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Crossing an Apparent Chasm: Bridging Mindful and Less-Mindful Perspectives on Organizational Learning

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An important new stream of organizational research has emerged in recent years that draws on the notion of mindfulness. At the same time, there is a long-standing body of work in the organizations literature that emphasizes the role of routine-driven, or less-mindful, behavior. We attempt to connect these two seemingly disparate literatures arguing that, at a performative level, important elements of less-mindful processes are necessary elements underlying mindfulness. In particular, we note the role of established action repertories that facilitate the response to novel stimuli and how routines and established role structures enable mindfulness to be sustained across time and the span of the organization. Similarly, we note important elements of mindfulness that underlie less-mindful behavior, highlighting in particular the role of mindfulness in interpreting one's context so as to identify what constitutes appropriate action in a given circumstance and in interpreting outcomes that form the basis for processes of reinforcement learning. Although we emphasize the complementarity between the two perspectives, we also note points of tension regarding the opportunity costs of mindfulness and the theories' implied normative claims.

Key words: organizational learning; mindfulness; routines

Just as philosophical traditions have struggled with the relationship between mind and body (Descartes 1641/1931), the organizations literature has struggled with an analogous tension between cognitive and behavioral perspectives on action. In particular, in the context of organizational learning, Fiol and Lyles (1985) make the important distinction between changes at a cognitive level in actors' understanding of causal relationships (i.e., the mind) and changes in the realm of actual behavior (i.e., the body) and they note that the two sorts of changes need not be related. March (1994) offers a related contrast between a logic of consequence and a logic of appropriateness. Intelligent choice may be driven by processes of consequential reasoning corresponding to classic images of *mind-like* processes, but he argues that intelligence may equally stem from more *body-like* processes of the consideration of existing norms and rules of behavior. A particular variant of this tension has emerged in recent years as the psychological construct of mindfulness has been introduced into and developed within the organizations literature (Weick et al. 1999). Implicit in the construct of mindfulness is its antithesis, which we term less-mindful behavior.[1]

The notion of mindfulness was initially developed in the psychology literature at the individual level of analysis (Sternberg 2000) by Ryle (1990) and Langer (1989a, b, 1997), and introduced into organizational studies in discussions contrasting automatic and nonautomatic information processing (Sims and Gioia 1986, Sandelands and Stablein 1987), and in research on high-reliability organizations (Weick and Roberts 1993, Weick et al. 1999). Langer (1989a) specifies the concept of mindfulness as a state of active awareness characterized by the continual creation and refinement of categories, an openness to new information, and a willingness to view contexts from multiple perspectives. Work on mindfulness suggests a number of antecedent processes that lead to mindfulness in organizations, including reluctance to simplify interpretations, sensitivity to operations, commitment to resilience, underspecification of structure, and preoccupation with failure (Weick et al. 1999, Fiol and O'Connor 2003).

In contrast, Langer (1997, p. 4) suggests that "being mindless, colloquially speaking, is like being on automatic pilot"; similarly, Weick et al. (1999, p. 90) note that "when fewer cognitive processes are activated less often, the resulting state is one of mindlessness characterized by reliance on past categories, acting on 'automatic pilot,' and fixation on a single perspective without awareness that things could be otherwise." The tendency to mindlessly or automatically invoke familiar routines is well established in the psychology literature (Weick 1979, Gersick and Hackman 1990). Furthermore, there are salient examples in the organizations literature of actors invoking familiar routines even in circumstances

in which such routines are clearly inappropriate. For instance, Gersick and Hackman (1990) offer the example of an Air Florida pilot, accustomed to uniformly warm weather, automatically responding in the affirmative to his team member's routine question, "Anti-ice off?" despite the heavy snowfall at Washington, D.C.'s National Airport. This response led to a crash into the Potomac River shortly after takeoff, and the death of crew and passengers.

Yet automatic behavior is not without its virtues. As Bargh and Chartrand (1999, p. 464) note, automatic processes free us from tasks that don't require our vigilance and intervention so that our time and energy can be directed toward those tasks that do. An even stronger argument in favor of routine-based behavior is that such behavior is not devoid of intelligence and that routines are an important storehouse of accumulated organizational experience (March 1994, Nelson and Winter 1982). March (1994) suggests that routine-driven behavior adheres to a logic of appropriateness: Actors consider the context in which they find themselves and ask what behaviors are suited to that context.

