Team Coordination and Organizational Routines: Bottoms Up—and Top Down

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Abstract

Conceptualizations of work coordination historically assumed that work systems are put into place and that these systems shape the ability of workers to accomplish tasks. Formalization has thus long been invoked as an explanatory mechanism for work coordination. Recent studies have extended interest in emergent implicit and relational coordination, yet their underlying mechanisms of bottom-up coordination have yet to be explicated such that formal top-down coordination can be approached as a complementary mechanism rather than an alternative substitute. In the present work, we integrate the literatures related to coordination and routines, and extend analysis of bottom-up coordination towards an understanding of how it can be complemented by top-down formalized coordination of routines within organizations. Implications of this work, for both theory and practice, are discussed.

Keywords: implicit coordination; explicit coordination; routines; relational coordination; teams
Team Coordination: Bottoms Up—and Top Down

Existing conceptualizations of coordination within the work environment have assumed that work systems are designed and put into place, henceforth determining how the people within the designed environment will “be” coordinated (Okhuysen & Bechky, 2009) to achieve business-related goals (Tikkanen, Lamberg, Parvinen, & Kallunki, 2005). This is how extant research approaches the concept of routines in organizations (Becker, Lazaric, Nelson & Winter, 2005)—as patterns of behavior followed repeatedly, but subject to change (e.g., Becker, 2004; also see Winter, 1964, p. 263). Accordingly, the consensus in the literature views an organization as a “set of interdependent and administrative routines, which slowly evolve on the basis of performance feedbacks…” (Zollo & Winter, 2002, p. 340).

Unfortunately, as a result of this sentiment analyses of coordination have, perhaps not surprisingly, concentrated on distinguishing pre-planned, top-down, mechanistically programmed schemes of coordination versus more open-ended plans that delegate responsibility to human actors to achieve coordination through bottom-up mutual adjustments (e.g., Aagaard, Eskerod, & Madsen, 2015). Both forms still assume that reliable procedures for coordination would be made explicit so as to facilitate subsequent work performance. But, only recently have conceptions of how these routines, and subsequent coordination processes, been advanced that shift our focus to how coordination might emerge implicitly through, for example, worker interactions, business group relationships, and multi-agency collaborations (Curnin, Owen, Paton, Trist, & Parsons, 2015; Feldman, 2000; Gkeredakis, 2014), rather than through formal delegation in companies (Gittell, 2002; Quinn & Dutton, 2005; Rico, Sanchez-Manzanares, Gil, & Gibson, 2008).
Despite isolated examples (e.g., Wildman, Shuffler, Lazzara, Fiore, Burke, Salas, & Garven, 2012), the majority of research and theory on coordination (e.g., Faraj & Xiao, 2006; Okhuysen & Bechky, 2008), continues the historical tendency to not delve deeply, if at all, into level of analysis issues. As one example of an emerging focus here, Gittell and Weiss (2004) provide a compelling example—integrating levels of analysis in the domain of patient care—of how intraorganizational coordination can be extended to multiple partners, both internal and external. Overall however, in contrast to prevailing perspectives, it is our position that organizational coordination can only occur through actions by individuals and the lower level units within which they work. Specifically, we posit that “managing” coordination thus requires integrating higher-level and lower-level learning mechanisms and dynamic capabilities, rather than the simple notion that top-down and bottom-up coordination are separate and independent alternate approaches to how routines are formed in organizations (Zollo & Winter, 2002).

In the present work, we review the existing literature pertaining to bottom-up coordination and examine the psychological mechanisms through which it must operate. We then consider the implications for managerial decision-making pertaining to top-down coordination or routines. Our analysis of bottom-up team coordination highlights commonalities across, and extend beyond, recent conceptions of coordination such as “energy in conversation” (Quinn & Dutton, 2005), implicit (Rico et al., 2008), and relational (Gittell, 2002). Multiple theory-based as well as practical contributions emerge from this line of thinking, and in the following sections we highlight our perspective on the extant literature.

