In Search of Mechanisms: How Do HR Practices Affect Organizational Performance?

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ABSTRACT

Empirical work in the strategic human resource management (SHRM) literature has provided ample evidence that configurations of “high performance” work practices are linked to organizational performance, but these studies have failed to adequately develop and test the causal mechanisms underlying this association. While empirical tests of potential mediating mechanisms remain scarce, the theoretical SHRM literature has converged on a set of cognitive and behavioral mechanisms that are proposed to underlie the relationship between high performance HR (HPHR) practices and performance. Specifically, this literature has argued that investing in employees through HPHR practices creates a psychological contract that fosters a sense of mutual obligation between employee and employer. Employees fulfill their obligation through commitment to the organization, which, in turn, yields discretionary effort. These discretionary behaviors lead to superior performance when employees are also sufficiently skilled to improve performance through their discretionary effort. However, the convergence around these mechanisms as necessary and sufficient for high performance may be an artifact of the decomposable and routinized work traditionally studied in the SHRM literature (e.g., front-line manufacturing work). Examining a drastically different type of front-line work that is interdependent, nonroutine, and cognitively demanding, such as nursing, suggests a different set of mechanisms. In these more dynamic settings, high performance results from continuously adapting to ever-changing conditions. HPHR practices enable this adaptability by fostering respectful interactions characterized by trust, honesty, and mutual respect. Respectful interactions allow actions to be more heedfully interrelated into the organization’s ongoing processes. This network of interrelating enables the processes of mindful organizing that have been shown to be positively associated with high performance in dynamic settings. Based on these perspectives, I develop and empirically test 12 hypotheses using survey and archival data from 102 nursing units in 9 hospitals.
INTRODUCTION

Research in strategic human resource management (SHRM)\(^1\) has consistently shown a positive relationship between configurations of “high performance” human resource (HPHR) practices such as extensive formal training programs, employee empowerment, and performance-based compensation and organizational performance (e.g., Ichniowski, Shaw, & Prennushi, 1997). These findings are robust across a number of performance indicators including quality (Arthur, 1994), productivity (Ichniowski, et al., 1997), market performance (e.g., Tobin’s Q, Huselid, 1995), accounting performance (e.g., ROE and ROA, Delery & Doty, 1996), and firm survival (Welbourne & Andrews, 1996). However, the question of how these practices affect organizational outcomes has received far less attention and largely remains an empirical “black box” as few attempts have been made to demonstrate that HPHR practices actually impact the attitudes, skills, and behaviors of the workforce and “no study has demonstrated anything close to a full causal model through which HPHR practices are purported to impact organization performance” (Wright, Dunford, & Snell, 2001: 709). Failing to understand the mechanisms underlying the HPHR practice – organizational performance relationship is problematic because it becomes difficult to definitively rule out the alternative explanations and impossible to assess whether or not prior explanations for the empirical findings rely on faulty assumptions.

While empirical tests of potential mediating mechanisms remain scarce, prior theorizing in the SHRM literature has converged on a set of cognitive and behavioral mechanisms that link HPHR practices to performance. Specifically, HPHR practices help develop committed employees who can be trusted to use their discretion to carry out job tasks in ways that are

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\(^1\) In this paper, when I refer to the SHRM literature I am referring to studies that link a bundle of HR practices to organization-level performance and not the fit between HR practices and business strategy or the role of business strategy in determining the adoption of HR practices (e.g., Jackson, Schuler & Rivero, 1989). I eschew both of these alternate SHRM literatures to focus on the mechanisms through which HR practices affect performance and not the manner by which this relationship can be optimized (i.e., through tight fit).

consistent with organizational goals (Arthur, 1994). That is, the SHRM literature has argued that investing in employees through HPHR practices creates a psychological contract that fosters a sense of mutual obligation between employee and employer. Employees, fulfill their obligation through commitment to the organization, which, in turn, yields discretionary effort, or performing activities outside one’s formal job requirements and applying one’s creativity, imagination, and tacit knowledge of work process toward organizational goals (Appelbaum, Bailey, Berg, & Kalleberg, 2000). The psychological contract and commitment are necessary prerequisites for discretionary effort because it is assumed that “workers will only contribute their discretionary effort to problem-solving if they believe that their individual interests are aligned with those of the company and that the company will make a reciprocal investment in their well-being” (MacDuffie, 1995: 201). Moreover, these discretionary behaviors only lead to superior performance if employees are sufficiently skilled to improve performance through their discretionary effort.

Although the extant SHRM literature views skill, commitment, and discretionary effort as necessary and sufficient conditions for high performance that generalize across work settings (Wright, et al., 2001; Pfeffer, 1998), scholars’ convergence on these mechanisms may be an artifact of the work settings previously studied (i.e., front-line work in manufacturing plants, call centers, and banks). In these settings, work is largely decomposable and routinized. When work is routinized, decomposable, and tasks are highly analyzable, individual performance is primarily a function of individual motivation and collective performance an aggregation of individual performances. I argue that this conceptualization of work is too restrictive and offers an impoverished view of the relational content of work. That is, prior research has only considered interpersonal processes such as “mutual monitoring” or talking to one’s co-workers when they
are not working as hard or as well as they should with the assumption being that maintaining alignment between employee and organizational goals is the key mechanism for explaining organizational performance (e.g., Kruse, Freeman, Blasi, Buchele, Scharf, Rodgers, and Mackin, 2003).

While implementing HPHR practices to align employee and organizational goals and foster commitment and discretionary effort may be necessary for high performance in most settings, it is not sufficient for ensuring performance in interdependent and nonroutine knowledge work (e.g., acute-care nursing). In addition to commitment, discretionary effort, and skill, nursing work requires a richer set of relational dynamics to create high performance. Before describing these dynamics it is important to more fully articulate how nursing work is interdependent and nonroutine knowledge work. First, nurses are highly (i.e., reciprocally) interdependent both with other functions (e.g., doctors, pharmacists, techs) and with the actions of nurses from prior shifts. Second, nursing expertise is distributed across a unit such that nurses need to regularly draw on each other for second assessments of patient conditions as well as advice on specific procedures, medications, or pieces of equipment (Benner, Tanner, and Chesla, 1995). The high levels of interdependence characterizing nursing work suggests that performance (e.g., patient safety) is a collective accomplishment resulting more from gaining an intimate and particular understanding of patients through effective collective relational practice and coordination rather than from relatively isolated individual performances.