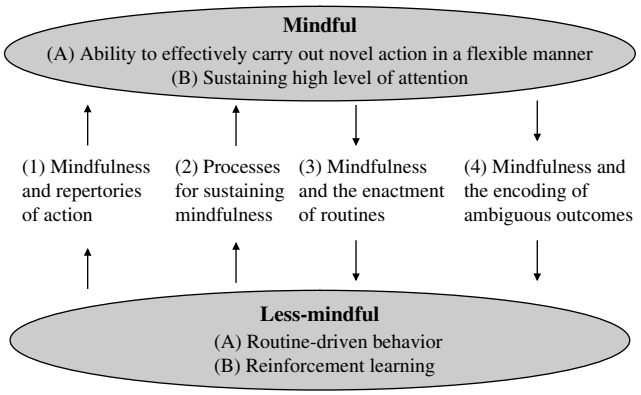
Although a careful reading of classic articulations of the mindful (Weick et al. 1999) and less-mindful (March and Simon 1958, Cyert and March 1963) perspectives reveals a sensitivity to and awareness of the fact that mindful and less-mindful behavior are not wholly distinct categories but that there are important interrelationships between the two processes, this more nuanced understanding has generally been lost in most readings and citations to these works.[2] In part, the responsibility can be laid at the feet of readers of this work. However, it is also the case, and quite natural, that in articulating the role and importance of mindful (or less-mindful) behavior and learning, scholars place the focal perspective in the foreground and the nonfocal perspective in the background of their discourses.

The purpose of this paper is to bring the interrelationship between the two perspectives to the foreground of organization theory. Using the language of Feldman and Pentland (2003), we argue that although the two perspectives have been performatively interrelated in prior work (e.g., Weick et al. 1999), their ostensive interdependence has not been systematically linked. The distinction between ostensive (abstract pattern) and performative (specific actions) is an important basis for understanding why a chasm exists between the two perspectives. On the one hand, mindful and less-mindful processes of learning can be characterized as abstractions that researchers use to account for and refer to as specific performances of a routine. This is what Pentland and Feldman (2005, p. 795) refer to as the ostensive. On the other hand, mindful and less-mindful processes of learning can be characterized as actual performances by specific people, at specific times, in specific places—what Pentland and Feldman (2005, p. 795) refer to as the performative. In past research (Weick et al. 1999, p. 109; Louis and Sutton 1991; Gersick and Hackman 1990; Langer 1989a, b), the ostensive script has mainly emphasized the distinct and unrelated characteristics of mindful and less-mindful processes of learning. Paradoxically, however, empirical observations of specific performances of the two perspectives indicate that they are closely linked (Bigley and Roberts 2001, Narduzzo et al. 2000). As a result, the time seems ripe for rewriting the script and to begin to provide a more direct account of the ostensive and performative linkages between the two perspectives—an agenda to which we hope the current effort can contribute.

In particular, we argue that there is a strong complementarity between the two perspectives. As exemplified in recent work in psychology (Bargh and Chartrand 1999, Bargh and Ferguson 2000) in which a phenomenon (e.g., attention, encoding, emotional appraisal, social perception, and judgment) is said to be influenced simultaneously by conscious (mindful) and automatic (less-mindful) processes, we suggest that the enactment of neither mindful nor routinized behavior is possible without the other. Thus, while the two streams of literature highlight very different processes, each process requires elements of the other to be effective. Figure 1 characterizes the set of interrelationships that we wish to highlight—the connections are developed in the following section of the paper. We do not claim that the four interrelationships in the center of Figure 1 comprise an exhaustive set, but rather that they constitute important forms of interdependence between mindful and less-mindful processes and, furthermore, that identifying these interrelationships helps establish the broader point that much is to be gained by creating clearer links between these formerly rather disparate literatures.