**Conceptions Pertaining to Bottom-up Coordination**

Bottom-up cognition can explain the emergence of a coordinated behavioral pattern which was first observed nearly half a century ago by Rabinowitz, Kelley, and Rosenblatt
(1966), and which Weick (1979) subsequently labeled “pure organizing.” In pure organizing, stable interlocking behaviors readily develop without people sharing mutual goals or even knowledge of each other. This is in line with Zollo and Winter (2002) who proposed that “...capabilities emerge from the coevolution of tacit experience accumulation processes with explicit knowledge articulation and codification activities” (p. 344). Individuals are thus able to produce mutually advantageous relationships “...unconsciously (without realization of the relationship), unintentionally (without deliberately planning to do so), and tacitly (without words or speech)” (Rabinowitz et al., 1966, p. 194).

That the current literatures largely fail to account for the role of such unplanned, naturally occurring coordination hinders both the theoretical advancement of coordination research as well as the practical utility of extant findings. In an effort to address the changing organizational landscape, Quinn and Dutton (2005) proposed a theory of “coordination as energy in conversation,” arguing that the coordination process should be viewed as the entirety of how people create, change, and re-create environments. They argue that conversations both establish narratives that direct the participants' actions, and convey emotion that stimulates energy toward this action. Related, and recently, Aagaard et al. (2015) highlighted the need for greater understanding, specifically, of bottom-up coordination. They found that “good chemistry” was the most important aspect of informal coordination. We contend, however, that terms such as “good chemistry” constitute labels for our ignorance.

As a path forward, insights from Hackman's (2003) proposal for bracketing in research on social and organizational dynamics is particularly useful in that it discusses higher level dynamics relative to lower level ones. Coordination research appears to present an atypical
counter example in which the higher level mechanism of formalization has long been featured, with only relatively recent attention to lower level individual behavioral interaction processes.

This prompts us to bring to bear what has been established by research in areas such as cognitive psychology for understanding how individual behavior can produce evolution in team coordination and routines. Cognitive psychology has developed its own application of a top-down versus bottom-up metaphor, and bottom-up cognition plays a key role in our analysis of bottom-up coordination. Accordingly, we proceed in the following sections furthering this psychological perspective and integrating the literature related to explicit and implicit coordination.

**Explicit and implicit coordination**

Rico et al. (2008) defined coordination as “the use of strategies and behavior patterns aimed at integrating and aligning the actions, knowledge, and objectives of interdependent members, with a view to attaining common goals” (Rico et al., 2008, p. 163). The Rico et al. (2008) model of coordination proposes a distinction between *explicit* coordination and *implicit* coordination, in much the same way as Zollo and Winter (2002) suggested that capabilities emerge. Overall, both planning and communication are argued to compose explicit coordination (Malone & Crowston, 1994). Planning is a key aspect of such coordination processes because such actions are necessary to establish the strategies and behavior patterns needed for integration. The use of planning for coordination is applied in circumstances when there are stable and predictable variables (Rico et al., 2008). For instance, these variables might include known processes, deadlines, and goals. Communication is composed of feedback processes (March & Simon, 1958), personal coordination (Van de Ven, Delbecq, & Koenig Jr., 1976), and information exchange (Kraut & Streeter, 1995).
Studies that consider only explicit coordination are limiting in that they paint a static picture of dynamic processes (Rico et al., 2008). However, if we incorporate the latter type of coordination, implicit coordination, we are better able to understand the full notion of coordinating mechanisms. Implicit coordination “takes place when team members anticipate the actions and needs of their colleagues and task demands and dynamically adjust their own behavior accordingly, without having to communicate directly with each other or plan the activity” (Rico et al., 2008, p. 164). This, it is proposed, is how routines emerge—a collective endeavor (Becker, 2004; Harrison & Rouse, 2014; Nelson & Winter, 1982).

The concept of implicit coordination recognizes that in making decisions in real-time, it is necessary to anticipate and make assumptions about how others will behave—individuals and/or work units have to anticipate the actions of others with whom they are coordinating. When coordinating actors have a degree of expertise, shared goals, and are knowledgeable about past behaviors they are able to make necessary assumptions which then facilitate implicit (e.g., informal, elastic) coordination (Harrison & Rouse, 2014; Rico et al., 2008). We note that even though Rico et al. (2008) highlight implicit coordination, their description of assumptions stops short of noting that assumptions themselves can either be explicit or implicit. Similarly, anticipation can either be conscious or non-conscious. These distinctions were not of particular consequence in their analysis, but in our consideration of cognition research below, we will need to revisit them. What matters is that particular actions anticipate other particular actions, not whether such actions were consciously and explicitly chosen for that reason.

