

**RELATIONSHIPS AND RESILIENCE:
CARE PROVIDER RESPONSES TO PRESSURES FROM MANAGED CARE**

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Organizations in the healthcare industry and beyond face pressures to lower their costs while maintaining quality, resulting in high levels of stress for their workers. In a nine-hospital study, this paper explores the role that relationships play in enabling resilient responses to external pressures, and the organizational practices that enable workers to respond in a resilient way when organizational change is required. The paper argues that relational coordination – communicating and relating for the purpose of task integration – is a resilient response to external threats that require a coordinated collective response across multiple functions or roles. Findings suggest that workers engage in higher levels of relational coordination when they perceive this type of threat but that the presence of a particular type of high performance work system – a relational work system – greatly strengthens this resilient response.

(135 words)

The U.S. healthcare industry is criticized daily for failing to deliver cost-effective, high quality care. Unlike in the past when hospitals were reimbursed based on their costs and were required to focus primarily on quality outcomes, payment systems now reward providers who minimize costs and penalize those who do not (Gray & Field, 1989; Kuttner, 1999). Payers have reduced the number of days they will reimburse for any given episode of care, often by more than one half, from twelve to five days for a hip replacement, for example. Hospitals can keep patients longer than the number of reimbursed days, but at a financial loss. Alternatively, payers provide a fixed fee to the hospital for a patient with a particular diagnosis, so that a hospital earns money if the patient is discharged quickly and loses money if the patient stays longer. Hospitals compete for managed care contracts and referrals based not only on their costs, however, but also based on the quality of care they provide, measured by their quality ratings; therefore pressures to maintain or increase quality have continued at the same time that pressures for cost reduction have increased (O’Leary, 1998; *QRC Advisor*, 1994). As a result of these pressures, care providers in today’s healthcare industry work under high levels of stress (Elsass & Veiga, 1997; Davidson, Folcarelli, et al, 1997; Weinberg, 2003). As one physician explained:

“We’re all being put with a gun to our head, that if you continue doing things the way we did things, we are going to be a non-entity... You can’t lose a million dollars a week and survive... And we’re frustrated.... We don’t get the time with the patients that we once got... It’s not a happy place for us...But if you don’t make the changes, you’re going to be doing catering” (Weinberg, 2003: 42).

In this paper I explore the role that relationships play in resilient responses to external threat, and the factors that enable organizational members to respond in a resilient manner (Sutcliffe & Vogus, 2003) when a rigid response might be expected (Staw, Sandelands & Dutton, 1981). From the standpoint of coping theories, effective responses require that participants perceive stressors and respond to them through coping mechanisms. From the

standpoint of contingency theory, effective responses require organizational practices that meet the information-processing needs of the environment. Building on both theories, a model of organizational resilience is developed in this paper, arguing that resilient responses to external threat require resources that are both psychosocial and organizational.

SOCIAL PSYCHOLOGICAL RESPONSES TO EXTERNAL PRESSURE

Pressures that originate from an organization's environment can impact workers if they are experienced as work stressors, or in other words as conditions that increase challenges or demands while limiting one's ability to respond to them.¹ Work stressors can arise from the work itself, for example from jobs that have too many demands and too little latitude to meet those demands, or from the external pressures facing an organization that result in jobs with demands that are difficult to meet. Either way, the resultant blocking of goal attainment creates a condition known as strain (Karasek, 1979). Strain is exhibited as reduced job satisfaction, reduced well-being, increased absence and turnover. In addition to creating strain, work stressors are expected to reduce task performance. As summarized by Peters and O'Connor (1980), the literature "has indicated that persons tend to perform better and express more positive affective responses in work settings in which constraints are absent compared to when they are present."

However, work stressors can also have a positive impact on performance. Challenging goals are one type of work stressor that can have a positive impact on performance under certain conditions, including the condition that goals are specific and challenging yet reachable (Latham & Locke, 1979). Situational constraints more broadly, such as pressures for performance and resource constraints, are work stressors that can have differential effects on performance by

¹ Following Schaubroeck and Merritt (1997), the term work stressors is used throughout this paper to encompass both job demands (e.g. Karasek, 1979) and situational constraints (e.g. Peters and O'Connor, 1980).

either allowing abilities to be utilized to their fullest or constraining the utilization of abilities (Peters, O'Connor & Rudolf, 1980). The performance effects of work stressors are expected to depend in part on the coping mechanisms that people use to respond to them. In particular, a work stressor can be expected to have a positive rather than negative impact on performance if the coping mechanism that is used to respond to it is suitable for addressing the work stressor at hand.

Individual Coping Mechanisms

Organizational theorists who have explored the mechanisms through which workers cope with stress have focused most often on individual coping. Karasek (1979) theorized that with sufficiently high levels of job control, workers experience positive outcomes, rather than negative, from high job demands. With sufficient job control, people working under high job demands do not experience the blocking of their goal attainment, but instead are stimulated by these demands to achieve higher performance. As a result of this stimulation they are also more satisfied with their work. Testing this proposition, scholars have found evidence that job control reduces the negative effects of job demands on work outcomes (e.g. Dwyer & Ganster, 1991; Moyle & Parkes, 1999; Parker & Sprigg, 1999; Schaubroeck & Merritt, 1997; Schaubroeck & Fink, 1998), while a few have found that with sufficiently high levels of job control, job demands actually improve rather than reduce outcomes (Fox, Dwyer & Ganster, 1993; Xie, 1996). Theorists have argued for similar reasons that individual self-efficacy and the fit between one's abilities and one's job should reduce the negative outcomes of work stressors (e.g. Edwards, 1996; Jex & Bliese, 1999; Schaubroeck & Merritt, 1997; Xie, 1996). Both self-efficacy and job control act in similar ways as coping mechanisms in the face of work stress by increasing the perceived possibility of goal attainment.

Collective Coping Mechanisms

When stressors originate from an organization's external environment, however, it is questionable whether individual mechanisms are sufficient for dealing with work-related stress. Jex and Bliese (1999) proposed that collective self-efficacy reduces the negative effects of work stressors on job satisfaction. Collective efficacy increases the possibility of collective goal attainment and is therefore an effective mechanism for coping with stressors that require more than an individual response. Other collective coping mechanisms – like cohesion and social support – are expected to work due to the unique characteristics of collectives, namely that collectives provide a kind of psychic support such that the stress is shared among their members and is therefore less intensely experienced by any one of them. In a laboratory study where subjects were subjected to equivalent levels of stressors, Aiello and Kolb (1995) found that members of cohesive groups reported the least stress. Others have theorized for similar reasons that social support reduces the negative effects of work stressors on work outcomes and have found evidence to support this proposition (e.g. Moyle & Parkes, 1999; Schaubroeck & Fink, 1998).