Underlying organizational mindfulness is both a sustained high level of sensitivity to errors, unexpected events, and, more generally, to subtle cues suggested by the organization's environment or its own processes; and the capacity to engage in a flexible range of behaviors

Figure 1 Interrelationships Between Mindful and Less-Mindful Behavior



in order to respond effectively to this potentially diverse and changing set of stimuli (Weick et al. 1999). However, the effectiveness of the process of mindfulness and especially *bricolage* or improvisation (Weick 1998) is very much a function of the richness of the tools that one has available. The quality of this tool set is in turn determined by the richness of the set of well-rehearsed routines available for the construction of novel recombinations. In addition, as Schulman (1993) and Bigley and Roberts (2001) argue, mindfulness in terms of the sensitivity to possible signals can only be sustained in the presence of routinized processes of monitoring.

A critical basis for the intelligence of rule-based behavior stems from the mapping of a given repertoire of routines to a set of cues or stimuli—in March's (1994) terms the logic of appropriateness. Central to the logic of appropriateness, in turn, are processes of encoding one's context—what sort of setting is one in, what role or identity is one adhering to at any one point, and how is it appropriate to act given the setting and one's identity. Furthermore, routines themselves are not fixed, inert objects, but are enacted anew in each substantiation (Feldman 2000, Feldman and Pentland 2003, Pentland and Feldman 2005). Thus, important elements of mindfulness underlie the actual process of routinized behavior. Moreover, as routines are held to evolve through a process of reinforcement learning (Levitt and March 1988), the encoding of outcomes, as perceived to be successful or not, is critical to the evolution of routines. While in the basic model of aspiration-driven search the dichotomy between successful and unsuccessful outcomes is presumed to be clear, recent research observes that outcomes may be ambiguous or heterogeneous (e.g., near failures and near successes) and more subject to interpretation (Haunschild and Sullivan 2002, Rerup 2006a). Furthermore, outcomes may be multidimensional. Thus, the encoding of outcomes underlying a process of reinforcement learning may require some elements of mindfulness.

However, the mindful and less-mindful perspectives do not just act as complements. There are important points of tension or conflict between the two perspectives; in the subsequent section, we highlight two of these. First, the primacy and value of change versus stability in behavior is quite different in the two perspectives. One emphasizes the role of continuity as a mechanism to preserve accumulated experience, while the other stresses the importance of novelty to respond to changing, and possibly unique, circumstances. Relatedly, there is the issue of the scarcity cost of attention. In Langer's (1989a, b) original work, the heightened attention associated with mindfulness is viewed as costless, though some sensitivity to the attentional cost of mindfulness has been expressed by later writers (cf. Vogus and Welbourn 2003, Swanson and Ramiller 2004, Rerup 2005). In contrast, an important virtue of less-mindful, routinized behavior is the property of economizing on scarce attentional resources (Greve 2003). In some sense, both these issues pose the question of the opportunity costs associated with mindfulness: the opportunity costs of forgoing the use of established procedures as well as the opportunity costs of forgone attention. Second, it is hard to interpret the terms mindful and less-mindful behavior in a value-free manner. However, mindfulness and less-mindful-driven actions refer to sets of processes and behavior. Any association of these behaviors with more or less favorable performance outcomes can not be presupposed, but must be derived through analysis and empirical observation.

By examining these four points of complementary and two points of tension between the mindful and less-mindful perspectives on organizational learning, we hope our work establishes a set of meaningful linkages between two important perspectives and encourages other scholars to continue working on integrating the two perspectives.

Mindful and Less-Mindful Behavior: Four Elements of Complementarity

As Figure 1 suggests, we wish to highlight four important manifestations of complementarity between the mindful and less-mindful perspectives on organizations. Again, we do not suggest that these four form an exhaustive set, but rather that they are important exemplars of a broader phenomenon. We highlight two basic ways in which elements of less-mindful bases of action and organizational intelligence underlie the capacity for mindful organizational behavior: the presence of a large set of well-rehearsed routines to provide the fodder for improvisation and novel action, and the role of less-mindful organizational processes to sustain attentiveness to signals across time and the span of large organizational entities. Similarly, we note the role of mindfulness in operationalizing logics of appropriateness both in the recognition of one's context and in the enactment of routine behavior itself. We also note the relationship between mindfulness and the process of reinforcement learning that is central to behavioral perspectives on learning.