Nursing work is also cognitively demanding with high levels of uncertainty regarding patient conditions and appropriate treatments (Argote, 1982), numerous exceptions to “standard care” requiring improvised responses (Tucker & Edmondson, 2003), and interpreting ambiguous data to recognize ominous patterns in patient conditions. In other words, nurses are “an around-
the-clock surveillance system in hospitals for early detection and prompt intervention when patients’ conditions deteriorate” (Aiken, Clarke, Sloane, Sochaski, and Silber, 2002). This quote by Aiken and colleagues illustrates another important dimension of nursing work – operating under extreme time pressure where the room for error is small. Under such demanding circumstances, motivation and effort are insufficient for effective performance. Rather, high performance becomes a function of collective sensemaking or, as Benner and colleagues describe it, piecing together “their understandings and clinical perceptions of patients through consensual validation with other nurses over time” (1995: 211) (see Table 1 for a summary of the contrasting assumptions and mechanisms).

In such dynamic and unpredictable conditions where the cost of mistakes is especially high, performance is created and sustained through relational processes that enable the detection and correction of “unforeseen situations in ways that forestall unintended consequences” (Weick, Sutcliffe, & Obstfeld, 1999: 87). HPHR practices enable this detection and correction by enabling and sustaining rich collective sensemaking. Sensemaking is made richer to the extent that it is grounded in respectful interactions that are characterized by trust, honesty, and mutual respect. Respectful interactions allow for real-time synthesis of meaning when unforeseen situations arise. When individuals interact respectfully, they are provided with a more robust template for acting with system awareness and effectively integrating their actions into the organization’s ongoing processes. When individual actions are heedfully interrelated into organizational processes, the resulting network of interrelating enables a capability for rapid detection and correcting of unexpected events, or what Weick, Sutcliffe, and Obstfeld (1999) refer to as the process of mindful organizing, that has been shown to be positively associated
with high performance in dynamic settings (Vogus & Welbourne, 2003; Weick & Sutcliffe, 2001).

Drawing on both these perspectives, I develop and test 12 hypotheses using archival and survey data from a sample of 2,953 nurses in 102 nursing units in 9 hospitals. In the following section, I define two key concepts critical to the study - “HPHR practices” and “mechanisms.” After defining these concepts, I develop hypotheses corresponding with the “traditional” and then an alternative more specifically grounded in the dynamics of interdependent and nonroutine knowledge work. In developing this alternative perspective (which I refer to as a “sensemaking” perspective), I articulate cognitive and coordinative mechanisms that specifically address the unique problems characterizing knowledge work in general and nursing work in specific. Then I describe the sample, study design, measures, and analysis techniques. I conclude with a brief discussion of the contributions to SHRM and organization theory.

Definitions

**HPHR Practices.** To assess the effect of HR practices on performance, it is necessary to specify the relevant HR practices. In this dissertation, when I refer to HR practices, I am not generally referring to any HR practices, but specifically to “high performance work systems” (e.g., Huselid, 1995). “High performance” means that the focus is on “progressive” employment practices such as extensive training and employee empowerment as opposed to “low performance” or “traditional” employment practices that emphasize minimal investment in employees and tight control over work processes (e.g., Tayloristic job design). Defining HR practices as a “system,” means these practices are conceptualized to have the strongest impact on

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2 It is important to note that some empirical work has found that “low performance” work systems can lead to performance outcomes equivalent to high performance work systems (e.g., Lewin, 2002). However, my focus on high performance work systems remains justified because this dissertation is focused on articulating the mechanisms relevant to the mainstream literature, which is overwhelmingly focused on high performance work systems.
performance as a cluster or “bundle” of coherent practices (MacDuffie, 1995). Focusing on an internally consistent HR system is important because it recognizes that the effectiveness of any HR practice depends on other practices in place (Delery, 1998; Baird & Meshoulam, 1988) and that an internally consistent system provides a stronger and more coherent set of cues to employees (Baron & Kreps, 1999). Prior empirical research has further confirmed that HPHR systems have a greater impact on performance than individual practices (Ichniowski, et al., 1997; MacDuffie, 1995).

However, this focus on “high performance” practices fails to adequately specify the practices that comprise the system (Becker & Gerhart, 1996). To help rectify this situation, I reviewed 22 published empirical studies in the SHRM literature in an attempt to cull common categories of HR practices. Based on this review, seven clusters of practices emerged (i.e., appeared in a majority of the studies) and appear to characterize high performance work practices, including training, performance-based compensation, promotion from within, employee empowerment, selective staffing, developmental performance appraisal, and employment security.

Mechanisms. In this paper, I assert that the question of how HPHR practices affect organizational performance is a question of mechanisms. While this is a useful theoretical starting point, the meaning of mechanisms and the process through which they operate needs further elaboration. Consistent with Stinchcombe, I define a mechanism as a “bit of theory about entities at a different level (e.g., individuals) than the main entities being theorized about (e.g., groups), which serve to make the higher-level theory more supple, more accurate, or more general” (1991: 367). Theorizing about mechanisms helps establish how macro-level events or conditions affect the individual, how the individual assimilates the impact of these macro-level
events, and how a number of individuals, through their actions and interactions, generate macro-
level outcomes.

A mechanisms-based approach is especially useful for my research question because although the extant empirical literature ostensibly provides compelling support for a significant positive relationship between HPHR practices and performance, this relationship is reliant upon untested assumptions about lower levels of analysis (i.e., the individual). This is problematic because in the absence of clearly specified and measured mechanisms it is difficult to definitively rule out the alternative explanations. For example, the possibility of reverse causation plagues much of the HPHR-organizational performance literature (e.g., Batt, 2001; Guthrie, 2000). That is, the positive correlation between HPHR practices and performance may not mean that HPHR practices lead to performance, but may in fact mean that high performing organizations are more likely to implement high performance HPHR practices. While longitudinal designs may help alleviate this problem (e.g., Becker & Huselid, 1996; Cappelli & Neumark, 2000), a mechanisms-based approach that encourages deeper, more direct, and more fine-grained explanations provides an equally fruitful path by which to distinguish between genuine causality and coincidental association (Hedstrom & Swedberg, 1998: 8-9). Becker and Gerhart similarly assert “if it can be demonstrated that employees in firms with profit sharing have different attitudes and behaviors than those in firms without profit sharing and that those differences also translate into different levels of [performance] … then researchers can begin to have more confidence in the causal model” (1996: 793-4).
HYPOTHESES