Others have proposed alternative collective coping responses to external pressures. Orlikowski and Yates (1994) proposed that participants tend to engage in more timely communication with each other in response to increased external performance pressures. Anderson and Williams (1996) proposed that participants increase both help seeking and helping under stressful conditions. Both of these collective coping mechanisms involve behaviors that are specifically designed to improve task performance, undertaken in response to pressures for improved task performance. On a different note, Wicks (1998) suggested that external and organizational pressures tend to diminish the importance of status differences between members

of different disciplines, while Nemhard and Edmondson (2006) showed that reduced status differences improve working relationships. This phenomenon is illustrated in the following comment by a nurse administrator whose hospital unit was experiencing significant pressures for reduced resource utilization. Pressures from managed care, she explained, have “been a leveler for a lot of nurse-physician relationships. It seems to me like they’re in the soup together.” She explained that the clinical staff had united around the common threat with the result that “their hierarchy seems to have broken down a little bit. It’s lumped the nurses and physicians together more...” (Weinberg, 2000: 45). Reductions in status differences may result in more positive relationships among key participants, thus facilitating their ability to respond collectively, suggesting a relational mechanism for coping with external pressures.

CONTINGENCY RESPONSES TO EXTERNAL PRESSURE

Contingency theory suggests a different story about organizational responses to external pressure. Rather than individuals perceiving external pressures as work stressors then engaging in individual or collective coping responses, as in social psychological theories, contingency theory focuses on organizational structures and their fit or lack of fit with the demands of a particular environment. According to Burns and Stalker’s (1961) classic formulation, mechanistic organizational forms are sufficient in stable environments, but changing environments require more organic organizational forms, with greater connectedness among participants to facilitate responses to external demands. In support of this argument, Hall (1962) found that mechanistic forms were more prevalent when tasks were predictable and that organic forms were more prevalent when tasks were less predictable. Similarly, Harvey (1968) found that more organic organizational forms were found when product changes were rapid, and

Lawrence and Lorsch (1968) found that subunits were more loosely connected when tasks were predictable and more tightly connected when tasks were less predictable.

An information-processing model was introduced by Galbraith to make sense of these insights and findings. According to his formulation, “the certainty or predictability of the task is emerging as one of the primary determinants of organizational form” (1972: 52). The explanation, he argues, is that greater uncertainty results in a greater need for information to achieve performance, and that “to be effective, the information processing capacity of an organization must be equal to the information processing requirements of the task [in order to] obtain an integrated pattern of behavior across all the interdependent subunits” (ibid: 56).

Organic organizational forms are those with more interconnections among participants, and these interconnections provide information-processing capacity that enable organizations to respond effectively to an environment that poses greater information processing requirements. Galbraith spelled out in some detail the organizational forms that support these interconnections, including liaisons or boundary spanners, task forces, teams, and so on. Subsequent scholars have further developed these insights regarding the role of connectedness among participants to respond to changing organizational environments and the uncertainty that these environments introduce (e.g. Tushman & Nadler, 1978), but the basic insights have remained intact.

In sum, contingency theory suggests that organizational practices that support interconnections among participants are needed to meet the information processing needs that emanate from uncertain environments, and also predicts that such organizational practices will be adopted *in response* to these uncertain environments.

ORGANIZATIONAL RESILIENCE

Organizational resilience is a newer tradition in organizational theory that incorporates insights from both coping and contingency theories. According to Sutcliffe and Vogus (2003), resilience refers to the maintenance of positive adjustment and the ability to flourish or thrive amid adverse conditions when rigidity might otherwise be expected (e.g. Staw, Sandelands & Dutton, 1981). Resilience is clearly related to the phenomenon of coping, they argue. Like coping, for example, individual resilience can be fostered by self-efficacy, and collective resilience can be fostered by collective efficacy. But organizational resilience is also related to information processing capacity found in contingency theories. As Sutcliffe and Vogus (2003: 105) argue, organizational resilience can be fostered through problem-solving networks, social capital and relationships because the “greater usage of respectful interaction [can] accelerate and enrich the exchange of information and the capacity to process it.”

Going beyond current theory, I propose the extension of resilience theory to include the use of so-called relational work practices to support the development of the relationships through which positive adjustment can occur. Even once we accept that organizational resilience occurs through positive relationships, collective self-efficacy, social capital, or problem-solving networks, we are left with the question of how organizations can support the development of these connections. Sutcliffe and Vogus draw upon Meyer (1982) to argue that certain structures such as rigid job descriptions and centralization inhibit the development of resilience, and argue that other structures, like fluid decision structures, promote resilience (Rochlin, 1989). But these isolated examples can be taken further.

A broad array of relational work practices, together forming a “relational work system,” enables organizations to support the development of the connections through which organizational resilience occurs. These work practices resemble in many ways the work

practices found in the high performance work systems literature, but they differ in an important way – the work practices found in these social capital approaches are more explicitly designed to foster relationships among workers (Leana & Van Buren, 1999; Gant, Ichniowski & Shaw, 2002; Vogus, 2004). This new understanding of high performance work systems builds on a long standing argument by post-bureaucracy theorists that traditional work practices create divisions between workers even when relationships are critically important due to the need for coordination (e.g., Piore, 1992; Heckscher, 1994). According to Piore, bureaucratic organizational practices that have become widespread through the rise of Taylorism “have pushed us to restrict communication among the people responsible for the way in which the different parts are performed” (1992: 20). Heckscher envisions a post-bureaucratic, interactive organizational form in which “everyone takes responsibility for the success of the whole” and in which “employees need to understand the key objectives in depth in order to coordinate their actions intelligently ‘on the fly’” (1994: 24-25). Rather than rejecting the role of formal work practices as some tend to do, I argue that formal work practices can be redesigned to foster the relationships of shared goals, shared knowledge and mutual respect through which work can be effectively coordinated ‘on the fly.’

