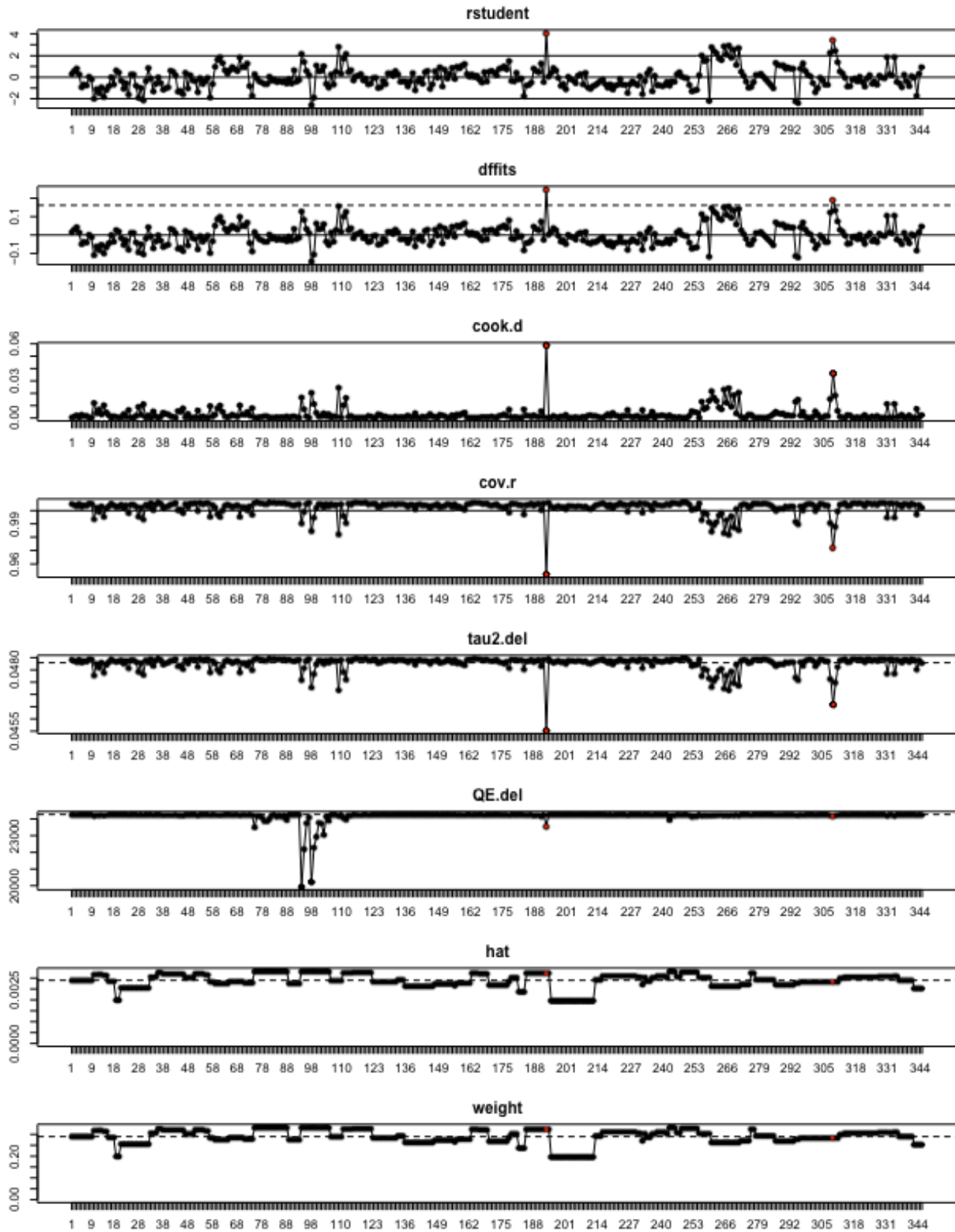
& Cannella, 2009		published by each scientist each year. p. 556
Moran, 2005	sales	HR Directors rate on a 1-7 scale, from "weak" to "outstanding", their managers' contribution to the overall products sales in the past 6 months. p. 1138
Moran, 2005	innovation	HR Directors rate on a 1-7 scale, from "weak" to "outstanding", their managers' efforts in generating and implementing new ideas in their companies in the past 6 months. p. 1139
Obstfeld, 2005	innovation involvement	Respondents are asked to evaluate their level of involvement in each of the 73 innovation on Ibarra's (1989;1993) scale of five categories of innovation involvement. A respondent's innovation involvement reflects the highest level of involvement across all 73 innovations. p.110-111
Mors, 2010	innovation performance	Calculated by combining two measures from the performance evaluation survey which score on a 1 to 5 Likert scale (1) partners' contribution to the firm in terms of new knowledge, and (2) partners' ability to create new knowledge and expertise. p.853-854
Perry-Smith, 2006	creative contributions	A 5-items measure of broad creative contributions for the past 2 years. p.92
Rodan & Galunic, 2004	overall performance	Six subjective items, four relating to general aspects of managerial task performance and two dealing specifically with innovativeness. p. 550
Rodan & Galunic, 2004	innovation performance	The last two items in the above measure - assessment of individual creativity and implementation effectiveness. p. 550
Rotolo & Petruzzelli, 2012	academic scientist's productivity	The number of scientific articles published by a scientist, weighted by the number of received citations. p. 657
Sosa, 2011	ease of generating creative ideas	On a seven-point Likert scale the respondent rates the statement "When I interact with (name of source contact), it is easy for me to generate NOVEL creative solutions and/or ideas. These NOVEL ideas can be either related to our product or the way we do things". p. 8
Sykes, Venkatesh & Johnson, 2014	job performance pre/post	4 items using a seven-point Likert scale, pertaining to doing things related to one's job description (HR's measure). p. 60
Thompson, 2005	job performance	Four-item scale: (1) employees set high goals for themselves; (2) attain the goals they set; (3) spend their time effectively in doing their work; and (4) achieve required work outcomes. p.1014
Venkataramani, Richter & Clarke, 2014	employee radical creativity	Three-item scale, e.g. "Developed ideas that make existing knowledge about current products/services obsolete". p.5
Vissa, 2012	addition of new exchange partners	The count of new interfirm exchange ties initiated between the focal venture and the target organizations (potential customers, alliance partners, and/or suppliers). p. 502
Wang, Rodan, Fruin & Xu, 2014	number of new knowledge elements	The number of the knowledge elements that were explored, advanced, and incorporated into a focal researcher's inventions and were new to the firm's extant stock of knowledge. p.495
Wang, Rodan, Fruin & Xu, 2014	number of patents 2000	Number of new patents with which the researcher got involved. p. 497

Yuan, Gay & Hembrooke, 2006	performance	Final grade on a project to design thermal protection system for a next generation reusable launch vehicle (space shuttle). p. 29
Zhou, Shin, Brass, hoiZhang, 2009	creativity	A 13-item scale measuring to what extent each of the 13 behaviors is characteristic of the employee, e.g. "Comes up with new and practical ideas to improve performance" or "Comes up with creative solutions to problems". p.1547
Zou & Ingram, 2012	creativity	3-items: (1) S/he is able to work to implement new ideas; (2) S/he is good at coming up with creative ideas; and (3) S/he is able to find improved ways to do things. p. 107
Zou & Ingram, 2012	task execution	3-items: (1) S/he can be relied on to complete a task s/he has agreed to do for me; (2) S/he maintains focus on the task at hand; and (3) S/he can be relied on to have the knowledge and competence for getting tasks done. p. 107
Barsness, Diekmann & Seidel, 2005	performance evaluation	Wayne & Liden's (1995) measure of performance: supervisors rated their subordinates' effectiveness in fulfilling their roles and responsibilities, overall performance and effectiveness, and superiority relative to other subordinates. p. 408
Bizzi, 2013	performance	Supervisory rating of employees measured as the comparative evaluation of the employee in relation to the average of his or her colleagues in the organization on a scale from 1 (much below the average) to 5 (much above the average). p.1566
Brandes, Dharwadakar & Wheatley, 2004	in-role behavior	Williams & Anderson's (1991) scale that reflect the supervisors reports that the employee meets the requirements and responsibilities of his or her respective job. p. 287
Brandes, Dharwadakar & Wheatley, 2004	extra-role behavior	Williams & Anderson's (1991) scale that reflect the supervisors reports that the employee takes on additional responsibilities at work, volunteers for overtime, helps cohorts who are burned by heavy workloads. p. 287
Briscoe & Tsai, 2011	revenue generation	The total number of billable hours charged to clients for which the focal partner has responsibility over the three years after the acquisition, p. 420
Briscoe & Tsai, 2011	billable hours	Billable hours in the year prior to the acquisition. p. 422
Carboni & Ehrlich, 2013	individual performance	Category variable (1 to 4, higher values associated with higher performance) indicating the year-end performance rating, based primarily on sales quota attainment. p. 519
Carmeli, Ben-Hador, Waldman & Rupp, 2009	individual performance	Managers assessed on a 7-point scale (ranging from 1=very good to 7=very poor) their employees' overall performance, timely completion of tasks, quality of performance, and achievement of work goals. p. 1556
Cattani & Ferriani, 2008	individual awards & achievements	Captures each professional's creative performance by the number of awards and nominations s/he received in a given year. p. 832
Erdogan, Bauer & Walter, 2015	task performance	Category variable, reported by store managers using Williams & Anderson's (1991) seven-item scale; sample item is "Adequately completes assigned duties". p. 196
Evans, Hendron &	individual	District rangers of each unit evaluated their direct-

Oldroyd, 2014	performance	report employees' job performance on a five-point scale using three items: (1) adequately completes assigned job; (2) fulfills responsibilities specified in his/her job description; and (3) meets formal performance requirements of the job. p. 6
Gargiulo, Ertug & Galunic, 2009	ego's mean evaluation	The average evaluation received by the focal banker. p. 316
Hirst, Van Knippenberg, Zhou, Quintane & Zhu, 2015	creativity	Oldham & Cummings (1996) measure of creative performance with 3 items: (1) How original and practical is this person's work?; (2) How adaptive and practical is this person's work?; and (3) How creative is this person's work?, Appendix of the original article
Ibarra, 1993	administrative innovation	Category variable that describes the level of the individual's involvement on five stages of bringing new ideas into use. p. 484
Ibarra, 1993	technical innovation	Category variable that describes the level of the individual's involvement on five stages of bringing new ideas into use. p. 484
Mehra, Kilduff & Brass, 2001	performance	Supervisors evaluated subordinates' performance on a five-point scale on 6 items: (1) the overall job performance; (2) the likelihood that the subordinate would achieve future career related success; (3) the likelihood that you would pick the subordinate to succeed you in your job; (4) the degree to which the subordinate generated creative work-related ideas; (5) the degree to which the subordinate promoted and championed work-related ideas to others; and (6) the degree to which the subordinate searched out new technologies processes, techniques, and/or product related ideas. p. 132.
Metz & Tharenou, 2001	performance assessment	The mean of two 7-point items, corresponding to the performance ratings categories used by three large banks; respondents were asked to provide the last two assessments they were given. p. 323
Morrison, 2002	task mastery	7 items: (1) I have learned how to successfully perform my job in an efficient manner; (2) I have mastered the required tasks of my job; (3) I have not fully developed the appropriate skills and abilities to successfully perform my job (reverse coded); (4) I am confident about the adequacy of my job skills and abilities; (5) I feel competent conducting my job assignments; (6) It seems to take me longer than planned to complete my job assignments (reverse coded); (7) I rarely make mistakes when conducting my job assignments. 1-3 on p.1153. 4-7 from Morrison, 1992, JAP
Pappas & Wooldbridge, 2007	divergent strategic activity (champion, facilitate)	Each respondent rated two or three of their peers on 20 Likert-type items developed by Floyd & Wooldbridge (1992, 1996, 1997) to assess how frequently middle managers performed various strategic activities. p. 330
Rodan, 2010	job performance	2 senior managers rated the managers' performance on 4 items: (1) Overall, to what extent is the manager performing his/her job the way you would like it to be performed; (2) To what extent has she/he met your expectation in his/her roles and responsibilities?; (3) If you had your way, to what extent would you change the manner in which he/she is doing the job?; (4) To what