Mindfulness and Repertories of Action

Mindfulness requires two basic elements: attentiveness to one's context and the capacity to respond to unanticipated cues or signals from one's context. Indeed, Weick et al. (1999, p. 90) argue that the capacity to act on an issue enhances the ability to attend to such an issue in a mindful manner and suggest that "the richness of a state of mindfulness is determined by the richness of the action repertoire." Furthermore, as Emirbayer and Mische (1998, p. 994) note, the locus of agency

in action lies in the ability to "respond to the demands and contingencies of the present." Mindfulness in action is local, situated, and involves thinking in real time, simultaneous with the execution of action. Mindfulness in action is necessary both because ongoing organizational activity often deviates from plans and expectations thereby resulting in "organizational messes" (Schon 1983, pp. 45–47) and because ongoing activity may reveal new opportunities not previously recognized (Feldman 2000). Mindful organizations, especially high-reliability organizations, recognize the impossibility of anticipating all problems and events in advance. Consequently, in order to prevent unexpected, disruptive events from disabling operations, mindful organizations are preoccupied with resilience—the ability to contain and manage real-time unexpected events in an adaptive, flexible fashion.

If mindfulness requires the capacity to respond rapidly to unanticipated events, then the degree of deliberative calculation by boundedly rational actors must be relatively modest. If some form of the classical cognitive process of representation and computation (Thagard 1996) is not taking place, then what is? We suggest two possibilities.

One possibility is that an existing repertoire of initiatives available to the actors allows organizations to respond rapidly to stimuli and to engage in a wide set of possible actions. Thus, as characterized in Allison's (1971) Model II of organizational behavior and developed by Feldman and March (1981), actors are able to choose from an inventory of established routines. A second but related possibility is that, per Nelson and Winter (1982), the rapid emergence of novelty results from the recombination of existing routines. Thus, the set of familiar routines is the fodder for rapid innovative action. This line of argument is also supported by the work by Miner et al. (2001) on improvisation in the context of new product development, and Pentland and Rueter's (1994) use of grammar as an analogy to explain variation in routines: "In the same way that English grammar allows speakers to produce a variety of sentences, an organizational routine allows members to produce a variety of performances" (Pentland and Rueter 1994, p. 490). A grammar consists of rules about how the elements of the repertoire (the language) can be connected to "create sentences that make sense to others who know the grammar. The same can be said of organizational processes such as routines" (Feldman 2000, p. 623). Hargadon and Sutton's (1997) description of technology brokering makes a similar point. When encountering new problems, old ideas embedded in existing prototypes are often rediscovered as useful because they remind brokers of specific solutions embedded in particular designs.

Related to the process of recombination is the notion of associative learning (Thompson et al. 2000). To an important degree, the cognition of the mindful (individual) actor is not computation, but pattern recognition. An enormous set of possible linkages is possible. Akin to the issue of recombination, the set of encoded prior experiences provides the basis for the rapid linking of one context or stimulus to another (Narduzzo et al. 2000).

What this means is that mindfulness in action is local and situated and involves spontaneous recombination of wisdom accumulated from prior experimental learning. For example, when Apollo 13 was stalled in space due to an explosion on board, the mission was accomplished without loss of life because NASA was able to expand and improvise on rehearsed simulations (Lovell and Kluger 1994). As pointed out by Weick et al. (1999), recombination of well-rehearsed routines can therefore be seen as an important activity that makes mindfulness in action possible. This argument is further developed in Bigley and Roberts's (2001) study of an incident command system (ICS). An ICS is highly formalized, characterized by an extensive storehouse of rules, procedures, policies, and instructions. Jobs within the system are specialized and require particular training. Although highly bureaucratic, the ICS is also very flexible, because it is able to rapidly recombine people, resources, and structures to deal with unexpected situations. For example, the ICS is designed to "oscillate effectively between various preplanned solutions to the more predictable aspects of a disaster circumstance and improvised approaches for the unforeseen and novel complications that often arise in such situations" (Bigley and Roberts 2001, p. 1282).

Narduzzo et al. (2000) illustrate the importance of integrating existing component knowledge in facing novel situations. Technicians were faced with the novel task of developing capabilities for managing a cellular communication network. The operating routines were not designed from scratch, but instead were organized through a new recombination of single building blocks of operating routines that the technical staff carried with them from prior, related contexts. This helped channel their attention on the few entirely new operations and on the connection among different building blocks, leaving unchanged the execution of the building blocks themselves, where "within single modules or building blocks, actors are able to act in a semi-automatic way even in front of novel situations" (Narduzzo et al. 2000, p. 43).

