Outcomes and Predictors of Relational Coordination:

Empirical Assessment of an Emerging HRM Theory

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According to an emerging theory, relational coordination is expected to drive a wide array of performance outcomes, particularly for organizations whose work is highly interdependent, uncertain and time constrained. In turn, the strength of relational coordination is expected to depend on the design of an organization's structures, from selection and training through information systems. In this paper we conduct an empirical assessment of this emerging theory. We establish selection criteria, identify 69 studies in 16 industry contexts and 18 countries based on these criteria, and summarize the evidence thus far. We find that relational coordination predicts expected performance outcomes for the most part, including efficiency and financial outcomes, quality and safety outcomes, as well as client engagement, worker well-being, learning and innovation, with some mixed evidence in the area of quality and safety. We find organizational structures such as hiring for teamwork, training for teamwork, shared conflict resolution, shared accountability and shared rewards support relational coordination in the expected ways, while other structures like boundary spanner roles, shared protocols, shared information systems, and union representation have mixed effects that appear to depend on their implementation. We discuss implications and propose new directions for theory and research.

(196 words)

Key words: teams, quality, employee relations, organizational effectiveness
INTRODUCTION

As work has become more interdependent, uncertain and time constrained, coordination has become a less mechanical and more relational process. Building on Thompson's (1967) view of coordination as a process of mutual adjustment and Follett's (1949) view of coordination as a process of reciprocal interrelating, scholars have developed relational theories of coordination, including feedback forms of coordination (Argote, 1982), coordination as sense-making (Weick & Roberts, 1994), expertise coordination (Faraj & Sproull, 2000), coordination as energy-in-conversation (Quinn & Dutton, 2005), role-based coordination (Bechky, 2006), interactionist coordination (Kellogg, Orlikowski & Yates, 2006) and relational coordination (Gittell & Douglass, 2012).

The latter branch - relational coordination theory - has been widely subjected to empirical testing, facilitated by the meauserability of its core construct. Relational coordination is communicating and relating for the purpose of task integration (Gittell, 2002a), both within and across organizational boundaries (Gittell & Weiss, 2004). It is a form of social capital that enables task integration across interdependent roles (Adler & Kwon, 2002). Similar to the other relational theories of coordination, relational coordination is theorized to drive a wide array of positive performance outcomes. Similar to the other relational theories of coordination, relational coordination is not expected to emerge solely from interactions among individuals; rather it is theorized to depend upon organizations to support its development. See Figure 1 for a depiction of the outcomes and predictors of relational coordination as reflected in the theory.

(Insert Figure 1 about here.)

Because relational coordination theory crosses disciplinary boundaries, for example operations management and human resource management, its visibility in the literature has been
diffuse rather than focused. In this paper we address this diffusion by summarizing the theory and evidence to date, identifying both support and lack of support for the theory, and suggesting promising areas for further development. We first establish criteria for inclusion in our review, then use these criteria to identify 69 papers from 16 industry contexts and 18 countries. The findings thus far suggest that relational coordination predicts expected performance outcomes for the most part, such as efficiency and financial outcomes, quality and safety outcomes, as well as client engagement, worker well-being, learning and innovation. We found that organizational structures such as hiring for teamwork, shared conflict resolution, and shared accountability and rewards support relational coordination as expected, while others like boundary spanner roles, protocols, and information systems have more mixed effects depending on their design and implementation. We propose new directions for theory and practice, for example extending the theory of relational coordination to reflect the non-linear dynamics of organizational change.

METHODS

Initially a search of Academic Search Premier, Google Scholar and PubMed was conducted using the term “relational coordination.” In this search, 1709 articles were identified. After removing duplicates across the three search engines, only working papers, published dissertations, conference presentations and articles published in peer-reviewed journals that are publicly available and published in English through March 2015 were included. The abstracts of this modified set of articles were then screened by both authors for relevance. Articles were included in the review only if relational coordination was empirically measured, either qualitatively or via the validated survey tool, and linked to either organizational performance outcomes or organizational structures. A discussion of the measurement of relational coordination follows. Articles were excluded if methodology was unclear or not included.
these criteria were applied, the final sample included 74 papers from 16 industry contexts and 18 countries, as shown in Table 1.

(Insert Table 1 about here.)

Relational coordination theory has been amenable to the testing of outcomes and predictors due in part to the measurability of its core construct. Relational coordination is measured as a network of communication and relationship ties among the roles involved in a work process of interest - whether that work process is broadly defined such as "the education of our students" or more narrowly defined such as "handoffs from grade level to grade level" or "handoffs from elementary school to high school." The survey instrument was first developed in the airline industry (Gittell, 2000) and then adapted and validated for use in healthcare (Gittell et al., 2000). Following the original airline study, an additional dimension of communication was added - accuracy - expanding the survey instrument from six questions to seven. See Table 2. The survey instrument has been assessed successfully for internal consistency, structural validity, content validity and inter-rater agreement and reliability (Gittell, Seidner & Wimbush, 2010; Valentine, Nembhard & Edmondson, 2015). A recent analysis of teamwork measures in the healthcare industry found that relational coordination is one of only two teamwork measures that is both fully validated and "unbounded," indicating its ability to measure teamwork across multiple organizational boundaries (Valentine et al, 2015).