Historically, explicit coordination has been seen as the more dominant form as bureaucratic processes of forming routines were traditionally more static in nature (Becker, 2004). And, though our understanding of coordination theory has been advanced by the concept
of explicit and implicit coordinating mechanisms as complementary processes (Rico et al., 2008), the literature still falls short of capturing the true nature of workplace coordination processes. In the following section, we discuss how relational coordination helps address this shortcoming.

**Relational coordination**

Gittell’s (2002) model of relational coordination proposes that effective coordination can arise through the successful facilitation of interpersonal interactions and relationships. When patterns of relational routines are established, these patterns can reduce the amount of facilitated interpersonal interaction required. In fast-paced contemporary workplaces characterized by high uncertainty, relational coordination is especially useful (Gittell, 2002).

Relational coordination is similar to other types of coordination as it does incorporate the aspects of time, accuracy, frequency, and problem solving. Organizational design theory explains that informal types of coordination, such as relational coordination in routines, are organic in nature and are spontaneous (Gittell, 2002). Relational coordination is distinct from other types of coordination because it occurs naturally and it incorporates the importance of relationships (Gittell, 2002). Relational coordination requires mutual goals and knowledge—strong relationships allow employees to draw upon each other’s knowledge and efforts. As was the case for the Rico et al. (2008) conception of implicit coordination, we anticipate that insights from cognition research may significantly extend the perceived utility of relational coordination as it pertains to routines. In particular, we will need to address whether mutual goals are truly necessary, and whether the relevant knowledge can be tacit as well as it can be explicit.

Extrapolating from this point of view, an individual may better coordinate with a coworker with whom they have a strong relationship than with another coworker with whom
they have a weaker relationship. This is especially relevant when coordinating in a cross-level environment, which is increasingly necessary to exist in the workplace (e.g., across levels, functionality, and across teams, Vashdi, Bamberger, & Erez, 2013). Through mutual respect and understanding, employees gain increased appreciation for the contribution of their coworkers to the routines that emerge in the workplace. Furthermore, a strong relationship will likely improve the frequency, timeliness, and accuracy of communication (Gittell, 2002). This will enhance both the efficiency and effectiveness of coordination. Empirical evidence suggests that this type of coordination can positively affect performance (Gittell, 2002).

Relational coordination allows for flexible and organically developed task completion. This is in comparison to more formal types of coordination which are rigid and require a greater amount of time (i.e., effortful accomplishments; Becker, 2004). Inherent within our research is that it is people who behave, not groups, nor organizations. The simultaneous behavior of associated individual members is essential for the coordination process necessary to have routines emerge (Feldman, 2000). We assert that informal coordination processes incorporate both the design, maintenance, and adaptation of formally specified coordinating procedures as well as monitoring and intervening in the informal patterns of human behavior through which people naturally align their behavior. Put differently, informal relationships lead to patterns of behavior which then become formalized (Seers & Chopin, 2010). Programmed coordination is sufficient only for events that can be anticipated well in advance, such that procedures for coordination can be designated even before work commences.

Relational coordination, implicit coordination, and coordination as energy-in-conversation all address ways in which the members of teams themselves can act in ways that facilitate team coordination through a bottom-up process. They nonetheless leave unresolved the
behavioral underpinnings of naturalistic, bottom-up coordination. Only a more fine-grained analysis of the individual behavior pertinent to the coordination process can provide a basis for effective top-down managerial approaches that serve in a complementary fashion and capitalize on the naturalistic processes capable of compiling individual member actions into team actions rather than treating top-down coordination and bottom-up coordination as substitutes for each other.

**Bottom-up Coordination Revisited**

Why we, and others mentioned above (e.g., Malone & Crowston, 1994; Rico et al., 2008), treat coordination by communication as an explicit, top-down process is that the extant view on the nature of communication centers on authority and responsibility that has been hierarchically delegated. In contrast to this incomplete top-down perspective, bottom-up processes center on emergent interaction that facilitates task integration. What we are proposing here, then, is that understanding implicit coordination requires going well beyond its prior contemplation, as exemplified by Rico et al. (2008). Rico et al. (2008) argued that the underlying mechanism enabling team implicit coordination was the emergence of team situational knowledge structures, called team situation models (TSMs).

TSMs were posited by Cooke, Salas, Cannon-Bowers, and Stout (2003), and Cooke, Kiekel, Salas, Stout, Bowers and Cannon-Bowers (2003) as situation-specific team mental models (TMM; Klimoski & Mohammed, 1994). Klimoski and Mohammed explicated precisely, though, that their description of a team mental model would not include implicit knowledge: “This is not to say that implicit, subconscious or otherwise un-articulated types of shared knowledge, cognitions, or schemas are irrelevant . . . It is just that we would not subsume these things under the team mental model construct” (1994, p. 432).
Cooke, Salas, Cannon-Bowers, and Stout (2000) cited other earlier works relevant to team knowledge structures in addition to Kimoski and Mohammed (1994), and some, such as Rouse, Cannon-Bowers, and Salas (1992) do not similarly preclude implicit knowledge as a base for implicit coordination. Rouse et al. (1992) do speculate, however, that knowledge is initially processed formally and consciously, and then subsequently automated via practice and repetition. Cooke et al. (2000) mention briefly, without specific examples or research citations, that forms of nonverbal data have been used in process tracing studies to infer underlying procedural knowledge. They subsequently discuss at length specific procedures for measuring explicit, conceptual knowledge pertaining to TSMs. The Cooke et al. (2003) study focused specifically on articulated conceptual knowledge in its investigation of TSMs. In contrast, we propose that what remains inarticulate as actors inter-relate can subsequently become the taken-for-granted substance of effective coordination.

The premise that automatic behavior derives from extensive practice and repetition of initially conscious intentions to perform a particular action appears to be widely assumed in the organizational literature (e.g., Feldman, 2000). This premise belies mainstream research and theory in cognition and neuroscience. Gawronski and Payne (2010) detail the rapid advance of knowledge in this area, noting that of the 14,811 references they found in a PsychINFO search for the key phrase, “social cognition,” with either implicit or automatic, more than half were published after 2000. This handbook included application chapters for health psychology, clinical psychology, forensic psychology, consumer behavior, and political psychology, but not organizational psychology. That organizational research evidently lags other areas that draw on cognitive psychology may simply reflect what Scott (1998) described as the traditional predominance of a rational systems approach in the organizational literature.
Most organizational research that addresses cognition thus continues to emphasize explicit cognition. Hodgkinson and Healey’s (2008) recent review of the organizational cognition literature observes no division between top-down and bottom-up cognitive processes. What they do note as a major division in this literature is between works that presumes a computational model of cognition in contrast to an interpretive model. The former attends to the ability of organizational participants to make rational decisions that guide organizational behavior, with an emphasis on the inherent limitations that have been documented empirically. The latter interpretive model is attributed to the influence of Karl Weick’s (1979, 1995) analyses of sensemaking as a post-action dynamic. The division here is between a top-down model that works imperfectly versus one that side-steps the top-down versus bottom-up distinction by starting its analysis at a point where action has already occurred. Sensemaking interprets and articulates observed events and behavior into explicit cognitions. It may include both rational and non-rational aspects, and is taken as interesting in its own right, apart from whatever implications it may have for later actions.

McKenzie’s (2005) review of judgment and decision-making research points out that over a half-decade of work on artificial intelligence indicates that rule-based systems can outperform human behavior in very few endeavors. The under-performance of these logical routines is greatest in mundane, everyday behaviors central to how people work in teams, such as understanding a story, recognizing a scene, or understanding speech. He notes that “To the extent that normative rule-following behavior does not entail real-world accuracy, we are comparing human behavior to the wrong benchmark, and the field of judgment and decision-making will need to undergo a radical change” (McKenzie, 2005, p. 334).
Although most organizational research continues to emphasize explicit cognition, research on cognitive processes in general psychology, social cognition, and neuroscience is converging with research in developmental psychology (Zelazo, Chandler, & Crone, 2010) to demonstrate that our brains are self-organizing systems. This work further undermines the digital computer as a useful metaphor for brain function despite ubiquitous use of this metaphor. We do not have addressable memory (Marcus, 2008), nor do we have the neurological equivalent of a central processor commanding an operating system that assigns specific information processing tasks to logically designed subroutines (Linden, 2007), and the central function of consciousness is to monitor what brains are doing, and not to orchestrate it (Damasio, 1999).

It is here that we can appreciate the central role that metaphors of ‘bottom-up’ and ‘top-down’ continue to play in studies of cognition and neuroscience. Roepstorff and Frith (2004) note that beyond the allusion to colloquial expressions of ‘top management’ and ‘bottom rung employee,’ up versus down refer to whether action is controlled by thought and understanding versus simple reactions to external environmental stimuli. Top-down cognitive processing is controlled, effortful, slow, and error-prone, but its flexibility is ideal for dealing with novelty and complexity. Bottom-up cognitive processing is automatic, very fast, effortless, and fairly error-free. The portion of brain information processing capacity we can use for top-down is miniscule relative to the portion available for bottom-up processing. The coexistence of top-down with bottom-up cognitive processes is a central problem for cognition research, as is the question in Roepstorff and Frith’s (2004) title: “What’s at the top in the top-down control of action?”

The assumptions nonetheless appears widespread in organizational research that conscious, explicit thought is at the top of top-down cognition, and that conscious, top-down cognition is central to organizational behavior. There are nonetheless examples pertaining to
implicit cognition and mechanisms for continuous change within emergent phenomena (e.g. Feldman, 2000). It is relatively easy to find studies on implicit bias (e.g., Hardin, 2009) and biases in decision-making (e.g., Kay, Wheeler, Bargh, & Ross, 2004). These lines of research preserve the central presumption that rationality, albeit bounded, lies at the core of organizational phenomena. Rationality is treated as the substratum of organizational processes, subject to the overlay of idiosyncratic cognitive and emotional biases that complicate the operation of those core rational processes. To the extent that implicit, bottom-up processing is recognized, almost uniformly its theoretical role is merely as an interference that must be overcome.

By continuing to rely on the premise of bounded rationality, most organizational researchers continue to treat non-rational cognitive processes as complicating factors that introduce error variance that make understanding organizational life less straightforward than it would be were it possible to keep them from interfering with organizational rationality.

Alternately, emotion (Elfenbein, 2007) can be incorporated as a “black-box” mediator between environmental stimuli and human responses other than expressive cues. An insightful exception is recent work by George (2009), who notes that very little of the existing organizational literature incorporates what has been learned from the rapid progress of socio-cognitive research in psychology, but goes on to explore the potential advantages of recasting job design research by integrating knowledge of automaticity.

The rule-based, computational aspects of cognition that thus remain central in much organizational research offer little basis for a complete understanding of how member behaviors can coordinate team action. Understanding how coordination can arise from non-computational cognition appears essential. Penn and Povinelli’s (2007) review of comparative research on causal cognition in human and nonhuman animals underscores that both appear capable of what
has commonly been regarded as the unique human ability to reason inferentially. Research does nonetheless indicate that the cognition of nonhuman animals displays a greater proportion of simplistic associational processing, along the lines of Pavlov’s dogs and B. F. Skinner’s pigeons.

The human versus nonhuman difference, though, is a difference of degree, not of kind. As seen in the human cognition research reviewed above, the proportion of human cognition that is controlled and explicit rather than implicit and automatic, being accomplished through logical reasoning rather than being inherently associational, is quite small. For both humans and nonhumans, then, explicit, consciously controlled processing is minimal, albeit even more so for the latter than for the former. What this suggests is that research on nonhuman animal coordination may well be much more informative for understanding human coordination than has ever been considered in existing theory and research. A variety of animals, other than humans, live in groups that employ coordinated activities which rely on specialization and the division of labor. Some of these animal work teams feature as much, if not more task interdependence than do some human employees within corporate work units. A group of sales employees may be called a sales team, even when little or no cooperation is necessary for task completion, and the most effective members are the most competitive.

**Primary Mechanisms of Bottom-up Coordination**

Our ensuing analysis rests on the recognition that a great deal of our anticipation of what others will do does not depend on knowing what someone else is supposed to do according to their formally assigned duties. Rather, we develop, and use, a great deal of tacit knowledge bearing on what *anyone* would most likely do in any given circumstance, and we similarly use tacit knowledge bearing on what *specific individuals* would most likely do. Because such knowledge is tacit, we need to recognize that it cannot be imparted through explicit articulation
of conscious thought and communication. Though this phenomenon is not captured completely by the extant literature, the development of such knowledge can, however, be analyzed, and an effective analysis can allow us to facilitate its acquisition.

Our bracketing from previous research suggests the four primary ways in which separate individuals can coordinate their action (Knoblich & Sebanz, 2008). The simplest mechanism is simultaneous affordance (Richardson, Marsh, & Baron, 2007). Here the actions of different individuals can become entrained simply because they face common behavior opportunities. It was this pattern that Weick (1979) called “pure organizing.”

A second simple way in which individuals can coordinate their action occurs by the priming that results when one individual sees the action of another (Richardson, Marsh, & Schmidt, 2005). The cognitive pathways relevant to performing that action become activated, which can facilitate simulation and imitation (Keysers & Gazzole, 2006). This form is quite fortuitous in some forms of joint effort, with simple team examples being the behavior of sled dogs and horse teams. Priming is not always visual, as our other senses often elicit unplanned and unintended cognitions, such as familiar sounds or smells that evoke old memories.

A third way is the generation of shared perceptions that incorporate recognition of self-other distinctions (Atamaca, Sebanz, Prinz, & Knoblich, 2008). In this form, the counterpart other can be a specific dyadic partner, a generic dyadic partner, or the other might actually be a “they” that the individual can see as her counterpart within a ‘we’ (Sebanz, 2007). In this sense, the other then becomes construed as ‘we’ such as when an employee speaks of what ‘the work we do in my team.’ The essence of this third mechanism remains simple reaction to external, environmental stimuli, except that it can take advantage of two of the more sophisticated aspects of perception, specifically that distinct individuals can develop shared perceptions, and that the...
nature of some perceptions is such that they more readily can be explicated by conscious articulation.

The fourth way extends recognition of the self and other distinction by considering how shared intentions can develop (Knoblich & Jordan, 2003; Sebanz & Lackner, 2007). This fourth way, then, stands out from the first three in being the only one in which we can begin to see the role of top-down cognitive processes. Tollefson (2004) pointed out that most accounts of joint action involve inferences of states of individual intentions that are more sophisticated than would be possible for young children as well as non-human animals, and proceeded to outline a much more parsimonious account of shared intentions. The necessary cognitive architecture underlying aspects such as shared perception and recognition of self and other is nonetheless far more rudimentary than contemplated by existing explanations of coordination that have assumed a basis in explicit cognition.

**Top-Down Coordination Revisited**

Consideration of which of the four underlying primary mechanisms of bottom-up coordination may be operating in specific work settings provides a starting point for managerial decisions regarding the appropriate design of formalized top-down coordination mechanisms. The most straightforward case is where shared intentions are feasible and can be encouraged. We already have considerable useful knowledge here in that coordinating work through shared intentions is central to the operation of long advocated approaches to coordination variously termed feedback (March and Simon, 1958), mutual adjustment (Thompson, 1967), or personal and group coordination (Van de Ven et al., 1976). These approaches operate explicitly and accord well with an understanding of human work behavior as primarily guided by rational,
albeit boundedly so, cognition. The development of shared mental models as described by Klimoski and Mohammed (1994) is entirely relevant here.

In general, the other three primary mechanisms pose increasingly more difficult cases for formal management, in inverse order to their underlying degree of cognitive complexity. Shared perceptions grounded in self-other distinctions involve significantly less cognitive complexity than do shared intentions, but much greater complex cognition than sensory priming, and vastly more than simple simultaneous affordance. The major tool accessible for managerial intervention here is likely the arrangement of work settings and work activities that facilitate interaction with the counterpart others with whom coordination is most important. Those with whom we frequently associate can easily collectively become “we” in contrast with the “us versus them” that can readily develop with respect to those with whom we generally don't associate.

Priming plays a key role where split-second improvisational coordination becomes important. It is much more open to development through repetition, practice, and drill rather than articulate instruction. We see this in operation in many sports, with basketball and soccer presenting prime examples. What is often called innate or intuitive performance can be better understood as being guided by tacit, inarticulate knowledge developed through extensive experience. A good deal of what Gittell's (e.g., 2002) research has investigated involves this mechanism.

Complementary affordance presents the most difficult case for advance planning and design. Just as a tree stump along a forest path was never designed to be a chair, it readily becomes one for many long-distance hikers. The mutual affordance found long ago by Rabinowitz et al. (1966) came only via a highly contrived psychology laboratory experiment. Rather than focus on how managers might contrive mutual affordance in work contexts, the more
practical focus would be to attend to situational factors that present inadvertent discouragements to coordination, such as zero-sum reward contingencies among workers who need to cooperate.

**Implications and Conclusion**

Across the history of management research, what we understood about management and the suggestions we had to offer regarding management practice have continued to evolve as we have learned more about human work behavior. An initial assumption was simply that employees should do as they were directed to do, no more and no less. Management theory became more sophisticated as we continued to learn how employees did things in their own ways, whether more, less, or simply differently than managers’ initial expectations. Our understanding of coordination has thus evolved as research better informed us of the incompleteness of formal top-down coordination, and continues to evolve as research expands our understanding of informal, implicit, bottoms up coordination. Taken alone, top-down coordination is insufficient, and bottom-up coordination, taken alone, cannot achieve the complexity and intricacy necessary in many contemporary endeavors.

Managers are ultimately responsible for work outcomes, and must remain pragmatic about how such outcomes can appropriately be produced. Capitalizing on potential complementary between top-down and bottom-up coordination should be clearly preferable to settling for trade-offs between them. In turn, better understanding of bottom-up coordination is presently where we can best progress toward such complementarity. That complementarity offers clear potential for more effective and efficient coordination, and fewer unanticipated consequences stemming from managerial decisions bearing on coordination—this is applicable across a range of environments, ranging from small ventures to large multi-national entities.
In sum, all organizations large enough to require multiple workers or even multiple tasks require coordination across those workers and/or tasks. The scale and scope of coordination requirements, and thus the potential advantages of integrating top-down with bottom-up coordination, nonetheless vary across workplace settings. In general, however, the larger and more complex the enterprise, and the greater the number of stakeholders with which it deals, advantages accruing to improved coordination should be greater, whether it be public or private.

How coordination is achieved in the workplace, and how routines evolve, are distinct but inter-related matters, and research has not yet fully accounted for their emergent aspects. Traditional views took a mechanistic, top-down perspective to suggest that coordination and routines are set in place and repeated, until change is necessary. The ongoing advance of the post-industrial economy continues to increase coordination demands, and highlights the effectiveness of emergent processes (Harrison & Rouse, 2014). From a practical point of view, the implications of efficiency gains are quite clear—put simply, in a growing number of jobs, across an increasing quantity of workplace interactions—both domestic (i.e., U.S.-based) and international—the optimal manner by which coordination drives economic value creation can occur through relational, emergent, interactions among individuals.

Overall, what we see in the contemporary workplace is that implicit, relational processes enable individuals to continuously assess what changes are needed and adapt coordinated routines to accomplish the task at hand. This propensity will continue to increase as technology facilitates even more seamless communication among employees, organizations and external partners (Gittell & Weiss, 2004).

From a theory-based point of view, in the present work, we integrated the literatures related to coordination and routines and arrived at the conclusion that bottom-up coordination
can be complemented by top-down formalized coordination of routines within organizations. This has the potential to bridge the gap between the growing literature on emergent organizational coordination processes within and among organizations and the increasingly irrelevant top-down mechanistic view of coordination. Rather than dispensing with the entire oeuvre, we suggest that future work take into account how today’s workplace may need both emergent as well as formalized coordination routines. We hope the present work facilitates such theoretical, as well as practical, pursuits.
References