Of course, the critical role of mindfulness in the process of recombination is to shift the happenstance of recombination from a potentially random baseline to what, it is hoped, are more promising or apt recombinations. The process of analogical reasoning highlights this point (Gavetti et al. 2005). The effectiveness of analogical reasoning depends not only on having a rich inventory of experience upon which to draw, but also

on the aptness with which one maps the current context to the set of latent source settings. Does one base this mapping on superficial and potentially misleading features of the two problem domains, or does one base the mapping on the deep structure inherent in the two contexts? Experimental (cf. Gilovich 1981, Holyoak and Thagard 1995) and fieldwork (cf. Barry and Rerup 2006) research suggests that such mapping efforts may often be problematic.

Scholars from Levi-Strauss (1966) to Berliner (1994) argue that improvisation or innovation happens because existing knowledge via recombination is used as building blocks (Weick 1998). Improvisation takes at least two things: experience and creativity. Consequently, experiential learning prior to action provides the necessary experience or building blocks, whereas mindfulness in action brings together experience and creativity (Miner et al. 2001). The creative recombination of these sets of action repertoires are mindful activities. However, the effectiveness of those mindful acts is premised on a developed repertoire of less-mindful learning.

Sustaining Mindfulness

Variations in mindfulness can occur over time and across organizational units (e.g., departments, teams, plants), and hierarchical levels (Rerup 2006b). In order to sustain mindfulness across time, organizations develop and sustain cultures and practices that keep variations in mindfulness within certain boundaries. Such cultures are concerned with how adequately people can convert experience into reconfigurations of assumptions, frameworks, and actions, as well as how they legitimate learning from near misses and close calls (Edmonton et al. 2001). Practices include developing procedures, routines, training sessions, and employing auditors or facilitators to detect when mindfulness varies beyond specified thresholds. For instance, Schulman (1993) observes that in order to sustain mindfulness, operators at nuclear power plants deliberately change the structure of the required paperwork to be filled out to counter the tendency for safety inspectors to begin to comply with such requests in a mindless or rote manner as they become highly familiar with the task. Similarly, Weick and Sutcliffe (2001) suggest that organizations might engage in a regular practice of audits to sustain mindful-like practices across time. The general idea is that dedicated cultural beliefs and values as well as positions and routines are necessary to trigger and sustain high levels of mindfulness, inasmuch as social systems tend to drift towards complacency and less-mindful forms of acting and thinking over time (Miller 1993).

Variations in organizational mindfulness stem, in part, from differentiated role structures (Dearborn and Simon 1958, Gavetti 2005), but also from individuals' finite capacity for mindfulness. Every individual and organizational subunit cannot be mindful about all issues, and therefore the depth and breadth of what they are mindful of is likely to vary. Most organizations are specialized. Specialization imposes the need to coordinate, and integrating divergent views requires ongoing efforts to keep the infrastructure from unraveling. Consider the link between individual and organizational mindfulness as characterized by Bigley and Roberts's (2001) in their study of an ICS. To prevent cognitive overload, the complex, unfolding tasks are often shared by several individuals or groups. Bigley and Roberts (2001, p. 1290) note that,

> As a system becomes larger and more elaborate, fewer and fewer of its emergent properties are likely to be held in the mental model of any one individual. As a result, evolving, discrepant, and disconnected representations can become more and more widely dispersed across the system in a short time period.

To sustain coordination of the task and prevent detachment, these researchers emphasize the importance of developing and using several integrating mechanisms such as role switching, authority migration, rules, artifacts, and communication to tie individual mindfulness together and thus form a higher-order pattern of organizational mindfulness. These mechanisms generate a storehouse or structure of action possibilities that shape agency across the organization.

Can we go further and consider the notion of routinization of mindfulness, or is such a notion an oxymoron? Weick et al. (1999) argue that, in the nuclear power industry, routines are in place that enable the personnel to respond vigilantly and automatically to warning signals. Winter's (1996) discussion of efforts at continual improvement points to the role of stable heuristics for problem identification and diagnosis that underlie these intentional, but relatively routinized efforts. Indeed, the question of sustaining mindfulness seems, ironically, to call for some notion of routinization. If mindfulness is to be a relatively stable property of organizations, then reinforcing structures and processes, i.e., routines, are necessary to sustain this property across time (Bigley and Roberts 2001, Schulman 1993).