The Traditional Perspective on the HPHR Practice – Firm Performance Linkage

The prevailing view in the SHRM literature is that HR practices beget high performance to the extent they align employee and employer goals, which, in turn, motivates employees to act in a manner consistent with employer goals. Meyer and Allen suggest that HPHR practices do this by communicating that the organization supports its employees, treats them fairly (e.g., provides job security), and enhances their sense of personal importance and competence by appearing to value their contributions to the organization, which, in turn, increases commitment (1997: 46). In support of this argument, Whitener found that “motivation-oriented” HR practices (e.g., developmental performance appraisal, equitable compensation) were significantly associated with commitment, which led her to conclude that employees perceive these practices as signals of the organization’s commitment to them (2001: 520-521). Numerous empirical studies support this argument. For example, Gaertner and Nollen’s study of a Fortune 100 manufacturing organization (1989) found that “psychological commitment is higher among employees who believe they are being treated as resources [as indicated by HR practices] to be developed rather than commodities to buy and sell” (1989: 987). Tsui and colleagues (1997) similarly found that HR practices (i.e., performance appraisal and organization-based rewards) were related to employee commitment. Using a sample of life insurance agents, Galunic & Anderson (2000) found that both generalized and firm-specific investments in human capital (i.e., training) increased agent affective commitment to the organization. While these studies of the relationship between individual or small clusters of HR practices and commitment are instructive, prior work has not attempted to link a complete system of HPHR practices with...
commitment. This study will investigate this gap by proposing that, to the extent that organizational investment in HPHR practices fosters a reciprocal obligation by employees:

*Hypothesis 1: HPHR practices will be positively related to employee commitment.*

While commitment is an important linkage in the HPHR practices – organizational performance relationship, it is only likely to yield superior performance to the extent that it results in behavior aligned with organizational goals (Wright, McMahan, & McWilliams, 1994). A strong commitment-behavior linkage is likely because an employee with strong affective commitment feels emotional attachment to the organization and, as such, it follows that he or she will have greater motivation or desire to contribute meaningfully to the organization than would an employee with weak affective commitment (Meyer & Allen, 1997). The main class of behavior envisioned to yield high performance is discretionary effort (e.g., Appelbaum, et al., 2000; MacDuffie, 1995), or productive behavior outside formal job requirements (e.g., organizational citizenship behavior, Organ, 1988).

The literatures on commitment and organizational citizenship behavior are replete with studies linking the two constructs. For example, numerous studies have found significant relationships between commitment and citizenship behavior (Meyer & Allen, 1986; Meyer, Allen, & Smith, 1993; Pearce, 1993). Organ and Ryan’s (1995) meta-analysis of previously published studies also found significant correlations between affective commitment and discretionary effort (namely, altruism and generalized compliance). Thus, I hypothesize:

*Hypothesis 2: Employee commitment will be positively related to discretionary effort.*

As noted earlier, discretionary effort is theorized to play a critical role in explaining how HPHR practices yield high performance (e.g., Appelbaum, et al., 2000; MacDuffie, 1995), but this assertion remains untested in the SHRM literature. Moreover, prior empirical research in the
discretionary effort (e.g., organizational citizenship behavior) literature has also infrequently linked discretionary effort to organizational performance (Podsakoff, MacKenzie, Paine, Bachrach, 2000), but recent work by Podsakoff and colleagues suggests a positive relationship between discretionary effort (specifically helping behaviors) and several indicators of performance including quantity produced and product quality (Podsakoff, Ahearne, & MacKenzie, 1997), as well as customer satisfaction, waste reduction, and revenue per employee (Walz & Niehoff, 1996). Thus, I hypothesize:

**Hypothesis 3:** Discretionary effort will be positively related to performance.

Moreover, HPHR practices can develop employee skills and abilities to help make discretionary effort more efficacious. For example, HPHR practices can increase employee skills through technical, problem-solving, and team-building training (Appelbaum, et al., 2000; Youndt, et al., 1996). In addition, staffing practices including rigorous selection and recruitment procedures can enable an organization to obtain employees with the appropriate knowledge, skills, and abilities to function effectively in a specific organizational context. Selective staffing is also generally recognized as leading to a better-educated or more proficient workforce (Appelbaum, et al., 2000). Use of employee involvement programs and according front-line employees greater discretion in their work practice also contributes to allowing employees to learn in context as well as exercise and build their competence (Batt, 2002). When coupled in a mutually reinforcing system of selective staffing, extensive training, and employee discretion, HPHR practices can have an especially significant impact on employee skills. Thus, I hypothesize:

**Hypothesis 4:** HPHR practices will be positively related to employee skills.
While, I have hypothesized that HPHR practices affect organizational performance through commitment and discretionary effort, this additional effort only yields performance when performed by individuals with the appropriate skills and knowledge. In other words “motivated workers who lack skills or knowledge may contribute discretionary effort with little impact on performance” (MacDuffie, 1995: 199). When employees engage in discretionary effort in a dangerous environment (e.g., a hospital nursing unit) possessing the requisite skill is especially important because in such settings unskilled improvisation can easily backfire (e.g., Rousseau & Libuser, 1997). Thus, I hypothesize:

_Hypothesis 5: The positive impact of discretionary effort on performance will be stronger when employee skills are high than when they are low._

By adding the proposed underlying mechanisms to a model that attempts to link HPHR practices and performance, it is expected that these intervening processes will at least partially mediate the HPHR practice – organizational performance relationship. The mediation may only be partial because HPHR practices may also impact organizational performance through improving employees’ baseline performance on their core job tasks or operate through alternative mechanisms that are not accounted for in these models such as turnover (Batt, 2002; Huselid, 1995) or social capital (Collins & Clark, forthcoming). Thus, I hypothesize:

_Hypothesis 6: Employee commitment and discretionary effort will (partially) mediate the relationship between HPHR practices and performance._

A New Perspective on the HPHR Practice – Organizational Performance Linkage

Next I develop a set of hypotheses that are grounded in the assumption that in dynamic knowledge-based work motivation and discretionary effort may be necessary, but insufficient bases for high performance. In these settings, high performance on coordinated action and
effective collective sensemaking. When taken together these hypotheses and their supporting logic articulates how unit-level HPHR practices infuse individual interactions with trust, honesty, and mutual respect, which enable individual actions to be heedfully interrelated into ongoing unit processes. This network of interrelating, in turn, enables the several processes (i.e., the processes of mindful organizing) that allow nursing units to remain adaptable, effective, and safe in the face of a seemingly unending stream of unexpected and potentially disastrous events.

**Respectful Interaction**

Respectful interaction is the underpinning of socially achieved knowledge (Campbell, 1990; Asch, 1952) and, the basis for effective collective sensemaking. Respectful interaction fosters effective sensemaking by cultivating intersubjectivity (Wiley, 1988: 258), which has two defining characteristics: (1) intersubjectivity emerges from the interchange and synthesis of meanings among two or more communicating selves, and (2) the self or subject gets transformed during interaction such that a joint or merged subjectivity develops (Weick, 1993: 642).

Interactions are more respectful to the extent that they are consistent with the following three “moral norms”: (1) people respect the reports of others and be willing to base beliefs and actions on them (trust); (2) people report honestly so that others may use their observations in coming to valid beliefs (honesty); and (3) people respect their own perceptions and beliefs and seek to integrate them with the reports of others without deprecating themselves (self-respect) (Campbell, 1990: 39).

In dynamic and crisis-prone settings like hospital nursing units, respectful interaction may be the only way to make sense of and coordinate responses to rapidly unfolding events or deteriorating conditions. That is, when unexpected events occur, they undermine existing structures and routines such that the only way to comprehend what is unfolding and respond to it
effectively is through face-to-face synthesis of meaning (Weick, 1993). Prior research on high reliability organizations (HROs), such as nuclear power plants, that exist in crisis-prone settings often rely upon extensive ongoing and respectful communication to sustain nearly error-free performance (Schulman, 1993). There is also ample evidence from case studies of disasters at Tenerife (Weick, 1990), Mann Gulch (Weick, 1993), and South Canyon (Maclean, 1999) that the absence of trust, honesty, and self-respect in interactions causes, or at least severely exacerbates, crises. Moreover, respectful interaction is also critical for navigating potentially treacherous hand-offs between people, shifts, or units (Roberts & Yu, 2002). When hand-offs are respectful, they endow people with a robust framework for action that is likely to include an assessment of the current situation, a proposed course of action, a working rationale, and identify sources of concern (Weick, 2003).

HPHR practices help enable respectful interaction in two ways – 1) structuring the unit and 2) signaling expectations for how work is to be carried out. HPHR practices help structure a unit for respectful interaction by selecting employees for their interpersonal skills as well as their specific formal credentials may increase the likelihood of respectful interaction (Gittell, 2000). More specifically, affect each component of respectful interaction - trust, honesty, and self-respect. HPHR practices cultivate trust by giving employees more opportunity to interact and build trusting relationships through work design (e.g., team-based nursing) and training (e.g., preceptor programs that pair experienced and new nurses for an extended orientation). These practices also signal that the organization is trustworthy (i.e., treats its employees fairly through non-punitive performance appraisal, opportunities for advancement, and job security) and that employees and their expertise are to be trusted (as indicated by allowing nurses to have discretion in providing patient care and in setting work schedules). The effect of HPHR
practices on trust has also been previously demonstrated in prior empirical work (Appelbaum, et al., 2000). HPHR practices also help encourage honesty. For example, developmental performance appraisals instill a problem-solving orientation that creates a psychologically safe (Edmondson, 1999) environment for honestly disclosing and near errors without fear of punishment. Lastly, HPHR practices increase self-respect. For example, extensive training increases employee skills and confidence. When training is coupled with employee involvement in unit decision-making and the freedom to exercise clinical expertise, employees will have greater respect for their own competence for themselves and those with whom they work. This increased self-respect renders these employees more willing to stand up for their assessments of patient conditions and appropriate courses of action. When employees see their colleagues as equally competent (and when coupled with trust and honesty), self-respect is more likely to curb bullheadedness, hubris, headstrong acts, and self-importance (Schulman, 1993) and lead to richer shared understandings. Given the effects of HPHR on trust, honesty, and self-respect, I hypothesize:

Hypothesis 7: HPHR practices will be positively related to respectful interaction.

Heedful Interrelating

Heedful interrelating consists of three interdependent processes – contribution, representation, and subordination (Weick & Roberts, 1993). That means relations are more heedful when each of these processes is present. First, when people understand how the work system is configured to achieve its goals and view their work as a contribution to this system, not as a stand-alone activity. Second, when people understand the interdependencies in the work system (i.e., how their work fits with other people’s work) and how others contribute to the functioning of the system (i.e., representation). Third, when people look out for each other and
subordinate their idiosyncratic intentions to the effective functioning of the system. When contribution, representation, and subordination are all present, it increases the alertness and intelligence mobilized to deal with the unexpected (Weick & Roberts, 1993). Respectful interaction enables heedful interrelating by cultivating intersubjectivity, equipping actors with rich cues for making sense of their social context, and fostering valued relationships. Respectful interaction cultivates intersubjectivity, which allows individuals to envisage a system and contribute accordingly. When interactions are buoyed by trust, honesty, and self-respect, they yield rich stories that “organize know-how, tacit knowledge, nuance, sequence, multiple causation, means-end relations, and consequences into a memorable plot” that represent interdependencies and how others contribute to the system and, as such, provide the basis for heedful action (Weick & Roberts, 1993: 368). Lastly, respectful interactions that are characterized by trust and honesty generate valued relationships that people will try to sustain. As such, they will look out for each other or at least try not to jeopardize their valued relationships through acting solely in self-interest. The combination of rich cues embedded in valued relationships increases the likelihood that respectful interactions will be transformed into heedful action. Thus, I hypothesize:

Hypothesis 8: Respectful interaction will be positively related to heedful interrelating.

Mindful Organizing

Mindfulness entails an “enriched awareness … [through] active differentiation and refinement of existing categories and distinctions…creation of new discontinuous categories out of the continuous stream of events, … and a more nuanced appreciation of context and alternative ways to deal with it” (Weick, et al., 1999, p. 90). Mindfulness is continuously reaccomplished through the processes of mindful organizing (Weick and Sutcliffe, 2001; Weick,
et al., 1999). Weick and his colleagues identify five processes that contribute to creating and sustaining the enriched awareness of mindfulness – preoccupation with failure, reluctance to simplify interpretations, sensitivity to operations, commitment to resilience, and deference to expertise. Organizations preoccupied with failure treat any failure or near miss as an indicator of the reliability and health of the system and reward the reporting of errors (Weick, et al., 1999). Reluctance to simplify interpretations entails seeking out and maintaining divergent viewpoints and skepticism to minimize blind spots and ensure key variables are not overlooked. Sensitivity to operations means creating and maintaining an integrated big picture of the moment through ongoing attention to real-time information (Weick, et al., 1999). Commitment to resilience is the belief in the fallibility of existing knowledge as well as the ability to both bounce back from errors and handle surprises in the moment (Wildavsky, 1988). Deference to expertise results from the fluid decision-making that occurs in high-reliability organizations (HROs) during high tempo times. During these periods, decisions migrate to the individuals in the organization who have the greatest expertise and who are closest to the problem (Roberts, Stout, & Halpern, 1994).

While the concepts of respectful interaction and heedful interrelating provide insight into how to act to ensure high performance (Weick, 2002), they do not provide insight into “what” must be heedfully interrelated. The processes of mindful organizing are that “what.” Specifically, heedful interrelating establishes a network of relations that enable the processes of mindful organizing or, in other words, a capability for error detection and correction. For example, when contributing, representing, and subordinating, individuals become aware of each other’s capabilities and expertise, and as such, when the unexpected arises, they can call upon and defer to this expertise. Similarly, the contributions, representations, and subordination that characterize heedful interrelating result in the construction and updating of an integrated big
picture of operations in the moment (i.e., sensitivity to operations). This occurs because all the participants in the organization act knowingly with respect to how they fit and how their peers fit into the system in the moment. When heedfully interrelating in a context such as a hospital nursing unit, one is looking out for how one may need to subordinate in order to maintain safety and avoid errors (i.e., preoccupation with failure). When actions are taken with the impact on the system in mind, awareness of what others are doing, and unwillingness to jeopardize the health of the system, actors are reluctant to simplify their interpretations (i.e., make the self-interested decision). Thus, I hypothesize:

_Hypothesis 9: Heedful interrelating will be positively related to the processes of mindful organizing (i.e., preoccupation with failure, reluctance to simplify interpretations, sensitivity to operations, commitment to resilience, and deference to expertise)._ 

While HPHR practices affect mindfulness indirectly through their influence on respectful interaction and heedful interrelating, I also posit these practices directly influence the process of mindful organizing. HPHR practices can enable mindful organizing to the extent that they provide templates for examining and learning from failure (e.g., employee suggestion programs, developmental performance appraisal), cultivating and maintaining diverse interpretations (e.g., selecting people with diverse backgrounds), gaining an intimate knowledge of operations in the moment (e.g., through empowerment and training in context), developing the capability to be resilient in the face of the unexpected (e.g., training), and locating situational expertise and deferring to it. More specifically, HPHR practices help build the broad response repertoires necessary for resilience. Selective staffing and training increase collective competence, developmental performance appraisal fosters inquiry and a learning orientation, and job security and empowerment allow the freedom to increase individual and collective skills by safely
experimenting at the edge of one’s competence. Consistent with these arguments, Vogus & Welbourne (2003) found preliminary support for a direct relationship between HPHR practices and the processes of mindful organizing. Thus, I hypothesize:

**Hypothesis 10:** Respectful interaction and heedful interrelating will partially mediate the relationships between HPHR practices and the processes of mindful organizing.

According to Weick and Sutcliffe (2001; Weick, et al., 1999), mindful organizing is the hallmark of a class of organizations (HROs) that experience nearly error-free performance under extremely hazardous operating conditions (e.g., naval aircraft carriers, nuclear power plants) where one would expect many errors. Specifically, mindful organizing yields such extraordinary performance because it enables organizations to maintain continuing alertness and vigilance in such a way that it allows them to more readily detect weak signals and mobilize their broad response repertoires more effectively. Thus, I hypothesize:

**Hypothesis 11:** Mindful organizing will be positively related to performance.

In similar fashion to Hypothesis 6, I expect that these intervening processes will at least partially mediate the HPHR practice – organizational performance relationship. Thus, I hypothesize:

**Hypothesis 12:** Mindful organizing will (partially) mediate the relationship between HPHR practices and performance.

All the hypotheses are summarized in Figure 1.

**METHODS**

**Sample**

The empirical context for this research is 102 nursing units in 9 hospitals within a single health system. Hospital nursing units are a relevant setting to test this framework because
producing safe operations (and effective performance) relies heavily upon nurses’ collective skill, effort, and ability to coordinate. Moreover, prior work in SHRM suggests that high performance work systems will have the greatest impact on performance when implemented for employees that comprise the “strategic core” workforce (Delery & Shaw, 2001). In the case of a hospital, this core mission is the ongoing provision of patient care. Staff nurses are core to achieving this mission because they are the primary caregiver and patient advocate (Benner, Tanner, & Chesla, 1995). Staff nurses are also the “strategic core” workforce with respect to the measures of performance in this study in that they have a great deal of impact on these performance outcomes (i.e., length of stay, medication errors, patient falls, skin breakdowns, and patient satisfaction). As previously mentioned, this setting also allows me to examine two potential boundary conditions on prior work in SHRM – work content and work context. Nurses are professionals engaged in knowledge work in an extremely dynamic setting as opposed to the assembly line work and stable manufacturing settings of prior studies (e.g., Ichniowski, et al., 1997).

**Design**

Specifically, my empirical design consists of three steps: exploratory interviews and observation, development and pre-testing of a survey instrument, and administering the survey to a large sample of nursing units. I gathered preliminary qualitative data through 40 hours of semi-structured interviews and observation in three nursing units (one high performing, one medium performing, and one low performing) of a large Midwestern teaching hospital. The semi-structured interviews lasted between 10 (staff nurses) and 90 minutes (nurse managers). Interviews with nurse managers and clinical nurse supervisors were tape recorded and transcribed. The semi-structured interview protocol is detailed in Appendix 1. Observation took
place when patients were handed off from the exiting to the oncoming shift during nurse report. I observed report at three times during the day (7am, 3pm, and 7pm). The units were selected based on theoretical sampling of extreme cases. A knowledgeable manager in the hospital’s Office of Clinical Affairs assessed the units as high, medium, and low performing based on the outcomes of interest in this study (medication errors, falls, skin breakdowns, etc.). I was notified of which units were high, medium, and low performing after completing my observation and interviews.

As the constructs of interest had already been developed as a result of rigorous qualitative fieldwork (e.g., Weick & Roberts, 1993), my objectives were much more limited than building a grounded theory. The primary goal of my fieldwork was to assess the validity of my key constructs in the field (i.e., respectful interaction, heedful interrelating, and the processes of mindful organizing). That is, I wanted to determine if in these constructs were applicable to the nursing context and to see if they differed between high and low performing units. I also wanted to use data from my observations to more accurately tailor my survey instrument to incorporate relevant aspects of nursing work and to use the language of nurses as much as possible. Even with these relatively narrow objectives, my fieldwork produced an even more striking contrast than I had expected. Although the high and low performing unit were both very similar in terms of patient acuity and identical in RN to patient ratios, they did differ dramatically in terms of their use of HPHR practices and the presence of the sensemaking processes I have theorized. The high performing unit utilized nearly the full repertoire of HPHR practices. For example, this unit coupled selective staffing (“We want the cream of the crop, but … leery of overconfidence … look for people calm in the setting”) with developmental performance appraisal

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3 All quotes regarding HPHR practices are derived from thematic analysis of interview transcripts. All quotes regarding respectful interaction, heedful interrelating, and mindful organizing are derived from field notes.
(characterized by an attitude of “Let’s learn from this … how would you do it differently?”) and allowing nurses to have a great deal of input into their patient assignment. In stark contrast, the low performing unit only utilized selective staffing with an emphasis on finding fit and then did little to capitalize upon that fit (i.e., only “mandatory” training, minimal employee involvement in unit-decision making, etc.). Moreover, the significant difference in HPHR practices also corresponded with significant differences in respectful interaction, heedful interrelating, and mindful organizing. In the high performing unit, nurses gave more deliberate, detailed, and narrative reports that approximated the rich basis for action suggested by respectful interaction. The interactions in the high performing units also contained much greater amounts of active listening in an attempt to build a shared understanding of the best course of action (“is that a beta blocker?”; “How can you go from one day high risk to one day not?”). In contrast, in the low performing unit, relied much less on conversation and narratives and much more on pre-existing patient cards as the primary source of patient information. There were also significant differences in heedful interrelating and mindful organizing as the high performing unit talked about being “nosy … if I see something unusual in a room I have to stick my head in,” whereas, the attitude on the low performing unit was one of “just tell me about my patients so I can do my job.” In sum, my qualitative work suggested that these constructs were viable in the nursing context and differed, often dramatically, across differentially performing units.

Based upon my interviews and field observation as well as my review of the relevant literatures, I developed and pre-tested the survey instrument in a hospital nursing unit of 96 registered nurses (RNs). I received responses from 45 of the 96 nurses (47%) on their unit and used their response to preliminarily validate my measures and to make minor adjustments to the survey instrument.
After making minor adjustments as a result of the pilot test, I followed up the pilot test by conducting a large sample survey study and surveying 2,953 RNs in 102 nursing units in 9 acute-care hospitals in the same hospital system. I collected data through two surveys – 1) a nurse manager survey that assesses discretionary effort, HR practices implemented on the unit, and several unit level control variables and 2) a RN survey to assess commitment, employee skills, respectful interaction, heedful interrelating, the processes of mindful organizing, and additional control variables. I surveyed all RNs on a given unit for data on the independent variables as well as several control variables. To reduce concerns about the percept-percept bias with self-assessments of performance, I surveyed nurse managers regarding discretionary effort, and utilize archival data to assess unit performance. I received responses usable responses from 902 of the 2,953 RNs (31%). While the response rate was lower than desired, subsequent checks revealed that the respondents were not significantly different from non-respondents in either age or tenure.

Dependent Variables

To test my hypotheses I will utilize five measures of performance – length of stay, medication errors, patient safety (two measures – patient falls and skin breakdown), and patient satisfaction. I selected these performance indicators because they are largely under the control of nurses and relevant to overall hospital financial performance. These dependent variables are also consistent with the extant plant or unit-level research in SHRM that focuses on operational performance measures such as quality (MacDuffie, 1995) or customer satisfaction and are of tremendous importance to the units and all their constituencies (e.g., governmental regulators, hospital administration, and patients). Each of these variables is derived from unit-level archival data that is standardized across the 9 hospitals. To minimize concerns of reverse causation that
have plagued prior research in SHRM, all the dependent variables are measured either in the month (falls, skin breakdowns, length of stay, medication errors) or the quarter (patient satisfaction) after the collection of the survey data. Medication errors, patient falls, and skin breakdowns (e.g., bed sores) are all measured as the number of occurrences of an event during a month (e.g., medication error) divided by the number of patient days for the same month. Patient satisfaction is measured using a standardized questionnaire that assesses the quality of nursing care (e.g., “Nursing staff responded to your requests in a reasonable amount of time,” “Nursing staff treated you with dignity”).

**Independent Variables**

My independent variables include an additive index of *HPHR practices* (measured using survey items assessing the extent to which several practices are implemented, adapted from (Becker & Huselid, 1998; Snell & Dean, 1992). A sub-sample of these items as well as items for all the other independent variables and their reliabilities (i.e., Cronbach’s alpha) is included in Table 2. An additive approach to combining HPHR practices into an index is appropriate because it suggests that organizations can improve performance either by increasing the number of practices they employ within the system or by using the practices in an HR system in a more comprehensive and widespread manner. This approach is more justified conceptually and empirically than a multiplicative approach to creating HR systems because it does not reduce the index value to zero if a single practice is absent from a system. Instead, the absence of a practice only weakens the net effect of the system (MacDuffie, 1995). Moreover, an additive index provides a conservative estimate that may understate the synergies or multiplicative effects of combining practices (Batt, 2002). Although the additive index is endorsed as the preferred method (Delery, 1998), I will also test a multiplicative index of HPHR practices as well as the
effects of individual practices (e.g., selective staffing). Commitment will be measured using survey items adapted from Meyer and Allen (1997). Discretionary effort will be operationalized as organizational citizenship behavior (Organ, 1988) and measured using survey items adapted from Cappelli and Rogovsk (1998), Konovsky and Organ (1996) and Van Dyne and LePine (2000). Employee skills will be measured using survey items adapted from Wright, McCormick, Sherman, and McMahan (1999). Lastly, I created survey items for constructs previously unmeasured in the existing literature including respectful interaction (items based on Campbell, 1990), heedful interrelating (based on Weick & Roberts, 1993; Asch, 1952), and the processes of mindful organizing (based on Weick & Sutcliffe, 2001; Weick, Sutcliffe, & Obstfeld, 1999). Table 2 also contains a sub-sample of these items.

Control Variables

Because there are several factors that contribute to or impede performance (i.e., errors, safety, patient satisfaction, and length of stay) as well as the mediating mechanisms, I include control variables for hospital unit factors and attributes of the nursing workforce. At the work unit level, I control for several factors including unit size (number of beds), unit type (dummy variables, e.g., ICU), whether or not the nurses are unionized (dummy variable), work process complexity (survey items adapted from Preuss, 1998; Schoonhoven, Scott, Flood, & Forest, 1980), task interdependence (survey items adapted from Pearce & Gregerson, 1991), and prior performance on each of the dependent variables. Lastly, I control for collective attributes of a given unit’s RNs including experience (average tenure), and commitment to nursing (as opposed to commitment to the work unit, survey items adapted from Meyer, et al., 1993).

Analysis
My analytical plan consists of a combination of exploratory factor analysis and item analysis to assess the psychometric properties of the survey, conducting a confirmatory factor analysis to ensure convergent and discriminant validity and group the items, and statistically connecting these factors to the performance indicators. I will conduct an exploratory principal components factor analysis, item analyses, and preliminary tests for convergent and discriminant validity with the data from my survey pre-test and will verify that the survey items are reliable and valid. Then I will develop a measurement model to test the strength of the empirical relationships between items and their latent variables (Bollen, 1989). This measurement model is generated through a confirmatory factor analysis (CFA), which is a subset of structural equation modeling and is an appropriate technique for reducing the data for subsequent regression analyses as all the question items are based on prior theory. I will use the weighted item values given by the CFA as the inputs for the independent variables, creating aggregate measures for each factor at the nurse level.

However, since my unit of analysis is the nursing unit and I am collecting data from individuals through surveys, I will need to aggregate the responses from individual RNs to the unit level. For aggregation to be appropriate it is necessary to demonstrate that - 1) the members of each unit reported similar scores for the unit on a given measure, and 2) the units have greater variance between units than they have within units for a given variable. To assess the first condition for aggregation, within unit agreement, I will use the $r_{wg(j)}$ statistic (James, Demaree, & Wolf, 1984). This measure compares within unit agreement against expected within unit agreement using the following formula:

$$r_{wg(j)} = \frac{(J * [1-(s_{xj}^2/\sigma_{EU}^2)])/(J * [1 - (s_{xj}^2/\sigma_{EU}^2)]) + (s_{xj}^2/\sigma_{EU}^2))}{1}$$
where $r_{wg(j)}$ is the within-unit inter-rater agreement for the unit’s mean scores based on $J$ items, $s_{xj}^2$ is the mean of the observed variances on the $J$ items, and $\sigma_{EU}^2$ is the variance on the items if all judgments were due exclusively to random measurement error. James and colleagues (1984) recommend 0.70 as the threshold that collectives must exceed in order for a researcher to claim that the collective converges. I will test the second condition of convergence, greater variance between units than within units, using two forms of the intraclass correlation coefficient (ICC(1) and ICC(2)). ICC(1) can be interpreted as the total variance explained by membership in the unit and ICC(2) as the stability of the unit level means (Bliese, 1998). Given a sufficient level of agreement (greater than 0.70), I will aggregate the individual RN responses to the unit level and take the average.

Next, I will test my hypotheses by connecting the independent variable factors created in the previous stage with the dependent variables – length of stay, medication errors, patient falls, patient satisfaction, and skin breakdowns (e.g., bed sores). While it would be preferable to utilize structural equations modeling to test my hypotheses since all of my independent variables are latent and likely to have measurement error, my sample size (102 units) is too small to conduct structural equations modeling. Therefore, I will utilize path analysis (Bollen, 1989; Asher, 1983), which also allows for the estimation of direct and indirect relationships and hierarchical multiple regression to test for mediation.

**Contributions**

This research makes three key contributions to the SHRM literature and organization theory. First, it is a first step in testing the mechanisms that were previously an empirical “black box” in the SHRM literature. Specifically, I propose and test two sets of theory-driven mechanisms that solve either of two fundamental problems of effective organizing – motivating individuals so
their goals are aligned (commitment and discretionary effort) or organizing individuals so their actions are aligned (respectful interaction, heedful interrelating, and mindful organizing).

Second, I introduce work as a critical contingency that shapes how HPHR practices enable high performance. Specifically, the mechanisms posited by the SHRM literature (i.e., commitment and discretionary effort) may be necessary and sufficient for work that is standardized and decomposable, but not for work in more dynamic and interdependent settings, where coordination and effective interrelating are more essential to performance.

Third, the proposed research will add to our understanding of high reliability and mindful organizing. In particular, I articulate and test how organizational (HPHR) practices enable mindful organizing at the local level and, in turn, unit performance. I also elaborate how the processes of mindful organizing emerge from the translation of individual-level respectful interaction into unit-level heedful interrelating. Lastly, if the new survey instruments developed in this dissertation have adequate psychometric properties they will enable future researchers to investigate to what extent other organizational phenomena can be explained by respectful interaction, heedful interrelating, and the processes of mindful organizing.
References


Administrative Science Quarterly 44: 350-383.


Vogus, T. J. and T. M. Welbourne (Forthcoming). "Structuring for High Reliability: HR


<table>
<thead>
<tr>
<th>Assumptions</th>
<th>“Traditional”</th>
<th>“Sensemaking”</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Work</strong></td>
<td>• Decomposable – collective performance is an aggregation of individual performances</td>
<td>• Interdependent – collective performance is a collective outcome, not reducible to individual performance</td>
</tr>
<tr>
<td></td>
<td>• Routinized – performance is a function of effort and skill</td>
<td>• Nonroutine – numerous exceptions, high levels of uncertainty and ambiguity</td>
</tr>
<tr>
<td><strong>2. Performance</strong></td>
<td>• Agency problem - performance results from aligning individual and organizational goals.</td>
<td>• Coordination problem - performance results from aligning actions and ongoing communication.</td>
</tr>
<tr>
<td><strong>Mechanisms</strong></td>
<td><strong>1. Cognitive</strong></td>
<td>• Commitment – individual perception of obligation</td>
</tr>
<tr>
<td></td>
<td><strong>2. Behavioral</strong></td>
<td>• Discretionary effort</td>
</tr>
</tbody>
</table>
### TABLE 2 - Representative Survey Items Measuring Independent Variables