I propose the following work practices: selection and training for cross-functional teamwork; the use of conflict resolution to build relationships between workers; feedback and rewards that are oriented toward contributions to shared goals; and information sharing or coordinating mechanisms like team meetings and boundary spanners. I call these work practices *relational work practices*, and suggest that when they are adopted together they form a *relational work system*. As argued by other theorists of high performance work systems, these practices appear in sets or bundles because they work more effectively together than separately

(MacDuffie, 1995; Ichniowski, Shaw & Prennushi, 1996; Batt, 1999; Laursen, 2002) or alternatively because they reflect a common managerial mental model (Baron, Burton, et al, 1996). Relational work systems are expected to promote resilience by fostering the development of communication and relationships through which work can be effectively coordinated, thus enabling an organization and its participants to respond effectively to external performance pressures.

These communication and relationship networks that facilitate coordination on the fly are also known as relational coordination (Gittell, 2003, 2006). Relational coordination is communicating and relating for the purpose of task integration. It is a form of role-based coordination, consistent with Bechky's (2006) work, but the relational coordination construct makes more specific claims about the relational dimensions of effective role-based coordination. The relational dimensions – shared goals, shared knowledge and mutual respect – provide high levels of information processing capacity, making relational coordination particularly relevant for coordinating work that is highly interdependent, uncertain and time-constrained. It is similar to heedful interrelating (Weick & Roberts, 1993) and respectful interacting (Vogus, 2004) in its focus on the relational aspects of interaction. However, unlike heedful interrelating and respectful interaction, it is role-based and specifically concerned with the coordination of work.

Relational coordination can serve as a resilient response to certain kinds of external threats. As argued above, an effective coping response will vary depending on the nature of the threat. The interplay of communication and relationships that characterizes relational coordination provides both the psychosocial support and the information processing capacity needed to respond effectively to external threats that require a coordinated collective response across multiple functions or roles. Such threats can vary widely from relatively routine threats

like heightened competition or resource constraints (including pressures from managed care as in the current study), to disasters like the September 11th terrorist attacks or Hurricane Katrina.

Figure 1 illustrates the model to be explored empirically in this paper. According to this model, when participants perceive external pressures as work stressors, they respond with collective coping responses such as relational coordination. But the model also suggests that an organization's formal work practices, which may themselves be a response to external pressures, can serve to support and sustain these collective coping responses.

[Insert Figure 1 about here.]

METHODS

Setting

To evaluate the model proposed above, a work process was selected from the healthcare context for which outcomes were readily measured and whose correlates were relatively well understood: surgical care for joint replacement patients in acute care hospitals. Nine hospitals that perform relatively large numbers of joint replacements were selected in order to secure an adequate sample of patients in a short period of time. The orthopedics unit in each of the nine hospitals was the focal point for data collection. The nine hospitals were located in different managed care environments, and thus were experiencing different levels of performance pressures during the time period of the study.

Data Sources

Data for the nine orthopedics units included archival data to measure managed care penetration, and administrator interviews to measure formal work practices. To measure work practices, administrators and direct care providers were interviewed in each of the nine orthopedics departments, including at least one physician, nurse, physical therapist, social

worker and case manager. For each unit, unstructured interviews and observations were conducted in person at the time of the initial site visits, followed up by more systematic structured interviews after the site visits by phone. Because research has shown that individual high-level administrators are unreliable raters of specific practices (Wright, Gardner, et al, 2001), administrators were selected for interviews from within the unit where the work practices were implemented.

To measure perceived work stressor and collective coping responses, surveys were sent to all eligible care providers in the five core functions who had responsibilities for joint replacement patients during the study period: physicians, nurses, physical therapists, social workers and case managers. A key departmental administrator designated by the department chief identified all eligible care providers at each institution. The administrator was supplied written guidelines as to whom should be included (all providers from the above five functions who were directly or indirectly involved with providing care for joint replacement patients). Surveys were mailed to all eligible care providers initially during the second month of the study period, with one repeat mailing during the study period for non-respondents.

Responses from 338 of 666 providers were received, for an overall provider response rate of 51%. Response rates differed by provider function, with nurses responding in the lowest proportion, perhaps due to relatively low levels of control over their workday schedules. Nurses responded at a rate of 35%, physical therapists 73%, physicians 77%, social workers 92%, while case managers responded at a rate of 94%. We were unable to test for response bias due to the absence of provider-level variables. Still, because nurses were by far the largest function within each of the units, they were well represented despite their relatively low response rates.

External Pressure

External pressure was captured for this study as the percent of managed care penetration in each hospital's operating environment. The orthopedics departments in this study were located in nine hospitals in three different states – Massachusetts, New York and Texas. Given that these hospitals were large, well-known hospitals serving populations across their states, the relevant operating environment for each hospital was at the state level. Managed care penetration levels (percent of population insured by managed care) were measured for Massachusetts, New York and Texas at the time of this study. At the time these patient and provider data were collected, Massachusetts had the highest managed care penetration of all 50 states, ranking 1st at 55 percent, while New York ranked 12th at 38 percent, and Texas ranked 31st at 22 percent (*Managed Care Digest*, 2000).

Perceived Work Stressor

As noted above, care providers in today's healthcare environment work under high levels of stress (e.g. Elsass & Veiga, 1997; Davidson, Folcarelli, et al, 1997; Weinberg, 2003), particularly in the form of resource constraints (Woodward, Shannon, et al, 1999). Due to the role of managed care in recent decades, the work stressor measured for this study was the perceived constraints posed by patient insurance restrictions on a provider's ability to accomplish his or her job. Based on initial interviews, the following survey item was developed: "Does patient insurance coverage interfere with your ability to meet the needs of patients?" Responses were recorded on a three-point scale: "does not interfere," "interferes somewhat," and "interferes to a great extent." Ideally, more items would have been included to measure perceived work stressors. Still, initial interviews indicated that this perceived work stressor was highly salient to providers at the time of the study.

Using one-way analysis of variance, significant cross-unit differences in this perceived work stressor ($p < 0.0001$) were found, as well as significant cross-functional differences ($p = 0.0014$). When unit-level and function-level differences were considered jointly, unit-level differences remained significant: unit-level differences were significant ($p < 0.0001$), while function-level differences were also significant ($p = 0.0268$). The intra-class correlation for this perceived work stressor was significantly greater than zero ($p < 0.05$). These results were consistent with treating this perceived work stressor as a unit-level construct.