Schulman's (1993) account of the Diablo Canyon nuclear power plant illustrates the performative relationship between the mindful and less-mindful perspectives in sustaining mindfulness. Schulman (1993, p. 362) characterizes the plant as operating with a higher degree of standardization; however, these rules and routines continue to evolve as the organization responds to operational problems: "Within the Diablo Canyon [nuclear power] plant . . . the need for *standardization* in the character and quality of job performance is a preeminent organizational requirement" (italics in original). This standardization is embraced formally in the organization as an integral foundation of its safe and reliable operations. For example, there are more than 3,000 separate

written procedures at Diablo Canyon covering administration, operations, and maintenance. But, as Schulman (1993) argues, the formality that underlies the system establishes a sort of order that is undergoing continual renegotiation—renewal, revision, or rejection—as day-to-day life proceeds at the power plant. The ostensive structure as reflected by individuals' understandings of the processes, and to some degree captured by the formal routines, coevolves with the enactment of the routines themselves. Thus, routines guide action and reflect a prior pattern of action.

The sheer number of rules at Diablo suggests another aspect of mindfulness—figuring out which rule to use in a particular situation requires a fair degree of mindfulness in the form of discretion. Such discretion invites variation, as argued by Pentland and Feldman (2005, pp. 796–797). Even within a single organization, there may be a variety of perspectives on the appropriate way to go about being mindful (or less-mindful) for different tasks, in different departments, or at different times. Understanding of the abstract pattern of how one is mindful (e.g., how to perform the five subprocesses of mindfulness detailed by Weick et al. 1999) may not be the same from person to person, department to department, event to event, or over time: " Multiple and divergent understandings are probably more the norm than the exception. For these reasons, the ostensive aspect [of mindful (or less-mindful) processes] should not be conceptualized as a single, unified entity" (Pentland and Feldman 2005, p. 797). Indeed, the necessity of discretion in the enactment of routines is taken up in the following section in which we highlight some of the ways in which mindful action underlies less-mindful behavior.

Mindfulness and the Enactment of Routines

Ambiguous stimuli are a challenge to less-mindful action because such stimuli require interpretation, and possibly the coordination of such interpretations with others before established repertoires can be triggered. As a result, individuals need to convert ambiguous stimuli into nonambiguous stimuli. The existence of ambiguous stimuli and the notion of mindful conversion of such stimuli suggest that a routine is not simply "a fixed response to defined stimuli" (March and Simon 1958, p. 142). As is clear from March and Olsen (1976), problems and issues do not arrive with clear labels as to what constitutes the appropriate action. Organizational life is filled with special cases that have to be fitted to a given repertoire of actions. Because an organization's environment is likely to provide stimuli that are far more varied than the categories associated with a given set of routines, the response to defined stimuli (e.g., the routine) needs to be flexible and adaptive.

To mindfully encode a stimulus situation, actors need to consider the type of request being made and the type of problem being faced. Actors also need to consider what role they are playing in a particular context. This sorting out process often needs to precede routinized behavior. Indeed, an important skill in the context of bureaucratic organizations is the art of manipulating the label or category with which a given request or initiative is encoded to elicit the desired outcome. For example, Bower (1970) illustrates the mindful manipulation of the differentiation between what constitutes a capital expense and what constitutes an operating expense in budgeting processes in his account of the mysterious request for a budget toward a chimney for a factory that had never been approved to be built. The manager had manipulated the organization's rules of budget allocation by decomposing the plant into individual budget requests that did not require top management approval. Having built the plant, the chimney was the one item that crossed the financial threshold to constitute a capital expense.