		extent are you satisfied with the total contribution made by this person?. p. 173, 174
Rodan, 2010	managerial innovativeness	2 senior managers rated the managers' innovativeness on 2 items: (1) To what extent is this person particularly creative: someone able to come up with novel and useful ideas?; (2) To what extent is this person good at implementing novel ideas? p. 173-174
Seiber et al., 2015	citation count	Citation count for the focal professors' publications from 1995 to 2002 using Thomson Reuter's Institute for Scientific Information. p. 12
Seiber et al., 2015	number of first-tier publications	Count of the number of publications in journals with average scores at or above the 1.0. p.12
Seiber et al., 2015	number of second-tier publications	Count of the number of publications in journals with average scores between .50 and .99. p.12
Seiber et al., 2015	number of third-tier publications	Count of the number of publications in journals with average scores below .50. p. 12
Sparrowe, Liden & Kraimer, 2001	in-role performance	Performance on required duties and responsibilities, assessed by group leaders with Williams and Anderson's (1991) 7-item scale. p. 320
Sparrowe, Liden & Kraimer, 2001	extra-role performance	Performance on discretionary behaviors that go beyond the formal job description, assessed by group leaders with the 6-item altruism scale by Smith, Organ & Near (1983) and 1 item from Podsakoff, MacKenzie
Tortoriello & Krackhardt, 2010	patents	Moorman & Fetter (1990) - "This employee willingly gives his/her time to help others who have been absent. p. 320 The number of patents filed by individuals in the sample. p. 17.
Dahlander & Frederiksen, 2012	innovative	5 judges ranked each respondent on the degree of their innovative contributions (0=not innovative; 1=innovative; 2=very innovative); I use only the dichotomous variable which is 0 for not innovative and 1 for innovative and very innovative as the inter-rater reliability is higher compared to the categories ranking. p. 994-995
Madjar, Oldham & Pratt, 2002	creative performance	Oldham & Cummings's (1996) three items: (1) How creative is this person's work? (2) How original and practical is this person's work?; (3) How adaptive and practical is this person's work? p. 761
Mueller & Kamdar, 2011	creativity	Oldham & Cummings's (1996) three items: (1) How creative is this person's work? (2) How original and practical is this person's work?; (3) How adaptive and practical is this person's work? p. 268
Ross, 2011	number of patents	The number of patents the focal inventor is involved in. p. 596
Ross, 2011	forward patent citation	The number of citations that inventor's patents, invented after the survey, received from subsequent inventions. p. 593
Carnabuci & Dioszegi, 2015	innovative performance	Measured through the Role-Based Performance Scale innovation subsection with 4 items: "Coming up with good ideas", "Working to implement new ideas", "Finding improved ways to do things", and "Creating better processes and routines". The response was on a five-point Likert scale from 1=needs much improvement to 5 - excellent. p. 888

APPENDIX D: Influence Diagnostics



APPENDIX E: CODING FORM FOR META-ANALYSIS ON SOCIAL CAPITAL AND PERFORMANCE

General Study Information

Bibliographic reference:
Study ID Number [STUDID]:
Publication Year [PUBYEAR]:
Publication Outlet [OUTLET]:

Theoretical Moderators

Social Resource Theory [SRT]:
1. resources embedded in a network
2. resources from contacts
3. theory not tested
Social Resource Description [SRDESCR]:
Industry [INDUSTRY]:
Organizational age [ORGAGE]:
1. Less than 10 years 2. More than 10 years 3. Unknown
Organization size [ORGSIZE]:
1. 1-100 employees 2. 101-500 employees 3. 500-1000 employees
4. More than 1000 employees 5. Unknown
Organizational structure [ORGSTRUCT]:
1. Hierarchical 2. Flat 3. Dispersed 4. Unknown
Functional area [FUNAREA]:
1. Technical 2. Administrative 3. Mixed 4. Unknown
Culture [CULTURE]:
Motivation [MOTIV]:
1. Instrumental commitment 2. Normative commitment
3. Both commitments 4. Unknown
Goals [GOALS]:
1. Collective 2. Individual 3. Unknown
Contingency of goals [GOALCONT]:
1. Contingent 2. Not contingent 3. Unknown

Social Network Method Moderators

Network features examined [NETFEAT]:
1. Whole network 2. Ego-network
Number of networks examined [NETNUM]:
Network type examined [NETTYPE]:
1. Friendship tie 2. Advice tie 3. Work tie
4. Support tie 5. Information tie 6. Co-membership tie
7. Resource tie 8. Adversarial tie 9. Social tie
Network locus [NETLOC]:
1. Internal 2. External, within the organization
3. External, outside the organization 4. Mixed

Methodological Moderators	
Dependent variable measured as perception: 0. no 1. yes	
Sample location [SAMPLELOC]: unknown 1. U.S. 2. Europe 3. Asia 4. other	
Sample size [N]:	
Sample type [SAMPLETYPE]: 1. MBA students 2. Employees 3. Managers 4. Executives 5. Entrepreneurs	
Type of model [MODELTYPE]: 1. Static 2. Dynamic	
Data set [DATASET]: 0. not unique 1. unique	
Data type [DATATYPE]: 1. Primary 2. Secondary 3. Both	
Type of research [RESEARCHTYPE]: 1. cross-sectional 2. longitudinal	
Level of analysis [LEVANALYSIS]: 1. individual 2. dyad 3. team 4. organization	
Unit of analysis [UNITANALYSIS]: 1. individual 2. dyad 3. team 4. other	
Time period covered [PERIOD]: 1. up to 6 months 2. 6-12 months 3. more than 12 months 4. more than 24 months	
Controls	
Mean age [MEANAGE]:	
Gender [GENDER]: (% male) 1. <10% male 2. 10-40% male 3. 40-60% male 4. 60-90% male 5. >90% male 6. Unknown	
Race [RACE]: 1. > 60% White 2. > 60% Black 3. > 60% Hispanic 4. > 60% Other Minority 5. Mixed (none, more than > 60%) 6. Mixed, but can't estimate proportion 7. Unknown	

Independent and dependent variable categorization

Independent variables tested and input descriptor [INDES]:

1. Bridging Structure [BRNET]:
2. Bridging Relations [BRREL]:
3. Bonding Structure [BONNET]:

4. Bonding Relations [BONREL]:
 Scale of independent variable [INDSCA]:
 1. Continuous 2. Categorical
 3. Dichotomous 4. Scale

Dependent variables tested and outcome descriptor [OUTDES]:
 1. Performance [PERFORM]: _____ DSCA _____ α _____
 Scale of independent variable [DSCA]:
 1. Continuous 2. Categorical
 4. Dichotomous 4. Scale

Effect Size Information

Page number of effect size [PAGENUM]: p.
 Relation tested: ... → ...
 Correlation coefficient [CORR]:
 Beta coefficient [BETA]: S.e. [SE]:
 T-Value [T]:

Relation tested: ... → ...
 Correlation coefficient [CORR]:
 Beta coefficient [BETA]: S.e. [SE]:
 T-Value [T]:

Relation tested: ... → ...
 Correlation coefficient [CORR]:
 Beta coefficient [BETA]: S.e. [SE]:
 T-Value [T]:

APPENDIX F: Main Effects of Social Capital Sources on Other Individual

Achievements

	SNum	k	N	$\bar{r}$	WSD (r)	95% CI ($\bar{r}$)	Q	P ²
Status								
BridgingS	2	7	899	.23	.18	.09: .38	28.82***	79.18%
BridgingR	2	3	1120	.29	.12	.08: .50	16.64***	87.98%
BondingS	5	18	2183	.20	.35	.06: .33	135.22***	87.43%
BondingR	3	12	1616	.01	.16	-.08: .11	39.10***	71.87%
Promotion								
BridgingS	4	12	16937	.16	.07	.10: .21	84.44***	86.97%
BridgingR	7	16	17036	.06	.06	.02: .10	70.51***	78.73%
BondingS	4	13	5233	.02	.18	-.10: .14	171.10***	92.99%
BondingR	6	15	30788	.04	.04	.01: .07	42.47***	67.04%
Salary								
BridgingS	4	12	5073	.07	.15	-.02: .16	112.03***	90.18%
BridgingR	10	20	8814	.16	.21	.05: .26	387.75***	95.10%
BondingS	6	17	11974	-.17	.21	-.28: -.06	543.35***	97.06%
BondingR	8	18	40360	.06	.19	-.04: .16	1413.00***	98.80%
Rank								
BridgingS	14	24	2649	.25	.21	.16: .34	107.91***	78.69%
BridgingR	12	23	4023	.24	.18	.16: .32	126.32***	82.58%
BondingS	14	28	5117	.14	.34	.01: .27	567.35***	95.24%
BondingR	8	11	958	.14	.14	.05: .23	17.75*	43.66%
Power								
BridgingS	6	29	4433	.27	.19	.19 : .34	159.26***	82.42%
BridgingR	6	11	1532	.48	.19	.35 : .60	53.56***	81.33%
BondingS	5	19	2480	.24	.20	.15 : .33	98.04***	81.64%
BondingR	4	4	779	.26	.01	.14 : .39	7.39*	45.87%

Titre : Capital social: Stratégies et éventualités

Mots clés : capital social, méta-analyse, performance au travail, stratégies de réseau.

Résumé: La thèse se compose de trois essais, abordant chacun la dichotomie entre la liaison et l'adhérence à partir d'un angle théorique différent. Dans le premier essai, je pose la question *Comment Lier et Comment Adhérer* et je propose un nouveau cadre théorique pour analyser le capital social, qui déconstruit sa principale fonction au-delà de la liaison ou de l'adhérence dans sa substance comme les relations sociales par rapport à la position dans la structure du réseau. Compte tenu de ces deux dimensions de l'analyse des réseaux sociaux, je propose quatre sources distinctes du capital social qui ont une valeur prédictive différente pour les réalisations individuelles - le réseau de liaison, les relations de liaison, le réseau d'adhérence et les relations d'adhérence - et j'examine leur valeur à la performance individuelle. La question du plomb dans le deuxième essai de ma thèse est *Quand faut-il lier et Quand faut-il adhérer?* Rejoignant la recherche sur la valeur éventuelle du capital social, je cherche comment l'organisation et les facteurs liés à l'emploi modèrent la relation entre chaque source de capital social à la performance et théorisent sur les stratégies que les individus devraient poursuivre afin d'obtenir de meilleures performances. Dans le troisième essai, je pose la question *Sur Quelle Source devrais-je me fonder ?* J'examine la puissance individuelle de chaque source de capital social et de la complémentarité entre les quatre d'entre eux. Je démontre que, bien que toutes les sources de capital social doivent avoir un impact positif sur la performance, certains d'entre eux pourraient supprimer le déploiement des autres formes.

Title : Should I Bridge or Should I Bond? Social Capital Strategies and Contingencies

Keywords: social capital, meta analysis, job performance, network strategies

Abstract: My dissertation expands the line of inquiry of the contingent value of social capital to individual performance by raising three novel questions. In the first essay of my dissertation I focus on *“How to bridge and how to bond”* and propose a new theoretical framework for analyzing social capital, which deconstructs its major function beyond bridging or bonding into its substance as social relations versus position in network structure. Considering these two dimensions of social network analysis I propose four distinct sources of social capital that have different predictive value for individual achievements: bridging network, bridging relations, bonding network and bonding relations. The lead question in the second chapter of my dissertation is *“When to bridge and when to bond”*. Joining the research on the contingent value of social capital, I look at organization and individual level factors to predict the value of each social capital source to performance and theorize about the strategies individuals should pursue in order to achieve better performance. In the third essay I ask *“Should one start with bridging or with bonding?”* Building on the categorization proposed in the first chapter I investigate the most successful social capital path to on-the-job performance.