(Insert Table 2 about here.)

Among the 69 papers assessed, we found several different approaches to measuring relational coordination. While a large majority of the studies used the validated survey instrument (Gittell et al., 2000), there were also qualitative studies that used a semi-structured interview guide to explore the dimensions of relational coordination, as well as quantitative
studies that assessed a subset of the seven dimensions, and quantitative studies that used alternative metrics to capture the communicating and relating dimensions of relational coordination. Because our aim was to assess evidence for the theory of relational coordination rather than to validate a particular measure, we did not exclude papers using alternative measures of relational coordination.

PERFORMANCE OUTCOMES OF RELATIONAL COORDINATION

We now present propositions regarding the expected impact of relational coordination (RC) on organizational performance outcomes, and review the evidence thus far. See Appendix A for a summary of the studies reviewed in this section, including the sample, the context, the measurement of RC and the findings.

Efficiency and Financial Outcomes

RC is expected to increase efficiency by helping participants to better manage their interdependence, thus reducing waste and increasing resource utilization (Gittell, 1995, 2002b). As a result of these increased efficiencies, financial outcomes are expected to improve as well. Based on information processing theory, RC is expected to have a stronger impact on outcomes when high bandwidth forms of coordination are needed due to the interdependent, uncertain and time-constrained nature of the work (Daft & Lengel, 1986).

Proposition 1: RC improves efficiency and financial outcomes.

Our search identified 11 studies that assessed the impact of RC on efficiency and/or financial outcomes. In the airline industry, RC was associated with higher staff productivity, and faster turnaround time of aircrafts (Gittell, 2001). In the healthcare industry, RC among the care team was associated with a shorter risk-adjusted hospital length of stay for both medical and surgical patients (Gittell et al, 2000; Gittell, Weinberg, Bennett & Miller, 2008). The relationship
between RC and length of stay was strongest when patient needs were complex (Gittell 2002b) consistent with Proposition 1. A study of primary care practices found that RC predicted higher productivity as measured by number of face to face patient consultations per staff per year, though it had no impact on number of consultations per physician per year, suggesting that RC impacted team productivity rather than individual productivity (Lundstrom, 2014). A study of manufacturing firms found that RC positively predicted employee productivity (Kim & Lee, 2016).

A few studies have also explored the impact of RC on firm-level financial outcomes, consistently finding a significant positive relationship. RC is associated with lower patient costs in healthcare in both inpatient (Gittell, Weinberg, Bennett & Miller 2008; Hagigi, 2012) and outpatient settings (Hagigi, 2012), improved cost performance in the pharmacy sector (Alvarez, 2014), sustainable competitive advantage in the airline industry (Gillen & Lall, 2004), higher net profits and firm competitiveness in manufacturing (Kim & Lee, 2016) and growth in deposits in the banking sector (Siddique, 2014).

There were also some unexpected findings. RC was associated in one study with longer lengths of stay for medical and surgical patients (Brewer, 2006). In another, RC was associated with longer lengths of stay when nursing workloads were high and had no effect on length of stay when nursing workload was moderate or low (Lin, 2010).

Quality and Safety Outcomes

RC is expected to increase quality and safety by helping participants to better manage their interdependence, improving their handoffs and reducing the potential for errors to occur.

Proposition 2: RC increases quality and safety outcomes.
As expected, RC predicted fewer passenger complaints, fewer late arrivals and fewer baggage handling errors in the airline industry (Gittell, 2001) as well as higher patient satisfaction and better clinical outcomes in the healthcare industry (Bae, Mark & Fried, 2010; Cramm & Nieboer, 2012; Cramm, Hoeljmakers & Nieboer, 2014; Gittell, et al 2000; Gittell, 2002; Havens, Vasey, Gittell & Lin, 2010, Romanow, 2013). The Romanow study found that while RC positively predicted satisfaction among patients with complex care needs, there was no significant relationship for patients with less complicated care needs (Romanow, 2013), and Gittell (2002b) found that RC was more highly predictive of satisfaction when patient needs were complex, consistent with Proposition 2. RC also positively predicted internal audit effectiveness in the professional services industry (Hoos, D’Arcy & Sarens, 2012; Lenz & Sarens, 2012), as well as product development quality and on-time performance in the pharmaceutical industry (Alvarez, 2014) and student achievement in higher education (Skakon 2014). RC among care providers was associated with patient intent to recommend to family and friends (Gittell, 2002a) as well as increased quality of life for the elderly in residential long term care facilities (Gittell, Weinberg, Pfefferle & Bishop, 2008).

RC has positively predicted safety outcomes in healthcare such as less frequent medication errors, fewer hospital-acquired infections, fewer patient falls, adherence to recommended clinical guidelines and a reduction in wrong site surgeries (Havens, Vasey, Gittell & Lin 2010; Newell, 2009; Noel et al, 2013). Similarly, RC positively predicted clinician perception of quality of care among nurses (McIntosh et al., 2014). RC between patients and providers in a chronic care management program was associated with greater patient-reported well-being (Cramm & Nieboer, 2014a), while RC between inpatient and outpatient providers in an integrated delivery system predicted lower rates of hospitalizations for heart failure patients.
and a greater use of care plans for asthma patients (Hagigi, 2012). RC between family members and care providers across the healthcare continuum (acute care, rehab care, home care) was positively associated with improved post-surgical outcomes and psychological well-being for patients (Weinberg, Lusenhop, Gittell & Kautz, 2007). Similarly, RC between providers and chronic care patients predicted greater patient well-being, and the strength of RC between patients and providers mediated the impact of the disease management program on patient well-being (Cramm & Nieboer, 2014b).

Other findings have not supported Proposition 2. In a multi-city study of community-based efforts to reduce offender recidivism, RC across agencies was associated with increased rather than reduced recidivism of criminal offenders (Bond & Gittell, 2010). RC among providers in primary clinics had no impact on patient quality measures such as inpatient admissions, 30-day readmission rates and emergency department visits (Flieger, 2013). Similarly, in a study conducted in primarily care clinics in Denmark, RC was not associated with patient satisfaction with care (Lundstrom, 2014). Hagigi (2012) study cited above found that RC predicted a higher rate of emergency department use for highly complex patients even though it predicted lower rates of hospitalization for those same patients. In sum, while empirical studies thus far have typically found a positive correlation between RC and quality and safety outcomes, there are some non-significant or negative results that merit further attention.

**Client Engagement**

As organizations see the potential value of engaging clients as co-producers of desired outcomes rather than passive recipients (Adler, Kwon & Heckscher, 2008; Gittell & Douglass, 2012), client engagement has become an increasingly important outcome. RC is expected to improve participants' ability to connect *around* their clients and *with* their clients, impacting
client engagement in two ways. First, clients will have increased trust and confidence, increasing their willingness to engage. Second, clients will have more accurate information, thus increasing their ability to engage. As with other outcomes, RC is expected to impact client engagement most when work is highly interdependent, uncertain and time constrained.

**Proposition 3**: RC increases client engagement.

**Proposition 3** has been consistently supported by the evidence thus far. RC between family members and care providers in acute, rehab and home health care settings positively predicted family members' preparation for care-giving (Weinberg, Lusenhop, Gittell & Kautz, 2007), while RC between hospitals and early intervention agencies positively predicted family engagement, enrollment and retention of their drug-exposed infants in treatment (Derrington, 2012). RC among early childhood teaching staff was associated with greater parent engagement with teaching staff regarding their child’s education (Douglass & Gittell, 2012), while RC between providers and families receiving services for children with autism predicted lower parenting stress, greater parent ability to cope, and greater parent ability to care for their child (Warfield et al, 2013). From an organizational change perspective, an interventional study found that RC among banking employees was positively associated with service delivery redesign to foster client engagement (Ple, 2013), and RC among primary care staff was associated with successful patient decision support interventions (Tietbohl et al, 2015).

**Worker Outcomes**

In addition to facilitating the engagement of clients, RC is also expected to produce positive outcomes for workers (Gittell, Weinberg, Pfefferle & Bishop, 2008). Like other forms of social capital, RC is an asset that makes it easier to access the resources needed to accomplish one’s work (e.g. Adler & Kwon, 2002). In addition to this instrumental benefit for participants,
there are intrinsic benefits as well given that high-quality relationships are a source of well-being for people at work (Dutton & Heaphy, 2003). Based on these instrumental and intrinsic benefits of positive connections, RC is expected to be positively associated with worker outcomes, including job satisfaction, engagement, proactive work behaviors and reduced burnout.

**Proposition 4**: RC improves worker outcomes.

RC between nurse managers and their colleagues positively predicted both their work engagement and their proactive work behaviors (Warshawsky, Havens & Knafl, 2012); the same was found across multiple generations of nurses (Havens, Warshawsky & Vasey, 2013). RC positively predicted job satisfaction in both hospital care (Havens, Vasey, Gitell & Lin, 2014) and elder care settings (Gittell, Weinberg, Pfefferle & Bishop, 2008). RC between nurses and their colleagues also predicted greater career satisfaction, professional efficacy, motivation and identification with organizational values, as well as reduced burnout (Cramm, Hoeljmakers & Nieboer, 2014; Havens, Vasey, Gittell & Lin, 2014; Newell 2009). RC between home care participants and nurses, physical therapists and leaders positively predicted job involvement, satisfaction, competence and use of competence on the job (Albertsen, et al, 2014). RC between community nurses and their nurse and physician colleagues positively predicted confidence in collaboration and sense of social support (Naruse, Sakai & Nagata, 2014). RC between community nurses and their managers predicted nurses' work engagement, while RC between community nurses and their colleagues predicted work engagement when managerial spans of control were high (Naruse, Sakai & Nagata, 2015). Similarly, RC among workers was found to be predictive of worker well-being outcomes such as affective commitment and perceived equity in the pharmaceutical industry and in early childhood education (Alvarez 2014; Wright 2015). In one of the few interventional studies identified in our search, both RC and worker well-being
improved over time with coaching and feedback of RC metrics to participants (Kenwood, 2011). Taken together these findings are supportive of Proposition 4.

**Learning and Innovation**

In addition to improving an organization’s operational capacity and outcomes for its workers, RC is expected to promote learning and innovation, thus contributing to the organization’s adaptive capacity. Why? Many innovations cut across organizational boundaries such that when participants are aware of what other parts of the organization do and of the interdependencies between these parts (shared knowledge), they can more easily see opportunities for innovation (Carlile, 2004). Participants can also more easily develop and implement innovative ideas when they are engaged in timely, problem-solving communication with their colleagues across the organization. Finally, the high quality relationships found in RC help to boost psychological safety among participants (Carmeli & Gittell, 2009), thus reducing identity threat and loss of face when learning new skills and role relationships and increasing the potential for learning and innovation (Edmondson, 1999). For these three reasons we propose that:

**Proposition 5:** RC promotes learning and innovation.

The evidence so far largely supports Proposition 5. In the pharmacy sector, RC among positively predicted collaborative knowledge creation by reducing three key barriers to collaboration - dual allegiance, equity concerns and appropriation concerns (Alvarez, 2014). In accounting firms, RC among accountants positively predicted their ability to innovate (Fu, 2014). In rural primary care clinics, RC positively predicted reciprocal learning among clinic staff (Noel et al, 2013), while relationships of shared goals, shared knowledge and mutual respect in software, electronics and finance firms positively predicted ability to learn from failures.
(Carmeli & Gittell, 2009).

Other studies have explored the connection between RC and psychological safety. The Carmeli and Gittell (2009) study cited above found that RC predicted learning from failure through its impact on psychological safety. Looking in the opposite direction, psychological safety among obstetricians, anesthesiologists and nurses working in labor and delivery units positively predicted communication quality - frequent, timely, accurate and problem-solving, through its impact on relationship quality - shared goals, shared knowledge and mutual respect (Henrichs, 2013). Taken together, these findings suggest that relational coordination is conducive to learning and innovation in organizations, and that psychological safety plays a role in this process.

STRUCTURES THAT SUPPORT RELATIONAL COORDINATION

This growing evidence regarding the performance outcomes of RC further motivates the question - how do organizations shape the development of RC? How do organizations, intentionally or otherwise, shape the patterns of communicating and relating that comprise RC? According to RC theory, organizations as traditionally designed support the development of bureaucratic silos, resulting in low levels of RC (Gittell & Douglass, 2012). Personal networks tend to connect people who are similar due to homophily (Ibarra, 1992) and due to the ability to connect more readily with those who are similar to ourselves (Williams, 2007). Achieving RC and associated performance outcomes therefore requires the design of organizational structures that enable participants to understand their differences and bridge across them (Gittell & Douglass, 2012).

Traditionally designed human resource practices, such as selecting for individual expertise, measuring and rewarding for individual performance, resolving conflicts vertically but
not horizontally, etc., are expected to undermine the development of RC between participants in different functions by reinforcing their tendency to associate with others like themselves. RC theory hypothesizes a set of organizational structures, including hiring and training, conflict resolution practices, performance measurement, rewards, boundary spanner roles, supervisor and leader roles, job design, protocols, information systems and meetings, that are expected to shape the development of RC for better or worse, depending on whether they are designed to bridge across difference (Gittell, 2000; Gittell & Douglass, 2010; Gittell, Seidner & Wimbush, 2010). See Appendix B for a summary of the studies reviewed in this section, including the sample, the context, the measurement of RC and the findings.

**Selection and Training for Relational Competence**

Relational competencies such as collaboration and showing respect for others are not easily taught. Organizations therefore rely heavily upon selection, long recognized as a powerful way to achieve fit between a prospective employee and a job (Lawrence & Lorsch, 1968). Though selection has traditionally focused on skills, personality traits (Day & Silverman, 1989) and teamwork ability (Cappelli & Rogovsky, 1994) are also relevant to job performance. Once selected for, these capabilities can be further strengthened through training (Baker & Dutton, 2007).

**Proposition 6:** Selection and training for relational competence supports development of RC.

Consistent with this proposition, early studies found that selection processes designed to identify and choose individuals who are oriented toward teamwork, were predictive of higher levels of RC across work groups in both the airline (Gittell, 2000) and healthcare industries (Gittell, Seidner, Wimbush, 2010). Similarly, training for teamwork was positively associated
with RC among participants in both healthcare (Ross, 2014) and banking (Siddique, 2014).

**Shared Accountability and Rewards**

Holding individuals accountable for outcomes can quickly turn into a “blame game” that undermines coordination and learning particularly when accountability is fragmented between interdependent roles (Chenhall, 2005). Shared accountability and shared reward structures across interdependent roles are expected to counteract these negative dynamics and support the development of RC (Gittell, 2003; Gittell & Douglass, 2012).

**Proposition 7:** Shared accountability and rewards support development of RC.

In support of this proposition, cross-functional approaches to performance measurement were positively and significantly correlated with RC across diverse work groups in airlines (Gittell, 2000), healthcare (Gittell, 2008; Gittell, Seidner & Wimbush 2010) and banking (Siddique, 2014). Similarly, multi-source feedback predicted RC in manufacturing firms (Kim & Lee, 2016), while cross-functional reward structures and performance based pay positively predicted RC in hospitals and bank branches (Gittell, Seidner & Wimbush 2010; Siddique, 2014).

**Shared Conflict Resolution**

Conflict is more likely to occur under conditions of interdependence, time constraints and resource constraints (Pondy, 1967). In the presence of well-designed organizational structures and practices, conflict can play a highly constructive role (Kolb & Putnam 1992). Organizational structures to address conflict are often underdeveloped, however, or designed to address vertical conflict rather than horizontal conflict (Lipsky, Seeber & Fincher, 2003). With conflict resolution structures that bridge across diverse functions, organizations are better equipped to use conflict as an opportunity to increase shared knowledge and to build shared goals (Gittell, 2003;
Gittell & Douglass, 2012).

**Proposition 8:** Shared conflict resolution supports development of RC.

To date this proposition has been tested in only two studies. In airlines (Gittell, 2000) and in surgical care (Gittell, Seidner & Wimbush, 2010), proactive cross-functional conflict resolution positively predicted RC across interdependent work groups.

**Job Design**

Specialization improves performance by enabling the development of deep expertise (Taylor, 1911) but at the same time, increases the challenge of coordinating work (Tushman & Nadler, 1978). While shared experience of doing the same job is expected to create greater RC within a function by fostering shared goals, shared knowledge and respect for one another’s work, these occupational silos also make it harder to coordinate across functions. Consistent with theories of flexible specialization (Liker, Collins & Hull, 1999), scholars have theorized that well-defined jobs with flexible boundaries between them are conducive to the development of RC (Gittell & Douglass, 2012).

**Proposition 9:** Well-defined jobs with flexible boundaries support development of RC.

In the study of flight departures, flexible boundaries between well-defined jobs were positively associated with levels of RC (Gittell, 2000). This hypothesis was further supported by two qualitative studies that found flexible responsibility among healthcare professionals supported RC (Manski-Nankervis et al., 2014; Solberg et al., 2014). In a study of bank branches, the clarity of roles positively predicted RC (Siddique, 2014). In addition a physician job redesign - hospitalists - that created greater focus by dedicating some physicians exclusively to hospital-based work positively predicted RC between those physicians and hospital staff (Gittell, Weinberg, Bennett & Miller, 2008). The authors theorized that the improvement was due to
greater availability of physicians to other members of the team enabling them to engage in higher
good communication and to develop shared goals, shared knowledge and mutual respect with
other members of the team regarding patient needs. These findings suggest that job design
matters, but how is not completely clear. Is it the clarity of roles, flexibility across role
boundaries, or a combination of both, that is most supportive of RC?

**Leadership and Supervisory Roles**

Leadership is an organizational role and, as such, can be designed. In particular,
organizations can design their leadership roles to enhance the potential for engaging in relational
leadership, and thus enhance the potential to support RC among workers. Consistent with the
theory of relational leadership, leadership roles that enable leaders to build reciprocal
relationships with and among participants are expected to support the development of RC
(Fletcher, 1999; Uhl-Bien, 2006). For example, although organizations have been striving to
become flatter, small spans of control are more conducive to relational leadership and therefore
more conducive to RC (Gittell, 2001). When spans become large, managers find it prohibitive to
engage in consultation and tend toward more autocratic behaviors. Small spans increase the time
a leader can work alongside of each direct report, thus providing greater opportunities for
building shared goals and shared knowledge, and greater opportunities to provide coaching and
feedback.

**Proposition 10:** Relational leadership and supervisory roles support development of RC.

This proposition has received relatively little empirical attention thus far. Smaller spans
of control for frontline leaders were associated with higher RC across work groups in the flight
departure process (Gittell, 2001) and with higher RC across organizations in a study of hospitals
and early intervention agencies (Derrington, 2012), due to the ability of leaders with smaller
spans to engage more actively in coaching, feedback and relationship building. A study of primary care practices found that transformational leadership - leading through shared vision - predicted higher levels of RC across diverse work groups (Bright, 2012).

**Boundary Spanners**

Boundary spanners are individuals whose job is to coordinate the tasks of others across functional or organizational boundaries (Gittell, 2002b; Tushman, 1977). Boundary spanners are thus expected to support the development of RC among diverse work groups.

**Proposition 11:** Boundary spanner roles support development of RC.

Smaller caseloads for boundary spanners predicted higher levels of RC across work groups in the airline industry (Gittell, 2000) and in surgical care (Gittell, 2002b), and a well-defined boundary spanner role improved RC between schools and external mental health providers in a qualitative study (Parsons, 2012). In an interventional study, a course coordinator role in a university psychology department increased RC among faculty (Skakon, 2014). However in another study, the presence of a boundary spanner role did not predict RC between hospitals and early intervention agencies (Derrington, 2012) and in primary care clinics having a care coordinator was negatively associated with RC (Flieger, 2013). One qualitative study found boundary spanners were more effective when other organizational practices such as clearly defined relational workspaces and opportunities for interaction with co-participants were in place (McEvoy, Escott & Bee, 2011), while another study found that boundary spanner roles were significantly more effective in achieving desired outcomes when implemented in settings with high levels of RC (Lee, 2014). These findings suggest the need for a better understanding of the dynamics of boundary spanner implementation.

**Shared Meetings**


Meetings provide scheduled opportunities for diverse individuals with interdependent tasks to share information (Faraj & Xiao, 2006). Meetings are expected to increase communication quality as well as to promote the development of shared goals, shared knowledge and mutual respect (Gittell, 2002b).

**Proposition 12:** Shared meetings support development of RC.

Empirical tests of this proposition have yielded positive results thus far. In the healthcare industry, interdisciplinary meetings such as patient rounds were predictive of RC (Gittell, 2002b; Scholmerich et al., 2014), and their absence has been identified in a qualitative study as a barrier to improving RC (Solberg et al., 2014). In an interventional study, weekly meetings to manage structured time off fostered RC in a consulting firm (Mazmanian & Perlow, 2011). Meetings can support RC across organizations as well. Open houses and community events held by hospitals for early intervention agencies predicted higher levels of RC (Derrington, 2012).

**Shared Protocols and Routines**

Coordination across diverse work groups can also be supported by shared protocols, routines and standards that build shared knowledge (Feldman & Rafaeli, 2002), particularly when they provide participants with visibility into the underlying interdependencies (Adler & Borys, 1992).

**Proposition 13:** Shared protocols support development of RC.

Qualitative studies have found that shared protocols are associated with higher levels of RC (Douglass & Gittell, 2012; Parsons, 2012) and were identified by staff as an opportunity to improve RC (Solberg et al., 2014). These findings were supported by quantitative analyses in surgical care (Gittell, 2002b), rehabilitation (Haase & Grote, 2013) and accounting (Fu, 2014). One large-scale study found no relationship between the use of a clinical pathway and RC.
(Deneckere, et al, 2012). Other researchers have explored the relationship between RC and the adoption of evidence based practices in healthcare. Patients in practices with higher levels of RC were more likely to receive care aligned with clinical guidelines, protocols and process recommendations (Cramm & Nieboer, 2012a; Hartgerink et al., 2012; Hartgerink et al., 2014). There appeared to be a mutually reinforcing cycle in which the use of best practices positively predicted RC over time, while RC further reinforced the use of best practices over time (Cramm & Nieboer, 2012a; Cramm & Nieboer, 2014b).

**Shared Information Systems**

Information systems are a mechanism for coordinating across diverse functions with interdependent tasks by providing a uniform infrastructure of information (Venkatramen, 1994) and by reducing the costs of coordination (Argyres, 1999; Malone & Crowston, 1990).

**Proposition 14:** Shared information systems support development of RC.

Research assessing the impact of information systems on RC has been limited so far but represents an important area moving forward due to the increasingly distributed nature of many work processes. Results of empirical work have been mixed. An early study of flight departures found that higher reliance on IT interfaces predicted lower levels of RC across work groups (Gittell, 2001). A more recent large scale study found the opposite relationship between the use of IT and the level of RC; across chronic care programs in Netherlands, the use of clinical information systems, decision support and self-management support all positively predicted the level of RC reported among care providers (Cramm & Nieboer, 2012b). Other studies have explored IT utilization in a more nuanced way. One found that the "deep use" of clinical provider order entry systems positively predicted RC for both high and low complexity patient conditions (Romanow, 2013). An in-depth field study of IT utilization found that the impact of
IT on RC varied depending on the relational context in which it was utilized (Sebastien, 2014). These mixed results point to a need for additional theory development and empirical study.

**Formal Contracts**

A handful of researchers have explored the impact of formal contracts like worker membership in unions (Gittell, 2000) and organizational membership in integrated delivery systems (Kautz, et al, 2007) on relational coordination. The theory of relational contracting predicts that the quality of relationships is determined not by formal contracts but rather by the relational context in which those contracts are enacted (Gibbons & Henderson, 2011). According to this theory, formal contracts by themselves are not expected to foster RC.

**Proposition 15:** Formal contracts support - or undermine - the development of RC, depending on the relational context in which they are enacted.

Empirical analyses to date have been inconclusive, with no studies designed to test the contingency hypothesis articulated above. Worker unionization levels were not predictive of RC (Gittell, 2000) nor of performance (Gittell, von Nordenflycht & Kochan, 2004), though qualitative findings suggested that the contracts themselves were less important than the relational context in which they were enacted. One common attribute of union contracts however - job security - was highly predictive of RC in a study of bank branches (Siddique, 2014), perhaps due to its impact on psychological safety.

A cross-organizational analysis of patient care found no significant difference in RC or outcomes in the presence or absence of contractual relationships among the organizational entities (Kautz, et al, 2007). Gittell and Weiss's (2004) analysis suggested that it is other structures adopted by the organizations to coordinate their work rather than the formal contract itself that supports the development of RC. As work becomes increasingly interdependent across
organizations, the relational elements of contracting become an important area for study.

**DISCUSSION**

Our review suggests that RC has demonstrated a high degree of flexibility as a concept, having been used as an empirical concept across 16 industry settings including airlines, healthcare, accounting, banking, pharmacies and manufacturing, and in 18 countries thus far. In the studies identified for this systematic review of the literature, a large majority of the findings have been consistent with the theory of relational coordination. See Table 3. In the studies testing the outcomes of RC, 94 of the findings were as predicted by the theory, while 13 of the findings ran counter to the theory, for an 88% ratio of supportive to total findings. In the studies testing the impact of structures that were expected to shape RC, 51 of the findings thus far have been consistent with the theory, while 11 of the findings run counter to it, for an 82% ratio of supportive to total findings.

(Insert Table 3 about here.)

**Outcomes of Relational Coordination**

Findings regarding the outcomes of RC that are inconsistent with the theory provide opportunities for additional theory building. As stated in Propositions 1 through 5, RC is expected to contribute most strongly to organizational efficiency and quality outcomes as well as client and worker well-being when work is highly interdependent, uncertain and time constrained. Some of the unexpected findings can be understood by thinking more broadly about these contingency conditions. For example, one study of RC and hospital length of stay found the relationship was only significant in the expected direction when nursing workloads were high (Lin, 2010), suggesting RC may contribute more acutely to improving efficiency when work is more time-constrained. The same study found there was no relationship between RC and length
of stay when nursing workloads were moderate or low. Another study found that RC was predictive of patient satisfaction for patients receiving complex treatments, while the relationship was not significant for patients undergoing more routine care (Romanow, 2013). It appears that the nature of the work could influence the impact of RC on outcomes more powerfully than previously theorized.

Other instances where RC showed no impact on performance could suggest the potential for threshold and ceiling effects. RC may not impact performance until it reaches a certain threshold, and its impact on performance may flatten out at very high levels of RC due to diminishing returns. Future research should identify the shape of the RC/ performance relationship for the sake of greater theoretical robustness and practical utility.

**Predictors of Relational Coordination**

Likewise findings about predictors of RC that ran counter to the theory reveal areas for additional research and theory building. For example, while the theory proposes that boundary spanner roles support the development of RC, findings have been mixed to date, suggesting there may be a more complicated relationship at work. It may be that an overreliance on boundary spanner roles can inhibit the development of RC. More research is thus needed to explore the conditions for effective design and implementation of the boundary spanner role. Counter to our proposition, the effective use of this structure may require relational coordination, and then in turn may strengthen relational coordination.

Likewise, shared information systems are theorized to support the development of RC, but the mixed findings thus far suggest that the impact of shared information systems on the development of RC may depend on their design and implementation. If relationships are needed
to support information sharing, future research should explore how IT can be designed and implemented to better support the development of RC (Sebastien, 2014).

**A More Dynamic Model of Relational Coordination**

The argument that organizational structures are capable of supporting RC when they are implemented in a relational context is initially puzzling, and appears to be circular. What does it mean if structures can only support RC when RC is already present? The idea that effective adoption of new structures may require some basic level of RC to enable participants to embrace and effectively use them is consistent with theories of structuration and relational organizational change (Feldman & Rafaeli, 2002; Kellogg, Orlikowski & Yates, 2006; Fletcher, Bailyn & Blake-Beard, 2009; Perlow et al, 2004). Research has begun to explore the interventional process itself, finding that change often begins with *relational interventions* that establish a safe space to reflect on and transform existing patterns of RC (Gittell, 2016; Kenwood, 2011; Suchman, Gittell & Mainali, 2011), consistent with our finding that RC is positively related to psychological safety, learning from failure, and innovation. As RC takes hold, participants are then able to enact new structures that further reinforce and sustain RC in a kind of bootstrapping process.

**CONCLUSION**

In conclusion, this paper has served to assess the empirical support for the emerging theory of relational coordination, with the potential to accelerate its development going forward. Our review revealed a wide array of country and industry contexts in which this theory has been tested. Secondly, our review reveals opportunities for understanding more deeply the relational dynamics of coordinating highly interdependent work and the organizational structures that shape these dynamics. Most significantly, we have identified the potential for a more dynamic
model of change in which structures support desired patterns of RC in a far less linear way than suggested by Figure 1. Such a model, in which relational interventions require structural interventions for their success - and vice versa - would contribute to a theory of relational organizational change (Feldman & Rafaeli, 2002; Kellogg, Orlikowski & Yates, 2006; Fletcher, Bailyn & Blake-Beard, 2009; Perlow, et al, 2004), bringing organization science, human resource management and organization development together to extend the insights each has to offer to understanding organizational effectiveness and change.
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Figure 1: Structure/Process/Outcomes Model of Relational Coordination
Table 1: Measuring Relational Coordination

<table>
<thead>
<tr>
<th>Frequent communication</th>
<th>How frequently do people in each of these groups communicate with you about [focal work process or client population]?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Timely communication</td>
<td>Do people in these groups communicate with you in a <strong>timely</strong> way about [focal work process or client population]?</td>
</tr>
<tr>
<td>Accurate communication</td>
<td>Do people in these groups communicate with you <strong>accurately</strong> about [focal work process or client population]?</td>
</tr>
<tr>
<td>Problem solving</td>
<td>When a problem occurs with [focal work process or client population], do the people in these groups blame others or work with you to <strong>solve the problem</strong>?</td>
</tr>
<tr>
<td>Shared goals</td>
<td>Do people in these groups <strong>share your goals</strong> regarding [focal work process or client population]?</td>
</tr>
<tr>
<td>Shared knowledge</td>
<td>Do people in each of these groups <strong>know</strong> about the work you do with [focal work process or client population]?</td>
</tr>
<tr>
<td>Mutual respect</td>
<td>Do people in these groups <strong>respect</strong> the work you do with [focal work process or client population]?</td>
</tr>
</tbody>
</table>
Table 2: Industry and Country Contexts for Studies of Relational Coordination

<table>
<thead>
<tr>
<th>INDUSTRY CONTEXTS</th>
<th>COUNTRY CONTEXTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accounting</td>
<td>Australia</td>
</tr>
<tr>
<td>Airlines</td>
<td>Austria</td>
</tr>
<tr>
<td>Autism care</td>
<td>Belgium</td>
</tr>
<tr>
<td>Banking</td>
<td>Canada</td>
</tr>
<tr>
<td>Consulting</td>
<td>Denmark</td>
</tr>
<tr>
<td>Criminal justice</td>
<td>Ecuador</td>
</tr>
<tr>
<td>Education</td>
<td>France</td>
</tr>
<tr>
<td>Early child education</td>
<td>Ireland</td>
</tr>
<tr>
<td>Higher education</td>
<td>Israel</td>
</tr>
<tr>
<td>Early intervention</td>
<td>Japan</td>
</tr>
<tr>
<td>Electronics</td>
<td>Korea</td>
</tr>
<tr>
<td>Finance</td>
<td>Netherlands</td>
</tr>
<tr>
<td>Healthcare</td>
<td>New Zealand</td>
</tr>
<tr>
<td>Chronic care</td>
<td>Norway</td>
</tr>
<tr>
<td>Elder care</td>
<td>Pakistan</td>
</tr>
<tr>
<td>Emergency care</td>
<td>Scotland</td>
</tr>
<tr>
<td>Home care</td>
<td>Switzerland</td>
</tr>
<tr>
<td>Intensive care</td>
<td>United States</td>
</tr>
<tr>
<td>Medical care</td>
<td></td>
</tr>
<tr>
<td>Mental health care</td>
<td></td>
</tr>
<tr>
<td>Obstetrics care</td>
<td></td>
</tr>
<tr>
<td>Primary care</td>
<td></td>
</tr>
<tr>
<td>Rehabilitation care</td>
<td></td>
</tr>
<tr>
<td>Specialty care</td>
<td></td>
</tr>
<tr>
<td>Surgical care</td>
<td></td>
</tr>
<tr>
<td>Manufacturing</td>
<td></td>
</tr>
<tr>
<td>Pharmacy</td>
<td></td>
</tr>
<tr>
<td>Software</td>
<td></td>
</tr>
</tbody>
</table>
Table 3: Summary of the Evidence

<table>
<thead>
<tr>
<th>Outcomes of Relational Coordination</th>
<th>Total Findings In Database</th>
<th>% Findings That Support RC Theory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Efficiency &amp; Financial Outcomes</td>
<td>19</td>
<td>84%</td>
</tr>
<tr>
<td>Quality &amp; Safety Outcomes</td>
<td>45</td>
<td>82%</td>
</tr>
<tr>
<td>Client Engagement</td>
<td>10</td>
<td>100%</td>
</tr>
<tr>
<td>Worker Engagement</td>
<td>25</td>
<td>96%</td>
</tr>
<tr>
<td>Learning &amp; Innovation</td>
<td>7</td>
<td>100%</td>
</tr>
<tr>
<td>TOTAL FINDINGS</td>
<td><strong>105</strong></td>
<td><strong>89%</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Structures That Support Relational Coordination</th>
<th>Total Findings In Database</th>
<th>% Findings That Support RC Theory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select &amp; Train for Teamwork</td>
<td>4</td>
<td>100%</td>
</tr>
<tr>
<td>Shared Accountability &amp; Rewards</td>
<td>7</td>
<td>100%</td>
</tr>
<tr>
<td>Shared Conflict Resolution</td>
<td>2</td>
<td>100%</td>
</tr>
<tr>
<td>Job Design</td>
<td>4</td>
<td>100%</td>
</tr>
<tr>
<td>Leadership &amp; Supervisory Roles</td>
<td>3</td>
<td>100%</td>
</tr>
<tr>
<td>Boundary Spanners</td>
<td>8</td>
<td>63%</td>
</tr>
<tr>
<td>Shared Meetings</td>
<td>5</td>
<td>100%</td>
</tr>
<tr>
<td>Shared Protocols &amp; Routines</td>
<td>9</td>
<td>89%</td>
</tr>
<tr>
<td>Shared Information Systems</td>
<td>7</td>
<td>71%</td>
</tr>
<tr>
<td>Formal Contracts</td>
<td>2</td>
<td>100%</td>
</tr>
<tr>
<td>TOTAL FINDINGS</td>
<td><strong>51</strong></td>
<td><strong>88%</strong></td>
</tr>
</tbody>
</table>