A particularly conscious mindful exercise of mapping a context to appropriate routines occurs in the context of novel situations. Learning and experiential wisdom are inherently a backward-looking form of intelligence (Gavetti and Levinthal 2000). Related insights can be of value in a current context if there is some mapping from these prior experiences to the current setting. One important form of such mapping, as noted earlier, is analogical reasoning (Gentner et al. 2001). March and Olsen's (1989, pp. 34–37) discussion of the challenge Norwegian officials faced in having to operate, for the first time, a sea-based oil rig provides a useful illustration. The authorities had no experience with oil rigs but were familiar with ship operations and decided to consider an oil rig to be a "somewhat peculiar ship" (March and Olsen 1989, p. 36), and thus to draw on the safety rules and routines that existed for ships. The epilogue to this effort, the disastrous collapse of a rig, points to the limits of analogical reasoning. Analogical reasoning is a powerful form of intelligence if in fact the deep structure of the two problem contexts is similar (Gilovich 1981). Regardless of whether analogical reasoning is a source of real or illusionary insight, it is a clear illustration of the importance of the encoding of context as an antecedent to the execution of routinized behavior.

As recent work has highlighted (Pentland and Rueter 1994, Feldman 2003, Feldman and Pentland 2003, Pentland and Feldman 2005), routines are repetitive patterns of action that are functionally similar, but are not necessarily fixed. According to Feldman (2000), there is an internal dynamic to routines that promotes continuous change and calls for constant reenactment. As Giddens (1984, p. 86) suggests, routinized behavior may be "an effortful, nonautomatic accomplishment." Thus, notions of mindfulness are not alien to the exertion of so-called routine behavior. Building on structuration theory (Giddens 1984), Feldman and Pentland (2003) argue for the inherent role of agency in the enactment of routines.

Although some situations and tasks are approximately identical, actual day-to-day activity is not necessarily static. Moreover, routines consist of two elements: the ostensive and the performative. The ostensive element comprises individuals' cognitive understanding of the processes, while the performative element consists of the actual behavior. However, Feldman and Pentland (2003) argue that the ostensive is not a scripted set of behaviors and that performative activity inevitably involves an element of unique enactment of these ostensive understandings, suggesting that routinized action (e.g., iteration between the ostensive and performative elements) is not necessarily automatic and mindless (March and Olsen 1989, p. 39). The Narduzzo et al. (2000) account of troubleshooting in the context of repairing problems that arose in the operation of the cellular communication network illustrates this point:

> Trouble fixing is not just an automatic execution of a behavioral repertoire [e.g., the ostensive element], but implies reasoning through a model of the trouble—there is some flexibility in actions [e.g., the performative element] that is hardly amenable to a strict behavioral view of routines.... Thus, there is mixed evidence of routinization in a strict (behavioral) sense. In order to describe trouble-fixing activities, one needs to account for both automatic action and reasoning. (pp. 39–40)

The example points out the iterative and cocreating relationship between the ostensive and performative elements of routine enactment and, in turn, highlights the interdependence between mindful and less-mindful processes of acting and thinking.

Thus, simultaneity of cognition and action is also present in less-mindful intelligence, although perhaps with a different weight on the two elements than for mindful behavior. The performance of a particular routine requires actors to identify the stimulus associated with that routine. In this sense, even the routine-based view of organizational behavior requires a cognitive or reflective component. In addition, and as discussed above, an organization cannot simply mindlessly replicate or extrapolate a routine into a new context, or even within the same context. Routines are constantly modified and adjusted to accommodate unexpected contingencies (Feldman 2000). Thus, while early work focused on routines as relatively fixed programs of action (March and Simon 1958) and indeed the inheritable genetic code of an organization (Nelson and Winter 1982), more-recent writing has highlighted the dynamic quality of routines (Feldman and Pentland 2003, Pentland and Feldman 2005) and the need for their continual reenactment (Padgett et al. 2003). The employment of sequences of past experience is neither mindless nor mechanical, but rather requires a process of selection from competing practical repertoires of habitual activity. Emirbayer and Mische (1998) summarize this perspective as follows:

> While repertoires are limited by individual and collective histories and may be more or less extensive and flexible, they do require a certain degree of maneuverability in order to assure the appropriateness of the response to the situation at hand. ... In unproblematic situations, this maneuvering is semiconscious or taken for granted, the result of an incorporation of schemas of action into one's embodied practical activity. On the other hand, the application of such repertoires remains intentional insofar as it allows one to get things done through habitual interactions or negotiation. ... There may be much ingenuity and resourcefulness to the selection of responses from practical repertoires, even when this contributes to the reproduction of a given structure. (p. 980)

Mindfulness and the Encoding of Ambiguous Outcomes

Processes of organizational learning are generally viewed as a form of reinforcement learning (Levitt and March 1988, