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# Nurses' Workplace Social Capital: Development and Validation of a Self-report Questionnaire

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## Abstract

**Background:** Social capital refers to resources created by and embedded in social relationships and has been identified as an important aspect of nurses' work life. There is limited empirical evidence regarding its role and currently no valid and reliable self-report instruments to measure workplace social capital comprehensively.

**Purpose:** This study aimed to develop and test a self-report questionnaire to measure nurses' workplace social capital and examine the nomological network of the concept including authentic leadership and structural empowerment as precursors of social capital and team effectiveness and patient care quality as outcomes.

**Methods:** A cross-sectional survey of 1,000 Registered Nurses from Ontario was conducted. Eligible participants were mailed a letter of information, study questionnaire, and a return envelope, and a link to an online survey option. Non-responders received a reminder letter four weeks later and a second survey eight weeks later. Descriptive statistics were conducted using SPSS. Structural equation modeling in Mplus was used to test the new measure and the hypothesized model.

**Results:** The final measurement model for the questionnaire had an adequate fit:  $\chi^2(544) = 1043.237$ ,  $p < .001$ ; CFI = .882; TLI = .871; RMSEA = .063 (.057-.068); SRMR = .066. Item factor loadings were generally high ( $>.70$ ) but ranged from .36 to .94. Reliability estimates were high overall. The hypothesized model had an acceptable fit:  $\chi^2(219) = 420.617$ ,  $p < .001$ ; CFI = .923; TLI = .911; RMSEA = .066 (.056-.075); SRMR = .072. Adding a direct path between social capital and quality of care improved the model fit:  $\chi^2(218) = 405.884$ ,  $p < .001$ ; CFI = .928; TLI = .916; RMSEA = .063 (.054-.073); SRMR = .067. All hypothesized relationships were significant except for the direct path between authentic leadership and social capital.

**Conclusions:** Findings provide initial support for the new measure of nurses' workplace social capital. Authentic leaders play an integral role in cultivating nurses' workplace social capital by establishing empowering working conditions that promote positive relationships and cooperation, creating value for nurses, patients, and organizations.

**Keywords**

Nursing, authentic leadership, structural empowerment, workplace social capital, team effectiveness, patient care quality, questionnaire development

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“There is nothing like looking, if you want to find something. You certainly usually find something, if you look, but it is not always quite the something you were after.”  
— J.R.R. Tolkien

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## **Chapter 1: Introduction**

### **1.1 Introduction**

Work relationships play a key role in today's healthcare organizations. Recent reports have identified benefits of collaborative, interprofessional healthcare teams including high-quality patient-centered care and improved efficiency by reducing redundancy (Canadian Interprofessional Health Collaborative, 2010; Hall, 2005; Health Force Ontario, 2010). Difficult interpersonal relationships can result in conflict and incivility, making teams less effective (Hall, 2005). Positive relationships at work, on the other hand, create social resources (social capital) and foster cooperation and teamwork that may improve team performance, patient care, and provider satisfaction but have received far less attention in the literature.

Social capital, which refers to resources created by and embedded in social relationships, has been identified by healthcare leaders as an important resource that is instrumental to the success of healthcare organizations (DiCicco-Bloom et al., 2007; Hofmeyer, 2003). Yet, there is limited research about social capital in healthcare. Furthermore, studies conducted to date have used a wide variety of social capital theories, making it difficult to compare findings and fully understand the role of social capital in healthcare work environments.

Nahapiet and Ghoshal's (1998) theory of social capital in organizations provides a framework for understanding workplace social capital in healthcare. This theory has been used to examine the structural, relational, and cognitive aspects of social capital proposed by Nahapiet and Ghoshal (1998) in the management and organizational literature (Gianvito, 2007; O'Shea, 2003; Tsai & Ghoshal, 1998), as well as in nursing and healthcare (Ernstman et al., 2010; Hsu et al., 2011; Lee, 2013). Yet, despite the

recognition that social capital is an important part of organizational life that can be examined using this theoretical approach, there is not a comprehensive valid and reliable measure based on Nahapiet and Ghoshal's (1998) theory.

This research aimed to address the need for a self-report measure of workplace social capital and advance our understanding of the role of workplace social capital in nursing. This was accomplished by developing and testing a new self-report questionnaire to assess nurses' workplace social capital at work and examining the nomological network of the concept.

## **1.2 Background**

Registered nurses (RNs) are a valuable health human resource who contribute to high-quality patient care (Aiken, Clarke, & Sloane, 2002). Canada is currently facing an estimated shortfall of 60,000 full-time RNs by 2020 due to an aging workforce and increasing healthcare demands as the population ages (Tomblin-Murphy et al., 2012). Given these challenges, retaining highly qualified nurses is an important goal for hospital organizations in order to provide high-quality patient care and prevent negative consequences of employee turnover such as lost productivity and associated economic costs (Hayes et al., 2012).

In recent years, it has become evident that the work environment is influential in determining how nurses experience their work (Aiken et al., 2013; Djukic et al., 2013) including the level of care they feel they are able to provide to patients (You et al., 2013). In particular, research based on Kanter's (1977; 1993) theory of structural empowerment has demonstrated that the structure of the work environment greatly contributes to how

nurses experience their work (Laschinger, 2008; Laschinger, Finegan, & Shamian, 2001; Laschinger, Finegan, & Wilk, 2011) and influences patient care quality (Aiken et al., 2012; Laschinger, 2008; You et al., 2013). By providing nurses with access to the information, resources, and support they need to accomplish their work, as well as opportunities to develop and grow, nurse managers empower nurses to provide high-quality patient care (Laschinger, 2008; Lu, Barriball, Zhang, & While, 2012; Manojlovich & Laschinger, 2002). Relational leadership styles, such as authentic leadership, that focus on building high-quality, trusting relationships using emotional intelligence and self-awareness have been associated with structurally empowering workplaces (Laschinger, Wong, & Grau, 2012; Laschinger & Smith, 2013; Wong & Laschinger, 2013), and have been shown to influence nurses' work outcomes (Wong & Laschinger, 2013; Giallonardo et al., 2010) and patient care quality (Wong, Laschinger, & Cummings, 2010). Overall, evidence suggests that authentic leaders play an instrumental role in creating structurally empowering work environments and that relationships between nurse managers and their staff are vitally important for positive patient outcomes.

Relationships between staff nurses have received less attention in the literature than leader-follower relationships and have often focused on negative experiences such as co-worker incivility and bullying (Laschinger et al., 2013; Wilson, Diedrich, Phelps, & Choi, 2011). While these negative phenomena are important and need to be prevented, there is also a need to examine positive relationships at work to understand how to create healthy, vibrant workplaces where nurses, patients, and organizations can thrive. This shift in thinking about workplace relationships has resulted in the emergence of positive

organizational scholarship and positive relationships at work as valuable new fields of study in organizational and management research (Cameron, Dutton, & Quinn, 2003; Dutton & Ragins, 2007). Applying this positive lens to understanding nurses' relationships at work may provide new knowledge about how to create healthy work environments that promote positive outcomes for nurses, patients, and healthcare organizations.

### **1.3 Problem Statement**

Although some studies have examined workplace social capital in healthcare and other industries using Nahapiet and Ghoshal's (1998) theoretical framework, measurement approaches have been inconsistent. After reviewing the literature it became evident that a valid and reliable self-report questionnaire to assess workplace social capital from this multi-dimensional framework was needed to advance research in this area. Nurse leaders have speculated that social capital is an important form of capital that adds value to healthcare organizations (DiCicco-Bloom et al., 2007; Hofmeyer, 2003) and initial evidence suggests that relational social capital may be an influential aspect of nurses' work life that influences work outcomes such as unit effectiveness in providing timely patient care (Laschinger, Read, Finegan, & Wilk, 2014). However, current knowledge regarding the role of nurses' workplace social capital is limited, in part because it is difficult to measure without a valid and reliable instrument. This study addresses these needs by first developing and testing a new measure of nurses' workplace social capital and then testing a hypothesized model that includes precursors (authentic



leadership and structural empowerment) and outcomes (team effectiveness and patient care quality) in the nomological network of the concept.

#### **1.4 Study Purpose**

The purpose of this study was to develop and test a new self-report questionnaire to measure nurses' workplace social capital and examine the nomological network of social capital by testing a theoretical model that integrates Avolio and Gardner's (2005) theory of authentic leadership, Kanter's (1977, 1993) theory of structural empowerment, and Nahapiet and Ghoshal's (1998) theory of social capital within organizations.

Specifically, this model examined the influence of authentic leadership and empowerment on workplace social capital, and the subsequent effects of workplace social capital on team effectiveness and nurse-assessed patient care quality.

#### **1.5 Significance**

Results from this study improve our understanding of social capital within healthcare organizations and advance research in the field by providing researchers with a validated instrument that can be used in future studies. The study findings illuminate the effects authentic leadership and structural empowerment have on nurses' social capital at work and how social capital, in turn, influences team effectiveness and patient care quality in acute care hospital settings. These results provide nurse leaders with theory-based evidence to support strategies that build nurses' workplace social capital by fostering the development of positive social relationships in the workplace.

## **1.6 Summary**

Workplace social capital has been identified as an important aspect of employees' work life in many types of organizations, including hospitals. Yet, there is currently limited research about social capital in nursing and healthcare, which may be related to the lack of valid and reliable instruments to measure it. The intent of this study was to develop and test a new self-report questionnaire to measure social capital based on Nahapiet and Ghoshal's (1998) theory and expand our understanding of the critical links between authentic leadership and structurally empowering work environments and nurses' social capital at work, as well as the effects that social capital has on the effectiveness of teams and the quality of care patients receive. Social capital theory and the proposed measurement model, as well as the hypothesized model between key precursors and outcomes of social capital are discussed in detail in the upcoming chapter.

## **Chapter 2: Theoretical Framework and Review of the Literature**

### **2.1 Introduction**

This chapter provides the theoretical foundation and empirical support from the literature for the development of a new questionnaire to measure workplace social capital in nursing and a hypothesized model to explore the nomological network of the concept. This literature review is organized into two parts. Part 1 focuses on the rationale and development of a conceptual framework for the new measure of nurses' workplace social capital. Nahapiet and Ghoshal's (1998) theory of social capital within organizations is introduced and instruments available to measure social capital using this theoretical perspective are examined. Current evidence about the role of social capital in healthcare work environments is reviewed and support for the proposed measurement model is provided. Part 2 presents a theoretical model of precursors and outcomes of nurses' workplace social capital to be tested. Gaps in current research are identified and the rationale for the theoretical model is provided.

### **2.2 Social Capital within Organizations (Part 1)**

The concept of social capital broadly refers to resources embedded within social relationships and is built upon the notion that the relationships we have with other people are resources in and of themselves and provide us with access to resources through sharing and social exchange (Castiglione et al., 2008). In contrast to physical capital which refers to machines, equipment, or space, economic capital (money and assets), and human capital (reflected by education, knowledge, training, and/or experience), social capital is embedded in social relationships between individuals (Bolino, Turnley, &

Bloodgood, 2002). This study focused on workplace social capital, which specifically refers to the social resources embedded in the social fabric of workplace organizations.

For this study Nahapiet and Ghoshal's (1998) definition of social capital is adopted; that is, social capital is "the sum of the actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit" (p. 243). By combining social network and resource-based theories of social capital, Nahapiet and Ghoshal (1998) developed a comprehensive model of social capital within organizations consisting of three interrelated components: 1) structural social capital, which refers to the overall pattern of connections between actors, 2) relational social capital, describing the nature of the relationships that people have with one another and which guide social interactions between group members, and 3) cognitive social capital, which refers to the shared meanings that are created and sustained within a group. The authors proposed that increased social capital within organizations leads to greater exchange and combination of ideas among employees, ultimately creating more intellectual capital and providing a competitive advantage for the company (Nahapiet & Ghoshal, 1998).

According to Nahapiet and Ghoshal (1998), the most important aspects of structural social capital are the existence or absence of network ties between individuals and the overall configuration of the social network, consisting of density, connectivity, hierarchy, and appropriability (transferability). Network density, connectivity, and hierarchy are different ways to think about the pattern of social relationships within a network, while appropriability refers to the degree to which social relationships can be

leveraged for cross purposes (e.g., co-workers who develop a friendship may exchange gifts or information unrelated to work). As will be discussed in more detail, network ties are fundamental to understanding social capital and there is evidence that close and sparse networks have different advantages (Adler & Kwon, 2000; Burt, 1992).

Drawing on Granovetter's (1973) discussion of relational embeddedness (which describes the nature of relationships people develop with one another over time), relational social capital encompasses respect and friendship, personal attachment, trust and trustworthiness, norms and sanctions, obligations and expectations, and identity and identification (Nahapiet & Ghoshal, 1998). In other words, relational social capital concerns the nature or quality of social relationships between people. Many researchers have focused on this component of social capital, with trust (defined and measured in a variety of ways) being the dominant construct used to represent relational social capital in the literature. For instance, all of the instruments that will be reviewed included trust. This is not entirely surprising because trust is an important and popular construct that has been shown to influence employee and organizational outcomes.

Research outside of the social capital literature supports the importance of each of the aspects of relational social capital named by Nahapiet and Ghoshal (1998) within organizational life. For example, the concepts of identity (one's perception of self) and social identification (one's perception of oneness or belonging with a group) are fundamental to our broader understanding of human and organizational behaviour (Albert, Ashford, & Dutton, 2000; Ashforth & Mael, 1989) and have also been explored as a component of relational social capital (Gianvito, 2007). Baker and Dutton (2007)

have proposed that other concepts such as reciprocity and high-quality connections are important forms of social capital that reflect high-quality relationships. Overall, there is little agreement about how best to conceptualize and measure relational social capital but it has been established that the quality of social relationships at work is a vital part of the work life of employees that influences performance, retention, and organizational success (Baker & Dutton, 2007; Carmeli, Ben-Hador, Waldman, & Rupp, 2009; Dutton & Heaphy, 2003; Dutton & Ragins, 2007).

Finally, cognitive social capital was conceptualized by Nahapiet and Ghoshal (1998) as shared representations, interpretations, and meanings among employees, including shared language and codes, and shared narratives. Underlying this conceptualization is the idea that the language people use and the understandings they share are influenced by the social context in which they occur. Cognitive social capital also provides a medium for social exchange and facilitates social exchange with similar others, while making it more difficult when differences are present (Nahapiet & Ghoshal, 1998). In the past cognitive social capital has been conceptualized as shared vision (the collective goals and aspirations of an organization) by Tsai and Ghoshal (1998), shared rhetoric (people at work use similar words and phrases to communicate) by O'Shea (2003), and shared language (people at work use similar words and phrases to communicate) and shared interpretations (people at work interpret events and happenings similarly) (Gianvito, 2007). While cognitive social capital has received less attention than structural and relational social capital, it has been associated with higher levels of creativity and affective team commitment (O'Shea, 2003) as well as enhanced task

performance and organizational commitment and lower turnover intentions (Gianvito, 2007).

### **2.2.1 Workplace social capital in nursing.**

Workplace social capital is emerging as an important concept in nursing research and knowledge development (Hofmeyer, 2003). For the most part, social capital research in healthcare has focused on population health to understand how social relationships influence health outcomes (Rose, 2000; Snelgrove, Pikhart, & Stafford, 2009) and mortality rates (Holt-Lunstad, Smith, & Layton, 2010). Only recently have researchers begun to examine this important aspect of organizational life among nurses. Although work in this area is new, several authors highlight the potential benefits of nurses' social capital within healthcare organizations. These include improved patient care and patient safety, increased economic capital, a happier, more productive nursing workforce, and improved nurse retention (Hofmeyer & Marck 2008; DiCicco-Bloom et al., 2007).

Empirically, social capital has been positively associated with higher levels of organizational commitment, (Hsu, Chang, Huang, & Chiang, 2010), relational coordination (Lee, 2013), patient safety risk management behaviours (Ernstmann et al., 2009), and job satisfaction among hospital nurses (Huang, Tsai, & Wang, 2012), while being negatively associated with burnout (Kowalski et al., 2010). More recently, Laschinger, Read, Wilk, and Finegan (2014) found that structural empowerment at the unit-level led to higher levels of relational social capital, which in turn led to higher unit effectiveness and perceptions of patient care quality. Read and Laschinger (2015) also showed that authentic leadership and structural empowerment led to higher levels of

relational social capital among new graduate nurses, which in turn had positive effects on their mental health and job satisfaction.

These studies provide evidence that nurses' workplace social capital is a valuable resource for nurses within hospital organizations. These findings are promising but each of these studies used a different measure of social capital, and none of them fully reflect Nahapiet and Ghoshal's (1998) model of the concept, highlighting the need to develop a valid and reliable measure to further our understanding of the role and function of social capital in nurses' work life and be able to compare results across studies.

### **2.2.2 Social capital theory.**

By examining both the structure and content of social relationships at work, Nahapiet and Ghoshal (1998) provided a comprehensive theory of social capital that combines elements of social network theory, which is primarily interested in examining how people are connected to one another in social groups, and the resource-based view of the firm, which holds that organizational success is contingent upon acquiring unique resources (including economic, human, and social capital) that provide advantages over competitors (Barney, 1991). Nahapiet and Ghoshal's (1998) theory recognizes that positive social relationships are valuable, difficult to transfer or imitate, and provide value to customers, employees, and organizations (Bolino, 2002; Nahapiet & Ghoshal, 1998). It is these relationships that grease the wheels that help employees work together, leading to increased exchange and combination of ideas, and ultimately, providing organizations with competitive advantage. The aim of this section is to provide an overview of the



development of the concept of social capital within organizations and describe the main theoretical approaches in the literature.

### ***2.2.2.1 Origins of the concept.***

Modern scholarship on social capital developed out of the work of three key scholars in sociology and political science: Bourdieu, Coleman, and Putnam (Castiglione et al. 2008). Bourdieu (1979) examined social capital from a critical paradigm focusing on social class. From this vantage point, social capital is the sum of actual or potential resources accessible exclusively to individuals belonging to the wealthy elite or upper classes of society. Coleman (1988) viewed social capital as a group resource that was not exclusive to the elite. This makes sense considering the majority of us belong to the non-elite classes of society. There is also a strong body of evidence that human brains are hard-wired to be social (Leiberman, 2013), which supports Coleman's (1988) view that social relationships are important to all of us, regardless of one's station in life or circumstances. Coleman also proposed that social capital has productive capacity because it creates outcomes that otherwise would not be achievable (Coleman, 1988). Finally, Putnam (1993) used social capital to better understand civic engagement in Italy. Social capital in Putnam's work referred to characteristics of social organization such as trust, social norms, and network structure that facilitate social coordination, thus leading to increased efficiency.

Since the work of Bourdieu, Coleman, and Putnam, researchers have studied social capital and developed new theoretical perspectives to explain the phenomenon and its role in a vast array of situations including workplace organizations. The diversity of

views on social capital has made it difficult, if not impossible, to articulate one clear, undisputed meaning of social capital that is relevant to all contexts (Castiglione et al., 2008) but they all centre on the core idea that social relationships are valuable assets that provide access to other forms of capital. In the management literature, two main theoretical vantage points have been taken: (1) the social network theory perspective, which focuses primarily on how social relationships are organized (i.e., who knows who) and (2) the resource-based theory perspective which is primarily concerned with the characteristics of social relationships and social exchange (i.e., what is the nature of those relationships).

#### ***2.2.2.2 Social network theory.***

Social network theory has proven to be a useful way to understand social dynamics within the workplace. Kilduff and Brass (2010) point out four core ideas that characterize this area of research. These include (1) social relations, whereby individuals (also referred to as actors or nodes) have connections/ties with others (or not) which create a social structure, (2) embeddedness, the extent to which actors are involved or prefer to interact within a particular social network, (3) structural patterning, which refers to the configuration or clustering of actors within a group, and (4) utility, the idea that social relationships have consequences.

In contrast to work on social capital specifically, social network research is concerned more globally with workplace relations and their functions. Yet, it makes little sense to examine social capital without considering the social network within which it is embedded. Nahapiet and Ghoshal (1998) recognized that network structures are an

important aspect of social capital, thus social network theory underpins the structural aspect of social capital in their three-dimensional framework. Structural social capital captures the idea that actors hold different social locations within workplace social networks that influence the creation and access to resources at work. It is important to note that Nahapiet and Ghoshal (1998) distinguished the structure of social relationships from their content (i.e., relational and cognitive social capital).

### ***2.2.2.3 Network ties.***

One of the key tenants of social capital theory is that network ties provide a means for social resource exchange (Nahapiet & Ghoshal, 1998). Network ties refer to connections or relationships between two people in a social network (Adler & Kwon, 2002). Both the structure and content of network ties have been explored in wide range of ways including tie type, content, number (network size), density, centrality, strength, and status. For example, ties can be categorized as being formal (due to formal position within the organization) or informal (mutually chosen by actors for other reasons such as personal liking or shared interests). They can be direct ties (when two people know each other) or indirect ties (when two people share a common direct tie to a third person) (Podolny & Baron, 1997), internal (within one's organization or work group) or external (outside one's organization or work group) (Adler & Kwon, 2002).

Podolny and Baron (1997) also provided a typology of tie content, recognizing that different ties provide different content or resources and thus have different functions. Possible functions include task-advice, buy-in, strategic information, mentorship, and social support. Tie strength has been defined as a combination of time spent, emotional

intensity, intimacy (mutual confiding), and reciprocity between two people (Granovetter, 1973), and can be categorized as being weak, strong, or absent. Other work has focused on the influence of network size, diversity (range), centrality, density, and status (Marsden, 2002).

The terms bonding, bridging, and linking social capital have also been used to describe social capital derived from different types of ties between actors (Tucker & Woolcock, 2004). Bonding social capital (Adler & Kwon, 2002) refers to the social exchange of resources through homogeneous intragroup social ties such as those within the family and household structure, neighborhood social structure, neighborhood participation, and homogeneous social networks (e.g., a nurse with a tie to another nurse) (Woolcock & Narayan, 2000). Bridging social capital refers to intergroup social ties with heterogeneous others (e.g., having a friend from a neighborhood with a different socioeconomic status) (Woolcock & Narayan, 2000). Finally, linking social capital is used to describe social connections with people of power and influence (Woolcock & Narayan, 2000). In sum, it is clear that both the structure and content of network ties are important and that researchers have used diverse approaches to understand this aspect of social capital.

#### ***2.2.2.4 Resource-based theory.***

Barney (1991) described three types of resources that provide organizations with a competitive advantage over others: physical capital (equipment, space, technology, etc.), human capital (training, knowledge, experience, relationships, intelligence, etc. of individual workers), and organizational capital (the organization's systems of operation

and control, informal relations among groups within the firm and externally). One of the main tenants of Barney's (1991) theory is that when organizations have resources that are valuable, rare, imperfectly imitable, and non-substitutable they have the upper hand over competing organizations that do not have access to their particular bundle of resources.

Although social capital was not identified as a separate set of organizational resources by Barney (1991), he did identify that socially complex resources such as interpersonal relationships between managers, the firm's reputation, and organizational culture are resources that are valuable, rare, difficult to imitate, and cannot be substituted for exactly. Nahapiet and Ghoshal (1998) advanced this idea by theorizing that workplace social capital, that is, an organization's resources embedded within social relationships between employees, may provide organizations with a competitive advantage over others by leading to unique intellectual capital and innovation.

The resource-based perspective of social capital parallels Bourdieu's (1979) idea that social capital provides individuals with unfair advantages over others except that here, organizations, rather than individuals, serve to gain advantage. In addition, the resource-based view suggests that workplace social capital leads to increased efficiency and effectiveness and productive capacity within the firm, which creates the advantage in the first place. These ideas are consistent with the idea that social capital is a catalyst that allows people to achieve more together than alone (Coleman, 1988), and that it enhances cooperation through positive group norms, trust, and social engagement (Putnam, 1993).

### **2.2.3 Summary**

This review of the literature provided an overview of the development of the concept of workplace social capital within organizations and described theoretical approaches used in past research. Past studies show that social capital is an important organizational resource because when employees know, understand, and trust one another they work together more effectively and efficiently, providing competitive advantage for organizations. Nahapiet and Ghoshal's (1998) theory of social capital presents a useful way to think about social resources created by and available to staff nurses working in hospitals. Evidence to date suggests that social capital may be a valuable interpersonal resource for nurses that promotes positive outcomes for nurses, patients, and organizations.

### **2.3 Measurement of Workplace Social Capital**

This section provides a description and analysis of measures of social capital that have been reported in the literature based on Nahapiet and Ghoshal's (1998) theory (see Table 1 for summary). In order to assist with assessment of these measures, a brief description of reliability and validity, along with assessment criteria is provided. Next, each measure of social capital is examined. Strengths and limitations of each measure are identified.

#### **2.3.1 Reliability.**

Reliability refers to the consistency of a measure (DeVellis, 2012; Polit & Beck, 2012). Item reliability is assessed by examining the factor loadings between indicators and their respective latent factors. Factor loadings  $>.70$  are desirable (Tabachnick &

Fidell, 2013; Worthington & Whittaker, 2006). Internal consistency reflects the overall reliability of a set of items within a scale and is typically assessed using Cronbach's  $\alpha$  (all items equally weighted) (Cronbach, 1951) or composite reliability which accounts for the individual factor weights of each item (Raykov, 1997). It has been suggested that differences between Cronbach's  $\alpha$  and composite reliability are inconsequential, and that, therefore, both methods of reliability are interchangeable (Peterson & Kim, 2012). Reporting Cronbach's  $\alpha$  and/or composite reliability is generally accepted in the literature.

### **2.3.2 Validity.**

Validity is concerned with whether the variable in question is the cause of co-variation of items in a measure (DeVellis, 2012) and consists of several dimensions. *Face validity* is simply whether or not a measure makes sense (Pedhazur & Pedhazur-Schmelkin, 1991). *Content validity* refers to whether or not the items reflect the construct and can be assessed by examining the match between the content of each item and the definition of the construct they are purported to measure (DeVellis, 2012). *Construct validity* is concerned with the theoretical relationship between the variable at hand and other variables within its nomological network (Cronbach & Meehl, 1955; DeVellis, 2012; Polit & Beck, 2012). The nomological network refers to the theoretical framework identifying the focal constructs, the empirical framework operationalizing them, and the linkages between and among these constructs (Cronbach & Meehl, 1955). Assessment of convergent, discriminant, and criterion validity help determine construct validity (Cronbach & Meehl, 1955; DeVellis, 2012; Polit & Beck, 2012). *Convergent validity*

refers to the relatedness of different measures of the same or closely-related constructs whereas *discriminant validity* refers to the distinctiveness of measures of different constructs (Pedhazur & Pedhazur Schmelkin, 1991; Polit & Beck, 2012). Convergent validity can be assessed by evaluating the Average Variance Extracted (AVE) (>.50 is acceptable) which tells the researcher how much variance in the construct is explained by its items (Fornell & Larcker, 1981a, 1981b). Discriminant validity can be tested by examining latent factor correlations (i.e., the degree to which the latent constructs in the model are related) (Fornell & Larcker, 1981a, 1981b; Tabachnick & Fidell, 2013). Finally, *criterion validity* refers to whether or not the construct predicts outcomes as expected (DeVellis, 2012). For example, Nahapiet and Ghoshal (1998) proposed that high levels of social capital within organizations would lead to more opportunities for information exchange and combination, ultimately leading to increased intellectual capital and competitive advantage. Studies confirming these relationships would provide criterion validity.

### **2.3.3 Tsai and Ghoshal (1998).**

Tsai and Ghoshal (1998) were the first to conduct an empirical study based on the theoretical framework of organizational social capital proposed by Nahapiet and Ghoshal (1998). In their group-level study they surveyed directors and senior managers from 15 business units (total n = 45) of a large multi-national electronics company to test a model linking the structural, relational, and cognitive dimensions of social capital to one another and examine their influence on resource exchange and combination, and subsequent value creation (product innovations).



In this study Tsai and Ghoshal operationalized the three dimensions of social capital as social interaction (structural), trust and trustworthiness (relational), and shared vision (cognitive). Social interaction, defined as the centrality or relative importance of a unit within a social network, was measured using a sociomatrix of mutual ties in response to the following two questions: (1) "With people of which units do you spend the most time together in social occasions?" and (2) "Please indicate the units which maintain close social relationships with your unit" (Tsai & Ghoshal, 1998, p. 469). The data from each question was used to calculate a betweenness index at the business unit level using the formula suggested by Wasserman and Faust (1994, p. 190). The betweenness indices for the two questions had a correlation of .86 (Tsai & Ghoshal, 1998).

Trust, defined by the authors as the interunit trusting relationships in the company, was assessed using two questions developed by the researchers: (1) "Please indicate the units which you believe you can rely on without any fear that they will take advantage of you or your unit even if the opportunity arises" and (2) "In general, people from which of the following units will always keep the promises they make to you?" (Tsai & Ghoshal, 1998, p. 470). The responses to these two questions were used to create two relational matrixes and calculate degree centrality of the trust and trustworthiness of each business unit. The degree to which other business units trusted a unit (in-degree centrality) and the degree to which a business unit trusted other units (out-degree centrality) were both calculated to determine the trustworthiness and trust of each unit within the network of business units. Only trustworthiness was used in the model.

Finally, shared vision, defined as the collective goals and aspirations of an organizations' members, was measured using two items developed by the authors (1) "Our unit shares the same ambitions and vision with other units at work" and (2) "People in our unit are enthusiastic about pursuing the collective goals and missions of the whole organization" (Tsai & Ghoshal, 1998, p. 470). Items were ranked on a seven-point Likert scale from 1 = strongly disagree to 7 = strongly agree. Responses from the three participants in each unit were averaged to create a group score for each business unit. The authors did not conduct an assessment of inter-rater agreement which is recommended (Chan, 1998) to determine whether or not aggregation of individual data to the group level is appropriate. This additional analysis would have strengthened their measure by showing the agreement between the members of each business unit and providing rationale for their group-level measurement approach.

The authors reported acceptable convergent and discriminant validity of their measures. Confirmatory factor analysis (CFA) of the measurement model indicated an adequate fit between the data and the model ( $\chi^2(12)=6.13$ ,  $p=.91$ ; GFI=.91; NFI=.96). The coefficient estimates between each measure and its underlying construct were all significant ( $p < .05$ ) and cross-loadings were not significant, indicating that items were measuring what they were supposed to be measuring (construct validity).

Overall, the measures used by Tsai and Ghoshal (1998) were valid and reliable and were useful for measuring specific aspects of structural, relational, and cognitive social capital using a social network approach at the group level. There were also some limitations to consider. For example, these measures did not provide a comprehensive

assessment of each type of social capital, instead focusing on one particular element for each. Another consideration is that the questions for structural and relational social capital used by Tsai and Ghoshal (1998) measure group-level social capital rather than individual-level. All things considered, Tsai and Ghoshal's (1998) measurement approach is an interesting one that provided initial empirical support for Nahapiet and Ghoshal's (1998) theory of social capital at the group level but it is not amenable to measuring social capital from an individual perspective.

#### **2.3.4 O'Shea (2003).**

In his doctoral research study, O'Shea (2003) examined the effect of group-level social capital on affective team commitment and team creativity among employees in a pharmaceutical company. Based on the work of Tsai and Ghoshal (1998), O'Shea (2003) operationalized the three components of social capital as social interaction (structural), trust (relational), and shared rhetoric (cognitive). Social interaction was measured by asking participants to respond to the question: "Please rate the amount of social time that you spend with members of each of the project teams listed below" (O'Shea, 2003, p. 30). As in Tsai and Ghoshal's (1998) study, the responses were used to construct a sociomatrix and then calculate a betweenness index as a measure of network centrality at the group level. Trust was measured using a five-item intragroup trust scale (Simons & Peterson, 2000) rated on a seven-point Likert scale from 1 = Strongly Disagree to 7 = Strongly Agree (Cronbach's  $\alpha = .91$ ). Scoring procedures were not reported by the authors but the final score was aggregated to the group level.

O'Shea attempted to improve the assessment of cognitive social capital by operationalizing it as shared rhetoric instead of shared vision, used by Tsai and Ghoshal (1998). Shared rhetoric was measured using four new items developed by the author (O'Shea, 2003). Example items include: "I understand all of the technical language used by my project team" and "To communicate ideas, I use stories that my project teammates have experienced". Cronbach's  $\alpha$  for this new scale was .67. It is interesting to note that these items refer to the individual, though they are supposedly group-level constructs. It may have been more appropriate to have a group referent in this case (e.g. "*Team members* understand all of the technical language used by *our* project team"). As pointed out by Chan (1998), this highlights the need to clearly define and differentiate constructs at both the individual and group level before operationalizing them.

O'Shea (2003) did not assess the measurement model for each measure of social capital and item factor loadings were not reported. Considering that all of the items were different from those used by Tsai and Ghoshal (1998), assessing the reliability and validity of these measures before testing the relationships between study variables would have been desirable. Results supported a relationship between relational and cognitive social capital and affective team commitment, as well as between structural and cognitive social capital and team creativity, providing support for the criterion validity of this measure. Overall, O'Shea's (2003) findings provided some support for the use of these measures to assess specific aspects of social capital at the group level. As suggested, improvements to this measure could be made.

### **2.3.5 Leana and Pil (2006).**

Leana and Pil (2006) defined social capital as a higher-order group-level construct consisting of three factors: information sharing (structural), trust (relational), and shared vision (cognitive). In their study, elementary school teachers were asked to report about their school as a whole (rather than themselves) when responding to the questions. Interclass correlation coefficients (ICC), a measure of agreement between raters, were assessed before responses were averaged to create group-level scores for each school. As shown in Table 1, the proposed measurement model was supported, demonstrated acceptable internal consistency, and was found to predict student achievement. Therefore, the reliability and validity of this measure were supported.

This instrument has many strengths but there are two specific areas that limit its relevance to the present study. First, close reading of the items revealed that the wording of some questions could be improved. For example double-barrelled items that contain two questions (e.g., “Teachers engage in open and honest communication with one another”) should be avoided because they are ambiguous (Clark & Watson, 1995; Krosnick & Presser, 2010). In addition, simple language without adjectives and adverbs that place conditions on statements should be used (Clark & Watson, 1995; Krosnick & Presser, 2010). Some items in this questionnaire did not meet this requirement. For example, the item “Teachers enthusiastically pursue collective goals and mission” is conditional upon being enthusiastic and the item “Teachers in this school have no hidden agendas or issues) asks about two things (hidden agendas and issues) that may or may not coexist. Second, as with the other tools described above, each component of social capital

was operationalized using one construct which does not provide a comprehensive measure of workplace social capital.

### **2.3.6 Gianvito (2007).**

In her doctoral dissertation, Gianvito (2007) developed a comprehensive instrument to measure structural, relational, and cognitive social capital at the individual level based on Nahapiet and Ghoshal's (1998) theory. Participants were asked to list the initials of up to 12 important contacts in their workplace and then identify their top five. Respondents answered all questions five times, once for each contact. Gianvito (2007) used three measures of network structure: network size (total number of contacts listed), network strength (frequency of interaction), and network status (relative position of each contact within the formal organizational hierarchy). Relational social capital was operationalized as trust, liking, and identification. Cognitive social capital was operationalized as shared language and shared interpretations.

Data from two pilot studies and a field study of retail employees was used to conduct exploratory factor analysis (EFA) and develop the factor structure of the questionnaire. The final version of each subscale had high internal consistency and acceptable factor loadings were reported. Discriminant and criterion validity were supported in her study.

Of the instruments included in this review, Gianvito's (2007) tool was the most comprehensive representation of Nahapiet and Ghoshal's (1998) theory. In particular, her "contact" approach to measuring structural social capital captured important information about the configuration of workplace relationships that was not included in any of the

other questionnaires. This is a valuable approach but also increases participant burden by requiring participants to answer all of the questions multiple times. Despite this disadvantage, the questionnaire had strong reliability and validity and has also been successfully adapted to an outpatient clinic setting (Lee, 2013). In addition, it provides an individual level measure of social capital which allows the questionnaire to be administered to participants without having to conduct an organization-based study.

### **2.3.7 Hsu et al. (2010).**

Hsu et al. (2010) adapted items from Leana and Pil's (2006) study of teachers' social capital and examined individual-level social capital of hospital nurses (n= 797). They proposed a three-factor measurement model that included social interaction frequency (2 items) to represent structural social capital, trust (credibility and benevolence) (4 items) to represent relational social capital, and shared vision (collective goals and aspirations) (4 items) as cognitive social capital. Items were rated on a five-point Likert scale from 1 = strongly disagree to 5 = strongly agree. Example items were not provided by the authors.

Factor loadings and reliability coefficients were analyzed in SmartPLS and supported the internal reliability of the tool but the factor structure was not assessed. Positive prediction of organizational commitment supported the criterion validity of the instrument. The findings of this study provided empirical support for the reliability and validity of the instrument but the specific items adapted from Leana and Pil's (2006) study were not provided therefore the content validity cannot be assessed. In addition, PLS is unable to conduct CFA and does not provide model fit statistics. These measures

may provide valid and reliable tools to measure specific aspects of each of social capital but without the items it was difficult to fully assess them.

### **2.3.8 Lee (2013).**

Lee (2013) measured the influence of nurse and physician social capital on relational coordination in outpatient clinic settings in Ontario. Lee proposed a one-factor measurement model that included open communication (structural social capital), trust and liking (relational social capital), and shared language and interpretations (cognitive social capital). Four items from Contractor, Wasserman, and Faust (2006) were used to measure structural social capital, while three items were adapted from Gianvito (2007) for each of the remaining components. All 16 items were measured on a five-point Likert scale (1 = strongly disagree, 3 = neither agree nor disagree, and 5 = strongly agree). Two items with high cross-loadings on the relational coordination construct were removed from the scale following CFA resulting in a 14-item instrument. Statistically, the model had an acceptable fit with the data (Model fit:  $\chi^2(177) = 321.39$ ; CFI=0.911; TLI=0.894; RMSEA=0.10; SRMR=0.054). Factor loadings were acceptable and the scale had high internal consistency (see Table 1).

This instrument had several strengths but rather than proposing a hierarchical factor structure that aligns with Nahapiet and Ghoshal's (1998) theory (as used by Gianvito, 2007), Lee (2013) combined all items to form one general social capital factor. There is certainly nothing wrong with this approach but results from other studies show that different components of social capital have different effects (Gianvito, 2007; Hsu et al., 2010; Leana & Pil, 2006; O'Shea, 2003), therefore a more detailed factor structure



can enhance our understanding of social capital. Second, Lee (2013) defined structural social capital as communication openness. Based on Nahapiet and Ghoshal's (1998) theory, this fits better within relational social capital, as it characterizes the quality of the interactions people have with one another rather than the configuration (i.e., structure) of their relationships. In future studies it would make sense to re-examine both the conceptual and operational definitions of structural social capital in Lee's (2013) scale.

It is also important to point out that the instrument was intended to be used at the group level using dyads of nurses and physicians but the ICC did not justify aggregation of the data. This may be due to the fact that the referent for the items in Lee's (2013) scale was "The physicians in this clinic" rather than "The nurses and physicians in this clinic" or "The healthcare professionals in this clinic" which may have yielded different responses because both nurses and physicians were included in the sample. Finally, some of the items contain ambiguous wording or double-barrelled questions. Further development of this scale is recommended.

### **2.3.9 Summary of instruments.**

To date, several questionnaires have been developed to measure various aspects of social capital that align with Nahapiet and Ghoshal's (1998) framework. This review showed that social capital has been conceptualized and measured at both the group level (Tsai & Ghoshal, 1998; Leana & Pil; O'Shea, 2003) and the individual level (Gianvito, 2007; Hsu et al, 2010; Lee, 2013) and that, at times, there has been a mismatch between the referent for the items and the level of the construct (e.g., individual referent aggregated to the group level). Combinations of social network analysis and more

traditional Likert-scale questionnaires have been used to capture different components of social capital. In particular, structural social capital was often measured using group members' responses to one question to calculate a betweenness score or, as in the case of Gianvito's (2007) questionnaire, a contact approach was used and responses for each contact were analyzed separately. This review highlights the diversity of conceptual and operational definitions used to study structural, relational, and cognitive social capital and shows that trust was unanimously identified as a core component of relational social capital. The evidence suggests that development of a new instrument to measure workplace social capital is warranted and would make a valuable contribution to the field.

Table 1 Summary of instruments used to measure workplace social capital based on Nahapiet & Ghoshal's (1998) theory

Authors	Operational Definitions	Scale Range	# of items	Reliability	Validity	Notes
1. Tsai & Ghoshal, 1998	<b>Structural SC:</b> Social Interaction <b>Relational SC:</b> Trust & Trustworthiness <b>Cognitive SC:</b> Shared Vision	NA – sociomatrix NA – relational matrix 1 = strongly disagree to 7 = strongly agree	2 2 2	NA – less than 3 items for each subscale	Convergent Validity Discriminant Validity Criterion validity	Group-level study of 15 business units (n=3 in each unit)  Social network analysis used for social interaction and trust/trustworthiness  Average of 3 people's scores used as unit-level score for shared vision
2. O'Shea, 2003	<b>Structural SC:</b> Social Interaction <b>Relational SC:</b> Trust <b>Cognitive SC:</b> Shared Rhetoric	NA – sociomatrix 1 = strongly disagree to 7 = strongly agree	1 3 4	NA Cronbach's $\alpha$ =.91 Cronbach's $\alpha$ =.67	<b>Criterion validity:</b> Associated with team commitment and team creativity	Group-level study of pharmaceutical employees
3. Leana & Pil, 2006	<b>Structural SC:</b> Information sharing <b>Relational SC:</b> trust <b>Cognitive SC:</b> shared vision	1=strongly disagree to 5=strongly agree	Information sharing (6) Trust (6) Shared vision (6)	Cronbach's $\alpha$ =.88 (information sharing); .90 (trust); .83 (shared vision)	<b>Criterion validity:</b> student achievement in math and reading	CFA using Amos to examine three-factor model linked to second order factor of social capital Model fit: GFI=.958, IFI=.975, RMSEA=.05  N = 88 public schools in urban Northeast U.S.
4. Gianvito, 2007	<b>Structural SC:</b> network size,	Structural – list contacts	Structural = 15	Cronbach's $\alpha$ = .93	<b>Discriminant Validity:</b> task	Structural, relational, and cognitive measures

	network strength, network status	& rate interaction frequency and relationship strength for each contact	Relational – 9 items (3 each for trust, liking, and identification)	(relational) and .90 (cognitive) Factor loadings: .46-.93 (relational); .38-.87	mastery, role clarity, social integration, acculturation	separate; analyzed using 2 pilot tests in undergraduate psychology students (n=205; n=255); EFA in SPSS (PCA with Promax rotation) + main field study (doctoral dissertation)
	<b>Relational SC:</b> trust, liking, identification	Relational and Cognitive – 5 point Likert Scale from 1=strongly disagree to 5=strongly agree	Cognitive – 4 items (1 item for shared language + 3 items for shared interpretation)		<b>Criterion Validity:</b> task performance, contextual performance, organizational commitment, turnover intentions, career advancement	Field study: N = 170 retail employees in the U.S.
5.	Hsu, Chiang, Chang, & Huang, 2010	<b>Structural SC:</b> Social interaction <b>Relational SC:</b> trust <b>Cognitive SC:</b> shared vision	1=strongly disagree to 5=strongly agree Social interaction (2) Trust (4) Shared vision (4)	Social interaction: CR = .89; AVE=.80; item loadings .88-.90 Trust: CR = .95; AVE=.81; item loadings =.88-.92 Shared vision: CR=.96; AVE=.84;	<b>Criterion validity:</b> organizational commitment	Unclear which items were selected from Leana & Pil's (2006) scale or how they were adapted for the hospital context; reliability but not validity of 3-factor measurement model assessed using PLS software  N = 797 registered nurses in Taiwan

				item loadings =.91-.93		
6. Lee, 2013	<b>Structural SC:</b> open communication <b>Relational SC:</b> trust and liking <b>Cognitive SC:</b> shared language and shared interpretation	5 point Likert scale from 1=strongly disagree to 5 = strongly agree	14	Cronbach's $\alpha$ =.97 factor loadings .69-.91	<b>Criterion validity:</b> relational coordination communication and supportive relationships	Measurement model analysed using CFA in AMOS in relation to relational coordination  Model fit :Chi-square = 321.39 (df=177); CFI=0.911; TLI=0.894; RMSEA=0.10; SRMR=0.054  N=283 nurses (132) and physicians (151)

## **2.4 Theoretical Framework for a New Measure of Workplace Social Capital**

Nahapiet and Ghoshal (1998) originally conceptualized social capital as a multi-dimensional concept consisting of structural, relational, and cognitive components. Therefore, social capital was modeled as a higher-order factor comprised of these three multidimensional factors. Building on past work, structural social capital was operationalized as a higher-order construct consisting of network size (number of important workplace connections), network functional diversity (number of different types of important work contacts), and network social status (perceived social standing at work). Relational social capital included trust (the group-wide expectation that others will act with honesty and integrity), the norm of positive reciprocity (the group-wide expectation that others will reward helping behaviour in kind), and affective energy (perceptions of members' shared experience of positive feelings and emotional arousal due to their enthusiastic assessments of work-related issues). Cognitive social capital refers to shared understandings of work tasks and experiences (cognitive common ground), shared language, in the form of using the same jargon and code words, and shared narratives, stories and meanings that employees share about their work and organization.

In the following paragraphs the overall measurement model for the new questionnaire to measure nurses' workplace social capital will be described and theoretical and empirical support for each concept included in the model will be provided. I will also address the level of measurement, item referents, and scales and scoring of the new measure.

#### **2.4.1 Level of measurement.**

Social capital has been conceptualized at both the individual and group level and measured using both individual-level and group-level methods accordingly (Marsden, 1990). At the individual level, employees can be thought to have different amounts of social capital and unique relationships with other people in their network that are valuable, rare, not easily replicated, and not easily transferrable (Nahapiet & Ghoshal, 1998). For example, a nurse who needs to get an order from a busy physician that she doesn't know very well may take advantage of the positive relationship that the charge nurse has with that physician by asking the charge nurse to request the order from the physician on her behalf. By doing so she leverages her own social capital as well as that of the charge nurse in order to accomplish her work. This illustrates that social capital does indeed belong to individuals but that it also requires relationships with other people and, thus, is a social phenomenon that can also be conceptualized at the group level. From the group-level perspective, social capital could be examined among many different groups within a hospital such as professional group (nurses, physicians, physiotherapists, etc.), hospital unit, specialty area, or even work shift.

The current study is interested in workplace social capital of individual nurses working in hospitals. Considering that social capital is inherently a social phenomenon, it is proposed that measuring individuals' perceptions of their social group at work is essential for measuring workplace social capital. Under most circumstances it is not recommended to measure individuals' perceptions of others, but as DeVellis (2012) points out, there are times when this is appropriate (e.g., asking parents their perceptions

about their children or asking spouses about their significant other). The caveat here is that the concept being measured is individuals' perceptions of someone else, rather than reporting something about themselves. According to Chan's (1998) typology of group-level constructs, many group level constructs are first measured at the individual level and then steps are taken to justify aggregation or dispersion at the group level. Chan highlights the importance of providing clear definitions of homogenous constructs, that is, constructs at each level of measurement, in order to ensure their construct validity. To clarify the constructs in the current study, Table 2 provides an overview of each construct within the proposed measurement model of nurses' workplace social capital, showing how parallel constructs would be conceptualized at the individual level with an individual or group referent and at the group level.



Table 2. Conceptualization of Nurses' Workplace Social Capital Dimensions at the Individual and Group Level

<b>Construct</b>	<b>Individual Level – Individual Referent</b>	<b>Individual Level – Group Referent</b>	<b>Group Level (Group Referent)</b>
<b>Structural Social Capital</b>			
Network size	An employee's perception of the number of important work contacts that they have in their organization.	An employee's perception of the number of important work contacts that their work unit has in the organization.	Employees' shared perception of the number of important work contacts that their work unit has in the organization.
Network functional diversity	An employee's perception of the heterogeneity of their workplace social network of important contacts based on work role.	An employee's perception of the heterogeneity of their work unit's workplace social network of important contacts based on work role.	Employees' shared perception of the heterogeneity of their work unit's workplace social network of important contacts based on work role.
Social status	An employee's perceived social position or standing within their workplace.	An employee's perception of the social position or standing of their work unit within their organization.	Employees' shared perception of the social position or standing of their work unit within their organization.
<b>Relational Social Capital</b>			
Trust	An employee's expectations that others at work will be honest with them, have integrity, and live up to their word	An employee's perception of group-wide expectations of truthfulness, integrity, and living up to one's word	Employees' shared perception of group-wide expectations of truthfulness, integrity, and living up to one's word
Affective energy	An employee's experience of positive feelings and emotional arousal due to their enthusiastic assessments of work-related issues	An employee's experience of the group's positive feelings and emotional arousal due to their enthusiastic assessments of work-related issues	Employees' shared experience of positive feelings and emotional arousal due to their enthusiastic assessments of work-related issues
Norm of positive reciprocity	An employee's expectations concerning the implicit social rules guiding obligations and expectations about sharing resources with other group members	An employee's perceptions of group-wide expectations concerning the implicit social rules guiding obligations and expectations about sharing resources with other group members	Employees' shared perceptions of the implicit social rules guiding obligations and expectations about sharing resources with other group members
<b>Cognitive Social Capital</b>			
Cognitive common ground	An employee's perceptions that they have common knowledge about work tasks and team members	An employee's perceptions of the common knowledge about work tasks and team members that exists on their hospital unit	Employees' shared perceptions of the common knowledge about work tasks and team members that exists on their hospital unit
Shared language	An employee's perceptions of having a specialized vocabulary including jargon and code words used to convey knowledge or meaning to other employees at work	An employee's perceptions that their work unit has a specialized vocabulary including jargon and code words used to convey knowledge or meaning to other employees at work	Employees' shared perceptions of having a specialized vocabulary including jargon and code words used to convey knowledge or meaning to other employees at work
Shared narratives	An employee's knowledge of work stories which helps them understand their workplace and work role.	An employee's perceptions of group-wide knowledge of work stories which helps create a common understanding of one's workplace and work role.	Employees' shared perceptions of group-wide knowledge of work stories which helps create a common understanding of one's workplace and work role.

In the current study, structural social capital is viewed as a higher-order latent construct comprised of three components: network size, network functional diversity, and network status. Each of these lower-level constructs is at the individual level, measured using an individual-level referent. For example, it is logical to ask a nurse how many important contacts they have at work to assess the size of their workplace social network. Using a group-level referent would change the meaning of the concept, as it would mean asking nurses to estimate the number of contacts that their work unit has within the organization. Not only would this be difficult for individual nurses to judge, but it is unclear if other work units or individual people would be considered contacts using a group referent.

In contrast, relational and cognitive social capital concern nurses' perceptions of group norms and sharedness among members of their work group, therefore it makes perfect sense to conceptualize these constructs as individual-level constructs that are measured using a group referent. For example, the concept of cognitive common ground at the individual level with an individual level referent has an entirely different meaning than when a group referent is used. As illustrated in Table 2, the former is defined as "An employee's perceptions that they have common knowledge about work tasks and team members", which refers to nurses' perceptions that they have knowledge that everyone else at work does. When a group referent is used instead ("An employee's perceptions of the common knowledge about work tasks and team members that exists on their hospital unit") the meaning of the concept changes because now it refers to nurses' perceptions of

the shared knowledge of their work group or team. Finally, if I were to extend this to a group-level construct in a future study, at the group-level this translates to the homogenous concept of shared cognitive common ground, defined as “The group’s shared perceptions of the common knowledge about work tasks and team members that exists on their hospital unit”, in which case aggregation could be used if justified.

Although it is uncommon to use a group-level referent to measure individual-level constructs, using a self-referent conceptualization would change the meaning of these constructs in an unhelpful way. Thus, based on the aim to measure individuals’ perceptions of social phenomena (which by definition requires groups) I intentionally and thoughtfully decided to use this approach.

Moreover, while substantial justification is required to create group-level variables from individual level data, it should not be problematic to leave individual level data at the individual level where it was measured. In all cases of aggregation, a distinct rationale to do so is required (Klein & Kozlowski, 2000). In addition, aggregation of individual level data is not without controversy (Campion, Papper, & Medsker, 1996) and criteria have been established to help researchers decide when it is appropriate to do so (Klein & Kozlowski, 2000). Typically, conceptual and statistical arguments must be made justifying the composition of group-level constructs from data measured at the individual level (Chan, 1998) including those using group referent items which are proposed in the current measure. In other words, you can’t really ask a “group” a question as if it were one entity; it is a collection of individuals and group-level constructs are created by examining the average response or degree of consensus among or difference between

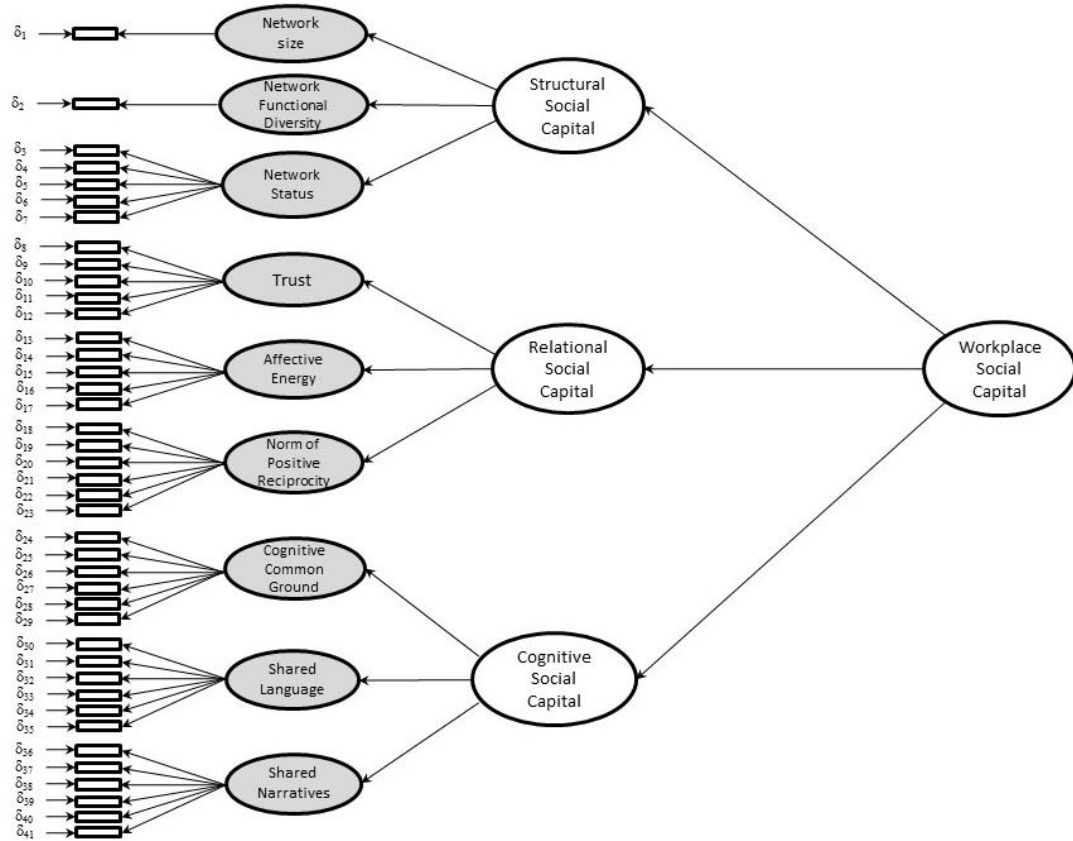
group members. Therefore, it is logical to keep individual-level data at the individual level, even when asking about people about their perceptions of a group to which they belong. This is not to say that the composition of group-level constructs cannot also be conducted using this data if an appropriate research design is selected and group composition is justified (Chan, 1998).

Considering the need to conceptually and empirically justify aggregation and the importance of using group referents to measure some components of social capital as I have conceptualized it, it makes sense to intentionally leave our data at the individual level.

#### **2.4.2 Measurement model structure.**

Establishing the theoretical relationship between constructs (latent variables) and measures (observed items) is a fundamental first step before developing a valid and reliable measurement model (DeVellis, 2012). In the current study social capital is conceptualized as a higher-order construct comprised of three inter-related components: structural, relational, and cognitive social capital, which, in turn, are each made up of three sub-constructs (for a total of nine altogether) measured using reflective indicators (see Figure 1 for an overview of the measurement model).

Figure 1. Proposed measurement model for social capital



### 2.4.3 Structural social capital.

The structural component of workplace social capital refers to the overall pattern of relationships (ties) within an organization's social fabric (Nahapiet & Ghoshal, 1998). In other words, it captures who people know (or don't know), how well they know each other, as well as the importance and diversity of different connections. Nahapiet and Ghoshal (1998) originally proposed that structural social capital consisted of multiple parameters of an organization's social network configuration, including density,

connectivity, hierarchy, and appropriability (transferability). After thoughtful consideration, the proposed instrument focuses on three elements of structural social capital thought to have important implications for employees, organizations, and patients: network size, network functional diversity, and network status.

#### *2.4.3.1 Network size.*

Network size refers to the number of workplace connections that an employee has (Nahapiet & Ghoshal, 1998). In social network analysis this has also been referred to as degree centrality, which refers to the number of direct ties that an actor (node) has (Marsden, 2002). It is important to note here that network strength is somewhat inseparable from network size because each employee theoretically has access to the same number of contacts within an organization but each person develops their own unique network of ties based on their formal and informal position, personality, and preferences, as well as those of other players within the network. As a result, network size specifically refers to the number of important ties that nurses have at work. Moreover, these are not necessarily strong ties, as weak ties can also quite valuable (Granovetter, 1973).

Actors with a greater number of ties benefit from access to more resources, though this is affected by the redundancy or similarity of people one is connected to, with low overlap providing more unique social capital which may be advantageous (Burt, 2004). Alternatively, in cooperative situations such as that of a hospital unit, it has been suggested that small, redundant networks enhance social identification with the group and provide consistent expectations (social norms) that facilitate better communication and

performance (Podolny & Baron, 1997). Thus, it would appear that there are advantages of having small and large networks in different situations.

In social network research, network size is typically determined by nomination (asking participants to list a specified number of important workplace contacts within their organization) (Marsden, 2002). This is a useful method but is limited to field studies that take place within organizations and has some disadvantages. For example, people who do not participate or who indicate no ties or non-mutual ties are excluded from the network analysis and there is a limit on the number of ties employees can report. This data, though valuable, is also tedious to analyze. The alternative individual-level approach focuses on the direct contacts reported by each individual actor (ego) and shows strong correlation (generally  $r > .90$ ) with analysis of group-level network data across diverse contexts and networks of different sizes (Marsden, 2002). One main benefit of this approach is that it can be used in survey studies using a self-report questionnaire such as the one proposed in the current study.

For the purposes of this study network size was defined as the total number of *important* ties that nurses perceive themselves to have at work. Specifically, nurses were asked to indicate the number of important contacts they have at work by organizational role (e.g., physicians, nurses, personal support worker, etc.). The number reported for each category was added together to create a total score for network size.

#### ***2.4.3.2 Network functional diversity.***

In the social network literature, network diversity refers to the extent to which an individual's network connects them to heterogeneous others (Burt, Minor, & Alba, 1983).

Diversity has been defined from a social categorization perspective (Turner & Oakes, 1989) as “any attribute that people use to tell themselves that another person is different” (Williams & O’Reilly, 1998, p. 81). More specifically, unlike demographic diversity which focuses on differences based on individuals’ personal characteristics such as age, gender, and race, functional diversity in the workplace refers to differences among people based on their roles and/or responsibilities (Northcraft, Polzer, Neale, & Kramer, 1996). This is synonymous with functional heterogeneity, defined as “the diversity of organizational roles embodied in the team” (Jackson, 1992, p. 353). The functional perspective on diversity is particularly relevant to the context of hospital organizations which require numerous healthcare professionals and other types of employees to work together. Therefore, the current study adopts this perspective, defining network diversity as the extent to which a nurse’s workplace social network connects them to other employees in heterogeneous occupational roles.

Diversity at work has been conceptualized as both an advantage and a disadvantage within organizations. For example, Burt’s (1992) theory of structural holes postulated that having a broad, diverse network with low information redundancy provides greater social capital than a close homogenous network of overlapping ties. It has also been demonstrated that team diversity leads to greater innovation and better decision making because it brings together different points of view (Williams & O’Reilly, 1998). Participative leadership and providing opportunities to constructively harness diversity (Simons, Pelled, & Smith, 1999) seem to be important conditions for diversity to positively affect team performance. In healthcare, the potential benefits of functional



diversity are becoming apparent (Mitchell, Parker, Giles, & White, 2010), resulting in an increased focus on interprofessional models of care which attempt to bring together a diverse network of healthcare professionals to provide holistic, patient-centered care (Deneckere et al., 2013). Thus, functional diversity within nurses' workplace social networks may provide them with new insights and perspectives that encourage open dialogue, shared cognitive understandings, and shared language among team members.

However, different ideas and ways of thinking also bring the potential for conflict and complexity that may make sharing and collaboration challenging. For example, Miller et al. (2008) discovered that nurses found interprofessional collaboration difficult when they felt that their colleagues in other professions did not value caring and emotional work in the same way that they did. In a study of academic researcher teams, Cummings et al. (2013) found that team heterogeneity moderated the relationship between team size and productivity. Their results showed that larger groups were more productive than smaller ones but that increased group diversity in terms of the number of academic disciplines or number of institutions had a dampening effect, suggesting that diversity increases the costs of working with others. Furthermore, close-knit, homogenous networks have been found to be beneficial in cooperative contexts when interdependency is high (Podolny & Baron, 1997). Thus, current evidence about the effects of functional diversity in teams is mixed.

Although diversity certainly brings challenges, from a social capital perspective there may be significant advantages of having positive working relationships with employees who occupy a wide range of roles within one's organization. Nurses may

benefit from these relationships in different ways. For example, developing relationships with organizational leaders can help nurses accomplish their daily work and achieve personal career goals. Through their conversations with higher-ups they may be more aware of upcoming job vacancies or professional development opportunities, be able to exert informal influence over decisions, or learn how to overcome bureaucratic constraints more effectively. Nurses who develop positive relationships with other healthcare professionals on their unit may benefit from increased knowledge sharing and gain status by establishing professional credibility through these work relationships.

Nurses may also benefit from developing good working relationships with employees who have non-professional roles within their healthcare organization. Nurses who are able to build positive relationships with unit clerks, custodial staff, and personal support workers may benefit from increased cooperation and support with their day-to-day work. For example, if a nurse has a particularly heavy patient load, a personal support worker may offer to help set up an extra patient in the morning even though it is not officially their responsibility. Likewise, nurses are likely to offer help and assistance to others that they have good working relationships with when asked and are more likely to be approached when help is required.

In the current study, network functional diversity was operationalized as the number of different types of employees within one's workplace social network ("State the number of important relationships you have at work with people in each of the following positions: Senior management; Physician; Nurse Practitioner..., Unit Clerk, etc."). Higher scores indicate greater functional diversity than lower scores. This measurement approach

has not been used to measure structural social capital in the workplace but it is similar to how group heterogeneity was measured by Cummings et al. (2013) in their study of academic researchers where the number of disciplines of PIs and the number of institutions were used, lending empirical support for this approach.

#### ***2.4.3.3 Network status.***

Social status refers to the prestige, respect, and value bestowed upon individuals and groups based on what is valued in a particular social context (Anderson & Miller, 2003). According to Lin (1999), status attainment is a process whereby individuals utilize and invest in personal and social resources for returns in the form of socioeconomic standing. Status is influenced by both achieved (formal) status (e.g., earned occupational or educational accomplishments) and ascribed (informal) status which refers to value bestowed upon individuals by others that involve perceptions and value judgements (Lin, 1999). In the context of hospital organizations, an employee's status is influenced by their formal professional status and role within the organization and their reputation, personality characteristics, and connections with others. While Nahapiet and Ghoshal's (1998) theory of social capital focused on how formal hierarchical structures within organizations create differential access to social resources (i.e., social capital), in reality social status is a combination of formal and informal status.

Moreover, formal status alone provides an incomplete picture of the social dynamics within a workplace, as one could have high formal status but not be well-liked, resulting in low social status and limited social capital. Additionally, the formal status hierarchy is not always well-defined among healthcare professionals and not everyone is

part of the formal organizational structure. For instance, in Ontario physicians are independent contractors granted hospital privileges (Ontario Hospital Association, 2014); they are not employees of the hospital. On paper this puts them outside of the organizational hierarchy but they are still an important part of the hospital and of nurses' workplace social network. They are also high-status individuals within the hospital because of the value patients, administrators, and other members of the healthcare team confer upon them due to their occupation, expertise, and scope of practice. Given the terms of employment of physicians and the lack of hierarchical structure for many healthcare employees, it makes sense to define status in the current study as subjective status which includes both informal and formal status.

Status is a key component of structural social capital that results in social stratification (Lamertz & Aquino, 2004). According to Lin's (1999) social resources theory, social strata form the shape of a pyramid, with few high-status individuals at the top and masses of low-status individuals at the bottom. This is congruent with the view that social status is a type of membership card held by a few elite members of society to the disadvantage of everyone else (Adler & Kwon, 2002; Coleman, 1988; Kawachi, Kennedy, Lochner, & Prothrow-Stith, 1997). Not surprisingly, research about the role of social status within organizations has largely focused on the influence of individuals' social capital on career success or compensation. For example, Belliveau et al. (1996) showed that social status influences CEO compensation, with higher status individuals earning more than those with lower status. Anderson and Miller (2003) also found that individuals' socio-economic status was an influential determinant of future social capital

and entrepreneurial success. This may be due to the tendency for people to be attracted to or identify with similar others (McPherson, Smith-Lovin, & Cook, 2001; Tajfal, 1978) which would result in high status individuals having access to greater resources through their relationships with other high status people, further perpetuating their high status.

Status, then, can be acquired by obtaining socially valued credentials (such as degrees or professional designations) and/or by associating with others who have high status or prestige within a particular group. This is supported by the work of Bonacich (1987) who proposed that an individual's status within a social network depends on the status of the people they are connected to and therefore should be measured using an equation accounting for the relative status of each alter in an ego's network.

Social status can be thought of as a valuable social resource that can be acquired in part by associating with valued others. That is, by virtue of having access to high status individuals within one's network, nurses themselves obtain status at work, providing them with power to access and mobilize social resources and to influence others (Lin, 1999). High status actors are also more likely to engage in valuable role interactions with others in their organization (Lamertz & Aquino, 2004), positioning themselves as a valuable actor within the network. Thus, nurses with higher status are likely to have greater social capital by virtue of their status location within their social network at work.

The current study operationalizes network status as the subjective social status an individual feels they have at work rather than the average hierarchical (formal) status of their network contacts which was used by Gianvito (2007). Kanter's (1977, 1993) notion of informal power within organizations describes how personal alliances and connections

with others at work provide employees with access to working conditions that empower them to accomplish their job effectively. While informal power and social status are not identical concepts, they go hand in hand. That is, employees with high social status often have high levels of informal power as a result of their social position and respect from others. In this way, informal power is a good indicator of social status in the workplace, thus it makes sense to adapt items from the informal power subscale of Chandler's (1991) Conditions of Work Effectiveness Questionnaire (CWEQ) to measure social status.

#### **2.4.4 Relational social capital.**

According to Nahapiet and Ghoshal (1998), relational social capital is characterized by high levels of trust, shared norms and obligations, identity and identification, and high quality interactions with others. In the proposed measurement model of social capital, three components of relational social capital that build on the work of Nahapiet and Ghoshal (1998) are included: trust, affective energy, and the norm of positive reciprocity. These concepts fit well with the original aspects of relational social capital of trust, high quality interactions, and norms, respectively. After reviewing the literature on organizational identification, it did not make sense to include the concept of identification, which refers to the iterative cognitive process through which individuals associate themselves with others and make sense of their social position at work (Cheney, 1983). While important, identification is cognitive, rather than relational, in nature and it is not clear that identification is a form of social capital (though identification by others in the form of social status or group membership may be a component or precursor of

structural social capital). The following paragraphs will explain each sub-component of relational social capital in further detail.

#### ***2.4.4.1 Trust.***

Trust is an important aspect of human relationships, including those in organizations. In regards to social capital in particular, trust is vital because it allows the exchange of resources to happen and it is created and deepened through exchanges over time. At the individual level, trust has been commonly defined as the expectation that others will act with honesty and integrity and involves the willingness to be vulnerable to the actions of another person (Mayer, Davis, & Schoorman, 1995) along with acceptance that you cannot control their behaviour (Zand, 1972). Trust is distinct from *trustworthiness*, which is the evaluation of whether someone can be trusted, and *propensity to trust*, which refers to stable individual differences in one's willingness to trust others (Mayer et al., 1995). As a group-level construct, the concept of generalized trust put forth by Putnam (1993) fits best with Nahapiet and Ghoshal's theory of social capital. Specifically, generalized trust refers to relatively stable norms and behaviours of group members that assume trust and trustworthiness of others within the group due to affiliation or shared membership within the group (Putnam, 1993; Leana & van Buren, 2002). This is similar to the concept of organizational trust, defined as:

The belief of an individual or a group as a whole that individuals or the organization will make every effort, whether explicit or implied, in good faith to act in accordance with commitments; that honesty in relationships will be ensured

as a consequence of commitments; and that involved people will not seek to take advantage of others even if they have such opportunities (Cummings & Bromily, 1995, p. 303).

Research on trust is ubiquitous in the social capital literature. Past findings suggest that trust in the workplace enables social interaction and exchange, and increases communication and cooperation between employees (Jones & George, 1998; Misztal, 2013; Putnam, 1993; Tsai & Ghoshal, 1998; Zand, 1972). Other benefits of trust within organizations include increased knowledge capital and innovation, better teamwork, and greater work productivity (Bouty, 2000; Jones & George, 1998; Nahapiet & Ghoshal, 1998). In nursing, organizational trust has been associated with empowering work environments, greater levels of job satisfaction, and organizational commitment (Laschinger, Finegan, & Shamian, 2001). In an exploratory descriptive study, Altuntas and Baykal (2010) also found that nurses' trust in management and trust in coworkers was related to increased organizational citizenship behaviours.

In the current study it was proposed that generalized trust, a group norm, is an important form of relational social capital for nurses working in hospitals. It makes sense that on units where people generally trust one another, nurses believe that others have good intentions towards them and are worthy of their kindness, help, advice, and time. Trust provides access to resources but is also a valuable resource itself because trust provides employees with power, autonomy, and responsibilities within the workplace.



Thus, trust is a social resource that provides access to exchanges with others and further resources.

Measures of social capital have often included trust. In fact, trust appears to be one of the only components of social capital that is consistently included in the wide variety of social capital measures that have been created based on different theoretical models. Specifically looking at instruments that align with Nahapiet and Ghoshal's (1998) model of social capital within organizations (reviewed above), all include a measure of trust, though notably, none of them are the same. Based on the extant literature, five items from Simons and Peterson (2000) that were used by O'Shea (2003) were used to measure nurses' perceptions of group-wide trust. Specifically, items were designed to assess group members' expectations of truthfulness, integrity, and keeping one's word, and shared respect for competence. The authors reported factor loadings ranging from .60-.86 and a Cronbach's  $\alpha$  of .89.

#### *2.4.4.2 Affective energy.*

Energy at work has been discussed as a positive, renewable resource for employees and organizations that contributes to organizational success (Quinn, 2007; Quinn, Spreitzer, & Lam, 2012) but it has not been formally identified as a form of relational social capital. Building on previous work that frames energy as a social resource, I propose that affective energy, which refers to members' shared experience of positive feelings and emotional arousal due to their enthusiastic assessments of work-related issues (Quinn & Dutton, 2005), is a social resource created by and embedded in positive interactions and relationships at work. In the current study it was conceptualized

as an employee's experience of the group's positive feelings and emotional arousal due to their enthusiastic assessments of work-related issues.

Energy is an important characteristic of the quality of relationships and results in mutual resource creation (i.e. it is productive) (Quinn, 2007). Cole, Bruch, and Vogel (2011) found that employees in energized units were committed to achieving shared goals, attached to and involved in the organization, and more likely to be satisfied with their jobs. Employees who feel energized at work by their relationships and interactions with others are likely to work enthusiastically towards accomplishing work tasks and goals. Evidence suggests that energetic people tend to enjoy working towards their work goals while also accomplishing them quickly (Schippers & Hogenes, 2011) and that energy can be contagious; in other words, energetic employees enhance the productivity of others (Bakker, Demerouti, & Schaufeli, 2005). This is in contrast to alternative theories of energy at work which suggest that energy is a scarce resource that must be conserved or replenished to prevent depletion and burnout (Spreitzer, Lam, & Quinn, 2012).

To date, energy at work has not been studied in a nursing context, nor has it been viewed within Nahapiet and Ghoshal's (1998) model of social capital. The current study adds to the literature on both concepts by examining how energy contributes to relational social capital among nurses. The affective energy subscale of Cole, Bruch, and Vogel's (2011) productive energy measure (PEM) was adapted to measure perceptions of group affective energy. This validated instrument consists of 5 items rated on a 5-point Likert scale from 1 = never to 5 = frequently, if not always. CFA results showed that the scale

demonstrated acceptable reliability (Cronbach's  $\alpha = .89$ ) and validity (Cole, Bruch, & Vogel, 2011).

#### ***2.4.4.3 Norm of positive reciprocity.***

Reciprocity has been defined as an in-kind conditional behaviour in response to another behaviour that can be positive (e.g. helping another person) or negative (e.g., withholding assistance, retribution) (Perugini, Gallucci, Presaghi, & Ercolani, 2003). Gouldner (1960) proposed that the norm of positive reciprocity is a universal aspect of human social interaction that creates a sense of duty or moral obligation to help others or return a favour. The moral component of the concept is supported by the finding that internalized personal norms of reciprocity influence individuals' tendency to reciprocate (Perugini et al., 2003). Overall, it appears that there are both external social norms and internalized norms of reciprocity that guide individuals' exchange of resources such as assistance, advice, favours, and gifts.

Reciprocity is a powerful social mechanism that allows people to reward or punish others based on their behaviour. It can also be a means in and of itself, where the goal is to help others with the expectation that help will be there for you when you need it (Perugini et al., 2011). Baker and Dutton (2007) conceptualized (positive) reciprocity as a collective repository of goodwill whereby employees exchange generosity with others in the form of help, support, and kindness. In other words, it is a pool of goodwill largely based on an honour system whereby members of a group help and rely upon one another, trusting that others will return the favour in the future, not unlike the concept of karma or the proverbial view that "it all works out in the end".

In the current study, the norm of positive reciprocity was defined as individuals' perceptions of the implicit social rules guiding obligations and expectations about sharing resources with other group members. By definition, norms are a group-level construct but individuals' beliefs or perceptions about the norms of a group can be measured at the individual level and can be either self-oriented or team-oriented. Self-oriented norms of reciprocity refer to direct trading of goods or favours characterized by trying to maintain equivalence (fair and equal trade) without being taken advantage of and usually involve keeping score as a means to ensure this. Team-oriented or collective reciprocity on the other hand, is thought to form a pool of goodwill into which members of a group contribute and trust they will also benefit from in the future (Baker & Dutton, 2007). From the collective perspective, individuals are concerned about the group as well as themselves and contribute or take from the group according to their abilities and needs.

Gouldner (1960) pointed out that reciprocity norms, while universal, are also context-dependent. Therefore, it is reasonable to expect that nurses working on different hospital units would experience different norms. Specifically, when nurses work in a context where everyone is expected to freely exchange resources with one another, more sharing and exchange is likely to happen, resulting in greater levels of social capital and better relationships among employees. Perugini et al.'s (2003) positive reciprocity scale was adapted to measure nurses' perception of social norms of positive reciprocity on their unit.

#### **2.4.5 Cognitive social capital.**

Cognitive social capital refers to representations, interpretations, and systems of meaning that can be communicated to and shared with others (Nahapiet & Ghoshal, 1998). In other words, it captures the idea that thoughts, ideas, and knowledge are resources that can be exchanged among and co-constructed by group members, leading to shared cognitive ground among employees. Of the three types of social capital proposed by Nahapiet and Ghoshal (1998), cognitive social capital has received the least attention, which is somewhat surprising given the excellent work that has been done on team cognition, sensemaking, and shared mental models within organizations (Cannon-Bowers, 2001; Jeffery, 1999; Weick, Sutcliffe, & Obstfeld, 2005). In addition to the dimensions of shared language and shared narratives proposed by Nahapiet & Ghoshal (1998), this study draws from the literature on group and team cognition by adding the concept of cognitive common ground as a key resource shared by employees.

##### ***2.4.5.1 Cognitive common ground.***

Shared cognition refers to cognitive representations or imagined structures of knowledge about a task, situation, or context which are held in common by members of a group or team (Cannon-Bowers & Salas, 2001; Jeffery, 1999). According to Cannon-Bowers and Salas (2001) shared knowledge means that team members have overlapping knowledge and understanding (i.e. cognitive common ground) that allows them to coordinate their actions with minimal explicit communication, enhancing efficiency and team performance. Research on team cognition has identified different types of shared knowledge important to team functioning including task-related, task-specific, and team-

related knowledge (Cannon-Bowers & Salas, 2001). Task-related knowledge refers to information about how the team should work together whereas task-specific knowledge refers to detailed information about how to perform a very specific task or procedure such as preparing a patient for surgery. Team-based knowledge refers to knowledge about the expertise, behaviours, and preferences of team members, allowing individuals to draw on others' strengths and compensate for weaknesses. Thus, shared knowledge about work and team members represents a common ground, or starting place, which can improve team functioning and performance by helping employees understand and anticipate the behaviours of others as well as create strategies to meet the demands of their work day successfully.

In nursing, research on shared cognition has focused on implementation of communication procedures or patient care flowsheets that create a standardized approach to patient care. In particular, shared mental models have been found to be an essential part of team functioning and performance when dealing with fast-paced emergency situations where team members must work together and make life-or-death decisions quickly (Custer et al., 2012). Shared cognitive knowledge among team members has been recognized as an important type of cognitive social capital (Mäkelä & Brewster, 2009) though not specifically among hospital nurses.

Employees' understandings about their work, co-workers, and organization are resources that help or hinder them in their job. When nurses have common knowledge about work-related procedures and tasks, they are able to work together more efficiently without having to explain protocols, policies, or procedures that are understood by

everyone. By having a working knowledge of the strengths and weaknesses of other members of the team, nurses can anticipate who they can ask for help if needed as well as who may need extra help during their shift. In this way, shared cognitions about work and other employees facilitate teamwork and help nurses manage their workloads.

Cognitive common ground was operationalized as nurses' perceptions of the common knowledge about work tasks and team members that exists on their hospital unit. There were no valid and reliable questionnaires that measure this construct. Therefore, new items were created and tested for the present study.

#### *2.4.5.2 Shared language.*

Nahapiet and Ghoshal (1998) theorized that the use of shared language and codes are a valuable form of cognitive capital. Language use as a social phenomenon has been studied extensively by linguistic anthropologists and social psychologists but has received limited attention in the social capital literature. This is surprising given that Pierre Bourdieu, who helped develop the concept of social capital, also wrote about the role of language as a form of social power, specifically labelled "linguistic capital". He proposed that language is a symbolic system of meaning that also indicates the social value of the speaker (Bourdieu, 1977). In his view linguistic capital is defined as having the skills to speak and understand the language of the dominant social group in society (linguistic competence) (Bourdieu, 1991) and indicates one's position as an insider or outsider.

In contrast to having the linguistic capital required by individuals to function in society at large, Eastman (1985) proposed that shared language among group members (group talk) consists of a special vocabulary, a common set of topics, and shared attitudes

about these topics that helps form and maintain the group's identity. As individuals become part of the group they learn the meaning of specialized words and figure out norms regarding the use of language within the group. This allows them to engage in mutually intelligible group talk and communicate successfully with others within the group.

In healthcare, nurses and other hospital employees use shared language and jargon to communicate with one another. They are able to do so because of their shared technical and experiential knowledge symbolized by these code words and a shared understanding of the group norms regulating communication. This makes it easier for healthcare providers to communicate with one another but also serves to create social capital that is exclusive to the in-group and identifies group membership. For example, the code words and jargon used by nurses and other employees on a particular hospital unit is very useful for communicating with others within the group and contributes to a shared understanding, identity, and sense of community.

Scholarship on jargon use in nursing has revealed that the use of specialized language among nurses during shift change allows nurses to communicate about patients efficiently and that learning the language of nursing is an important part of the professional socialization process (Wolf, 1989). Studies on linguistic social capital in North America have focused on immigrants and minority groups with limited proficiency in English, demonstrating that low levels of linguistic capital can be socially isolating and that linguistic capital is necessary for building social ties and resource exchange (Nawyn, Gjokaj, Agbényiga, & Grace, 2012).



In the current study, shared language is defined as nurses' perceptions of sharing a specialized vocabulary including jargon and code words used to convey knowledge or meaning to other employees at work. With the exception of Gianvito (2007) who tried to create and validate a shared language subscale as a component of cognitive social capital among a sample of undergraduate college students, few studies have examined this concept as a part of Nahapiet and Ghoshal's (1998) model. In the current study, three items adapted from Gianvito (2007) plus three new items were used to measure shared language.

#### ***2.4.5.3 Shared narratives.***

Nahapiet and Ghoshal (1998) included the concept of shared narratives as a component of cognitive social capital based on Orr's (1996) ethnographic study of Xerox technicians. This work revealed how storytelling was used to pass along important expertise and problem-solving strategies among technicians and created a common understanding about their work. Orr argued that organizations are cognitive constructions that are enacted by people (Orr, 2006). This fits with the qualitative paradigm of social constructivism (Gergen, 2009), which views social reality as being shaped in relationships between people, largely through language. Here, the narratives that are told and retold about one's work, role, and organization are seen as meaning-making activities that create a shared way of thinking about one's work and organization.

Shared narratives have been studied as form of social capital, primarily from a qualitative perspective. For example, Chamlee-Wright & Storr (2011) found that community narratives about resilience and hope were a valuable source of social capital

for communities dealing with natural disasters. Quantitative studies on shared narratives are rare but Stelter et al. (2011) conducted a collaborative narrative intervention study with elite high school athletes and found that those who participated in the narrative group developed more social support and better social recovery compared to those in the control condition. The authors also suggested that the intervention built social capital but this was not measured in their study.

In the current study shared narratives were defined as storytelling at work that helps create a common understanding of one's workplace and work role. These shared understandings and meanings about work form an important component of cognitive social capital which allows employees to bond and identify with one another. Through shared narratives, nurses come to understand how things have changed on their unit over time and gain knowledge vicariously about how to approach problems or situations that arise at work. Stories serve an important function of sharing history and experience, creating shared interpretations and knowledge that help nurses make sense of their work and organization, and are cognitive resources that can be shared or accessed in order to help nurses accomplish their work. There were no instruments to measure shared narratives in the workplace therefore new items were developed and tested.

#### **2.4.6 Summary of measurement model.**

Based on reviewing the literature and analysis of past instruments, a new instrument to assess workplace social capital among nurses was developed. The measurement model was developed based on the theoretical work of Nahapiet and Ghoshal (1998) that described social capital as a set of workplace social resources

comprised of structural, relational, and cognitive forms of social capital and the strengths of past instruments described above. Furthermore, this study advances Nahapiet and Ghoshal's (1998) theory by incorporating new concepts such as affective energy and cognitive common ground that are believed to function as important social resources for employees. Details of the methods that were used to test the reliability and validity of this measure are provided in the next chapter.

## **2.5 Testing the Nomological Network of Workplace Social Capital**

This section describes the proposed nomological network of nurses' workplace social capital, which refers to the theoretical framework identifying the focal constructs, the empirical framework operationalizing them, and the linkages between and among these constructs (Cronbach & Meehl, 1955). Each study variable will be defined and theoretical and empirical support for the hypothesized relationships in the nomological network will be provided.

### **2.5.1 Authentic leadership.**

According to authentic leadership theory, authentic leaders are insightful and self-aware individuals with high ethical and moral standards who engage in balanced decision-making and present themselves as they truly are to others (Luthans & Avolio, 2003; Avolio & Gardner, 2005; Gardner et al., 2005). These attributes help authentic leaders develop positive, honest, and open relationships with followers that encourage followers' to be authentic and cultivate their personal and professional selves, resulting in desirable employee wellbeing and performance outcomes (Avolio & Gardner, 2005; Gardner et al., 2005). Past studies have demonstrated that leaders' authentic leadership

behaviours are associated with positive outcomes among staff nurses. These include work engagement, trust in management, and job satisfaction (Wong & Cummings, 2007; Wong, Cummings, & Ducharme, 2013; Wong & Laschinger, 2012).

### **2.5.2 Workplace empowerment.**

According to Kanter's (1977, 1993) theory of structural empowerment, employees need to work in conditions that enable them to do their jobs effectively. Organizations that provide employees with power and independence to accomplish what they need to do will benefit from a happier, more engaged workforce and improved performance (Kanter, 1977; 1993). Specifically, creating a structurally empowering work environment involves providing employees with access to information, support, resources, and opportunities to learn and grow. Access to information refers to availability of information required to do one's work such as organizational policies and procedures, content expertise, and knowledge of organizational values, goals, and policies. Access to information allows nurses to make informed decisions and strive towards common organizational goals. Access to support involves providing nurses with constructive feedback and creating a safe environment where they can ask questions and rely on others for assistance and advice. Access to resources refers to the equipment, supplies, and time nurses need to accomplish their work. Access to opportunity means providing nurses with chances to safely develop new competencies and knowledge, to develop leadership skills, and to take on challenges. Based on Kanter's (1977, 1993) theory, nurses who have access to these four structures feel empowered because they are able to accomplish their work in meaningful ways.

There is a growing body of evidence that structural empowerment is an important characteristic of healthy nursing work environments (Laschinger, 2008; Laschinger, Almost, & Tuer-Hodes, 2003; Laschinger, Finegan, Shamian, & Wilk, 2001). Empowering hospital work environments have been associated with numerous positive outcomes for nurses and healthcare organizations. These include interprofessional collaboration (Laschinger & Smith, 2013), improved patient safety climate (Armstrong & Laschinger, 2006), and higher levels of job satisfaction (Laschinger, 2008; Manojlovich & Laschinger, 2002). Workplace empowerment has also been positively associated with organizational commitment (Laschinger, Finegan, & Shamian, 2001) and reduced turnover intentions (Laschinger, Leiter, Day, & Gilen, 2009), suggesting that nurses who feel that their workplace provides them with access to the information, support, resources, and opportunities that empower them to meet the demands of their jobs are more committed to their organization, more satisfied in their jobs, and less likely to leave. Recent studies have linked empowering work environments to nurses' relational social capital (Laschinger et al., 2014; Read & Laschinger, 2015), providing initial support for the link between empowerment and social capital among nurses which is explained in detail later on in this chapter.

### **2.5.3 Authentic leadership and structural empowerment**

Managers in formal leadership positions are instrumental in providing nurses with access to these four empowerment structures. Wong and Laschinger (2013) suggested that by creating structurally empowering work environments authentic leaders can influence nurses' job performance and job satisfaction by influencing followers' self-determination

(ability to perform their work autonomously, using their own discretion to determine how they will go about their work) (Deci & Ryan, 2008).

This is supported by empirical studies linking authentic leadership to structurally empowering working conditions in nursing. Findings have shown that authentic leadership and structural empowerment result in reduced burnout (Laschinger, Wong, & Grau, 2012) and higher levels of interprofessional collaboration (Laschinger & Smith, 2013), job performance, and satisfaction (Wong & Laschinger, 2013). Recently, Read and Laschinger (2015) found that structural empowerment fully mediated the relationship between authentic leadership and relational social capital among new graduate nurses working in Ontario hospitals, suggesting that authentic leaders influence nurses' relational social capital by creating empowering workplaces. This growing body of evidence supports the relationship between authentic leadership and structural empowerment and demonstrates the positive influence that nurse managers can have on their employees by practicing authentic leadership and creating empowering working conditions that set nurses up for work success.

Authentic leaders may foster the development of a structurally empowering work environment by understanding and responding to the needs of employees. They accomplish this through four key avenues: balanced processing, relational transparency, an internalized moral perspective, and self-awareness. Balanced processing involves requesting input and ideas from nurses, prior to making important decisions. By honestly presenting themselves to others (relational transparency), authentic leaders model openness and acceptance, encouraging nurses to feel safe disclosing their learning needs,

professional goals, and areas for development. As a result, managers can support nurses in their work by providing them with access to specific resources, information, and opportunities that match their needs and goals. Having an internalized moral perspective means that authentic leaders have a strong sense of ethics and personal integrity that serve as their moral compass. Staff nurses can look to their leader as a role model and key support person for acting with personal integrity and promoting ethical treatment of other people. Lastly, by having a high level of self-awareness, authentic leaders have insight into their own strengths and limitations which allows them to develop more honest relationships with the nurses on their unit and encourages others to be open and accepting of one another. Again, this may help managers understand the needs of their staff, helping them to provide access to specific empowerment structures that are valued and needed by their staff. Based on the empirical and theoretical links between authentic leadership and structural empowerment, the following hypothesis was established:

**Hypothesis 1:** Nurses' perceptions of their manager's authentic leadership will be positively related to their perceptions of structural empowerment at work.

#### **2.5.4 Authentic leadership and social capital**

In addition, it is reasonable to expect that authentic leaders have a powerful influence on nurses' social capital by fostering positive social exchanges in the workplace. According to Avolio and Gardner (2005), social identification (i.e., a sense of sharing similar views and values with another person or a group), positive role

modeling, and social exchange theory explain how authentic leaders develop positive relationships with others in the workplace. Specifically, it is thought that leaders who have an accurate view of themselves and others, high levels of personal integrity, and a genuine interest in developing positive working relationships with others will cultivate positive, respectful, honest, and trusting leader-follower relationships (Avolio & Gardner, 2005). It makes sense that high-quality relationships between leaders and followers would increase identification and values congruence between leaders and followers, as well as follower reciprocity, helping establish workplace norms that encourage positive social exchange among all employees, which in turn foster social capital in the workplace. In an open and friendly work environment, leaders are more likely to help employees build a strong network of colleagues that they can trust and connect people across structural holes in their network for the benefit of others. In this way, authentic leaders may directly impact structural social capital on their units. By leading by example and creating positive relationships with others, authentic leaders may establish positive social norms in the workplace, facilitating trust, reciprocity, and affective energy, three forms of relational social capital. Finally, by developing positive relationships and enhancing social identification, authentic leaders develop shared understandings and meanings at work, the use of shared language, and contribute to shared narratives about the unit as team members share their stories about experiences with the leader.

Therefore, the following hypothesis was proposed:



**Hypothesis 2:** Authentic leadership will be positively related to nurses' workplace social capital.

### **2.5.5 Structural empowerment and workplace social capital.**

As discussed, workplace social capital refers to structural, relational, and cognitive resources created by and embedded in relationships within organizations (Nahapiet & Ghoshal, 1998). Recent work has linked structural empowerment to relational social capital among nurses at the unit level (Laschinger et al., 2014). Read and Laschinger (2015) also showed that authentic leadership and structural empowerment lead to higher levels of relational social capital among new graduate nurses, which in turn had positive effects on their mental health and job satisfaction. These studies provide empirical support for the link between structurally empowering work environments and nurses' workplace social capital.

Empowering work environments are thought to encourage social capital in part by alleviating competitive pressures that can be caused by scarce resources, thus promoting greater cooperation and better social relationships. This is consistent with Kanter's (1977, 1993) theory of structural empowerment which posits that providing employees with access to resources, support, information, and opportunities for growth and development empowers them to accomplish their work in meaningful ways. It is suggested in the current study that nurses who have access to the empowerment structures needed to do their work are liberated from competing with one another to secure and protect scarce resources, allowing them to focus their attention and energy on developing positive

relationships (i.e., social capital) with their patients, co-workers, and leaders. According to Nahapiet and Ghoshal's (1998) theory of social capital, employees who develop trusting, cooperative relationships reduce social monitoring (watching and tracking others' behaviours), allowing greater sharing and combination of ideas, advice, and other resources to occur. Thus, structurally empowering workplaces may provide the necessary conditions for social capital to develop and thrive.

Each component of social capital (structural, relational, and cognitive) may benefit from structurally empowering working conditions in specific ways. For instance, nurses' structural social capital may be fostered by structural empowerment because when nurses have access to the structures needed to accomplish their work they will have time and energy available to engage in the valuable relational work necessary to develop and maintain relationships at work (Adler & Kwon, 2002). Structural empowerment facilitates social investments that help nurses develop and maintain their workplace social network by freeing up valuable time and energy that might otherwise be used to compete for scarce resources. In addition, sharing and exchange of resources with others in itself provides opportunities to build and maintain one's social network and social status at work.

Relational social capital may be facilitated by empowering work environments for similar reasons. When nurses are empowered to meet the demands of their jobs they are more likely to have the time and energy to provide assistance to others, ask for advice, and engage in dialogue with colleagues. These relational investments strengthen trust between employees, provide opportunities to share energy, and often involve withdrawals

or deposits into the collective bank account of social resources such as advice and assistance, contributing to the norm of positive reciprocity at work where everyone pitches in to help one another.

Lastly, cognitive social capital may be fostered by structural empowerment because cognitive common ground, shared language, and shared narratives require access to information (one of the four empowerment structures proposed by Kanter [1977, 1993]), in particular, but also because of the role that working conditions themselves play in employees' understanding of their workplace. In this sense, working in an empowering workplace itself may be part of the shared understanding and shared narrative that nurses have about their job. Given the theoretical links between structural empowerment and social capital outlined above, the following hypothesis is proposed:

**Hypothesis 3:** Nurses' perceptions of structural empowerment will be positively related to higher levels of social capital at work.

### **2.5.6 Team effectiveness.**

Being able to work well with others as part of a team has been identified as an important aspect of organizational life that contributes to successful outcomes for employees and organizations (Delarue, Van Hootegeem, Procter, & Burrige, 2006; Hackman, 1987, 1990; Hackman & Wageman, 2005; Kozlowski & Ilgen, 2006). In healthcare, teams have become increasingly important over the last few decades because of the increased use of interprofessional teams to improve the efficiency and quality of

healthcare services delivery while reducing costs (Canadian Health Services Research Foundation, 2006; Shortell et al., 2004).

Lemieux-Charles and McGuire's (2006) conceptualization of team effectiveness, the Integrated Team Effectiveness Model (ITEM) informs our understanding of team effectiveness. From this perspective, a team is defined as "a collection of individuals who are interdependent in their tasks, who share responsibility for outcomes, who see themselves and who are seen by others as an intact social entity embedded in one or more larger social systems (for example, business unit or corporation), and who manage their relationships across organizational boundaries" (Cohen & Bailey, 1997, p. 241).

Team effectiveness in the ITEM model consists of several objective and subjective outcomes including patient status, quality of care, cost-effectiveness, and employees' perceptions of successfully working together as a team. Previous studies of work effectiveness of hospital nurses have examined a variety of outcomes related to successful team performance. For example, Purdy and colleagues (2010) defined staff nurses' effectiveness as nurse-assessed quality and risk as well as patient satisfaction, falls, and therapeutic self-care. Shortell et al. (1991) also examined a number of different forms of effectiveness, including technical care quality (ability to work together to achieve patient care outcomes). Building on this work the current study focused on nurses' perceptions of their team's ability to work together and the subsequent impacts team functioning has on nurse-assessed patient care quality.

In order for teams to work together effectively, individuals must interact with one another and develop working relationships. Moreover, it is evident that relationships,

which are a key feature of social capital, are a vital component of teams that have a profound influence on performance (Brueller & Carmeli, 2011; Campion, Papper, & Medsker, 1996). Recent scholarship in the domain of positive organizational psychology (Dutton & Heaphy, 2003; Dutton & Ragins, 2007) has emphasized the role that positive relationships play in the workplace, with a call for increased research to enhance our knowledge in this area.

In their influential article, Nahapiet and Ghoshal (1998) certainly focused on the impact social capital may have on team performance, with a particular focus on how greater levels of cooperation and increased sharing and combination of ideas lead to increased intellectual capital and competitive advantage for organizations. They proposed that when employees have sufficient resources available to accomplish their jobs, they can engage in less social monitoring and reduce competitive behaviour. It makes sense that as competitive behaviour decreases, it becomes easier to build high-quality, trusting relationships and freely share social resources such as helpful advice and assistance with demanding patient care assignments that help nurses accomplish their work. Thus, team effectiveness should be facilitated by social capital.

Past studies have examined the influence of various components of social capital on teams, demonstrating that structural, relational, and cognitive social capital are valuable resources that affect team outcomes. Social capital has been linked to a number of outcomes that could be considered specific indicators of team effectiveness. These include product innovations (Tsai & Ghoshal, 1998), team creativity (O'Shea, 2003), teachers' student performance (Leana & Pil, 2006), retail employees' work performance

(Gianovito, 2007), and relational coordination among nurses and physicians working in outpatient clinics (Lee, 2013). In the nursing literature there is emerging evidence of the benefits of social capital for nurses within healthcare organizations. For example, nurses' social capital was positively associated with higher levels of organizational commitment (Hsu et al., 2010), relational coordination (Lee, 2013), patient safety risk management behaviours (Ernstmann et al., 2009), and job satisfaction (Huang, Tsai, & Wang, 2012), while being negatively associated with emotional exhaustion, a key component of burnout (Kowalski et al., 2010). A recent study of hospital nurses by Laschinger et al. (2014) also found that social capital was associated with higher levels of effectiveness (i.e. accomplishing patient care in a timely manner) at the unit level.

These studies provide empirical support for the hypothesized relationships between social capital and perceived team effectiveness in our model. Structural social capital may provide nurses with access to a wide range of employees with diverse skills and power within their hospital, allowing them to accomplish their work in a more effective manner. Relational social capital may influence team effectiveness by making it easier for team members to rely on one another for support and assistance, enhancing collaboration and influencing motivation to contribute towards group goals. Finally, cognitive social capital provides employees with a common understanding of their team, their organization, and the nature and meaning of their work which may help them coordinate their work and reduce the costs associated with working with others. To summarize, the current study proposed:

**Hypothesis 4:** Social capital will be positively related to team effectiveness.

### **2.5.7 Nurse-assessed patient care quality.**

Nurse-assessed patient care quality refers to nurses' professional judgments regarding the degree to which the care patients receive on their unit meets nurses' high standards. Nurse ratings of care quality have been found to be highly related to their ratings of patient safety (Sochlaski, 2004), patient ratings of hospital quality and satisfaction (Aiken, Sloane, Bruyneel, Van den Heede, & Sermeus, 2013; You et al., 2013), and objective patient outcomes including patient mortality (McHugh & Stimpfel, 2012). These empirical findings also provide support for the use of nurse-assessed patient care quality as a valid method of assessing patient care quality.

Organizational factors such as leadership and the work environment have been shown to influence patient care quality (Aiken, Clarke, & Sloane, 2002; Aiken et al., 2013; Van Bogaert et al., 2013; Wong, Laschinger, & Cummings, 2010) and adverse events (Wong & Cummings, 2007). It has been shown that structural empowerment plays an important role in the quality of care that patients receive (Laschinger, 2008; Laschinger & Leiter, 2006). Structurally empowering working conditions are thought to influence patient care quality by increasing nurses' ability to practice according to their professional scope of practice and by giving them greater control and autonomy in their jobs (Laschinger, 2008). In addition, by decreasing competition between employees by providing enough resources for everyone, increased cooperation and resource sharing may occur, facilitating social capital development and a team orientation, with an

increased focus on achieving shared patient care goals effectively rather than prioritizing individual goals.

Patient care quality has been examined as a component of team effectiveness (Lemieux-Charles et al., 2002; Purdy et al., 2010) but in this study it is conceptualized as an outcome that results from the combined actions of healthcare team members working together. In other words, teams that work together well will likely provide better quality patient care than teams who experience persistent relational difficulties resulting in poor communication, destructive conflict, and at worst, missed care or adverse events. Thus we propose the following:

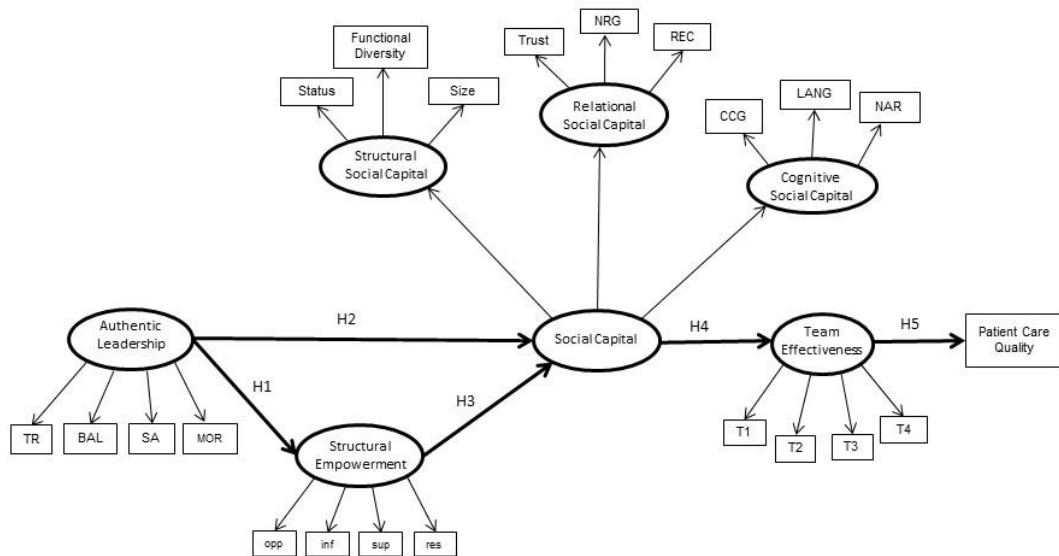
**Hypothesis 5:** Team effectiveness will be positively related to nurse-assessed quality of care.

#### **2.5.8 Summary of hypothesized nomological network**

Based on the literature reviewed above, the current study was designed to provide an examination of the role of nurses' social capital within hospital work environments and provide empirical evidence concerning the construct validity of a new measure of nurses' workplace social capital. The hypothesized model for the study was developed by integrating the proposed relationships between the variables that have been discussed. These relationships are summarized in Figure 2.



Figure 2. Hypothesized study model



Based on this study model, the following hypotheses were formulated:

1. Authentic leadership will be positively related to structural empowerment (H1)
2. Authentic leadership will be positively related to social capital (H2)
3. Structural empowerment will be positively related to social capital (H3)
4. Social capital will be positively related to team effectiveness (H4)
5. Team effectiveness will be positively related to perceptions of patient care quality (H5)
6. Structural empowerment will mediate the effect of authentic leadership on social capital (H6)

## 2.6 Chapter Summary

This chapter provided evidence that structural, relational, and cognitive forms of social capital are important components of nurses' work life that may lead to benefits for

patients, healthcare providers, and organizations. The current literature about social capital in the context of healthcare work environments was reviewed and the need to develop and test a new instrument to measure workplace social capital consistent with Nahapiet and Ghoshal's (1998) theory was identified. Building on past work and incorporating relevant concepts from recent advances in our understanding of groups within organizations, a new measurement model of workplace social capital was proposed. In addition, this chapter addressed the issue of whether social capital is an individual level or group level construct and provided rationale for measuring relational and cognitive social capital at the individual level as individuals' perceptions of their group.

Next, arguments were provided to support the proposed relationships between managers' authentic leadership behaviours, empowering working conditions, and the development of social capital, and the subsequent effects that social capital may have on team effectiveness and nurse-assessed patient care quality. Theoretical and empirical support for these arguments was provided. To summarize the proposed relationships, a model outlining the hypothesized effects of authentic leadership and structural empowerment on nurses' social capital and subsequent effects on team effectiveness and patient care quality was described. Methods used to test the validity and reliability of the new instrument and to test the study model are detailed in the next chapter.

## **Chapter 3: Methods**

### **3.1 Introduction**

The design and methods that were used to collect and analyze the data are described in this chapter. First the study design, sample size determination, sample, and setting will be discussed. Next, data collection procedures will be provided, followed by details regarding the reliability, validity, and scoring of the instruments used to measure the variables in the study. Data management strategies used to assess data integrity, underlying assumptions, and missing data are also described, followed by a description of the analysis procedures used to assess the measurement model of the new social capital questionnaire and test the hypothesized study model. Ethical considerations, study limitations, and dissemination plans will also be described.

### **3.2 Study Design**

A cross-sectional survey was conducted to (1) test the reliability and validity of the proposed measure of nurses' workplace social capital and (2) test the hypothesized model examining precursors and outcomes of the concept. A self-administered survey was mailed to the home address of a random sample of RNs in Ontario hospitals. This method was selected as an economical way to reach RNs across the province and allow them to complete the survey at their convenience.

### **3.3 Setting and Sample**

The sampling frame for the study consisted of ~60,194 RNs employed in direct care roles in acute care hospitals in Ontario at the time of the survey (College of Nurses of Ontario, 2014). A random sample was generated by the College of Nurses of Ontario

(CNO) who provided a mailing list of participants for the study. Random sampling attempts to collect data from a representative sample of staff nurses working in acute care across the province which may make the research findings generalizable.

### **3.3.1 Inclusion/exclusion criteria.**

To be included in the study, staff nurses had to provide consent to the CNO to participate in research when they renewed their annual licensure. Only those currently working in teaching or non-teaching hospitals in direct care staff nurse role were eligible to partake in the study. Exclusion criteria included any RNs who are not currently practicing for any reason (medical or maternity leave, retirement, etc.), those working in settings other than acute care hospitals, and those who are not working in a staff nurse position providing direct care to patients (managers, clinical nurse specialists, nurse educators, retired, etc.).

### **3.3.2 Sample size.**

The sample size needed for this study was based on recommendations by Kenny (2014) and Kline (2011) who recommend at least 200 participants for SEM analysis. In order to strengthen the validation of the new questionnaire to measure nurses' workplace social capital in this study, a sample of 400 participants was desired so that I could split it in half, effectively giving me two random samples of  $n = 200$  to test and cross-validate the measurement model of the new social capital instrument. To account for an expected return rate of 40% and non-response due to changes of address or employment an initial random sample of 1000 RNs was requested from the CNO registry database.

## **3.4 Data collection procedures**

The tailored design method outlined by Dillman, Smyth, and Christian (2011) was used to guide the survey design and data collection protocol. This scientific approach focuses on reducing errors and optimizing response rates through careful survey design and a well-planned data collection strategy. It was hoped that using this staged mailing procedure and providing participants with a choice of how to participate would reduce non-response and improve the representativeness of the sample.

In July 2015, 1,000 potential participants provided by CNO were sent a survey packet including a letter of information, a study questionnaire, an addressed, stamped return envelope, and a ballot for a gift certificate as an incentive to participate. Completion of the questionnaire indicated informed consent. In an effort to make it convenient for a variety of participants to complete the survey, a link to an online version of the survey hosted on Western's Qualtrics site was also provided. This professional survey site is a University of Western Ontario partner. The online and paper versions of the survey were formatted as similarly as possible for consistency. In order to avoid duplication of responses between the two survey modes, participants who completed the online survey were asked to enter their PIN from their paper survey as a question on the online version. According to Dillman, Smyth, and Christian (2011), providing an internet option with mail surveys can decrease non-response rates by 3-12%.

Four weeks after the initial mail-out (August, 2015) a reminder letter was mailed to non-responders ( $n = 820$ ). Four weeks after the reminder letter (September, 2015) remaining non-responders were mailed a replacement questionnaire with an addressed, stamped return envelope. In total, 280 surveys were returned. Of these, 249 were useable

(25.3% useable response rate) and 28 were completed online (11.24%). Due to the low response rate, cross-validation of the measurement model was not possible.

Two separate databases were created for the study: 1) a confidential database containing participants' names and addresses created using a Microsoft Excel spreadsheet, and 2) an SPSS data file containing participants' survey responses. In order to ensure confidentiality, PINs were the only personal identifier associated with their data in the SPSS file. Returned surveys were tracked using the Microsoft Excel spreadsheet in order to organize the mailing of the surveys and reminder letters and to calculate survey response rates. Data collected online was exported to an SPSS file from Western's Qualtrics site the first week of October, 2015, and merged with the main SPSS file containing mailed responses entered by hand.

### **3.5 Instrumentation**

Standardized questionnaires that have previously demonstrated acceptable reliability and validity were used to measure the main study variables with the exception of the questionnaire to measure nurses' workplace social capital. The measurement properties of this newly developed instrument were assessed as part of the current study.

#### **3.5.1 Authentic leadership.**

The Authentic Leadership Questionnaire (ALQ) (Walumbwa et al., 2008) was used to measure nurses' perceptions of their manager's authentic leadership behaviours. The ALQ consists of 16 items divided into four subscales: relational transparency (5 items), balanced processing (5 items), self-awareness (4 items), and internalized moral perspective (4 items). Items are rated on a 5-point Likert scale ranging from 0 = not at all

to 4 = frequently, if not always. Subscale scores were obtained by averaging all items in each subscale and were used as manifest variables in the hypothesized model. Higher scores indicate more frequent authentic leadership behaviours. The ALQ has demonstrated acceptable validity and reliability (Walumbwa et al., 2008). In the current study, Cronbach's  $\alpha$  values were .97 (overall), .90 (transparency), .86 (balanced processing), .90 (moral/ethical perspective), and .94 (self-awareness).

### **3.5.2 Structural empowerment.**

Structural empowerment was measured using the validated Conditions of Work Effectiveness Questionnaire II (CWEQ-II) (Laschinger, Finegan, Shamian, & Wilk, 2001) comprised of four subscales: access to opportunity, information, support, and resources (3 items each). Each item is measured on a 5-point Likert scale ranging from 1 = none to 5 = a lot, with higher scores indicating higher levels of each empowerment structure. Subscale scores were created by averaging the items for each of the four subscales and used as manifest variables reflecting the latent variable of structural empowerment in the hypothesized model. In the current study each of the subscales showed acceptable internal consistency: Cronbach's  $\alpha$  of .89 (information), .84 (opportunity), .80 (support), .78 (resources), and .84 (overall).

### **3.5.3 Workplace social capital.**

The newly developed instrument was used to measure structural, relational, and cognitive social capital. Prior to the survey study, content validity of the proposed instrument was assessed using the procedures outlined by Polit and Beck (2012). In March, 2015, a panel of 16 RNs with a wide range of clinical expertise were given the

definition of each subscale and asked to rate each the relevance of each item in the questionnaire on a scale from 1 = not relevant to 4 = very relevant. A content validity index (CVI) score for each item was then calculated using the method provided by Lynn (1986). Specifically, the total number of ratings of relevant or very relevant were divided by the total number of raters to create a score from 0 to 1; values of .70 or above show initial content validity for the items.

Results showed that the items in the new questionnaire had acceptable face validity, with CVI scores ranging from .75 to 1.0. The nurses also stated that the questionnaire was easy to complete and an appropriate length. Suggestions about question wording were made for some of the items such as removing qualifiers from items (e.g. “People show ~~absolute~~ integrity”). Changes were made to simplify the questions. The raters also suggested that the first question about the size and diversity of nurses’ social network (structural social capital) be expanded to include more categories to more accurately reflect the work roles in hospitals (from seven to thirteen). Reliability and validity of the Nurses’ Workplace Social Capital Questionnaire was examined as part of the current study (see results section).

#### ***3.5.3.1 Structural social capital.***

Structural social capital consisted of three subscales: network size (1 item), network functional diversity (1 item), and perceived social status (5 items). Network size was defined as the total number of *important* ties that nurses perceive themselves to have at work. Specifically, nurses were asked to indicate the number of important contacts they have at work by organizational role (e.g. physicians, nurses, personal support worker,



etc.). The number reported for each category was summed to create a total score for network size. Network functional diversity was operationalized as the number of different types of employees within one's workplace social network. The total number of categories reported was summed to create a total score for network functional diversity. Higher scores indicated greater functional diversity than lower scores. This measure is similar to how group heterogeneity was measured by Cummings et al. (2013) in their study of academic researchers where the number of disciplines of PIs and the number of institutions were used. Perceived network status was measured using 5 items adapted from Chandler's (1991) informal power subscale of the original Conditions of Work Effectiveness Scale (CWEQ) that reflect nurses' perceived social status on their unit. Higher scores indicated higher levels of perceived work status.

#### ***3.5.3.2 Relational social capital.***

Relational social capital was measured using three subscales: trust (5 items), affective energy (5 items), and the norm of positive reciprocity (6 items). All items for relational social capital were rated on a 5-point Likert scale from 1 = strongly disagree to 5 = strongly agree. Subscale scores were calculated by averaging the items within each subscale. Five items from Simons and Peterson (2000) that were used by O'Shea (2003) were used to measure nurses' perceptions of group-wide trust. Items were designed to assess group members' expectations of truthfulness, integrity, and keeping one's word, and shared respect for competence. Affective energy was measured using the affective energy subscale of Cole, Bruch, and Vogel's (2011) productive energy measure (PEM). As mentioned, the item "People feel ecstatic in their job" was changed to "People feel full

of energy in their job”. CFA results showed that the scale demonstrated acceptable reliability (Cronbach’s  $\alpha = .89$ ) and validity (Cole, Bruch, & Vogel, 2011). Perugini et al.’s (2003) positive reciprocity scale was adapted to measure nurses’ perception of social norms of positive reciprocity on their unit using six items. Acceptable validity and reliability of the original scale have been demonstrated (Perugini et al., 2003).

### ***3.5.3.3 Cognitive social capital.***

Cognitive social capital was measured using three subscales (common ground, shared language, and shared narratives) each consisting of six items. All items for cognitive social capital were rated on a 5-point Likert scale from 1 = strongly disagree to 5 = strongly agree. Subscale scores were calculated by averaging the items within each subscale. Cognitive common ground was operationalized as nurses’ perceptions of the common knowledge about work tasks and team members that exists on their hospital unit using six new items developed by the author. Shared language, defined as nurses’ perceptions of sharing a specialized vocabulary used to convey knowledge or meaning to other employees at work was measured using three items adapted from Gianvito (2007) plus three new items. Shared narratives, defined as storytelling at work that creates a common understanding of one’s workplace and work role, was measured using six new items developed by the author.

### **3.5.4 Team effectiveness.**

Team effectiveness was measured using four items adapted from the technical quality subscale of Shortell et al.’s (2001) ICU Survey. This scale assess nurses’ perceptions of their unit’s ability to work together effectively to achieve patient care goals

(example item “Our unit works together to achieve patient care treatment goals”). Items re rated on a 5-point Likert scale from 1 = strongly disagree to 5 = strongly agree.

Cronbach’s  $\alpha$  of .76 was reported by Shortell et al. (1991). In the current study, Cronbach’s  $\alpha$  was .91 for the modified scale.

### **3.5.5 Nurse-assessed patient care quality.**

Patient care quality was measured using one previously validated item from Aiken and Patrician (2000) (“In general, how would you describe the quality of nursing care delivered to patients on your unit?”). This item was rated on a 4-point Likert scale from 1 = poor to 4 = excellent. Previous studies have shown that this is a valid measure of nurses’ perceptions of quality care (Aiken & Patrician, 2000; Laschinger, 2000). Furthermore, McHugh & Stimpfel (2012) showed that this measure of nurse-assessed care quality was significantly related to objective hospital indicators of quality of care including patient mortality, failure to rescue, and patient satisfaction.

## **3.6 Data Management**

### **3.6.1 Data integrity.**

Data screening and cleaning was conducted following procedures outlined by Tabachnick and Fidell (2013). Ten percent of the paper surveys were audited to ensure accuracy. The error rate was less than 0.1% and no further auditing was deemed necessary.

### **3.6.2. Missing Data.**

Procedures for screening, analyzing, and dealing with missing data were conducted following the recommendations of Tabachnick and Fiddell (2013). In this

study missing data analysis was conducted twice: once prior to the CFA of the measurement model of the new questionnaire (only items for the questionnaire were assessed,  $n = 247$ ) and again prior to testing the hypothesized model (using all items for all variables in the hypothesized model,  $n = 214$ ).

Missing data can be categorized as one of three main types: missing not at random (MNAR), which refers to data that is missing due to the variable itself (e.g., overweight patients not wishing to state their weight), missing at random (MAR), which refers to missing data that can be predicted by other variables in the data (e.g., employees in a particular industry not wishing to report their income, which is related to the industry they are in), and missing completely at random (MCAR), referring to data that is not missing by an identifiable pattern (ideal scenario) (Tabachnick & Fidell, 2013).

In order to determine the amount and pattern of missing values in the dataset, data were analyzed for missing data by item and by participant using missing data analysis and Little's MCAR test (Little, 1988) which tests the null hypothesis that data is missing completely at random. Depending on the amount of missing data and the type, cases or variables may be deemed unusable. It is desirable to keep as many cases as possible to avoid bias that accompanies listwise deletion but when participants do not respond to any questions in a scale deletion of the incomplete cases is a viable option.

For both the CFA of the measurement model for the new questionnaire and the analysis of the hypothesized model, Full Information Maximum Likelihood (FIML) estimation was used to deal with missing data in Mplus. FIML is a technique that uses all available observed information in the dataset to estimate the likelihood for the unknown

values (Schafer & Graham, 2002). Although an assumption of this technique is that data are MAR, Schafer and Graham (2002) suggest that for self-report measures with few missing values it is a practical alternative to suggested methods of dealing with MNAR data (e.g., pattern mixture models and selection models) which rely on unstable assumptions about the distribution of the population.

#### ***3.6.2.1 Missing Data: Workplace Social Capital Questionnaire.***

Missing data analysis was first conducted for the measurement model of the new questionnaire to measure nurses' workplace social capital. Results revealed that two participants did not answer any items for one or more of the subscales for the new questionnaire. These cases were excluded from further analysis, resulting in a sample size of  $n = 247$  to analyze the measurement model for the new questionnaire. Overall, fewer than 1% of values were missing ( $n = 247$ ). Little's MCAR test was significant (764.872,  $df = 593$ ,  $p = .000$ ) suggesting that the missing data were not missing completely at random. Due to the low amount of missing data ( $< 1\%$ ) and the potential bias from excluding participants who were missing data, it was decided that they should be kept in the analysis.

#### ***3.6.2.1 Missing Data: Hypothesized model.***

After the measurement model for the new questionnaire was established, all items to be included in the structural model were assessed for missing data. In addition to the items for social capital, this analysis included all items for authentic leadership and structural empowerment, team effectiveness, and quality of care. Thirty-three participants did not respond to the question about quality of care and were excluded from further

analysis (new n = 214). After exclusion of these cases less than 1% of values were missing for all items in the hypothesized model.

### **3.6.3. Underlying assumptions.**

Next, data was checked to make sure the underlying assumptions of SEM were met. These included the assumptions of normality and the absence of multicollinearity (Tabachnick & Fidell, 2013). Normality, which means that the sample distribution follows a normally-shaped or bell curve, was examined using three methods: (1) the Shapiro-Wilk Test (Shapiro & Wilk, 1965) which tests the null hypothesis that the data is normally distributed, (2), skewness and kurtosis values, and (3) histograms for each item.

#### ***3.6.3.1 Underlying Assumptions: Workplace Social Capital Questionnaire.***

Skewness and kurtosis values greater than 1.0 indicate non-normal data distribution (Tabachnick & Fidell, 2013). As shown in Table 3, all but two items (network size and Trust2) were not significantly skewed. Seven items were leptokurtic (Stat1, Trust2, Rec5, Rec6, CCG1, CCG5, CCG6) and one item was platykurtic (Lang5). Trust2 was only slightly skewed (-1.082) therefore it was decided not to transform this item as it was unlikely to have a significant effect on the analysis (Tabachnick & Fidell, 2013). Network size was highly skewed (2.230) and leptokurtic (6.526). Therefore, as recommended by Tabacknick and Fidell (2013), transformation of network size was performed by taking the square root. This resulted in a new variable that was more normally distributed (see Table 4). Other items did not show extreme departures from normality. However, since this instrument has yet to be tested, robust maximum likelihood (MLR) estimation recommended by Muthén and Muthén (2015) for analyzing

non-normal data was used in Mplus. This method is robust to non-normality and non-independence of data which can result in inflated fit indices if left unaccounted for (Asparaouhov & Muthén, 2005; Lei & Wu, 2012; Muthén & Muthén, 2012).

Table 3. Descriptive statistics for items of the workplace social capital questionnaire

Item	Range	Mean	SD	N	Variance	Skewness	Kurtosis	Shapiro-Wilk Test	
								Statistic	Alpha
NSIZE	1-308	52.27	47.77	237	2281.573	2.230	6.526	.975	.002
FD	1-14	7.97	2.33	237	5.419	-.060	.211	.979	.001
STAT1	1-5	4.45	0.62	247	.379	-.981	1.484	.697	.000
STAT2	1-5	4.48	0.57	247	.324	-.662	.224	.699	.000
STAT3	1-5	3.66	0.96	247	.923	-.613	.089	.884	.000
STAT4	1-5	3.32	1.09	247	1.179	-.289	-.570	.911	.000
STAT5	1-5	3.13	1.16	246	1.349	-.327	-.817	.891	.000
TRUST1	1-5	4.07	0.80	247	.633	-.856	.965	.796	.000
TRUST2	1-5	4.17	0.73	247	.537	-1.082	2.588	.768	.000
TRUST3	1-5	4.37	0.69	247	.478	-.934	.791	.757	.000
TRUST4	1-5	3.95	0.84	246	.708	-.778	.716	.831	.000
TRUST5	1-5	4.06	0.79	247	.626	-.605	.035	.829	.000
NRG1	1-5	3.26	0.91	246	.836	-.207	-.101	.877	.000
NRG2	1-5	3.21	0.91	246	.820	-.065	-.281	.882	.000
NRG3	1-5	3.14	0.98	247	.957	-.043	-.567	.897	.000
NRG4	1-5	3.22	0.99	247	.976	-.145	-.536	.902	.000
NRG5	1-5	3.01	1.02	247	1.049	.052	-.471	.901	.000
REC1	1-5	4.27	0.74	247	.554	-.894	.685	.790	.000
REC2	1-5	3.93	0.78	245	.609	-.548	.703	.823	.000
REC3	1-5	4.02	0.82	245	.680	-.738	.489	.824	.000
REC4	1-5	4.33	0.68	246	.465	-.748	.363	.768	.000
REC5	1-5	4.04	0.85	247	.722	-.999	1.538	.821	.000
REC6	1-5	4.38	0.61	247	.367	-.860	2.703	.727	.000
CCG1	1-5	4.24	0.66	247	.435	-.815	2.125	.748	.000
CCG2	1-5	4.19	0.67	247	.450	-.656	.917	.759	.000
CCG3	1-5	3.89	0.80	246	.634	-.542	.332	.829	.000
CCG4	1-5	4.32	0.60	247	.363	-.495	.608	.752	.000
CCG5	1-5	4.34	0.62	246	.380	-.890	2.960	.716	.000
CCG6	1-5	4.36	0.60	246	.354	-.914	3.575	.701	.000
LANG1	1-5	4.20	0.65	247	.420	-.578	.902	.778	.000
LANG2	1-5	3.97	0.78	245	.605	-.575	.199	.832	.000
LANG3	1-5	4.19	0.62	247	.380	-.347	.457	.768	.000
LANG4	1-5	4.05	0.88	244	.776	-.963	.995	.817	.000
LANG5	1-5	3.15	1.28	247	1.629	-.158	-1.088	.897	.000
LANG6	1-5	3.46	1.21	247	1.461	-.501	-.734	.880	.000

Table 4. Descriptive statistics for transformed variable RTSIZE

Item	Mean	SD	N	Variance	Skewness	Kurtosis	Shapiro-Wilk Statistic	Alpha
RTSIZE	6.63	2.88	237	8.313	.956	1.185	.949	.000

Note: RTSIZE was computed by taking the square root of network size (NSIZE)

### 3.6.3.1 Underlying Assumptions: Hypothesized Model.

Before testing the hypothesized model, variables were assessed to ensure that they met the underlying assumptions of normality and multicollinearity required for SEM. As shown in Table 5, most variables were approximately normally distributed. Years on current unit was negatively skewed while years of nursing experience was platykurtic. Years of nursing experience and years on current unit were initially expected to be important covariates in the model but they were not correlated with any of the major study variables. As a result, they were not included in the analysis. The four team effectiveness items were positively skewed and leptokurtic. To address this departure from normality, they were transformed based on recommendations from Tabachnick and Fidell (2013) by reflecting scores and taking the logarithm as follows:

$$NEWX = LG10(K - X), \text{ where } K = \text{maximum score} + 1$$

As shown in Table 6, the transformed items were approximately normally distributed.



Table 5. Descriptive statistics for main study variables

Item	Mean	SD	N	Variance	Skewness	Kurtosis	Shapiro-Wilk Test Statistic	Alpha
Years of Nursing Experience	21.27	12.56	182	157.655	.162	-1.447	.908	.000
Years on Current Unit	11.83	9.47	185	89.664	1.221	.753	.867	.000
<b>Authentic Leadership</b>	<b>2.41</b>	<b>0.99</b>	<b>214</b>	<b>.970</b>	<b>-.320</b>	<b>-.688</b>	<b>.970</b>	<b>.000</b>
Transparency	2.52	0.99	214	.977	-.408	-.500	.962	.000
Moral/Ethical Perspective	2.63	1.00	214	.994	-.348	-.800	.950	.000
Balanced Processing	2.32	1.08	214	1.166	-.332	-.701	.959	.000
Self-Awareness	2.17	1.16	214	1.343	-.209	-.885	.959	.000
<b>Structural Empowerment</b>	<b>12.94</b>	<b>2.51</b>	<b>214</b>	<b>6.280</b>	<b>-.011</b>	<b>-.120</b>	<b>.994</b>	<b>.520</b>
Opportunity	4.10	0.81	214	.656	-.510	-.368	.886	.000
Information	3.07	0.98	214	.966	-.014	-.471	.968	.000
Support	3.05	0.91	213	.826	-.400	-.006	.956	.000
Resources	2.74	0.87	213	.760	.156	.012	.974	.000
<b>Overall Social Capital</b>	<b>3.97</b>	<b>0.43</b>	<b>214</b>	<b>.186</b>	<b>-.001</b>	<b>.093</b>	<b>.994</b>	<b>.504</b>
Status	3.95	0.62	214	.388	-.243	-.055	.962	.000
<b>Relational Social Capital</b>	<b>3.83</b>	<b>0.54</b>	<b>214</b>	<b>.293</b>	<b>-.152</b>	<b>.279</b>	<b>.991</b>	<b>.232</b>
Trust	4.14	0.60	214	.361	-.595	.572	.943	.000
Energy	3.18	0.84	214	.698	.036	-.113	.979	.003
Norm of Positive Reciprocity	4.18	0.56	214	.309	-.243	-.543	.957	.000
<b>Cognitive Social Capital</b>	<b>4.13</b>	<b>0.47</b>	<b>214</b>	<b>.218</b>	<b>-.050</b>	<b>-.014</b>	<b>.979</b>	<b>.003</b>
Cognitive Common Ground	4.24	0.51	214	.262	-.211	-.025	.929	.000
Shared Language	4.11	0.59	214	.353	-.204	.077	.913	.000
Shared Narratives	4.08	0.57	214	.326	-.101	-.538	.966	.000
<b>Team Effectiveness</b>	<b>4.11</b>	<b>0.89</b>	<b>214</b>	<b>.796</b>	<b>-1.748</b>	<b>3.109</b>	<b>.798</b>	<b>.000</b>
Team1	4.14	0.98	214	.963	-1.660	2.863	.716	.000
Team2	3.99	1.03	214	1.056	-1.124	.881	.810	.000
Team3	4.04	0.96	214	.914	-1.257	1.494	.781	.000
Team4	4.26	1.06	214	1.133	-1.836	2.949	.676	.000
Quality of Care	3.50	0.57	214	.326	-.592	-.642	.707	.000

Note: Variables in bold were modeled as latent variables in the structural model

Table 6. Descriptive statistics for transformed team effectiveness items

Item	Mean	SD	N	Variance	Skewness	Kurtosis	Shapiro-Wilk Test	
							Statistic	Alpha
Team1	.221	.200	214	.040	.465	-.357	.791	.000
Team2	.252	.211	214	.045	.204	-.906	.841	.000
Team3	.245	.199	214	.040	.209	-.687	.882	.000
Team4	.180	.215	214	.046	-.152	.331	.754	.000

Multicollinearity refers to high correlations between predictor variables and is problematic in SEM because it can result in inaccurate path coefficient and error estimates, particularly when  $r^2$  is small or in small samples (Grewal, Cote & Baumgartner, 2004). To test for multicollinearity, the hypothesized model was tested using multiple hierarchical regression in SPSS in order to obtain variance inflation factor (VIF) and tolerance statistics. VIF values represent how much larger the variance of each regression coefficient will be for multicollinear data relative to data that is orthogonal (where independent variables have a correlation of zero) (Mansfield & Helms, 1982; O'Brien, 2007). Tolerance is the mathematical reciprocal of VIF and represents the proportion of variance of each independent variable that is unique (not related to other independent variables) (O'Brien, 2007). VIF values greater than 5.0 or tolerance values less than .20 are considered problematic. As shown in Table 7, the collinearity statistics showed that multicollinearity was not a problem affecting the hypothesized model.

Table 7. VIF and tolerance values for independent variables in the hypothesized model

	Model	Unstandardized		Standardized		Collinearity Statistics			
		Coefficients		Coefficients		t	Sig.	Tolerance	VIF
		B	SE	B					
1	(Constant)	3.445	.104			33.280	.000		
	Authentic Leadership	.021	.040	.036		.529	.597	1.000	1.000
2	(Constant)	2.577	.196			13.169	.000		
	Authentic Leadership	-.060	.041	-.103		-1.460	.146	.851	1.175
	Structural Empowerment	.082	.016	.360		5.119	.000	.851	1.175
3	(Constant)	1.410	.336			4.195	.000		
	Authentic Leadership	-.085	.040	-.147		-2.149	.033	.830	1.204
	Structural Empowerment	.056	.017	.244		3.343	.001	.730	1.370
	Social Capital	.169	.040	.297		4.194	.000	.780	1.282
4	(Constant)	1.166	.340			3.429	.001		
	Authentic Leadership	-.081	.039	-.140		-2.079	.039	.829	1.206
	Structural Empowerment	.048	.017	.212		2.915	.004	.713	1.402
	Social Capital	.151	.040	.265		3.768	.000	.762	1.312
	Team Effectiveness	.122	.041	.190		2.975	.003	.924	1.083

### 3.6.3 Data analysis.

SPSS (version 22.0, IBM Corporation, 2014) was used for data cleaning and calculating descriptive statistics. To confirm the expected factor structure of the measurement model (Figure 1), confirmatory factor analysis (CFA) using MLR was conducted using MPlus (Muthén & Muthén, 2012). Factor loadings which indicate the degree to which each item in a scale reflects the latent construct it is intended to represent (Worthington & Whittaker, 2006) were also assessed. It is generally advised that they should be  $>.70$ , given that the square of the factor loading represents the amount of variance in an item explained by the latent variable (e.g. a factor loading of .70 means that

49% of the variance in the item is explained by the construct it is measuring and the remaining 51% is due to measurement error). Comrey and Lee (1992) suggested that interpretation of factor loadings should be graded rather than setting black and white cut-off points. This approach is also endorsed by Tabachnick and Fidell (2013) where loadings of 0.32 = poor, 0.45 = fair, 0.55 = good, 0.63 = very good and 0.71 = excellent.

Internal consistency refers to the idea that all items measuring the same latent construct should be related (Bollen & Lennox, 1991). As recommended by Fornell and Larcker (1981), in addition to the unweighted average item reliability (Cronbach's  $\alpha$ ), the composite reliability (CR), which is the weighted average reliability all items (Raykov, 1997), and the AVE, which is the amount of variance in the items, on average, that is explained by the latent construct they measure, were calculated for each scale.

Cronbach's  $\alpha$  and CR values  $>.70$  and AVE  $>.50$  are the recommended cut-off values to indicate a reliable measure (Hair, Black, Babin, & Anderson, 2010).

After examining the measurement model for the new questionnaire, the nomological model (Figure 2) was tested using SEM with ML estimation in Mplus software (Muthén & Muthén, 2012). SEM is a statistical technique that uses the shared variances between variables (i.e. covariances) to estimate relationships between variables (Hoyle, 2012). The ML estimation method approximates model parameters that are most likely to result in the observed data (Hoyle, 2012). Total indirect effects, which indicate the overall effect of a variable on another through all possible paths in a model, and specific indirect effects, which indicate the indirect effect through a particular path of variables (rather than all paths) (Bollen, 1987), were estimated by calculating the products

of the regression coefficients between variables (MacKinnon et al., 2002) and significance was examined by computing the bias-corrected bootstrap confidence intervals (MacKinnon, 2008; MacKinnon et al., 2004) based on 1000 bootstrap replications of the initial sample. Bootstrapping has been shown to be more accurate than methods based on significance testing using the normal distribution (MacKinnon, Lockwood, & Williams, 2004). Significance levels were set at  $p < .05$  for all analyses and 95% confidence intervals were used to assess the significance of indirect effects in the hypothesized model.

SEM provides the advantage of providing estimates of model fit by comparing the covariance structure of the observed data to that of the theorized model (Hoyle, 2012). A perfect fit means that there is no discrepancy between the model and the observed data. As recommended by Kline (2011), Hu and Bentler (1998, 1999), and West, Taylor, and Wu (2012) the following fit statistics were used to assess the fit between the covariance structure of the data and the hypothesized model: Chi-square ( $\chi^2$ ), the Comparative Fit Index (CFI), the Tucker-Lewis Index (TLI), and root mean square error of approximation (RMSEA), and the standardized root mean square residual (SRMR).

The  $\chi^2$  test is a goodness of fit test used to test the null hypothesis that there is no difference between the estimated covariance matrix and the observed one (Joreskog, 1969). If  $\chi^2$  is significant ( $p < .05$ ) we accept the alternative hypothesis that there is a significant difference between the model and the data. Importantly,  $\chi^2$  increases as a function of sample size and as a result tends to be significant in large samples (Kenny, 2014), therefore additional fit statistics were also used. The TLI is an incremental fit

index that is calculated by dividing the difference between the  $\chi^2$  ratio of the hypothesized model and a model where none of the variables are correlated to one another (“null model”) by the  $\chi^2$  ratio of the null model minus 1. A TLI value  $> .95$  indicates an acceptable fit (Tucker & Lewis, 1973). The CFI is a goodness-of-fit statistic which compares the fit of a target model to the fit of the null model using the  $\chi^2$  index. Values  $> .95$  indicate an acceptable fit (West, Taylor, & Wu, 2012). The RMSEA is a measure of discrepancy between the data and the model relative to the degrees of freedom in the model ( $< .08$  is acceptable;  $< .05$  ideal) (Steiger & Lind, 1980; Kenny, 2014). SRMR is an absolute measure of model fit that represents the standardized discrepancy between observed correlations and those predicted by the model. Smaller values represents less difference between the hypothesized model and the data therefore values  $< .08$  indicate a good fit (Bentler, 1995). Examining all five of these standard fit indices provided an overall picture of the degree to which the model fits the data in order to evaluate the strength of the theorized causal model and provide grounds for theory refinement.

### **3.7 Protection of Human Rights**

Research Ethics Board approval was obtained before beginning data collection for the study. All participants received a detailed letter of information (see Appendix A) which invited potential participants to voluntarily participate in the research study. Full disclosure of the potential risks and benefits of study participation was provided. Participants were made aware that they could choose not to participate without penalty. In addition, the letter explained how confidentiality was maintained through the following measures: 1. Personal information of participants was stored on one file on a computer

with a secure username and password login in a locked research office at the University of Western Ontario only accessible to the researcher; 2. Participants were assigned a unique pin number that was attached to their data on the computer so that no personal identifying information was connected to their data; 3. the hard copies of the surveys only contained demographic information (no personal identifiers) and are stored in a locked filing cabinet in a locked room at the University of Western Ontario; 4. the online survey site uses data encryption and firewalls to protect survey information and participants who opted to complete the survey online provided their study PIN number as the only personal identifier.

### **3.8 Summary**

This chapter provided an overview of the methods that were used to conduct this research study. Details about the study design, sample, and data collection procedures were provided, including a description of each of the study instruments that were used. In addition, data analysis procedures used to test the measurement model of the new workplace social capital questionnaire and to test the hypothesized model of the nomological network were discussed in detail. Steps taken to ensure the protection of human rights were also provided.

## **Chapter 4: Results**

### **4.1 Introduction**

The results of the CFA of the measurement model and the analysis of the hypothesized model are the focus of this chapter and will be discussed chronologically. First, the measurement model results will be described. Participant characteristics for the full sample ( $n = 247$ ) included in this analysis will be provided. Results from testing the hypothesized measurement model will be provided, including model fit statistics and item factor loadings. Decisions to make revisions to the measurement model will be discussed, followed by the presentation of results from testing the revised (final) measurement model. Model fit statistics, item factor loadings, and scale reliability statistics for this model will be provided. Next, the results from testing the hypothesized model will be provided. This will begin with a description of the participant characteristics for the subsample ( $n = 214$ ) who were included in this analysis. Next, descriptive statistics and Pearson's  $r$  correlations will be provided for each study variable. The model fit and standardized path coefficients for the relationships between study variables will be provided. Next, the decision to modify the model by adding a direct path between social capital and quality of care will be discussed, followed by the presentation of the results for the modified model. The chapter concludes with a summary to synthesize the overall findings of this study.

### **4.2 Participant Demographics**

Participant characteristics are provided in Table 8. For the full sample ( $n = 247$ ) participants had an average age of 47.27 with 22.38 years of nursing experience and



12.33 years working on their current hospital unit. The majority were female (94.2%) and had a diploma (57.2%) or bachelor's degree in nursing (40.4%). Most were working in medical or surgical (48.8%) or critical care (36.9%) specialty areas. Almost 78% worked in urban hospitals, while the remaining 22% worked in rural settings. Eighty-one percent reported only having one job and 19% worked multiple jobs.

Participant characteristics for the subsample (n = 214) used to analyze the hypothesized model of relationships between study variables were similar to that of the full sample. Mean age was 46.15 with 21.27 years of nursing experience and 11.82 years working on their current hospital unit. The majority were female (93.9%) and had a diploma (54.2%) or bachelor's degree in nursing (40.6%). Most were working in medical or surgical (48.8%) or critical care (38%) specialty areas. Almost 79% worked in urban hospitals in Ontario, while the remaining 21.1% worked in rural settings. More than 81% reported only having one job and 18.4% worked multiple jobs. Sample characteristics were similar to recent statistics reported by the CNO (2016), though our sample was slightly older than the average age of RNs in the province which is currently 45.1 years of age.

Table 8. Participant characteristics

<i>Demographic Characteristic</i>	<i>Measurement Model Sample (n = 247)</i>			<i>Structural Model Subsample (n = 214)</i>		
	<i>N</i>	<i>Mean</i>	<i>SD</i>	<i>N</i>	<i>Mean</i>	<i>SD</i>
<b>Age</b>	236	47.27	11.37	207	46.15	11.39
<b>Years of Nursing Experience</b>	204	22.38	12.93	185	21.27	12.56
<b>Years on Current Unit</b>	208	12.33	9.79	182	11.82	9.47
<b>Gender</b>	241	%		214	%	
Female	227	94.2		199	93.9	
Male	14	5.8		13	6.1	
<b>Highest Level of Nursing Education</b>	243	%			%	
Diploma	139	57.2		115	54.2	
Four-year Bachelor of Nursing Science	93	38.3		86	40.6	
Fast-track Bachelor of Nursing Science	5	2.1		5	2.4	
Master of Nursing	5	2.1		5	2.4	
Other (PhD candidate)	1	0.4		1	0.5	
<b>Specialty of current unit</b>	244	%		213	%	
Medical-surgical	119	48.8		104	48.8	
Critical care	90	36.9		81	38.0	
Maternal-child	26	10.7		20	9.4	
Mental health	6	2.5		5	2.3	
Float/Nursing Resources Unit	3	1.2		3	1.4	
<b>Current employment status</b>	244	%		213	%	
Full time	171	70.1		153	71.8	
Part time	61	25.0		52	24.4	
Casual	12	4.9		8	3.8	
<b>More than one job</b>	242	%		212	%	
No	196	81.0		173	81.6	
Yes	46	19.0		39	18.4	
<b>Type of Hospital</b>	240	%		209	%	
Rural	53	22.1		44	21.1	
Urban	187	77.9		165	78.9	

### 4.3 Confirmatory Factor Analysis of the Measurement Model for Nurses'

#### Workplace Social Capital

The first model was not a good fit for the data:  $\chi^2(769) = 1849.311$ ,  $p < .001$ ; CFI = .783; TLI = .769; RMSEA = .077 (.073-.082); SRMR = .083. The item factor loadings revealed that some items were not strongly related to their respective latent factors (Table 9). For the status subscale of structural social capital, STAT5 "My supervisor asks for my

opinion about unit management issues” had a factor loading of .217. In the shared language subscale of cognitive social capital, three items had poor loadings: LANG4 “Outsiders may not understand some of the terminology we use” (.296), LANG5 “We use special nicknames for things (e.g. “Walky-Talky” to describe a patient who is mobile and can communicate verbally)” (.113), and LANG6 “We use abbreviations that others would not understand” (.098). At the second-order factor level, network functional diversity (FD2) and network size (SIZE) had weak factor loadings on structural social capital (.164 and .137, respectively). Reassessing the items and the nature of the questions, it was decided to remove these items from the measurement model.

Structural social capital, which reflects the composition of one’s workplace social network (Nahapiet & Ghoshal, 1998) has rarely been assessed through self-report in past studies outside of organizational field research which lends itself to nomination measurement techniques. The results suggest that nurses have a hard time accurately estimating the number of important relationships they have at work (for example, some respondents reported 150 nurses as being important in their daily work) or that the question was not clearly stated or interpreted by all participants. Therefore, it was decided to keep the status subscale as a key component reflecting overall workplace structural social capital.

Table 9. Standardized factor loadings for hypothesized measurement model of the workplace social capital questionnaire

<b>Latent Factor</b>	<b>Item</b>	<b>B</b>	<b>SE</b>	<b>T</b>	<b>P</b>
<i>First Level Higher-Order Factors</i>					
<b>Status</b>					
Coworkers ask for my opinion about patient care issues.	<i>STAT1</i>	.878	.038	22.987	.000
Coworkers ask for my help with work-related challenges.	<i>STAT2</i>	.822	.044	18.754	.000
Physicians ask for my opinion about patient care issues.	<i>STAT3</i>	.442	.069	6.458	.000
Physicians ask for my help with work-related challenges.	<i>STAT4</i>	.379	.075	5.046	.000
My supervisor asks for my opinion about unit management issues.*	<i>STAT5</i>	.217	.078	2.771	.006
<b>Trust</b>					
We respect each other's competence.	<i>TRUST1</i>	.738	.053	13.873	.000
Everyone shows integrity.	<i>TRUST2</i>	.787	.049	15.944	.000
We expect the truth from each other.	<i>TRUST3</i>	.746	.041	18.137	.000
We can trust each other.	<i>TRUST4</i>	.754	.053	14.112	.000
We count on each other to live up to our word	<i>TRUST5</i>	.830	.035	23.866	.000
<b>Affective energy</b>					
People feel excited in their job.	<i>NRG1</i>	.869	.032	27.493	.000
People feel enthusiastic in their job.	<i>NRG2</i>	.925	.017	54.478	.000
People feel energetic in their job.	<i>NRG3</i>	.921	.016	58.856	.000
People feel inspired in their job.	<i>NRG4</i>	.827	.029	28.986	.000
People feel full of energy in their job.	<i>NRG5</i>	.812	.033	24.712	.000
<b>Norm of Positive Reciprocity</b>					
Everyone pitches in to help each other.	<i>REC1</i>	.681	.060	11.287	.000
People are committed to returning favours.	<i>REC2</i>	.787	.036	22.001	.000
Help from others will be there when you need it.	<i>REC3</i>	.750	.040	18.974	.000
People will go out of their way to help someone who has helped them in the past.	<i>REC4</i>	.756	.031	24.621	.000
People will do a task they dislike to return someone's previous help.	<i>REC5</i>	.705	.053	13.377	.000
People are happy to help those who helped them.	<i>REC6</i>	.783	.029	27.387	.000
<b>Cognitive Common Ground</b>					
We understand each person's work role.	<i>CCG1</i>	.681	.077	8.814	.000
We understand each team member's skill set.	<i>CCG2</i>	.743	.047	15.925	.000
We understand each team member's work style.	<i>CCG3</i>	.620	.051	12.172	.000
We understand the day-to-day work flow on the unit.	<i>CCG4</i>	.746	.049	15.302	.000
We have shared knowledge about our specialty area.	<i>CCG5</i>	.819	.038	21.469	.000
We have shared knowledge about the types of patients we care for.	<i>CCG6</i>	.721	.075	9.682	.000
<b>Shared Language</b>					
We express work-related ideas using the same terminology.	<i>LANG1</i>	.818	.043	19.090	.000
We easily communicate with each other.	<i>LANG2</i>	.582	.063	9.161	.000
We ask work-related questions using the same terminology.	<i>LANG3</i>	.942	.026	35.764	.000
Outsiders may not understand some of the terminology we use.*	<i>LANG4</i>	.296	.075	3.965	.000

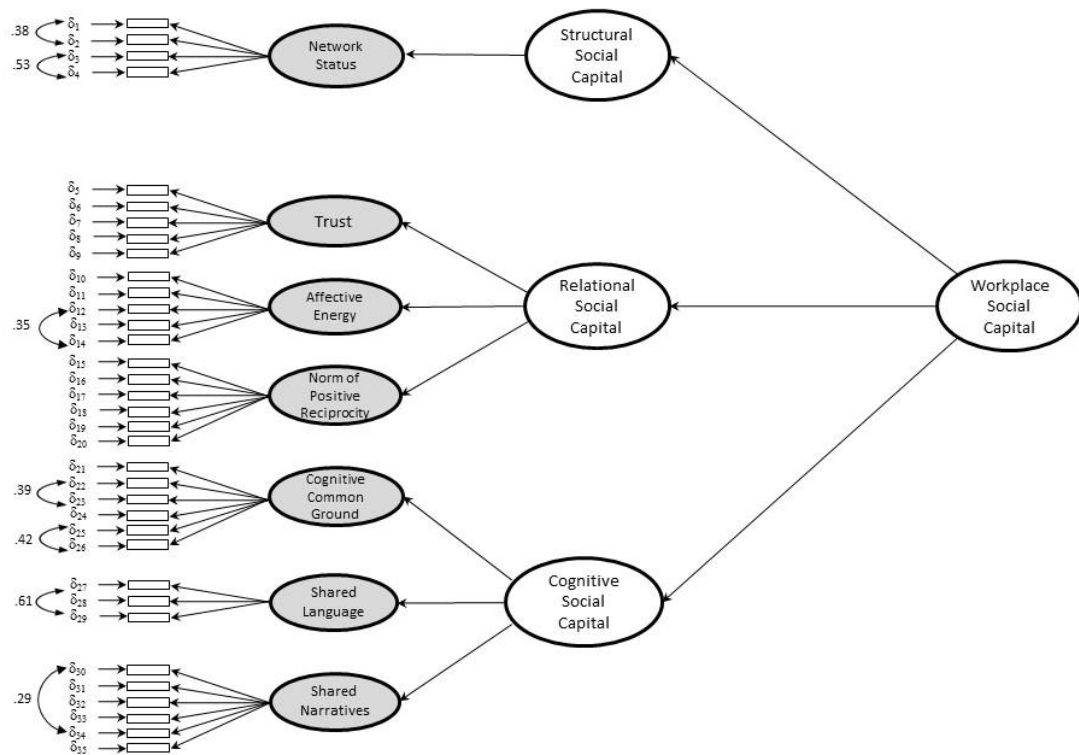
We use special nicknames for things (e.g. “Walky-Talky” to describe a patient who is mobile and can communicate verbally).*	<i>LANG5</i>	.113	.075	1.516	.130
We use abbreviations that others would not understand.*	<i>LANG6</i>	.098	.077	1.280	.201
<b>Shared Narratives</b>					
We share stories about our work experiences.	<i>NAR1</i>	.533	.075	7.070	.000
Our unit has been through a lot together.	<i>NAR2</i>	.631	.058	10.874	.000
We interpret experiences at work in a similar way.	<i>NAR3</i>	.643	.057	11.248	.000
People share stories about what the unit was like in the past.	<i>NAR4</i>	.639	.052	12.255	.000
We have similar views about the meaning of our work.	<i>NAR5</i>	.737	.053	13.922	.000
Our unit has a unique history.	<i>NAR6</i>	.710	.057	12.429	.000
<b>Second Level Higher-Order Factors</b>					
<i>Structural Social Capital</i>					
Network Functional Diversity	<i>FD2</i>	.164	.075	2.181	.029
Network Size	<i>SIZE</i>	.137	.075	1.821	.069
Status	<i>STATUS</i>	.872	.227	3.839	.000
<i>Relational Social Capital</i>					
Norm of Positive Reciprocity	<i>REC</i>	.932	.044	21.191	.000
Trust	<i>TRUST</i>	.814	.049	16.641	.000
Affective Energy	<i>ENERGY</i>	.543	.062	8.724	.000
<i>Cognitive Social Capital</i>					
Cognitive Common Ground	<i>CCG</i>	.946	.039	24.117	.000
Shared Language	<i>LANG</i>	.682	.055	12.292	.000
Shared Narratives	<i>NAR</i>	.646	.062	10.476	.000
<b>Third Level Higher Order Factor</b>					
<i>Social Capital</i>					
Structural Social Capital	<i>STRUC</i>	.691	.181	3.817	.000
Relational Social Capital	<i>REL</i>	.866	.066	13.182	.000
Cognitive Social Capital	<i>COG</i>	.959	.059	16.160	.000

\*Item not included in final measurement model

Results for the revised measurement model are shown in Figure 3 and Table 10.

Although not a perfect fit, these results demonstrate initial support for the measurement model.

Figure 3. Revised measurement model for the workplace social capital questionnaire



### **Items retained in the final measurement model:**

#### **Status**

- STAT1 Coworkers ask for my opinion about patient care issues.
- STAT2 Coworkers ask for my help with work-related challenges.
- STAT3 Physicians ask for my opinion about patient care issues.
- STAT4 Physicians ask for my help with work-related challenges.

#### **Trust**

- TRUST1 We respect each other's competence.
- TRUST2 Everyone shows integrity.
- TRUST3 We expect the truth from each other.
- TRUST4 We can trust each other.
- TRUST5 We count on each other to live up to our word

#### **Affective Energy**

- NRG1 People feel excited in their job.
- NRG2 People feel enthusiastic in their job.
- NRG3 People feel energetic in their job.
- NRG4 People feel inspired in their job.
- NRG5 People feel full of energy in their job.

#### **Norm of Positive Reciprocity**

- REC1 Everyone pitches in to help each other.
- REC2 People are committed to returning favours.
- REC3 Help from others will be there when you need it.
- REC4 People will go out of their way to help someone who has helped them in the past.
- REC5 People will do a task they dislike to return someone's previous help.
- REC6 People are happy to help those who helped them.

#### **Cognitive Common Ground**

- CCG1 We understand each person's work role.
- CCG2 We understand each team member's skill set.
- CCG3 We understand each team member's work style.
- CCG4 We understand the day-to-day work flow on the unit.
- CCG5 We have shared knowledge about our specialty area.
- CCG6 We have shared knowledge about the types of patients we care for.

#### **Shared Language**

- LANG1 We express work-related ideas using the same terminology.
- LANG2 We easily communicate with each other.
- LANG3 We ask work-related questions using the same terminology.

#### **Shared Narratives**

- NAR1 We share stories about our work experiences.
- NAR2 Our unit has been through a lot together.
- NAR3 We interpret experiences at work in a similar way.
- NAR4 People share stories about what the unit was like in the past.
- NAR5 We have similar views about the meaning of our work.
- NAR6 Our unit has a unique history.

Table 10. Standardized factor loadings for final measurement model of the nurses' workplace social capital questionnaire

<i>Latent Factor</i>	<i>Item</i>	<i>B</i>	<i>SE</i>	<i>t</i>	<i>P</i>
<b>First Level Higher-Order Factors</b>					
<i>Status</i>					
	<i>STAT1</i>	.820	.131	6.238	.000
	<i>STAT2</i>	.722	.099	7.330	.000
	<i>STAT3</i>	.437	.073	6.022	.000
	<i>STAT4</i>	.359	.107	3.356	.001
<i>Trust</i>					
	<i>TRUST1</i>	.738	.053	13.996	.000
	<i>TRUST2</i>	.787	.049	16.120	.000
	<i>TRUST3</i>	.745	.041	18.197	.000
	<i>TRUST4</i>	.754	.053	14.143	.000
	<i>TRUST5</i>	.831	.035	24.018	.000
<i>Affective energy</i>					
	<i>NRG1</i>	.882	.030	29.292	.000
	<i>NRG2</i>	.941	.015	63.995	.000
	<i>NRG3</i>	.898	.020	44.691	.000
	<i>NRG4</i>	.821	.030	27.520	.000
	<i>NRG5</i>	.777	.036	21.485	.000
<i>Norm of positive reciprocity</i>					
	<i>REC1</i>	.679	.060	11.251	.000
	<i>REC2</i>	.788	.036	22.083	.000
	<i>REC3</i>	.749	.040	18.812	.000
	<i>REC4</i>	.757	.031	24.469	.000
	<i>REC5</i>	.705	.053	13.266	.000
	<i>REC6</i>	.785	.029	27.410	.000
<i>Cognitive Common Ground</i>					
	<i>CCG1</i>	.706	.072	9.871	.000
	<i>CCG2</i>	.742	.040	18.429	.000
	<i>CCG3</i>	.603	.050	12.118	.000
	<i>CCG4</i>	.740	.053	13.906	.000
	<i>CCG5</i>	.776	.035	22.006	.000
	<i>CCG6</i>	.670	.054	12.460	.000
<i>Shared Language</i>					
	<i>LANG1</i>	.617	.062	10.007	.000
	<i>LANG2</i>	.736	.057	12.953	.000
	<i>LANG3</i>	.735	.051	14.493	.000
<i>Shared Narratives</i>					
	<i>NAR1</i>	.482	.076	6.362	.000



	<i>NAR2</i>	.609	.063	9.666	.000
	<i>NAR3</i>	.661	.057	11.541	.000
	<i>NAR4</i>	.599	.053	11.276	.000
	<i>NAR5</i>	.759	.051	14.956	.000
	<i>NAR6</i>	.717	.059	12.148	.000
<b>Second Level Higher-Order Factors</b>					
<i>Relational Social Capital</i>					
	<i>REC</i>	.923	.043	21.455	.000
	<i>TRUST</i>	.822	.048	16.985	.000
	<i>ENERGY</i>	.540	.064	8.498	.000
<i>Cognitive Social Capital</i>					
	<i>CCG</i>	.967	.042	22.890	.000
	<i>LANG</i>	.835	.055	15.272	.000
	<i>NAR</i>	.653	.062	10.576	.000
<b>Third Level Higher-Order Factor</b>					
<i>Social Capital</i>					
	<i>Status</i>	.636	.122	5.195	.000
	<i>Relational</i>				
	<i>Social Capital</i>	.898	.069	13.024	.000
	<i>Cognitive</i>				
	<i>Social Capital</i>	.942	.058	16.274	.000

Reliability estimates showed support for the internal consistency of the scale at each level (Table 11). Status had a Cronbach's  $\alpha$  of .73, CR of .69, and AVE was .38. Low CR and AVE likely reflects the way the items were worded because of the four items retained in the subscale, two items referred to co-workers and two items referred to physicians. Trust demonstrated strong internal consistency with a Cronbach's  $\alpha$  of .88, CR of .88, and AVE was .60. Similar results were found for the norm of positive reciprocity (Cronbach's  $\alpha$  = .88; CR = .88; AVE = .55) and affective energy (Cronbach's  $\alpha$  = .94; CR = .94; AVE = .75). Cognitive common ground had a Cronbach's  $\alpha$  of .86, CR of .86, and AVE was .50. Shared language had a Cronbach's  $\alpha$  of .79, CR of .74, and AVE was .49. Finally, shared narratives had a Cronbach's  $\alpha$  of .82, CR of .81, and AVE

was .41, suggesting that, while the overall scale is reliable, some revisions to the items may strengthen the scale.

Table 11. Social capital questionnaire scale reliabilities (n = 247)

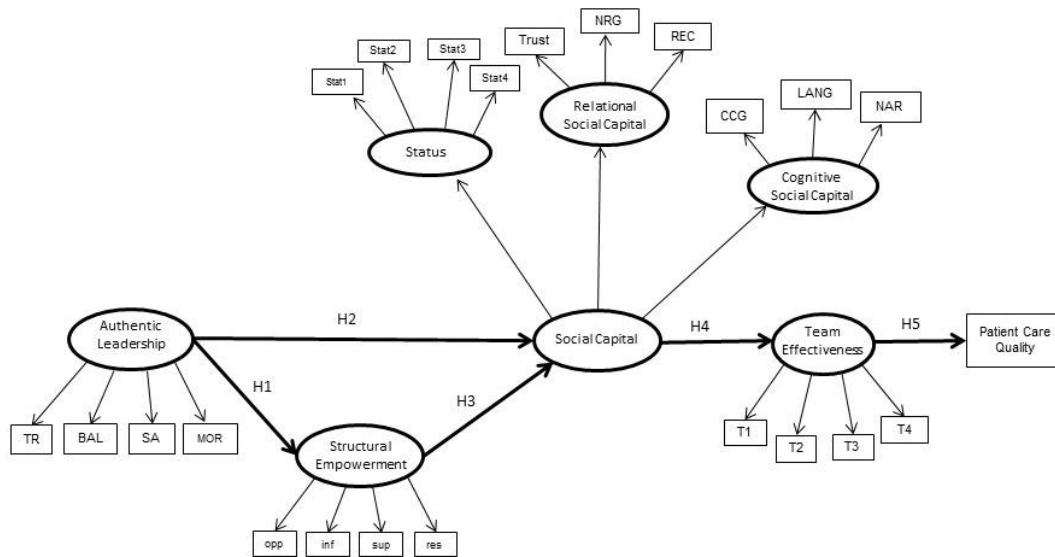
<b>Subscale</b>	<b>Cronbach's <math>\alpha</math></b>	<b>Composite Reliability</b>	<b>AVE</b>
Status	.73	.69	.38
Trust	.88	.88	.60
Norm of positive reciprocity	.88	.88	.55
Affective energy	.94	.94	.75
Cognitive Common Ground	.86	.86	.50
Shared Language	.79	.74	.49
Shared Narratives	.82	.81	.41

*Notes:* Cronbach's alpha was estimated using relevant items for each scale in SPSS. Composite reliability and average variance extracted (AVE) were estimated using Fornell and Larker's (1981) formula using standardized item factor loadings for first-order latent variables (status, trust, reciprocity, energy, cognitive common ground, shared language, and shared narratives) and subscale factor loadings for second-order latent variables (relational and cognitive social capital) and the third-order social capital latent variable from Mplus.

#### **4.4 Testing the Nomological Network of Nurses' Workplace Social Capital**

Based on Nahapiet and Ghoshal's (1998) theoretical framework and results of the CFA, the hypothesized model included a higher-order latent variable for overall social capital. In addition, status was the only component of structural social capital retained in the model. The revised model is depicted in Figure 4.

Figure 4. Revised hypothesized model.



#### 4.4.1 Descriptive Statistics

Descriptive results and correlations are provided in Table 12. On average nurses’ rated their direct supervisor’s authentic leadership behaviours as 2.41 out of 4 and felt that their work environments were moderately empowering (12.94 out of 20). Overall social capital was high with a mean of 3.97 out of a possible score of 5. Mean status ratings were 3.95 out of 5. Relational social capital was 3.83 out of a possible score of 5. Nurses felt that norms of trust and positive reciprocity were high on their units (4.14 and 4.18 out of 5, respectively), while affective energy was more moderate (3.18 out of 5). Cognitive social capital was 4.13 out of a possible score of 5. Ratings of cognitive common ground were high (4.24 out of 5), as were those for shared language (4.11 out of 5) and shared narratives (4.08 out of 5). Average ratings of team effectiveness were 4.11 out of 5 and quality of care was 3.50 out of 4.

Correlations between major study variables are shown in Table 13. Significant relationships between study variables will be described next based on their order of appearance in the table. For simplicity, each significant correlation will only be mentioned once.

Authentic leadership was significantly correlated with structural empowerment (.39), overall social capital (.25), relational social capital (.33), trust (.31), energy (.32), positive reciprocity (.16), cognitive social capital (.23), cognitive common ground (.15), and shared language (.31). Structural empowerment was significantly related to overall social capital (.42), status (.24), relational social capital (.41), trust (.33), energy (.36), positive reciprocity (.28), cognitive social capital (.39), cognitive common ground (.35), shared language (.35), shared narratives (.27), team effectiveness (.29), and quality of care (.32).

Overall social capital was significantly related to status (.77), relational social capital (.81), trust (.71), energy (.59), positive reciprocity (.72), cognitive social capital (.80), cognitive common ground (.73), shared language (.68), shared narratives (.57), team effectiveness (.35), and quality of care (.34). Status was significantly correlated with relational social capital (.37), trust (.34), energy (.28), positive reciprocity (.30), cognitive social capital (.38), cognitive common ground (.39), shared language (.32), shared narratives (.24), and quality of care (.16). Relational social capital had high correlations with trust (.81), energy (.82), positive reciprocity (.81), cognitive social capital (.60), cognitive common ground (.60), shared language (.52), shared narratives (.40), team effectiveness (.28), and quality of care (.40). Trust was significantly correlated with

energy (.43), positive reciprocity (.65), cognitive social capital (.57), cognitive common ground (.51), shared language (.51), shared narratives (.39), team effectiveness (.25), and quality of care (.32). Energy was significantly correlated with positive reciprocity (.44), cognitive social capital (.32), cognitive common ground (.34), shared language (.31), team effectiveness (.19), and quality of care (.29). Cognitive social capital was significantly correlated with cognitive common ground (.82), shared language (.86), shared narratives (.80), team effectiveness (.38), and quality of care (.23). Cognitive common ground was significantly correlated with shared language (.62), shared narratives (.45), team effectiveness (.32), and quality of care (.28). Shared language was significantly related to shared narratives (.51), team effectiveness (.28), and quality of care (.21). Shared narratives was associated with team effectiveness (.36) and quality of care (.14). Finally, the significant correlation between team effectiveness and quality of care was .34.

Table 122. Means, standard deviations, and correlations of main study variables (n = 214)

Variable	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Years of Nursing Experience	21.27	12.56	-														
2. Years on Current Unit	11.83	9.47	.64*	-													
3. <i>Authentic Leadership</i>	2.41	0.99	-.02	.08	<b>.97</b>												
4. <i>Structural Empowerment</i>	12.94	2.51	-.03	.04	.39*	<b>.84</b>											
5. <i>Overall Social Capital</i>	3.97	0.43	.08	.06	.25*	.42*	<b>.94</b>										
6. Status	3.95	0.62	.18*	.13	.06	.24*	.77*	<b>.72</b>									
7. <i>Relational Social Capital</i>	3.83	0.54	-.02	-.06	.33*	.41*	.81*	.37*	<b>.92</b>								
8. Trust	4.14	0.60	.03	.02	.31*	.33*	.71*	.34*	.81*	<b>.87</b>							
9. Energy	3.18	0.84	.02	-.07	.32*	.36*	.59*	.28*	.82*	.43*	<b>.87</b>						
10. Norm of Positive Reciprocity	4.18	0.56	-.10	-.08	.16*	.28*	.72*	.30*	.81*	.65*	.44*	<b>.93</b>					
11. <i>Cognitive Social Capital</i>	4.13	0.47	-.01	.06	.23*	.39*	.80*	.38*	.60*	.57*	.32*	.66*	<b>.89</b>				
12. Cognitive Common Ground	4.24	0.51	.06	.04	.15*	.35*	.73*	.39*	.60*	.51*	.34*	.68*	.82*	<b>.87</b>			
13. Shared Language	4.11	0.59	.01	.04	.31*	.35*	.68*	.32*	.52*	.51*	.31*	.51*	.86*	.62*	<b>.78</b>		
14. Shared Narratives	4.08	0.57	-.09	.05	.11	.27*	.57*	.24*	.40*	.39*	.13	.48*	.80*	.45*	.51*	<b>.82</b>	
15. Team Effectiveness	4.11	0.89	.13	.10	.11	.29*	.35*	.13	.28*	.25*	.19*	.25*	.38*	.32*	.28*	.36*	<b>.91</b>
16. Quality of Care	3.50	0.57	.14	.05	.04	.32*	.34*	.16*	.40*	.32*	.29*	.37*	.25*	.28*	.21*	.14*	.34*

Note: Cronbach's alphas for each scale are on the diagonal

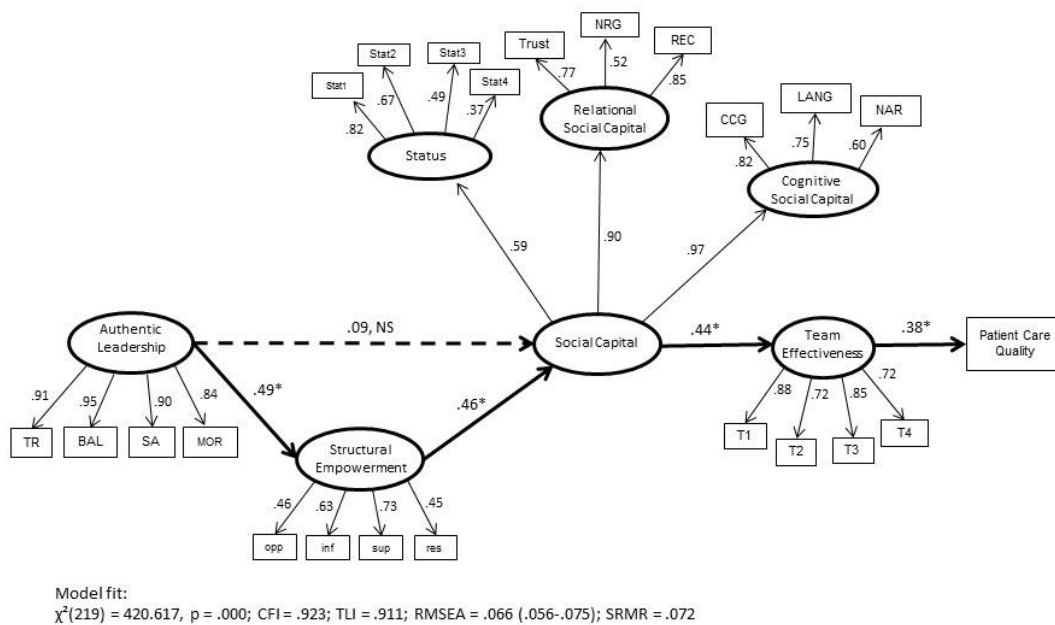
\* Significant,  $p < .05$

For team effectiveness, the transformed variable had a mean of 0.22 and a standard deviation of 0.18. This was used in the correlation calculations. The mean and standard deviation reported in the table is the mean score reported by participants before transformation on a scale from 1 to 5. The correlation between the mean of the original and transformed team effectiveness variables was .97, and significant,  $p < .001$ .

#### 4.4.2 Testing the Hypothesized Model

Results showed that the hypothesized model was an acceptable fit for the data:  $\chi^2(219) = 420.617, p < .001$ ; CFI = .923; TLI = .911; RMSEA = .066 (.056-.075); SRMR = .072. In this model, authentic leadership had a significant positive effect on structural empowerment ( $\beta = .49, p < .001$ ), structural empowerment had a significant positive effect on social capital ( $\beta = .46, p < .001$ ), social capital had a significant positive effect on team effectiveness ( $\beta = .44, p < .001$ ), and team effectiveness had a significant positive effect on quality of care ( $\beta = .38, p < .001$ ). Authentic leadership did not have a significant effect on social capital ( $\beta = .09, p = .407$ ). Thus, most hypothesized relationships between study variables were supported (Figure 5).

Figure 5. Standardized coefficients between study variables in the hypothesized model



Note: \* Significant; NS = non-significant,  $p < .05$

The modification indices showed that adding a direct path between social capital and quality of care would decrease the overall model  $\chi^2$  by approximately 15.324. Modification indices reflect the overall change in  $\chi^2$  that would occur if a fixed or constrained parameter were freely estimated (Brown & Moore, 2012). For example, two items in the same scale may share unexplained variance (error) that contributes more to model misfit when accounted for separately. Statistically, each modification index represents a  $\chi^2$  statistic with one degree of freedom. Therefore, modification indices greater than the critical value of 3.84 ( $p < .05$ ) indicate that the overall model fit can be significantly improved by allowing the error covariance of two indicators to be freely estimated. MacCallum, Rozowski, and Neocowitz (1992) emphasized that modification indices alone do not justify the use of modification indices to respecify models and that theoretical justification is also necessary.

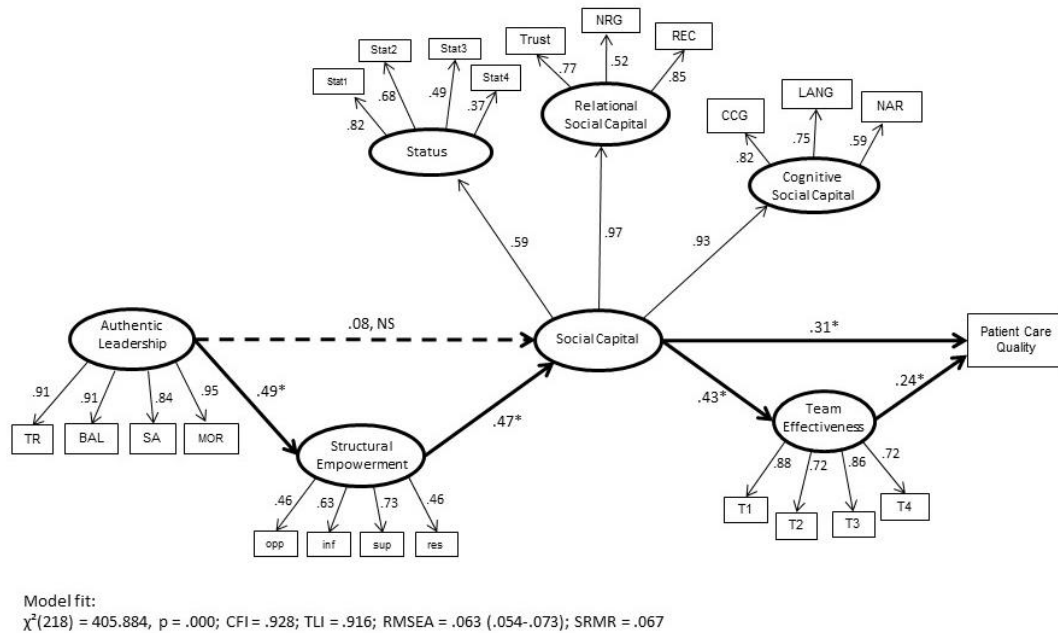
Theoretically, it makes sense that team effectiveness is not the only mechanism through which social capital has a positive effect on patient care quality. For example, nurses who have high levels of social capital are likely to value relationships and spend more time with patients. Greater social capital may also enable nurses to secure more and/or better resources for patients, resulting in improved care. Based on this logic, a direct path between social capital and patient care quality was added.

The modified model with the added direct path between social capital and quality of care showed a superior fit, supporting the importance of this additional relationship in the model:  $\chi^2(218) = 405.884$ ,  $p < .001$ ; CFI = .928; TLI = .916; RMSEA = .063 (.054 - .073) ; SRMR = .067 (Figure 6). In this revised model all hypothesized relationships were



significant including the new path between social capital and quality of care ( $\beta = .31, p < .001$ ), with the exception of the direct path from authentic leadership to social capital ( $\beta = .08, p = .441$ ). Authentic leadership had a significant positive effect on structural empowerment ( $\beta = .49, p < .001$ ), structural empowerment had a significant positive effect on social capital ( $\beta = .47, p < .001$ ), social capital had a significant positive effect on team effectiveness ( $\beta = .43, p < .001$ ), and team effectiveness had a significant positive effect on quality of care ( $\beta = .24, p = .001$ ). Results are displayed in Table 13 and Figure 6.

Figure 6. Standardized beta coefficients between study variables in modified model



Note: \* Significant; NS = non-significant,  $p < .05$

Table 133. Comparison of model fit for hypothesized model and final model

<b>Model</b>	$\chi^2$	<b>p</b>	<b>df</b>	<b>RMSEA (90% CI)</b>	<b>CFI</b>	<b>TLI</b>	<b>SR MR</b>
Hypothesized model	420.617	.000	219	.066 (.056-.075)	.923	.911	.072
Final model (additional direct path from social capital to quality of care)	405.884	.000	218	.063 (.054-.073)	.928	.916	.067
$\chi^2$ difference	14.733						

*Note:* The critical value for 1 df for the chi-square test is 3.84 at  $p < .05$ . Values above this critical value are significant.

Standardized total and specific indirect effects are shown in Table 14. Authentic leadership had a significant total indirect effect on patient care quality ( $\beta = .128$ , 95% CI .035-.222) through the combination of all indirect paths. Structural empowerment also had a significant total indirect effect on patient care quality ( $\beta = .194$ , 95% CI .046-.342), through its effects on social capital (specific indirect effect,  $\beta = .146$ , 95% CI .009-.283) and social capital and team effectiveness (specific indirect effect,  $\beta = .048$ , 95% CI .001-.095). Social capital had a significant indirect effect on patient care quality through team effectiveness ( $\beta = .102$ , 95% CI .022-.182). Authentic leadership also had a significant overall indirect effect on team effectiveness ( $\beta = .133$ , 95% CI .034-.231), through its effects on empowerment, social capital, and team effectiveness (specific indirect effect,  $\beta = .099$ , 95% CI .010-.188). Structural empowerment also had a significant indirect effect on team effectiveness through social capital ( $\beta = .200$ , 95% CI .050-.350). Finally, authentic leadership had a significant indirect effect on social capital through

empowerment ( $\beta = .232$ , 95% CI .064-.400). Total and specific indirect effects are presented in Table 15.

Table 144. Standardized total and specific indirect effects for final model

	<i>Standardized Estimates</i>				
	$\beta$	<i>SE</i>	<i>p</i>	<i>95% CI (lower bound)</i>	<i>95% CI (upper bound)</i>
<b>Authentic Leadership to Quality of Care</b>					
<i>Total Indirect Effect</i>	.128*	.048	.007	.035	.222
<i>Specific Indirect Effects</i>					
AL -> SocCap -> Care	.025	.041	.546	-.055	.105
AL -> Emp -> SocCap -> Care	.072	.040	.069	-.006	.150
AL -> SocCap -> Team -> Care	.008	.014	.576	-.020	.037
AL -> Emp -> SocCap -> Team -> Care	.024	.013	.078	-.003	.050
<b>Structural Empowerment to Quality of Care</b>					
<i>Total Indirect Effect</i>	.194*	.076	.010	.046	.342
<i>Specific Indirect Effects</i>					
Emp -> SocCap -> Care	.146*	.070	.037	.009	.283
Emp -> SocCap -> Team -> Care	.048*	.024	.046	.001	.095
<b>Social Capital to Quality of Care</b>					
SocCap -> Team -> Care	.102*	.041	.013	.022	.182
<b>Authentic Leadership to Team Effectiveness</b>					
<i>Total Indirect Effect</i>	.133*	.050	.008	.034	.231
<i>Specific Indirect Effects</i>					
AL -> SocCap -> Team	.034	.055	.539	-.074	.142
AL -> Emp -> SocCap -> Team	.099*	.045	.030	.010	.188
<b>Structural Empowerment to Team Effectiveness</b>					
Emp -> SocCap -> Team	.200*	.077	.009	.050	.350
<b>Authentic Leadership to Social Capital</b>					
AL -> Emp -> SocCap	.232*	.086	.007	.064	.400

\* Significant,  $p < .05$

#### **4.5 Summary of Overall Findings**

The measurement model of a new self-report questionnaire to assess nurses' workplace social capital was tested using CFA. Model fit indices and evaluation of item factor loadings provided data to revise the hypothesized measurement model. Results showed that this revised model was a better fit with the data. Item factoring loadings and reliability estimates for the new instrument were provided. Overall, the findings provided initial support for the final version of the new questionnaire as a valid and reliable self-report measure to assess nurses' perceptions of social capital in Canadian hospital settings. The results from testing the hypothesized model were also presented. The model fit and standardized path coefficients were described, along with the decision to revise the model by adding an additional direct path between social capital and patient care quality based on modification index results and theoretical rationale. Results from testing this revised model were provided, including a comparison of the model fit of the new model with that of the original hypothesized model. Again, standardized path coefficients were described. Overall and specific indirect effects were also described for the final model. A more detailed discussion of the study results is provided in Chapter 5.

## **Chapter 5: Discussion**

### **5.1 Introduction**

This chapter discusses the findings of the study and related implications, as well as strengths, limitations, and directions for future research. First, the CFA results of the new workplace social capital measure are discussed followed by the hypothesized relationships between study variables. Based on the study results and theoretical and empirical support from the literature, the relationships between variables are explored. Implications of the findings are then discussed, followed by conclusions drawn from the study. Strengths and limitations of this research and suggestions for further research are provided. The chapter concludes with an overall summary.

### **5.2 Measurement model of the new questionnaire to assess nurses' workplace social capital**

The results provided further empirical support for Nahapiet and Ghoshal's (1998) theory by showing that social capital is a multidimensional higher order construct comprised of structural, relational, and cognitive components. The findings supported the new measure and, in doing so, extend current knowledge of workplace social capital by showing that status is a key component of nurses' structural social capital, affective energy at work is a valuable aspect of their relational social capital, and that cognitive common ground and shared narratives are important dimensions of their cognitive social capital. The addition of these new dimensions are consistent with Nahapiet and Ghoshal's (1998) theory and provide a fuller understanding of the social resources embedded in workplace social relationships.

### **5.2.1 Structural social capital**

Structural social capital proved to be the most difficult aspect to measure via self-report. Contrary to expectations, findings showed that status was the only significant structural component related to structural social capital. Our results supported the idea that status is a valuable form of structural social capital for nurses that is separate from the size and functional diversity of their workplace social network. Research on social status has shown that ties to high-status individuals are valuable for status attainment (Bonacich, 1987) but the link between the number of ties and the diversity of those ties to status is less clear. Functional diversity in hospital settings may have less to do with social capital than it does with the workforce needs of each unit. That is, the diversity of nurses' workplace social capital may depend on the personnel requirements on their unit rather than on personal choice of association. Therefore, it is plausible that network functional diversity is a group-level social capital variable that varies at the unit level rather than by individual nurse. The wide range of responses provided for network size suggested a calibration issue with this question. It may be that the question was not specific or concrete enough to illicit accurate responses about the number of people nurses have important working relationships with at work.

The finding that status is an important form of structural social capital for nurses aligns with past work showing that social networks are socially stratified (Lamertz & Aquino, 2004), resulting in unequal distribution of resources within society and in the workplace (Belliveau, O'Reilly, & Wade, 1996). Informal status has received less attention in the healthcare literature than formal status but results consistently show that

higher status is associated with greater social power and resources. For example, Nembhard and Edmondson (1996) showed that physicians had higher levels of psychological safety than nurses and respiratory therapists and that physicians had the power to significantly influence unit-level psychological safety by including others. In a qualitative study of healthcare teams working in pediatric nephrology, Currie and White (2012) found that professional hierarchies played an important role in knowledge brokerage but that respect and group affiliation (sources of informal status) were also important factors influencing collaboration and knowledge sharing between team members. The findings of these studies demonstrate that both formal and informal social status play a valuable role in the distribution of resources as well as team dynamics within healthcare teams.

Our results suggest that individual nurses benefit from higher levels of status at work. If shared, the advantages of this form of structural social capital can also extend to work colleagues who gain access to the network of high status individuals at work. Competition for status among employees can lead to negative work behaviours such as sabotage and redemption (Charness, Masclet, & Villeval, 2013). Thus, nurse managers must be cognisant of the role that status plays in nurses' work life and recognize how their own status within the organization may influence their unit's access to organizational resources. Through self-reflection and self-awareness, nursing leaders can increase awareness of the informal social hierarchies on their unit(s) and reduce status competition by ensuring that workplace resources, opportunities, information, and support are distributed fairly among employees, providing everyone with equal access to these

empowering work structures. Nurse managers can use their status to connect nurses to likeminded people within the organization and identify or provide opportunities for professional networking and socializing. This sets a positive example for others who may be reluctant to share their connections with others. Lastly, nurse leaders can diminish the salience of status differences by providing individualized feedback and recognition to individual team members that emphasize their unique contributions to the team.

### **5.2.2 Relational Social Capital**

The findings of this research demonstrate that social norms of trust, positive reciprocity, and affective energy are important forms of relational social capital that contribute to the overall level of social capital that nurses have at work.

Although trust has been included in many studies of social capital in organizations, this is the first study to examine nurses' perceptions of trust norms on their hospital unit as a form of relational social capital. It makes sense that on units where people generally trust one another, nurses believe that others have good intentions towards them and are worthy of their kindness, help, advice, and time. When trust norms are high, nurses can expect that they will be treated fairly and respectfully by others and receive help and assistance when they need it.

Our findings add to evidence showing that employees' trust in others at work is related to other forms of relational social capital including liking (Gianvito, 2007; Lee, 2013), identification with others at work (Gianvito, 2007), and reciprocity (Stromgren, Eriksson, Bergman, & Dellve, 2016). In nursing, research has demonstrated the importance of nurses' trust in their manager on employee (Laschinger & Finegan, 2005)



and patient care outcomes (Wong & Giallonardo, 2013). While the focus of the current study is on generalized trust at work, nurses' trust in their manager is an important factor associated with trusting colleagues at work (Bobbio, Bellan, & Manganelli, 2012). Evidence also shows that the extent to which nurses feel they can trust their manager influences the degree to which they feel they can trust their organization and senior leaders (McCabe & Sambrook, 2014). Thus, building and maintaining trust is a vital part of nurse managers' role that extends beyond one-on-one relationships with followers. McCabe and Sambrook (2014) found that nurses trust managers who demonstrate leadership (e.g., exercising good judgement, leading by example), presence (e.g., being accessible, visibility on the unit), good communication (i.e., clear, honest, and transparent), and a strong commitment to professional nursing values.

These characteristics and behaviours provide an excellent starting point for developing actionable strategies that nurse managers can use to develop trusting relationships with employees and normalize trust at work. Example strategies include regularly spending time on the unit, understanding the patient care needs on the unit, and clearly explaining the rationale behind organizational decisions. Furthermore, nurse managers can facilitate group trust by demonstrating that they trust their employees. This can be done by providing nurses with appropriate autonomy in their day-to-day work, requesting input on decisions, and giving them appropriate opportunities to take on more responsibility or challenging work.

Consistent with the propositions of Quinn and colleagues (Quinn, 2007; Quinn & Dutton, 2005; Quinn et al., 2012), the results of this study support the notion that energy

at work is a renewable relational resource that influences nurses' work. This is an important contribution to the emerging scholarship on the role of collective energy in the workplace. Only a handful of studies have been conducted to date but the results show that employee perceptions of energy are important. For example, Muceldili and Erdil (2015) showed that employees' perceptions of openness and respect at work were associated with higher levels of collective energy, which in turn had a positive effect on group cohesiveness (cooperation). Cole, Bruch, and Vogel (2011) found that employees in energized units were committed to achieving shared goals, attached to and involved in the organization, and more likely to be satisfied with their jobs. Alparslan and Keskin-Kilinc (2015) found that informal communication and perceived organizational support were associated with teachers' perceptions of energy at work and subsequent extra-role behaviours. In another study examining industrial workers and physicians, Russo, Shteigman, and Carmeli (2016) also found that perceived organizational support was associated with employee energy levels (their own, rather than that of their work group). In their study, work-life balance and psychological availability (confidence in being able to handle work demands) were also important factors influencing employee energy. Our findings add to this literature by showing that nurses' perceptions of affective energy at work can be viewed as a form of relational social capital that is created by and embedded in positive interactions and relationships at work.

It was interesting that of the three relational social capital components, nurses rated energy lower than trust and norms of positive reciprocity. This is not entirely surprising given reports of high workloads, funding cuts, and job burnout among nurses

across Canada (CFNU, 2012; Grant, 2015; Laschinger, Wong, & Grau, 2013). Although burnout was not measured in the current study, emotional exhaustion (a lack of energy) is a core concept of burnout. Therefore it is likely that nurses would report low levels of energy in stressful working conditions associated with high levels of employee burnout.

Consistent with this idea, Welbourne and colleagues (2005) compare employee energy exertion at work to exercise training and athletic performance. Just as athletes risk overtraining and injury if they push too hard for too long, they propose that employee exposure to chronically stressful working conditions leads to burnout and significant drops in employee energy and motivation. In their study variance in employee energy at work was associated with lower job satisfaction, decreased work performance, and increased intention to leave (Welbourne, Andrews, & Andrews, 2005). This suggests that higher levels of energy at work are not necessarily better and may, in fact, represent increased burnout risk. While organizations may benefit in the short-term from high-energy employees motivated to work hard and accomplish as much as possible, more moderate employee energy expenditure may be more sustainable and effective over the long run. However, ideal energy levels for nurses at work are currently unknown. Further research is needed to establish workplace energy norms, examine the effects of rest and renewal (work recovery), and to examine how employee energy changes over time, as well as how employees' energy influences colleagues and perceptions of energy at the group level.

Healthcare funding cuts and job insecurity have also been shown to negatively influence nurses' work attitudes (Burke, Ng, & Wolpin, 2015), which would likely

dampen positive energy at work. Quinn et al. (2012) posited that employee perceptions of resource scarcity or abundance influence how energized people feel at work. Therefore organizational austerity may negatively influence energy at work. Linking this idea to Kanter's (1977, 1993) theory, it makes sense that nurses who work in structurally empowering work environments would likely view their access to resources as abundant, resulting in increased enthusiasm and effort mobilization at work, while unempowering working conditions would have the opposite effect. Still, average empowerment levels reported in this study were moderately high, similar to those reported in previous studies (Laschinger & Fida, 2014; Read & Laschinger, 2015). It is likely that higher levels of empowerment (enabled by increased government investments in healthcare) would have a positive effect on nurses' feelings of energy on their units by alleviating some of the stress and pressure that comes with trying to make do and get by with limited resources. Therefore, providing structurally empowering work environments may be a key strategy for managers wishing to boost affective energy on their units.

Identifying nurses' energy levels and working with them to develop sustainable energy management practices in their daily work may be another strategy managers can use to foster positive workplace energy over the long-term. Ensuring that nursing teams have an appropriate balance of new and experienced team members (DuBois & Singh, 2009), providing adequate staffing (Aiken, Clarke, Sloane, Sochalski, & Silber, 2002), supporting more desirable work schedules through centralized scheduling (Wright & Mahar, 2013), balancing patient assignments (DuBois & Singh, 2009), and providing employees with restorative areas for their breaks (Nejati et al., 2016) have been shown to

have positive effects on nurses' health and job satisfaction and retention. Though yet to be tested empirically, these job design features may also have a positive influence on nurses' affective energy at work by providing supportive working conditions for nurses.

The results also supported the inclusion of the norm of positive reciprocity as an element of relational social capital. This aligns with Nahapiet and Ghoshal's (1998) proposition that workplace norms, expectations, and sanctions guide the quality and nature of employee relationships at work. This finding contributes to the current understanding of relational social capital at work by demonstrating that nurses' perceptions of reciprocal resource-sharing are related to their perceptions of group trust and energy, contributing to the overall quality of relationships that nurses have at work. It makes sense that nurses who work on units where everyone is expected to contribute fairly to group goals and share help, assistance, advice, and workloads with one another are likely to benefit from greater access to resources and better workplace relationships with colleagues, facilitating trust and energizing employees to work together to achieve common goals.

Our results are consistent with past studies supporting the construct validity of positive reciprocity as a form of relational social capital. For example, Chiu, Hsu, and Wang (2006) demonstrated that reciprocity influenced the quality and quantity of knowledge sharing in online virtual communities (Chiu, Hsu, & Wang, 2006). In a study of healthcare employees in Sweden, Stromgren et al., (2016) found that reciprocity was a significant predictor of job satisfaction, work engagement, and engagement in initiatives to improve patient care quality and patient safety. Corcoran (2014) conducted a

phenomenological study of emergency department nurses' lived experiences of workplace reciprocity. Participants in this study emphasized the importance of unit culture, balancing work roles and relationship dynamics (e.g., being the In-charge nurse some shifts and not others), and building relationships with others as factors influencing workplace reciprocity. Nurses also identified their commitment to caring for patients as a key driver of workplace reciprocity because they were willing to help coworkers that they didn't particularly like in order to help the patient. This suggests that among nurses, norms of reciprocity are strongly motivated by professional values.

Demonstrating a commitment to patients and prioritizing patient care is one way that nurse managers may be able to positively influence norms of reciprocity on their units. In this way, managers lead by example and emphasize the need for everyone to work together for the benefit of patients. Recognizing team members for their efforts to help others, providing opportunities to precept students or orientate new nurses, and lending a hand on the unit when possible are other ways that nurse managers can show that they value and support positive reciprocity at work. In addition, nurse managers should work to address incidences of negative reciprocity and helping avoidance behaviour with individuals when necessary.

In sum, the results provided validation that norms of trust, positive reciprocity, and affective energy at work are related concepts that reflect nurses' relational social capital in the workplace.

### **5.2.3 Cognitive Social Capital**

The study results provide validation for Nahapiet and Ghoshal's (1998) conceptualization of cognitive social capital as a multi-dimensional concept. Our results supported the inclusion of all three cognitive social capital components proposed including two new concepts: cognitive common ground and shared narratives. Cognitive common ground draws from the literature on team cognition, sensemaking, and shared mental models within organizations (Cannon-Bowers, 2001; Jeffery, 1999; Weick, Sutcliffe, & Obstfeld, 2005), while the concept of shared narratives is rooted in the ground-breaking work of Orr (1996) who found that storytelling at work is an essential meaning-making activity that creates shared knowledge and understanding amongst Xerox technicians. Our results contribute to the literature by showing that cognitive common ground, shared language, and shared narratives are related to a common cognitive social capital factor, uniting ideas from several areas of the organizational literature to further explain the role of shared social cognition as a resource within nurses' work life.

Past work on cognitive social capital has focused on shared meanings at work which has examined employee perceptions of shared interpretations (Gianvito, 2007; Lee, 2013), shared vision (Hsu et al., 2010; Leana & Pil, 2006; Tsai & Ghoshal, 1998), and knowledge of a colleague's business goals and everyday work practices (Mäkelä & Brewster, 2009). The present study differs from this research in two ways. First, instead of examining cognitive social capital from an entirely individual perspective, cognitive common ground captures nurses' perceptions of their work group's shared knowledge

about their work and team members. This is important because nurses' understanding of their work and team members may not be consistent with that of their work unit. For example, a nurse with many years of experience would likely have a different understanding of a unit than a new graduate nurse who is learning the work flow of their new unit and the strengths and limitations of their new work colleagues. Yet, when considering how well the group as a whole understands the work that needs to be done and how different people work, both experienced and new graduate nurse are likely to have similar perceptions by picking up on social cues. For example, if everyone seems to be on the same page and is able to anticipate patient and colleagues' needs, it would be evident that there is a high level of cognitive common ground. Alternatively, a lack of organization and confusion about work flow, patient assignments, and employee roles, would signify a low level of cognitive common ground. This highlights the value of assessing nurses' perceptions of their work team's cognitive common ground.

Second, the idea of cognitive common ground moves beyond research on shared cognition and mental models in nursing which has focused largely on implementation of standardized protocols and procedures (Custer et al., 2012). Introducing flowsheets and protocols is certainly not a bad thing and may, in fact, be a useful strategy to increase cognitive common ground by providing clear roles and guidelines for everyone to follow. As Cannon-Bowers and Salas (2001) point out, this type of task-specific and task-related knowledge is important, but so is knowledge about the expertise and behaviours of team members. In most healthcare organizations, employees learn this knowledge informally, through their interactions and observations of others. According to Cooke (2013), team



cognition is an emergent phenomenon created by interactions between team members, highlighting the social nature of sharing ideas and learning to understand other people when working in groups. Thus, it makes sense that cognitive common ground is a dynamic cognitive social resource that develops over time as nurses gain experience working on their unit and that changes over time as conditions and personnel change.

The importance of common cognitive ground highlights the need for front-line managers to understand the day-to-day operations on their units, the nature of the work that nurses (and other employees) do, and be aware of the team dynamics at play. Thus, being regularly visible and present on the unit and communicating effectively with employees are essential behaviours for managers. Not only will they better understand the cognitive common ground on their unit through direct experience, they will also be able to play a stronger role in shaping the shared understandings on the unit. For example, managers can clarify misunderstandings about the purpose of certain policies or procedures and identify opportunities for further training such as practicing code blue procedures. Comprehensive training and orientation for new employees and the nurses orientating them to the unit should also be provided to ensure that everyone is on the same page.

The results showed support for shared language as a component of cognitive social capital but it was surprising that nurses did not seem to think that their unit used specialized language that would not be understood by outsiders. There are several possible explanations for this. It may be that items referring to a distinction between language understood on the unit (insiders) but not to outsiders refers to a different factor

than shared language or that the nurses in our study were so accustomed to the specialized terminology that they use at work that they did not recognize it as being specialized. Nevertheless, three items remained in the scale and shared language was significantly related to cognitive common ground, shared narratives, and cognitive social capital.

This fits with Nahapiet and Ghoshal's (1998) proposition that shared language improves communication and eases transaction costs in organizations, leading to increased knowledge creation. Shared language and jargon has been previously identified as a crucial aspect of nursing socialization (Wolf, 1989), but this is the first to examine shared language as a cognitive social resource among nurses. It makes sense that the language and jargon that nurses use in the workplace develop through social interactions over time and that it is context-specific, which may be one of the challenges with developing items that contain specific examples of jargon (which may be relevant to some nurses but not others). Shared language is an important aspect of cognitive social capital because it allows for effective communication between team members and signifies group membership to others. Lee (2013) showed that social capital (including shared language) was strongly related to relational coordination among nurses and physicians in ambulatory health clinics, suggesting that shared language is a key factor influencing healthcare providers' ability to organize and coordinate patient care.

While shared language develops through interaction and socialization to the nursing profession, nurse managers also play a role in making sure that communication with and between employees is consistent and easy to understand. To build shared language within the unit and the larger organization, managers should focus on consistent

and clear verbal and written communication strategies and policies, both for themselves and for staff members. Examples include providing a list of commonly used abbreviations in a highly visible location (ideally this is an organization-wide policy) and standardizing charting procedures so that written communication about patients is easy to follow. Providing ongoing education or reminders for staff such as a display of emergency colour codes and their meaning also help reinforce shared language at work.

Empirical support for the inclusion of shared narratives as a dimension of cognitive social capital is an important contribution of this study. Social narratives about one's work, role, and organization are meaning-making activities that create a shared way of thinking about one's work and organization. From the stories that nurses and their colleagues share, nurses can learn a great deal about how their organization operates, what to expect from their supervisor and senior leaders in the organization, how to deal with new clinical situations, as well as how coworkers deal with situations. Although these stories are not always valued in the workplace, they are an important source of information for nurses that help them understand their work and their place within their unit and their organization. Our findings suggest that further examination of the role of shared narratives as a form of cognitive social capital among nurses is warranted.

Examining shared narratives at the group level would be a particularly valuable area of future research, as there is evidence that employees who work together may have convergent and divergent interpretations of shared experiences (Brown, Stacey, & Nandhakumar, 2008). Weick (1995) himself argued that it is challenging to attain shared meaning within organizational groups. However, from a social constructivist perspective

(Gergen, 2009), narratives are dynamic and malleable, suggesting that nurses and managers help shape these narratives, both through their actions and the information they share with one another. Nurses' trust in their manager, the degree to which they perceive their manager to be authentic, and nurse manager visibility are relational factors that likely affect the influence that nurse managers are able to have on these narratives.

Furthermore, nurse managers must recognize that nurses' perceptions and experiences with their manager form part of the story of their unit, thus, simply by virtue of being in a formal leadership position, they have a significant influence on the unit narrative. Leading by example, being authentic, treating employees fairly, demonstrating kindness and concern for employees and patients, and taking responsibility for one's actions are some of the ways that nurse leaders can positively influence how nurses view them as a leader, contributing to their narrative of their workplace and organization.

#### **5.2.4 Summary**

Overall, the results suggest that the newly developed questionnaire as a valid and reliable measure of nurses' social capital at work. The findings add to the current literature and understanding of workplace social capital by demonstrating that informal status, perceptions of group norms of trust, energy, and positive reciprocity, and perceptions of cognitive common ground, shared language, and shared narratives are valuable social resources for nurses working in hospital settings.

### **5.3 Testing the Nomological Network of Workplace Social Capital**

The results of this study provide new knowledge about the nomological network of nurses' workplace social capital by showing how it relates to antecedents and

outcomes. Overall, the hypothesized model linking nurses' perceptions of authentic leadership and structural empowerment to social capital and subsequent team effectiveness and patient care quality was supported, but the direct effect of authentic leadership on social capital was found to be insignificant and an additional path between social capital and patient care quality was added. The results support Nahapiet and Ghoshal's (1998) theory of social capital and demonstrate that authentic leadership and structurally empowering working conditions facilitate the development of nurses' social capital, a valuable set of social resources that promote team effectiveness and patient care quality.

### **5.3.1 Proposed antecedents of social capital**

Our study adds to an increasing number of studies demonstrating the link between positive, relational forms of leadership, empowering working conditions, and nursing workforce outcomes (Cummings et al., 2010) and show that social capital is an important mediator in this relationship. Authentic leadership, in particular, has been linked to empowering working conditions leading to lower burnout levels (Laschinger, Wong, & Grau, 2012) and higher levels of interprofessional collaboration (Laschinger & Smith, 2013; Regan, Laschinger, & Wong, 2015), relational social capital (Read & Laschinger, 2015), job performance, and job satisfaction (Wong & Laschinger, 2013). Laschinger and Fida (2015) demonstrated that authentic leadership and empowering work environments had a positive effect on nurses' perceptions of support for professional practice, which in turn led to better patient care quality. In another study, Read and Laschinger (2015) linked authentic leadership and structurally empowering work environments to relational

social capital (a sense of community). Our results are consistent with these past studies and add to the evidence that authentic leaders set up working conditions that empower employees to accomplish their work in meaningful ways.

Nurses' ratings of their manager's authentic leadership behaviours were similar to those reported in past studies (Read & Laschinger, 2015; Wong & Laschinger, 2013). With the exceptions of status and shared narratives, authentic leadership was significantly correlated with each component of social capital. The finding that authentic leadership was not significantly associated with status was interesting because past studies have shown significant links between authentic leadership and the informal power component of structural empowerment (Wong & Laschinger, 2013) which was adapted in the current study to measure nurses' perceived informal status at work. One explanation for this finding is that the final status subscale referred to perceived status from coworkers and physicians. Moreover, nurses do not spend a lot of time with their manager in their day-to-day work. Therefore, their manager's authentic leadership behaviours are less likely to be directly related to their status among coworkers and physicians who they work with regularly.

A related finding was that authentic leadership was not significantly correlated with shared narratives, suggesting that the stories that are shared among nurses and their colleagues at work are not influenced directly by their manager's leadership behaviours. This was somewhat surprising, as it was initially thought that nurse managers' behaviour would influence shared narratives that nurses have about their work. It may be that the degree to which nurses share stories about their work is more related to social dynamics

with coworkers than with their managers. Past research has demonstrated that nurses and their managers often have divergent perceptions of their work environment (Armstrong-Stassen, 2014; Gormley, 2011). Therefore, nurses' interpretations and cognitive understanding of their workplace may not be all that related to their manager's viewpoint. This also suggests that nurse managers need to better understand their employees, a feat that is challenging with increasing spans of control and responsibilities. Future research examining shared narratives and the other components of workplace social capital from the perspective of both nurse managers and nurses would provide further insights into how well their perspectives of workplace social capital align.

Contrary to expectations, authentic leadership did not have a direct effect on nurses' social capital in our study. However, it did have a strong indirect effect on social capital through structural empowerment. This was an interesting finding because investment in relationships with followers is an integral aspect of authentic leadership theory (Gardner, Cogliser, Davis, & Dickens, 2010). According to Luthans and Avolio (2007), authentic leaders influence followers through role modeling, social exchange, and building positive relationships with followers, enhancing identification. Therefore, it makes sense that leaders with high levels of authentic leadership would influence nurses' social status through affiliation and increased informal power (structural social capital), establishing workplace norms of trust, reciprocity, and energy (i.e. relational social capital), and shaping the understandings, language, and narratives (i.e. cognitive social capital) used on their units. This logic is supported by theoretical propositions proposed by Baker and Dutton (2006) who contend that leaders play a key role in building

organizational social capital through their influence on workplace norms and values. However, our results did not support the direct links between leadership and social capital.

Instead, authentic leadership appears to be an important determinant of nurses' access to key workplace structures that enable them to accomplish their work, which in turn facilitates resource sharing and social capital development in the workplace. The indirect effect of authentic leadership on social capital is in line with findings of recent studies showing that structural empowerment mediated the relationship between authentic leadership and relational social capital (Read & Laschinger, 2015) and highlights the critical role that leadership plays in creating empowering working conditions that are conducive to positive workplace relationships and meaningful accomplishment of work.

Our finding that structural empowerment directly influenced social capital is consistent with structural empowerment theory (Kanter 1977, 1993), which suggests that providing employees with sufficient resources, information, support, and opportunities empowers them to accomplish their work effectively and with greater autonomy. Adequate access to these empowerment structures also provide nurses with more time to spend with coworkers and patients, facilitating the relational investment needed to create and sustain social capital at work (Nahapiet & Ghoshal, 1998). Our results provide empirical support for this view by demonstrating the positive influence that nurse managers can have on nurses' social capital by creating empowering working conditions that facilitate positive working relationships among employees.

### **5.3.2 Proposed outcomes of social capital**



As expected, social capital had a positive effect on team effectiveness, which in turn influenced perceived patient care quality. Furthermore, nurses' workplace social capital also had a direct effect on patient care quality, demonstrating the valuable role that nurses' social capital plays in supporting nurses to provide high quality care to their patients. These findings corroborate those of Laschinger et al. (2014) who found that nurses' social capital at the unit level was associated with greater unit effectiveness (ability to deliver timely patient care), which in turn influenced individual nurses' perceptions of patient care quality. Lee (2013) also found that social capital was associated with relational coordination in outpatient healthcare teams, supporting the idea that social capital facilitates team effectiveness by enhancing informal coordination of healthcare team members. Our findings linking nurses' social capital to their perceptions of team effectiveness on their units are consistent with Nahapiet and Ghoshal's (1998) theory of social capital in organizations and demonstrate that social capital is a valuable form of capital within healthcare organizations that improves healthcare team functioning by increasing cooperation and resource sharing. As a result of better communication and ability to work together well, highly effective teams are thought to provide high quality patient care, a premise supported by our results.

Importantly, our results showed that in addition to having a positive impact on team effectiveness, social capital also had a direct impact on perceived patient care quality. In fact, although social capital had a small indirect effect on patient care quality through its effect on team effectiveness, the direct effect was much greater in magnitude. This suggests that team effectiveness is not the main mechanism through which social

capital influences patient care quality. In line with a previous study by Laschinger et al. (2014) the results of the current study showed that social capital had a direct influence on nurses' perceptions of patient care quality. Siddiqui (2013) demonstrated the importance nurses placed on their workplace relationships as an integral part of their practice environment that influences their job satisfaction and quality of care. Outside of nursing, Ellinger, Ellinger, Wang, and Bas (2011) found that investments in organizational social capital (making connections, enabling trust, and fostering cooperation) were positively related to employee job performance, commitment to service quality, and organizational citizenship behaviours in a sample of US adults working in multiple industries. Together, these findings suggest that social capital influences employee commitment to providing high-quality service and patient care quality. Thus, organizational or professional commitment may be an important mediator between nurses' social capital and patient care quality. In addition, nurses who have high levels of social capital are likely to value relationships and spend more time with patients, allowing them to develop greater levels of trust and notice subtle changes in patients' health status that contribute to better care. Greater social capital may also enable nurses to secure more and/or better resources for patients, resulting in improved care. Given the links between nurses' perceptions of care quality and objective patient care outcomes (McHugh & Stimpfel, 2012), the findings of the current study support calls for prioritizing social capital investment in healthcare organizations (DiCicco-Bloom et al., 2007; Hofmeyer, 2003; Hofmeyer & Marck, 2008).

### **5.2.3 Total and specific indirect effects**

To gain a fuller understanding of the relationships between study variables in the hypothesized model we examined total and specific indirect effects. Total indirect effects represent the overall effect that a variable has on another through all possible pathways in the model, while specific indirect effects represent the effect through one specific pathway at a time. Authentic leadership was found to have significant indirect effects on quality of care (through all variables combined), team effectiveness (through empowerment and social capital), and social capital (through empowerment). This is consistent with Wong and colleagues' (2013) recent systematic review showing that leadership often has an indirect effect on nurse and patient outcomes through processes that improve working conditions and/or employee work behaviours and attitudes, rather than a direct effect.

The finding that structural empowerment had significant indirect effects on quality of care (through social capital and team effectiveness) and team effectiveness (through social capital) demonstrate further support for the importance of providing nurses with empowering working conditions. These findings also suggest that social capital is an important mechanism through which structural empowerment influences the ability of team members to work together to activate workplace resources and coordinate care for patients in an effective manner. This is consistent with Lee's (2013) study showing that social capital (mutual respect, shared goals, and shared knowledge) was significantly related to informal relational coordination among nurses and physicians working in Ontario outpatient clinics. The current study also showed that in addition to the direct effect that social capital had on patient care quality, it also had an indirect effect on

patient care quality through its ability to influence team effectiveness. Together, these findings show that social capital is a valuable set of resources embedded within workplace relationships in healthcare organizations that influences how healthcare professionals work together to provide patient care. The results provide further support for the value of applying Nahapiet and Ghoshal's (1998) theory of social capital to healthcare organizations.

#### **5.4 Implications**

Along with the specific strategies to enhance each component of nurses' workplace social capital that have been discussed above, the results of this study showed that authentic leadership behaviours were associated with structurally empowering working conditions that have the potential to enhance nurses' social capital at work.

Leadership has consistently been shown to play a critical role in nurse and patient outcomes, highlighting the need to invest in leadership training and development. Authentic leadership can be developed (Avolio and Gardner, 2005), suggesting that this is a promising strategy to improve leadership quality in healthcare organizations. Peus et al. (2012) showed that leaders' self-knowledge (understanding one's values and self) and self-consistency (alignment between values and actions) were significant antecedents of their authentic leadership behaviours. Thus, authentic leadership development programs should aim to increase leaders' understanding of themselves and enhance self-regulatory behaviours to achieve alignment between their actions and words. Bester (2008) also emphasized the need for greater emphasis on personal discipline among healthcare leaders and outcome-based assessment of leader performance.

A recent study by Baron (2015) showed that a three-year action-learning-based leadership development program led to increased authentic leadership development amongst leaders in middle management positions in Quebec. This program involved learning leadership theory but primarily focused on application and authentic leadership development by working through real problems, experiments, activities, and applications with peers and through coaching. The results of these studies support the notion that authentic leadership can be developed but also suggest that substantial investment in leadership development is needed for this to happen.

Employing workplace empowerment strategies based on Kanter's (1977, 1993) theory of structural empowerment is another avenue through which healthcare organizations can positively influence nurses' workplace social capital and could be included in leader orientation or inservice training. Nurse managers can provide structurally empowering working conditions by providing nurses with access to equipment and supplies needed to care for their patients, making organizational information available and easy to locate, providing opportunities for challenging work and professional development, and having an open-door policy to support staff members' work-related needs. Structural empowerment has also been linked to nurse managers' perceived organizational support and role satisfaction (Patrick & Laschinger, 2006), highlighting the importance of empowering nurse managers to enable them to empower nurses providing direct patient care (Patrick & Laschinger, 2006). Bester (2008) also suggested that organizational structural support is a crucial factor in developing authentic

leaders. Therefore, workplace empowerment should be considered at all organization levels and not just at the unit-level as the responsibility of front-line managers.

It has also been suggested that organizations can make direct investments into their social capital “bank account” by making connections (instilling behavioral norms and values that strengthen relationships and create a strong sense of community), enabling trust (creating confidence in leaders, employees, and the organization), and fostering cooperation (encouraging and rewarding collaboration and teamwork) (Cohen & Prusak, 2001). Past research has shown that these types of investments in organizational social capital are positively related to employee job performance, commitment to service quality, and organizational citizenship behaviours (Ellinger et al., 2011). This suggests that making connections, enabling trust, and fostering cooperation may be important mediators between authentic leadership and structural empowerment and workplace social capital that could be explored in future research.

Congruent with the specific strategies already discussed, Bester (2008) suggested that nurse leaders can activate nurses’ social capital in the workplace through a number of different strategies. For example, she suggested that nurses may benefit from training and information about trust and that leaders should create a culture of trust by establishing and supporting integrity and trustworthiness as social norms. Bester also suggested that virtual support groups for nurses and other team member and promoting community building activities might be ways to develop social capital within hospitals. The current study also emphasized the role of nurse managers in facilitating nurses’ workplace social capital. Specific strategies that were discussed include sharing social connections with others

(status), giving employees autonomy in their work (trust), recognizing nurses for their contributions to the team (reciprocity), supporting reasonable workloads and energy management strategies (affective energy), being visible and present on the unit (cognitive common ground), reinforcing shared language through visual reminders and standardized communication protocols (shared language), and enacting positive leadership behaviours that contribute positively to the story that nurses create about their workplace (shared narratives). In sum, there are many ways that nurse managers can positively influence social capital.

### **5.5 Strengths and Limitations**

The strengths of the current study include the use of a random sample of nurses across the province of Ontario. The demographic characteristics of the sample were similar to those reported by the College of Nurses of Ontario (2016) which increases confidence in the generalizability of the findings across the province. The results may also be generalizable to nurses working in similar acute care settings in other provinces or countries. This study supports the need for future studies examining nurses' workplace social capital in other regions and settings. Results also suggest that examining the role of social capital in nursing and healthcare teams at the group level is a valuable area of future research.

Using SEM analysis to assess the measurement models of the study variables and test the hypothesized model is another strength of this research. SEM has several advantages over more traditional statistical techniques. First, it is a theory-driven method that can be used to assess both the reliability and validity of measurement models using

CFA (Brown & Moore, 2012) and to test complex theory-based models between study variables (Byrne, 2010). SEM also accounts for measurement error and can incorporate both observed and latent variables (Byrne, 2010). In the current study CFA provided support for the final measurement model of the new questionnaire to assess nurses' workplace social capital as well as the other measures in the study, increasing confidence in the results.

The main limitations of the proposed study are the cross-sectional nature of the study and the use of self-report measurement tools. Cross-sectional studies are weak in their ability to support inferences about cause and effect. However, this can be combatted somewhat by conducting a study grounded in theory a priori (Polit & Beck, 2012). Self-report measures in organizational behavior research have been scrutinized primarily because they are liable to several response biases, and may be influenced by the dispositional characteristics of respondents and contextual/situational variables (Donaldson & Grant-Vallone, 2002; Podsakoff & Organ, 1986). Having nurses anonymously complete the study questionnaire on their own time in the privacy of their own home should reduce the effects of some of these influences by providing confidentiality and reducing fear of reprisal (Podsakoff & Organ, 1986).

Common method bias may also be a concern for single method self-report questionnaires but according to Podsakoff et al. (2012), techniques to control for common method variance are not always desirable for assessing constructs that are perceptual in nature. For example, it would not be useful to have people rate their co-workers' job satisfaction because what we present to others is not always an accurate reflection of how



we feel. Similarly, nurses themselves are the best judge of the structural, relational, and cognitive social capital embedded in their workplace relationships. Therefore it makes sense to have them complete self-report questionnaires. In addition, Spector (2006) suggests that common method bias may not be as pervasive as once thought and that having strong measures may reduce this threat to internal validity.

Regarding the fit of the final model, it should be noted that there are statistically identical models that could be tested by rearranging the order of the variables in the model (Breckler, 1990). However, as Boomsma (2000) points out, a priori theory should always be the driver of model selection. Considering that there are no theoretical reasons for reorganizing the order of variables in the model, it was decided not to test alternative models in the current study.

Lastly, the low response rate may limit the representativeness of the data and did not permit cross-validation of the questionnaire as initially planned. The current study provides initial evidence supporting the new questionnaire to assess nurses' social capital in the workplace but more studies are needed.

## **5.6 Avenues for future research**

Our results show that further examination of nurses' workplace social capital is warranted. Further validation of the new measure of nurses' social capital in other nursing samples is an important priority for future research. Adaptation of the new measure to other nursing contexts (e.g. long-term care, home care) and other healthcare professionals, as well as other occupational groups, is another important area of research that would help establish the generalizability of our findings.

As suggested by Payne et al. (2011) multi-level research within organizations is needed to better understand social capital in the workplace. While organizational research in healthcare can present additional research challenges, studies investigating social capital from the perspective of nurses as well as other healthcare providers at the individual, unit, and even hospital level would allow for examination of cross-level effects between individual and group-level social capital, as well as related antecedents and outcomes. This type of research would provide insights into how individuals contribute to group-level social capital and vice versa. Furthermore, longitudinal studies are recommended to examine the stability and change of social capital over time.

Theoretically, there are additional variables that could be explored to expand our knowledge about the nomological network of workplace social capital. For example, self-determination theory (SDT) provides insights into how authentic leadership and structural empowerment may influence social capital. According to Deci and Ryan's (2000, 2008) SDT, when employees' basic needs of autonomy, competence, and relatedness are met they have high levels of intrinsic motivation and engagement in their jobs. By being self-aware, engaging in behaviours congruent with one's true self, and being honest, ethical, and transparent, authentic leaders role model authentic functioning and establish workplace norms where others feel more comfortable being their true selves (Gardner et al., 2005). Congruent with this line of reasoning, Leroy et al. (2015) showed that authentic leadership was associated with followers' authentic functioning (authentic followership), leading to fulfillment of employees' needs for autonomy, competence, and relatedness. It also makes sense that authentic leaders' high levels of self-awareness allow

them to develop honest relationships with other, resulting in high awareness of the job-related needs of their employees. Greater understanding of employee needs allows leaders to provide access to specific information, resources, support, and opportunities to learn and develop (i.e. empowerment structures) that employees value and require. It is likely that in doing so, leaders create empowering working conditions that encourage employee autonomy, competence, and relatedness, facilitating social capital in the workplace because secure, empowered employees can focus less on competing for scarce resources and more on working together to accomplish team objectives (Barney, 1991; Kanter, 1977, 1993). Thus, examining the mediating role of employee self-determination may be a valuable avenue for further study.

## **5.7 Conclusion**

In conclusion, the results of this research provided initial support for the reliability and validity of the new multi-dimensional questionnaire to assess nurses' workplace social capital. The findings of this research further support Nahapiet and Ghoshal's (1998) theory of social capital in organizations and provide researchers with a valid and reliable self-report questionnaire that can be used to assess nurses' workplace social capital within hospital settings. This questionnaire provides a theory-based measure that can be adapted to other employee groups and work settings. The results also provided valuable new knowledge about the nomological network of workplace social capital by examining relationships between precursors and outcomes of the concept. Authentic leadership was shown to be an important factor influencing nurses' perceptions of structural empowering working conditions, which in turn had a positive effect on their

social capital at work, leading to greater team effectiveness and patient care quality. The evidence from this study reinforces the positive role that leaders play in creating empowering workplaces for nurses and illuminates the value of social resources embedded within nurses' workplace social network, reinforcing the need for leaders and organizations to invest in relationships in the workplace. Theory and evidence-informed strategies for enhancing nurses' workplace social capital, both directly, and indirectly through authentic leadership development and access to empowering working conditions have the potential to positively influence team performance and patient care.

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## Letter of Information

**Project Title:** WORKPLACE SOCIAL CAPITAL IN NURSING: DEVELOPMENT AND VALIDATION OF A SELF-REPORT QUESTIONNAIRE

**Principal Investigator:** Dr. Heather Laschinger, PhD, RN, FAAN, FCAHS; Western University  
**Principal Student Investigator:** Emily A. Read, RN, MSc, PhD (candidate); Western University

**Invitation to Participate:** You are being invited to participate in this research study examining how registered nurses' experiences in the workplace influence teamwork and patient care.

**Purpose of the Letter:** The purpose of this letter is to give you the information needed to decide if you want to take part in this study.

**Purpose of the Study:** This study aims to look at how registered nurses' experiences in the workplace influence teamwork and patient care. I would like to better understand the current nursing work environment through the viewpoint of experienced nurses across the province.

**Study Eligibility:** To be in the study you must be a registered nurse currently working in direct patient care in an Ontario hospital. If you are not currently working or are not in a staff nurse role you are not eligible.

**Study Actions:** If you agree to participate, please complete the enclosed survey. You will be asked questions about your current workplace, your co-workers, and feelings about work. It will take about 20 minutes of your time. When you are finished, mail it back to me using the self-addressed stamped envelope provided.

**If you would like to save yourself a trip to the mailbox you can complete the survey online here:**

**[www.socialcapitalatwork.com](http://www.socialcapitalatwork.com)**

The online version of the survey is hosted by Western University's secure Qualtrics account. You will be asked to enter your study PIN number from the front of your paper survey to avoid duplicate responses. No personal identifying information will be requested.

**Possible Risks and Harms:** There are no known or expected risks from participating in this research project. You do not have to respond to questions that you prefer not to. Your responses will be separate from your personal contact information to protect your confidentiality and privacy. The online version of the survey is hosted by Qualtrics which stores data using secure methods such as data encryption and firewalls. Once the study is completed this data will be downloaded onto our secure research computer at the university and removed from the survey site.

**Possible Benefits:** There are no direct benefits of taking part in this study. However, this study will examine how positive working conditions influence patient care. This information can be used in the future to help create healthy workplaces for nurses by informing policy and organizational initiatives in hospital work settings.

**Compensation:** You will not receive any compensation for your involvement in the study but you are eligible to enter your name in a draw for a \$500 gift card of your choice. To enter the draw you can write your email address on the paper ballot enclosed with your survey and send it back to us or submit your email address on the online version of the survey.

**Voluntary Participation:** Participation in this study is voluntary. You may decide not to participate, refuse to answer any questions, or withdraw from the study at any time with no penalty.

**Confidentiality and Privacy:** As a participant you will be given a unique PIN number linked to your name only for the purpose of mailing information letters and surveys to you and to make sure that you don't complete the survey more than once. Your name and contact information will be in a separate file from your survey responses and only group-level data will be used for analyses.

All collected data will remain confidential and will only be accessed by the study researcher. Immediately after data collection is done all participant names and mailing addresses will be destroyed. If you decide to withdraw from the study at any time, your data will be deleted from our database. Representatives of the Health Sciences Research Ethics Board at Western University may contact you to monitor how the study is being done.

**Contacts for Study Questions or Problems:** If you require any further information about this research project or about taking part in the study please contact Emily Read by telephone:  
or email:

If you have any questions about your rights as a research participant or how this study is being done, please contact The Office of Research Ethics by telephone: \_\_\_\_\_ or email: \_\_\_\_\_

For study updates and results, please visit the study website:

**[www.workplacesocialcapital.wordpress.com](http://www.workplacesocialcapital.wordpress.com)**

**Consent:** Completion of the survey indicates that you consent to take part in this study.

Sincerely,

Emily A. Read, RN, MSc, PhD (candidate)  
Arthur Labatt Family School of Nursing  
The University of Western Ontario

*This letter is yours to keep for future reference*

## Study Instruments

### AUTHENTIC LEADERSHIP QUESTIONNAIRE (Walumbwa et al., 2008)

**Please rate the EXTENT to which your leader (immediate supervisor):**

0 = Not at All	1 = Once in a While	2 = Sometimes	3 = Fairly Often	4 = Frequently, if not Always
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1. Says exactly what he or she means.	0	1	2	3	4
2. Admits mistakes when they are made.	0	1	2	3	4
3. Encourages everyone to speak their mind.	0	1	2	3	4
4. Tells you the hard truth.	0	1	2	3	4
5. Displays emotions exactly in line with feelings.	0	1	2	3	4
6. Demonstrates beliefs that are consistent with actions.	0	1	2	3	4
7. Makes decisions based on his or her core values.	0	1	2	3	4
8. Asks you to take positions that support your core values.	0	1	2	3	4
9. Makes difficult decisions based on high standards of ethical conduct.	0	1	2	3	4
10. Solicits views that challenge his or her deeply held positions.	0	1	2	3	4
11. Analyzes relevant data before coming to a decision.	0	1	2	3	4
12. Listens carefully to different points of view before coming to conclusions.	0	1	2	3	4
13. Seeks feedback to improve interactions with others.	0	1	2	3	4
14. Accurately describes how others view his or her capabilities.	0	1	2	3	4
15. Knows when it is time to re-evaluate his or her positions on important issues.	0	1	2	3	4
16. Shows he or she understands how specific actions impact others.	0	1	2	3	4

CONDITIONS OF WORK EFFECTIVENESS QUESTIONNAIRE (CWEQ-II)  
Laschinger et al., 2001

**Please rate the EXTENT to which the following is present in your current job:**

	1 = None	2	3 = Some	4	5 = A lot
1. Opportunity for challenging work.	1	2	3	4	5
2. The chance to gain new skills and knowledge on the job.	1	2	3	4	5
3. Tasks that use all of your own skills and knowledge.	1	2	3	4	5
4. Information about the current state of the hospital.	1	2	3	4	5
5. Information about the values of top management.	1	2	3	4	5
6. Information about the goals of top management.	1	2	3	4	5
7. Specific information about things you do well.	1	2	3	4	5
8. Specific comments about things you could improve.	1	2	3	4	5
9. Helpful hints or problem solving advice.	1	2	3	4	5
10. Time available to do necessary paperwork.	1	2	3	4	5
11. Time available to accomplish job requirements.	1	2	3	4	5
12. Acquiring temporary help when needed.	1	2	3	4	5

WORKPLACE SOCIAL CAPITAL QUESTIONNAIRE (Author)

Part A: Structural Social Capital

**1. Network Size and 2. Network Functional Diversity**

How many important working relationships do you have at work with people in the following roles? **Write the number on the line next to each work role. Leave blank if not applicable.**

- a. Physician \_\_\_\_
- b. Resident \_\_\_\_
- c. Nurse Practitioner \_\_\_\_
- d. Registered nurse \_\_\_\_
- e. RPN/LPN \_\_\_\_
- f. Cleaning staff \_\_\_\_
- g. Personal support worker/healthcare aid \_\_\_\_
- h. Immediate supervisor \_\_\_\_
- i. Senior management \_\_\_\_
- j. Physiotherapist/ Occupational therapist \_\_\_\_
- k. Registered Dietician/Speech Language Pathologist \_\_\_\_
- l. Respiratory Therapist \_\_\_\_
- m. Other Roles (please describe): \_\_\_\_\_ ## \_\_\_\_\_

**3. Network Status** (adapted from the Informal Power Scale of the CWEQ by Chandler, 1991)

In general, on my hospital unit...	Strongly disagree	1	2	3	4	5	Strongly Agree
1. Coworkers ask for my opinion about patient care issues.	1	2	3	4	5		
2. Coworkers ask for my help with work-related challenges.	1	2	3	4	5		
3. Physicians ask for my opinion about patient care issues.	1	2	3	4	5		
4. Physicians ask for my help with work-related challenges.	1	2	3	4	5		
5. My supervisor asks for my opinion about unit management issues.	1	2	3	4	5		

Part B. Relational Social Capital

**1. Generalized Trust** (adapted from Simons & Peterson, 2000)

In general, on my hospital unit...	Strongly disagree	2	Neither Agree nor Disagree	4	Strongly Agree
1. We respect each other's competence.	1	2	3	4	5
2. Everyone shows integrity.	1	2	3	4	5
3. We expect the truth from each other.	1	2	3	4	5
4. We can trust each other.	1	2	3	4	5
5. We count on each other to live up to our word	1	2	3	4	5

**2. Affective Energy** (adapted from Cole, Bruch, & Vogel, 2012)

In general, on my hospital unit...	Strongly disagree	2	Neither Agree nor Disagree	4	Strongly Agree
1. People feel excited in their job.	1	2	3	4	5
2. People feel enthusiastic in their job.	1	2	3	4	5
3. People feel energetic in their job.	1	2	3	4	5
4. People feel inspired in their job.	1	2	3	4	5
5. People feel full of energy in their job.	1	2	3	4	5

**3. Norm of Positive Collective Reciprocity** (adapted from Perugini et al., 2008)

In general, on my hospital unit...	Strongly disagree	2	Neither Agree nor Disagree	4	Strongly Agree
1. Everyone pitches in to help each other.	1	2	3	4	5
2. People are committed to returning favours.	1	2	3	4	5
3. Help from others will be there when you need it.	1	2	3	4	5
4. People will go out of their way to help someone who has helped them in the past.	1	2	3	4	5
5. People will do a task they dislike to return someone's previous help.	1	2	3	4	5
6. People are happy to help those who helped them.	1	2	3	4	5



Part C – Cognitive Social Capital

**1. Cognitive Common Ground** (all new items, Author)

<b>In general, on my hospital unit...</b>	Strongly disagree		Neither Agree nor Disagree		Strongly Agree
1. We understand each person's work role.	1	2	3	4	5
2. We understand each team member's skill set.	1	2	3	4	5
3. We understand each team member's work style.	1	2	3	4	5
4. We understand the day-to-day work flow on the unit.	1	2	3	4	5
5. We have shared knowledge about our specialty area.	1	2	3	4	5
6. We have shared knowledge about the types of patients we care for.	1	2	3	4	5

**2. Shared language** (adapted from Gianvito, 2007)

<b>In general, on my hospital unit...</b>	Strongly disagree		Neither Agree nor Disagree		Strongly Agree
1. We express work-related ideas using the same terminology.	1	2	3	4	5
2. We easily communicate with each other.	1	2	3	4	5
3. We ask work-related questions using the same terminology.	1	2	3	4	5
4. Outsiders may not understand some of the terminology we use.	1	2	3	4	5
5. We use special nicknames for things (e.g. "Walky-Talky" to describe a patient who is mobile and can communicate verbally).	1	2	3	4	5
6. We use abbreviations that others would not understand.	1	2	3	4	5

**3. Shared narratives** (all new items, author)

<b>In general, on my hospital unit...</b>	Strongly disagree		Neither Agree nor Disagree		Strongly Agree
1. We share stories about our work experiences.	1	2	3	4	5
2. Our unit has been through a lot together.	1	2	3	4	5
3. We interpret experiences at work in a similar way.	1	2	3	4	5
4. People share stories about what the unit was like in the past.	1	2	3	4	5
5. We have similar views about the meaning of our work.	1	2	3	4	5
6. Our unit has a unique history.	1	2	3	4	5

TEAM EFFECTIVENESS  
(Adapted from Shortell et al., 2001)

**Please rate the EXTENT to which you agree with the following statements about your work team:**

1 = Strongly Disagree	2 = Disagree	3 = Neither Agree nor Disagree	4 = Agree	5 = Strongly Agree
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1. Our unit works together to achieve patient care treatment goals.	1	2	3	4	5
2. Our unit does a good job of applying the most recently available technology to patient care needs.	1	2	3	4	5
3. Overall, our unit functions very well together as a team.	1	2	3	4	5
4. Our unit is very good at responding to emergency situations.	1	2	3	4	5

PATIENT CARE QUALITY  
(Aiken, Clarke, & Sloane, 2002)

	Poor	Fair	Good	Excellent
In general, how would you describe the quality of nursing care delivered to patients on your unit?	1	2	3	4

**Note:** Scale reversed from original so that a higher score indicates better quality patient care

DEMOGRAPHIC QUESTIONS

1. **Age:** \_\_\_\_                      2. **Gender:** M F
3. How long have you been practicing as a Registered Nurse (RN)?    \_\_\_\_ (YY)                      \_\_\_\_ (MM)
4. How long have you been working as an RN on your current unit?    \_\_\_\_ (YY)                      \_\_\_\_ (MM)
5. When did you graduate from your FIRST nursing program that allowed you to practice as an RN? \_\_\_\_ (YEAR)
6. What type of hospital unit do you work on? (Please select primary workplace)
  - Medical or Surgical     Critical Care     Maternal/child     Mental Health
  - Float pool/Resource Unit                       Other: \_\_\_\_\_
7. My hospital is....                       Rural     Urban
8. What is your current employment status?  Full-time                       Part-time                       Casual
9. Do you work more than 1 job?     Yes     No  
If yes, please explain: \_\_\_\_\_
10. What is your highest level of nursing education?
  - Diploma                       Bachelor of Nursing Science (BScN)                       Fast-track BScN
  - Master of Nursing (MN or MScN)                       Other: \_\_\_\_\_
11. Do you hold any specialized or advanced nursing qualifications or certifications?  
 No     Yes    If yes, please list: \_\_\_\_\_

Is there anything else you wish to share regarding your workplace relationships on your unit?

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Western University Health Science Research Ethics Board
NMREB Delegated Initial Approval Notice

Principal Investigator: Dr. Heather Laschinger
Department & Institution: Health Sciences\Nursing,Western University

NMREB File Number: 106661
Study Title: Workplace social capital in nursing: Development and validation of a self-report questionnaire
Sponsor:

NMREB Initial Approval Date: June 02, 2015
NMREB Expiry Date: June 02, 2016

Documents Approved and/or Received for Information:

Table with 3 columns: Document Name, Comments, Version Date. Rows include Revised Western University Protocol, Instruments, Revised Letter of Information & Consent.

The Western University Non-Medical Research Ethics Board (NMREB) has reviewed and approved the above named study, as of the NMREB Initial Approval Date noted above.

NMREB approval for this study remains valid until the NMREB Expiry Date noted above, conditional to timely submission and acceptance of NMREB Continuing Ethics Review.

The Western University NMREB operates in compliance with the Tri-Council Policy Statement Ethical Conduct for Research Involving Humans (TCPS2), the Ontario Personal Health Information Protection Act (PHIPA, 2004), and the applicable laws and regulations of Ontario.

Members of the NMREB who are named as Investigators in research studies do not participate in discussions related to, nor vote on such studies when they are presented to the REB.

The NMREB is registered with the U.S. Department of Health & Human Services under the IRB registration number IRB 00000941.

Ethics Officer, on behalf of Riley Hinson, NMREB Chair or delegated board member

Ethics Officer to Contact for Further Information

Table with 4 columns containing names: Erika Basile, Grace Kelly, Mina Mekhail, Vikki Tran.

This is an official document. Please retain the original in your files.

## Curriculum Vitae

**Name:** Emily A. Read

**Education/Degrees:** The University of Western Ontario  
London, Ontario, Canada  
2012-2016 PhD

The University of Western Ontario  
London, Ontario, Canada  
2010-2012 BScN

The University of Western Ontario  
London, Ontario, Canada  
2008-2010 MSc

Acadia University  
Wolfville, Nova Scotia, Canada  
2004-2008 BHKin

**Honours and Awards:** Ontario Graduate Scholarship  
2012-2016

Iota Omicron Chapter of Sigma Theta Tau International Research Grant  
2015-2016

Dorothy Wylie Fellowship Award, Nursing Leadership Network of Ontario  
2014-2015

Irene E. Nordwich Foundation Doctoral Award  
2012-2014

Dean's Entrance Scholarship, University of Western Ontario  
2012-2013

**Related Work Experience:** Research Coordinator  
The University of Western Ontario  
2015-2016

Research Assistant  
The University of Western Ontario  
2008-2015  
Acadia University  
2006-2008

Teaching Assistant  
The University of Western Ontario  
2008-2015  
Acadia University  
2005-2008

## **Publications:**

Read, E.A., & Laschinger, HKS. (2015). Correlates of new graduate nurses' experiences of workplace mistreatment. *Journal of Nursing Administration*, 45(10 supp), S28-35. (Selected for Supplement: Nursing Workforce: Implications for Nurse Executives).

Laschinger, HKS, Consiglio, C, Borgogni, L., Read, E. A. (2015). The Effects of Authentic Leadership and Occupational Coping Self-Efficacy on New Graduate Nurses' Burnout and Mental Health: A Cross-sectional Study. *International Journal of Nursing Studies*. Advance online publication.

Read, E. A., Laschinger, HKS. (2015). The Influence of Authentic Leadership and Empowerment on Nurses' Relational Social Capital, Mental Health, and Job Satisfaction over the First Year of Practice. *Journal of Advanced Nursing*. Advance online publication.

Laschinger, H.K.S., Read, E., Wilk, P., & Finegan, J. (2014). The Influence of Nursing Unit Empowerment and Social Capital on Unit Effectiveness and Nurse Perceptions of Patient Care Quality. *Journal of Nursing Administration*, 44(6), 347-352. Contribution 40%: data collection, writing, and manuscript preparation.

Read, E.A. (2014). Feasibility of the diabetes and technology for increased activity (DaTA) study: A pilot intervention in high-risk rural adults. *Journal of Physical Activity and Health*, 11(1), 118-126. (Contribution 100%: writing, data collection, analysis, interpretation, and discussion.

Read, EA. (2013). Workplace social capital: An evolutionary concept analysis. *Journal of Advanced Nursing*. Contribution 100%: writing, data collection, analysis, interpretation, and discussion.

Read, E.A., & Laschinger, HKS. (2013). Correlates of new graduate nurses' experiences of workplace mistreatment. *Journal of Nursing Administration*, 43(4), 221-228. doi: 10.1097/NNA.0b013e3182895a90, PMID: 23528688. Contribution 75%: conducted data collection, analysis, interpretation, and writing.

Laschinger, H.K., Wong, C.A., Grau, A.L., Read, E.A., and Pineau Stam, L.M. (2012). Influence of leadership practices and empowerment on Canadian nurse managers. *Journal of Nursing Management*, 20(7), 877-888. doi: 10.1111/j.1365-2834.2011.01307.x. Epub 2011 Sep 20. PMID: 2305062. Contribution 20%: data analysis, data presentation, and writing.

Stuckey M, Fulkerson R, Read E, Russell-Minda E, Munoz C, Kleinstiver P, Petrella R. (2011). Remote monitoring technologies for the prevention of metabolic syndrome: the Diabetes and Technology for Increased Activity (DaTA) study. *Journal of Diabetes Science and Technology*, 5(4), 936-44. Contribution 15%: data collection.

Stuckey M, Russel-Minda, B. Read E, Munoz C, Shoemaker K, Kleinstiver P, Petrella R. (2011). Diabetes and Technology for Increased Activity (DaTA) study: results of a remote monitoring intervention for prevention of metabolic syndrome. *Journal of Diabetes Science and Technology*, 5(4), 928-35. Contribution 15%: data collection.