Collective Coping Response

Collective coping response was measured as relational coordination, the coordination of work through frequent, high quality communication supported by high quality relationships. The theory of relational coordination was originally developed in the context of flight departures and has been used in several empirical studies (Gittell, 2000, 2001, 2002; Gittell, et al, 2000; Weinberg, et al, 2007; Gittell, et al, 2007).

Relational coordination was measured via the care provider survey. The questions reflected the seven dimensions of relational coordination: the frequency, timeliness, accuracy and problem-solving focus of communication among those providers, and the degree to which their relationships were characterized by shared goals, shared knowledge and mutual respect. Items included the following: “How frequently do you communicate with each of these groups about the status of joint replacement patients?” “Do people in these groups communicate with you in a timely way about the status of joint replacement patients?” “Do people in these groups communicate with you accurately about the status of joint replacement patients?” “When an error has been made regarding joint replacement patients, do people in these groups blame others or share responsibility?” “To what extent do people in these groups share your goals for the care

of joint replacement patients?” “How much do people in these groups know about the work you do with joint replacement patients?” and “How much do people in these groups respect you and the work you do with joint replacement patients?” Respondents from each of the five functions believed to be most central to the care of joint replacement patients – physicians, nurses, physical therapists, social workers and case managers – were asked to answer these questions with respect to each of the other functions. Responses were captured on a 5-point Likert-type scale.

The strength of the interactions between each individual respondent and each of the five functions was calculated, on each dimension of relational coordination. This resulted, for example, in a score for the frequency of communication between each nurse and the physician function, between each nurse and the therapist function, and so on for each of the five functions.

Exploratory factor analysis suggested that relational coordination is best characterized as a single factor with the following factor loadings: frequent communication 0.547, timely communication 0.772, accurate communication 0.789, problem-solving communication 0.801, shared goals 0.614, shared knowledge 0.607, and mutual respect 0.659. The eigenvalue for this factor was 3.34, while the eigenvalue for factor 2 was 0.65. Relational coordination is an equally weighted index of these seven items with a Cronbach’s alpha of 0.86, suggesting that this construct has a high level of internal validity (Nunnally, 1978). Previously published analyses from this study show that relational coordination is a significant predictor of quality and efficiency outcomes (e.g. Gittel, et al, 2000), suggesting that this construct also has a high level of external validity.

Using one-way analysis of variance, significant cross-unit differences in relational coordination were found ($p < 0.0001$), and also significant cross-functional differences in relational coordination ($p = 0.0415$). When unit-level and function-level differences were

considered jointly, unit-level differences remained significant: unit-level differences were significant ($p=0.0004$), while function-level differences became insignificant ($p=0.2280$). The intra-class correlation for relational coordination was significantly greater than zero ($p<0.05$). Taken together, these results were consistent with treating relational coordination as a unit-level construct. Descriptive data for relational coordination and its components are shown on Table 1.

[Insert Table 1 about here.]

Relational Work Systems

The relational work practices measured for this study included selection for cross-functional teamwork, rewards for cross-functional teamwork, cross-functional performance measurement, cross-functional conflict resolution, cross-functional team meetings and cross-functional boundary spanners. The scaling for each measure was determined during the coding process based on the degree of differentiation we were able to make given the information we had collected in the interview notes. Perhaps because performance measurement was a perceived problem area in our hospitals at the time, we tended to get longer, more detailed discussions of this issue, both with respect to quality assurance and utilization review, enabling us to construct more finely grained measures, as indicated below. Descriptive data for these work practices are shown in Table 1.

Selection for cross-functional teamwork was measured by asking administrators in each orthopedics unit about selection criteria for physicians, nurses and physical therapists, probing as to whether teamwork ability was considered an important selection criterion. This variable was coded from 0 to 2 for each of these three workgroups, 0 indicating that teamwork ability was not considered, 1 indicating that it was considered to some extent, and 2 indicating that it was a consistent criterion for selection. Statements like “usually,” or “some of us,” or “I look for”

were interpreted to mean “teamwork ability was considered to some extent,” while a statement such as “this is how we do it here” was interpreted to signify that “teamwork ability was a consistent criterion for selection.”

Rewards for cross-functional teamwork were measured by asking about the criteria for rewards for physicians, nurses and physical therapists, probing as to whether rewards were based purely on individual performance or if they were based on some team criteria as well. This variable was coded from 0 to 2. For physicians, 0 indicated individual rewards only, 1 indicated surplus sharing with the hospital and 2 indicated risk sharing with the hospital. For nurses and physical therapists, 0 indicated no rewards, 1 indicated individual rewards only, and 2 indicated some team rewards. *Cross-functional conflict resolution* was measured by asking about conflict resolution processes, probing as to whether any formal conflict resolution process was in place for physicians, nurses or physical therapists. This variable was coded from 0 to 1 for physicians, nurses and physical therapists, where 0 indicated that the workgroup had no access to formal cross-functional conflict resolution processes and where 1 indicated access.

Cross-functional performance measurement was measured by asking about the quality assurance process and the utilization review process in their hospital, probing as to whether each of these processes were largely focused on identifying the single function that was responsible for a quality or utilization problem, or whether there was a more cross-functional approach. These two variables were coded on a 1 to 5 scale, with 1 indicating a purely functional approach and 5 indicating a highly cross-functional approach. Interviewees were probed as to whether these two performance measurement processes were largely reactive, focused on affixing blame, or proactive, focused on problem solving. These two variables were coded on a 1 to 5 scale,

with 1 indicating a purely reactive, blaming focus and 5 indicating a highly proactive problem-solving focus.

Cross-functional team meetings were measured by asking key informants about participation in physician rounds and nursing rounds, probing to find out which functional groups participated in those rounds and the frequency of their participation. These variables were coded on a 0 to 2 scale, with 0 indicating that the workgroup did not participate in the rounds, with 1 indicating that they participated sometimes, and with 2 indicating that they participated usually or always. *Cross-functional boundary spanner* was measured by asking about the caseload and roles of the case managers who worked with joint replacement patients, and whether the primary nursing model was in place on that unit, providing a second boundary spanner role. Caseload was measured as a continuous variable, while each of the roles – coordination of patient care and planning for patient discharge – were coded as 0 to 1, with 0 indicating that the role was not expected and 1 indicating that the role was expected of case managers. Primary nursing was coded as 1 if the model was in place and 0 if it was not.