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>Representative Survey Items (7 point scale, Not at all -&gt; To a very great extent or Strongly disagree -&gt; Strongly agree)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HPHR Practices</strong></td>
<td><strong>Developmental Performance Appraisal (Alpha = .81, 6 items)</strong></td>
</tr>
<tr>
<td>(Aiken &amp; Patrician, 2000; Delery &amp; Doty, 1996; Snell &amp; Dean, 1992)</td>
<td>- RNs rarely receive informal feedback from their supervisors. (Reverse-coded)</td>
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<td></td>
<td>- When performance is discussed, the focus is on improving future performance</td>
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<tr>
<td><strong>Employee Involvement (Alpha = .75, 6 items)</strong></td>
<td>- RNs have the freedom to make important patient care decisions.</td>
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<td></td>
<td>- RNs actively participate in developing their work schedules (i.e., what days they work; days off, etc.).</td>
</tr>
<tr>
<td><strong>Job Security (Alpha = .75, 4 items)</strong></td>
<td>- Job security is almost guaranteed to staff nurses.</td>
</tr>
<tr>
<td><strong>Performance-Based Rewards and Promotions (Alpha = .72, 6 items)</strong></td>
<td>- RNs receive praise and recognition for a job well done.</td>
</tr>
<tr>
<td></td>
<td>- RNs are promoted based on job performance.</td>
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<tr>
<td><strong>Staffing (Alpha = .82, 4 items)</strong></td>
<td>- We utilize an extensive selection process (e.g., use of tests, interviews) when hiring RNs.</td>
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<tr>
<td></td>
<td>- We hire RNs based on their interpersonal and communication skills.</td>
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<tr>
<td><strong>Training (Alpha = .85, 5 items)</strong></td>
<td>- We have a preceptor program for newly hired RNs.</td>
</tr>
<tr>
<td></td>
<td>- We provide RNs with training in communication and interpersonal skills</td>
</tr>
<tr>
<td><strong>Commitment</strong></td>
<td><strong>(Alpha = .81, 6 items)</strong></td>
</tr>
<tr>
<td>(Meyer &amp; Allen, 1997)</td>
<td>- I owe a great deal to my work unit.</td>
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<tr>
<td></td>
<td>- I really feel as if this work unit’s problems are my own.</td>
</tr>
<tr>
<td><strong>Discretionary Effort (Cappelli &amp; Rogovsky, 1998)</strong></td>
<td><strong>(Alpha = .90, 7 items)</strong></td>
</tr>
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<td></td>
<td>- Nurses on our unit are always ready to lend a helping hand to those around her/him</td>
</tr>
<tr>
<td><strong>Employee Skills (Wright, et al., 1999)</strong></td>
<td><strong>(Alpha = .77, 3 items)</strong></td>
</tr>
<tr>
<td></td>
<td>- Compared to other nursing units within our hospital, the RNs on our unit are more skilled.</td>
</tr>
<tr>
<td></td>
<td>- Collectively, the RNs on our unit have enough competence to handle any situation.</td>
</tr>
<tr>
<td><strong>Respectful Interaction (Campbell, 1990)</strong></td>
<td><strong>(Alpha = .78, 6 items)</strong></td>
</tr>
<tr>
<td></td>
<td>- I am willing to base my actions on my colleagues’ assessments of situations.</td>
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<tr>
<td></td>
<td>- I am willing to stand up for my assessments of patients.</td>
</tr>
<tr>
<td><strong>Heedful Interrelating (Weick &amp; Roberts, 1993)</strong></td>
<td><strong>(Alpha = .85, 7 items)</strong></td>
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<tr>
<td></td>
<td>- When discussing our work, we look at things from each other’s perspective.</td>
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<td></td>
<td>- We focus mostly on doing our own job and don’t pay attention to what others are doing.</td>
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<tr>
<td><strong>Mindful Organizing</strong> (Weick &amp; Sutcliffe, 2001; Weick, Sutcliffe, &amp; Obstfeld, 1999)</td>
<td><strong>Preoccupation with Failure (Alpha = .64, 5 items)</strong></td>
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<td></td>
<td>- We share stories about close calls when they occur.</td>
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<td></td>
<td>- We discuss potential negative side effects of our actions.</td>
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<td><strong>Reluctance to Simplify Interpretations (Alpha = .74, 5 items)</strong></td>
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<td></td>
<td>- When performing an unfamiliar procedure such as dispensing an unfamiliar medication, we ask each other for help.</td>
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<td></td>
<td>- We discuss alternatives to how we go about our normal work activities.</td>
</tr>
<tr>
<td><strong>Commitment to Resilience (Alpha = .68, 5 items)</strong></td>
<td>- Our unit has sufficient staff to allow nurses to focus on patient care.</td>
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<td></td>
<td>- When a patient crisis occurs, we rapidly pool our collective expertise to attempt to resolve it.</td>
</tr>
<tr>
<td><strong>Sensitivity to Operations (Alpha = .76, 5 items)</strong></td>
<td>- Our nurse manager frequently asks nurses how things are going on the floor.</td>
</tr>
<tr>
<td></td>
<td>- We rarely discuss our workloads with each other. (Reverse-coded)</td>
</tr>
<tr>
<td><strong>Deference to Expertise (Alpha = .74, 5 items)</strong></td>
<td>- The person who has the greatest expertise with the problem at hand makes the decisions about the appropriate course of action.</td>
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<tr>
<td></td>
<td>- We have a good &quot;map&quot; of each other’s talents and skills.</td>
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</tbody>
</table>
FIGURE 1 - Diagram of Hypotheses
APPENDIX 1  
Semi-Structured Interview Protocol

I utilized the following questions in my semi-structured interviews to address specific issues and prompt discussion.

**Question for nurse managers and clinical nurse specialists**
1. Could you describe your background in nursing?

2. How do you view your current role in the functioning of the unit?

3. How do you go about hiring staff nurses (e.g., What types of interviewing techniques do you use? Do staff nurses play a role in hiring decisions?) What attributes do you look for when hiring nurses? Which attributes do you think are characteristic of the most effective nurses?

5. Describe staffing on your unit (e.g., nurse-to-patient ratios, experience of the nurses)? What are your biggest staffing concerns? Do staff nurses have input into staffing decision (i.e., are they able to have some say in choosing their patients)?

6. What types of training do your staff nurses receive in a given year? How much training? Do staff nurses participate in administering training?

7. How frequently do staff nurses receive formal performance feedback/performance evaluation? Informal? What is your approach to (or philosophy of) performance feedback?

8. What does the term patient safety mean to you? Can you describe the factors you think are most important for ensuring patient safety in your unit? What are the biggest barriers to patient safety in your unit? What are some of the sources of errors on your unit? Could you provide some examples?

**Questions for staff nurses**
1. What does the term “patient safety” mean to you? What are the biggest barriers to patient safety in your unit?

2. How much do nurses interact to discuss patient issues during a typical shift? In general, do nurses help each other out (e.g., to answer questions, help with a diagnosis, administer a new medication, etc.)?

3. What is the most important information you give/receive during nurse report? What are you listening for when you receive report from another nurse? How do you use the information you receive during report? What are the consequences of an incomplete/inaccurate report?