Together, these relational practices can be conceptualized as forming a *relational work system*. Exploratory factor analysis suggested that relational work systems are best characterized as a single factor with the following factor loadings: selecting physicians for teamwork 0.725, selecting nurses for teamwork 0.719, selecting physical therapists for teamwork 0.507; rewarding physicians for teamwork 0.431, rewarding nurses for teamwork 0.551, rewarding physical therapists for teamwork 0.881; cross-functional conflict resolution for physicians 0.927, for nurses 0.720, for physical therapists 0.439; cross-functional approach to quality measurement 0.591, problem-solving approach to quality measurement 0.766, cross-functional approach to utilization review 0.407, proactive approach to utilization review 0.852; nurses included in

physician rounds 0.509, physical therapists included in physician rounds 0.691, case managers included in physician rounds 0.650; case manager caseload -0.729 , case manager coordination role 0.377, case manager discharge planning role 0.438, primary nursing model 0.741. The eigenvalue for factor 1 was 8.79, while the eigenvalue for factor 2 was 3.77. All 20 items had factor 1 loadings greater than 0.35 and all were retained. An additive scaling method was used in which each item was standardized with a mean of zero and a standard deviation of one so that each item in the relational work system index was equally weighted. Cronbach's alpha for the relational work system index was 0.92, suggesting that this construct has a high level of internal validity (Nunnally, 1978).

As we see from the data in Table 1, the work systems in this study do not treat all types of workers the same. The work system experienced by workers in these hospital units is one in which different types of workers are treated differently. Though we do not focus on it in this paper, the consistency of a work system with respect to its treatment of different types of workers is another way to conceptualize and measure work systems.

Control Variables

Control variables include dummy variables indicating the functional identity of the respondent, given that physicians, nurses, therapists, case managers and social workers can be expected to perceive work stressors differently due to differences in the nature of their jobs, and can be expected to engage differently in collective coping responses due to differences in their professional identities. In all equations below, nurses are the omitted response category so that the coefficient on each response category indicates the differential between respondents in that workgroup and nurse respondents. In particular, physicians are expected, other things equal, to perceive work stress more strongly than their colleagues given their responsibility for much of

the decision-making in patient care. They are also expected to engage less strongly in collective coping responses like relational coordination, given that their professional identity has traditionally been oriented toward autonomous action (Wicks, 1998; Adler & Kwon, 2007).

DATA ANALYSIS

To test the model proposed above, four regression equations were tested. The first equation tested the effect of managed care penetration on perceived work stressors. The second equation tested the effects of managed care penetration on relational coordination. The third equation tested the combined effect of managed care penetration and perceived work stressors on relational coordination. Together these three equations constitute a test for mediation – testing whether managed care penetration influences relational coordination through its effect on perceived work stressors. To show mediation (Baron & Kenney, 1986), managed care penetration must significantly predict perceived work stressors, and must significantly predict relational coordination. Adding perceived work stressors to the relational coordination model should decrease the size and significance of the managed care variable. Finally, the fourth equation tested the combined effect of managed care penetration, perceived work stressors and relational work systems on relational coordination.

In all four equations, random effects regression analysis was used to adjust coefficients and standard errors for the multi-level nature of the data. In all equations, the care provider is the unit of analysis and the orthopedics unit ($n = 9$) is the random effect. Random effects models are a form of mixed, hierarchical linear, or multi-level models, are an extension of fixed effects models (Bryk & Raudenbush, 1992). Within and between-unit R squares are both reported, to indicate the percent of within and between-unit variation that is captured by the variables in the

models. To facilitate the comparison of regression coefficients, all variables were standardized with a mean of 0 and a standard deviation of 1 before being entered into the regression equations.

FINDINGS

All descriptive data for the variables that are included in the regression equations are presented on Table 2, including the number of observations, mean and standard deviation for each variable and the pair-wise correlations among all variables.

[Insert Table 2 about here.]

Table 3 shows the four equations that were tested to assess the model of relationships and resilience developed above. The first equation shows that managed care penetration in the hospital's environment significantly predicts the job pressures that are perceived by care providers in that hospital's orthopedics unit ($r = 0.15, p = 0.029$). As expected, physician respondents perceived significantly greater job pressures than do nurses ($r = 0.25, p < 0.001$), but so do physical therapists ($r = 0.21, p < 0.001$) and case managers ($r = 0.11, p = 0.042$). The second equation shows that managed care penetration in the hospital's environment significantly predicts the level of relational coordination engaged in by care providers in that hospital's orthopedics unit ($r = 0.12, p = 0.028$). As anticipated, physicians were less engaged in relational coordination than were nurses ($r = -0.22, p < 0.001$).

The third equation shows that when perceived job pressures are added to the model, perceived job pressures significantly predict the level of relational coordination reported by care providers ($r = 0.17, p = 0.002$), and managed care penetration becomes insignificant as a predictor of relational coordination ($r = 0.07, p = 0.162$), suggesting that perceived job pressures mediate the relationship between managed care penetration and relational coordination as expected.

The fourth equation shows that when relational work systems are added to the model, relational work systems significantly predict the level of relational coordination reported by care providers ($r = 0.25$, $p < 0.001$). Perceived job pressures continue to significantly predict relational coordination ($r = 0.13$, $p = 0.016$) and managed care penetration remains insignificant as a predictor of relational coordination ($r = 0.05$, $p = 0.379$). Furthermore, adding relational work systems to the model increases the proportion of variance captured by the model from 0.08 (within unit) and 0.24 (between unit) without relational work systems to 0.09 (within unit) and 0.94 (between unit) when relational work systems are included. The standardized coefficients used in all models allow for easy comparison of relative effect size. Coefficients in the fourth model suggest that relational work systems have an effect size that is almost double that of perceived job pressures.

[Insert Table 3 about here.]

To test whether these relational work systems are adopted in response to managed care penetration or perceived job pressures, Spearman's rank correlations were run between managed care penetration and relational work systems, and then between perceived job pressures and relational work systems. Both correlations were insignificant ($p = 0.491$ and $p = 0.183$, respectively), suggesting that the adoption of relational work systems is explained by factors other than managed care penetration rates or perceived job pressures related to managed care.

See Figure 2 for a summary of the findings presented above.

[Insert Figure 2 about here.]

DISCUSSION

In this paper I explored the conditions under which workers respond resiliently to external threats, and how an organization can support and sustain a resilient response. A model

of organizational relationships and resilience was developed in which participants perceive external pressures as work stressors and respond through the adoption of collective coping mechanisms, specifically relational coordination – communicating and relating for the purpose of task integration. This much of the model is consistent with social psychological theories of coping. But the proposed model goes further, suggesting that an organization’s work practices can support and sustain resilient responses if they are designed appropriately, as for example when they take the form of a relational work system. Results from a study of nine orthopedics units based in nine different hospitals show substantial support for this model, suggesting that relational work practices play a particularly important role in supporting collective coping responses. These findings are consistent with the contingency argument that certain kinds of organizational practices are needed to meet the information processing needs posed by uncertain environments.

Interestingly, however, neither external pressures in the form of managed care penetration rates nor perceived work stressors arising from managed care were able to explain differential adoption of these relational work systems. The results of this study are therefore only partially supportive of contingency theory. Rather than being adopted in response to external threat, the adoption of relational work systems might be motivated instead by the mental models held by leaders, as suggested by Baron, Burton and their co-authors (1996), or by strategic choices made by leaders proactively to engage the workforce in a more productive way of working (Kochan, Katz & McKersie, 1986).

Limitations

Alternatively, it is possible that the lack of association between external threat and relational work systems is due to a measurement problem. Our measure of managed care

penetration may be insufficiently fine-grained to pick up pressures from managed care that were relevant to our hospitals. However, this measure of external pressure *is* significantly related to both perceived work stressors and relational coordination, suggesting that it may not be a problem of measurement error. Even if relational work systems were not adopted in response to managed care pressures, they may have been adopted in response to other external threats that we did not measure here, such as nursing shortages and the need to offer better working environments for nurses in order to increase retention.

A second limitation of this study is the inability to demonstrate causality. Therefore the relationships shown in this study provide evidence of association only. A third limitation is the lack of provider-level variables such as tenure and gender, which may be important predictors of relational coordination, raising the potential for omitted variable bias. A fourth limitation is the absence of a mediating variable between perceived work stressors and resilient responses. We know that external threats and work stressors do not automatically lead to collective coping responses, and that sometimes non-resilient responses are chosen. This is clearly an area for further theoretical and empirical development. Finally, this study does not include measures of performance, so that although we characterize relational coordination as a resilient response to external threat, we do not demonstrate the performance benefits of adopting this response. However, earlier analyses of these data have shown that relational coordination in these nine hospital units was a significant predictor of both quality and efficiency outcomes (Gittell, et al, 2000), suggesting that relational coordination did indeed help these hospital units maintain positive adjustment in the face of external threat, thus supporting the notion that relational coordination is indeed a resilient response to pressures from managed care.

Contributions

One important contribution of this study is therefore to identify relational coordination – communicating and relating for the purpose of task integration – as a collective coping mechanism and as a resilient response to a particular type of external threat. Coordination, the management of task interdependencies, is an important aspect of what organizations do (Fayol, 1925; Coase, 1937; Kogut & Zander, 1996). According to relational theories of coordination, effective coordination is more dependent than has previously been recognized upon the relationships that exist among participants (Gittell, 2001; 2002). The theory of relational coordination specifies three types of relationships that are central to effective coordination – shared goals, shared knowledge and mutual respect – and four components of communication that are central to effective coordination – frequent, timely, accurate and problem-solving communication (Gittell, 2006).

Why should we expect relational coordination to serve as a resilient response to perceived work stressors? A sense of collective threat has been shown by others to reduce status boundaries among participants in different areas of functional expertise, thus enhancing mutual respect (Wicks, 1998) and strengthening relationships (Nembhard & Edmondson, 2006). A sense of collective threat may likewise reduce other barriers such as goal disparity between participants in different areas of functional expertise, and reduce the tendency to focus on one's own area of expertise to the detriment of understanding how one's job is connected to those of one's colleagues. Together, a perceived external threat would have the impact of increasing the extent of shared goals, shared knowledge and mutual respect among participants who experience that sense of threat, and given the interplay that has been theorized to occur between relationship and communication ties, would thereby increase the frequency and quality of communication among

those participants (Gittell, 2006). See Figure 3 for the theorized dynamics of relational coordination. As argued above, relational coordination is not a resilient response to every kind of external threat, but specifically to external threats that require a coordinated collective response across multiple functions or roles.

[Insert Figure 3 about here.]

In addition to identifying a new collective coping mechanism, the model developed here has other important implications for resilience theory. Consistent with coping theory, collective coping mechanisms were associated with perceived work stressors, which in turn were associated with threats from the external environment. But we saw evidence suggesting that formal work practices played a powerful role in supporting and strengthening collective coping responses to external threat. The level of relational coordination reported by individual care providers between themselves and their colleagues was associated with perceived stressors, but was also associated with the work practices that had been established in their hospital unit. These so-called “relational work practices” included selection for teamwork, rewards and performance measurement supportive of teamwork, cross-functional conflict resolution, cross-disciplinary patient rounds, and cross-disciplinary boundary spanners. Thus, the results indicate that resilient responses to external threat can be strengthened and sustained if they are accompanied by appropriate institutional supports. The results suggest a duality regarding effective responses to external threat; there appears to be a need for both reactive coping (through psychosocial reactions) and proactive structuring (through organizational practices), consistent with Wildavsky’s (1988) work on organizational resilience.

This broader understanding of organizational responses to external threat is precisely what resilience theorists have been striving to achieve. As Sutcliffe and Vogus (2003) argued, it

is not apparent that individuals or collectives exhibit rigid responses to threat in all cases (Staw, Sandelands & Dutton, 1981); in fact, resilient responses appear to be quite common. What we need is a better understanding of resilient responses to threat, at multiple levels, and how organizations can contribute to rather than undermine this resilience. The notion that organizations can nurture resilience is beginning to gain recognition, as seen in the argument that organizational choices regarding layoffs and financial reserves can be made with an eye to sustaining relationships, thereby fostering resilience in the face of crisis (e.g. Gittell, Cameron, Lim & Rivas, 2006). This paper goes further, suggesting that a broad array of everyday organizational practices can be designed to foster resilient responses to external threat.

Returning to the definition offered by Sutcliffe and Vogus (2003), resilience is the maintenance of positive adjustment and the ability to flourish or thrive amid adverse conditions when rigidity might otherwise be expected. This paper has argued that relational coordination – communicating and relating for the purpose of task integration – is a resilient response to certain types of external threats, specifically those that require a coordinated collective response across multiple functions or roles, whether those threats are relatively routine threats like heightened competition or resource constraints, or disasters like the September 11th terrorist attacks or Hurricane Katrina. We have seen that organizations can foster this resilient response by adopting relational work systems that help to support and sustain the relational coordination that emerges in response to external threats. Furthermore, the relational work systems that supported relational coordination among care providers in the nine hospitals we studied appeared not to have been adopted in response to immediate pressures from managed care, suggesting that leaders need not wait until a threat has emerged to take action toward building the organizational practices that foster resilience.

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FIGURE 1: Model of Relationships and Resilience

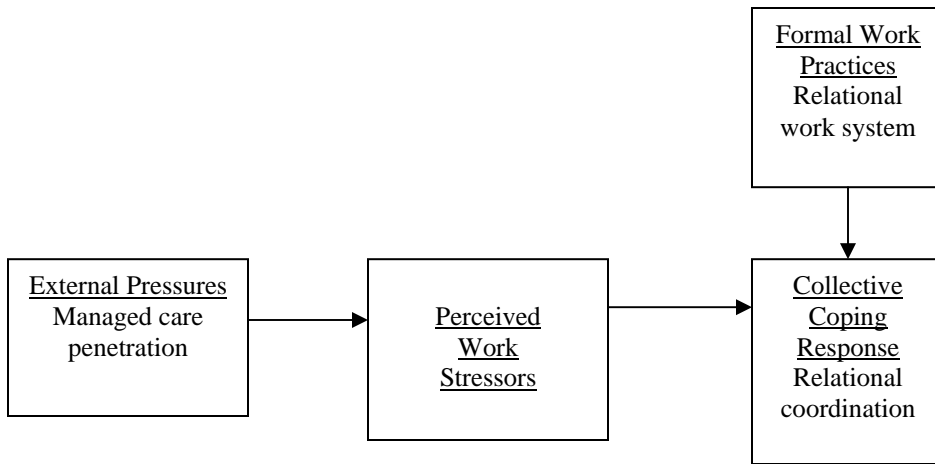


FIGURE 2: Support for Model of Relationships and Resilience

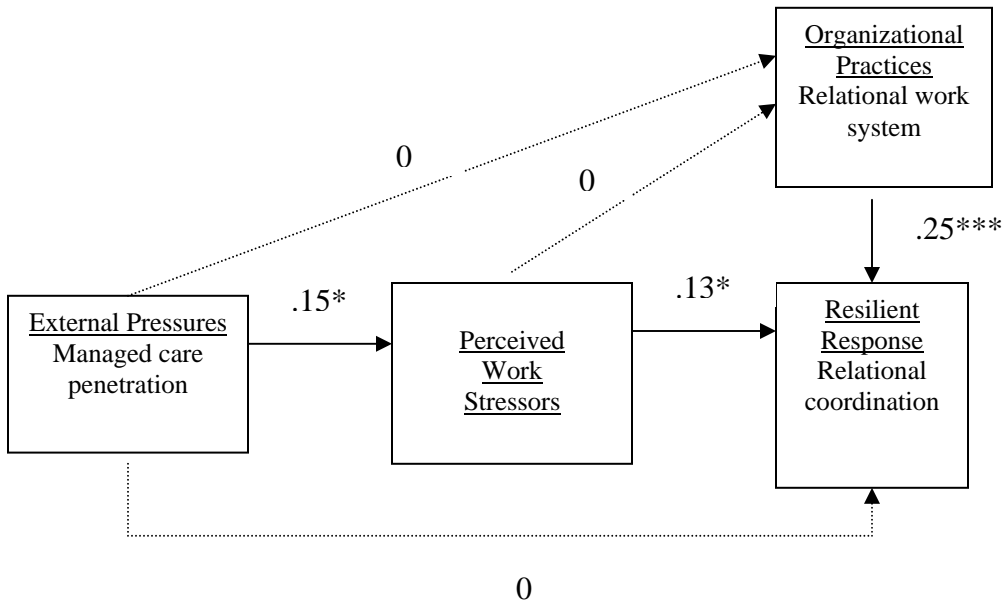


FIGURE 3: Relational Coordination

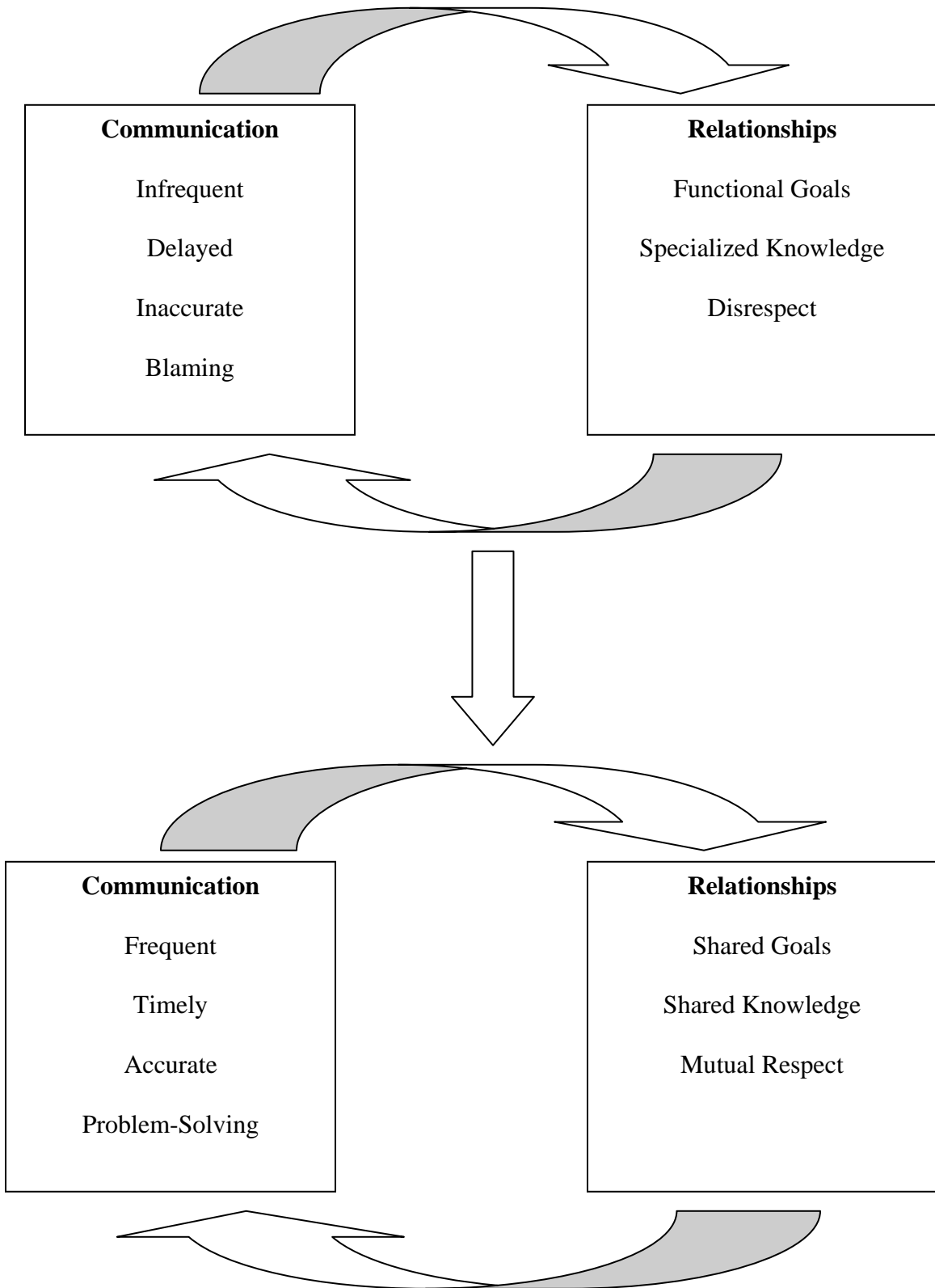


TABLE 1: Relational Work System and Relational Coordination

	Range	Mean	SD	Obs
Selection				
Physicians selected for teamwork qualities	0-2	0.44	.88	9
Nurses selected for teamwork qualities	0-2	1.44	.73	9
Physical therapists selected for teamwork qualities	0-2	1.67	.88	9
Rewards				
Physicians rewarded for teamwork	0-3	.22	.67	9
Nurses rewarded for teamwork	0-2	.56	.88	9
Physical therapists rewarded for teamwork	0-2	1.11	1.05	9
Conflict Resolution				
Physicians have access to formal process	0-1	.44	.53	9
Nurses have access to formal process	0-1	.22	.44	9
Physical therapists have access to formal process	0-1	.33	.50	9
Performance Measurement				
Cross-functional approach to quality measurement	1-5	3.33	1.41	9
Problem-solving approach to quality measurement	1-5	2.78	1.39	9
Cross-functional approach to efficiency measurement	1-5	2.56	1.88	9
Problem-solving approach to efficiency measurement	1-5	3.00	1.58	9
Team Meetings				
Nurses included in physician rounds	0-2	1.33	.87	9
Physical therapists included in physician rounds	0-2	.56	.88	9
Case managers included in physician rounds	0-2	.67	.87	9
Boundary Spanner				
Case manager caseload	6.7-40	26.3	10.8	9
Case manager coordination role	0-1	.44	.53	9
Case manager discharge planning role	0-1	.89	.33	9
Primary nursing model	0-1	.56	.53	9
Relational Work System Index ($\alpha=.92$)				
Relational Coordination				
Frequency of communication	1-5	3.83	.81	334
Timeliness of communication	1-5	3.99	.69	334
Accuracy of communication	1-5	4.18	.68	333
Problem-solving focus of communication	1-5	4.00	.50	315
Shared goals	1-5	4.11	.68	331
Shared knowledge	1-5	3.74	.67	333
Mutual respect	1-5	3.73	.67	326
Relational Coordination Index ($\alpha=.86$)				

TABLE 2: Descriptive Data for Model of Relationships and Resilience

	Obs	Mean (SD)	Range	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. Managed care penetration	9	.41 (.15)	.21 - .55	--									
2. Relational work system	9	.00 (.63)	-.74 - .87	.40	--								
3. Perceived work stressor	332	1.99 (.67)	1-3	.12*	.15**	--							
4. Relational coordination	336	.00 (.75)	-3.30-1.61	.15**	.24***	.15**	--						
5. Physician respondent	339	.19 (.39)	0-1	-.13*	-.05	.18**	-.23***	--					
6. Resident respondent	339	.12 (.33)	0-1	-.06	-.15**	-.15**	-.04	-.18***	--				
7. Nurse respondent	339	.43 (.50)	0-1	.12*	.14*	-.21**	.10+	-.42***	-.33***	--			
8. Physical therapist respondent	339	.17 (.28)	0-1	.02	-.04	.16**	.13*	-.22***	-.17**	-.39***	--		
9. Case manager respondent	339	.05 (.21)	0-1	-.00	.04	.07	.08	-.11*	-.08	-.19***	-.10+	--	
10. Social worker respondent	339	.014 (.19)	0-1	.03	.06	.03	-.06	-.10+	-.08	-.17**	-.09+	-.04	--

+p<0.10 *p<0.05 **p<0.01 ***p<0.001

TABLE 3:
Model of Relationships and Resilience²

	Perceived work stressor	Relational coordination	Relational coordination	Relational coordination
Managed care penetration	.15* (.029)	.12* (.028)	.07 (.162)	.05 (.379)
Perceived work stressor			.17** (.002)	.13* (.016)
Relational work system				.25*** (.000)
Physician respondent	.25*** (.000)	-.22*** (.000)	-.26*** (.000)	-.25*** (.000)
Resident respondent	-.03 (.580)	-.07 (.237)	-.06 (.242)	-.03 (.596)
Physical therapist respondent	.21*** (.000)	.07 (.246)	.02 (.661)	.05 (.363)
Case manager respondent	.11* (.042)	.06 (.295)	.03 (.507)	.02 (.682)
Social worker respondent	.07 (.252)	-.08 (.147)	-.03 (.582)	-.06 (.346)
Constant	.01 (.915)	-.00 (.959)	.02 (.749)	.07 (.211)
Within unit R squared	.08	.07	.08	.09
Between unit R squared	.64	.17	.24	.94

+p<0.10 *p<0.05 **p<0.01 ***p<0.001

² All models are random effects linear regressions with orthopedics unit (n=9) as the random effect. Care providers (n=317) are the unit of analysis. Nurse respondent is the omitted category. Standardized regression coefficients are shown. Results are summarized in Figure 2.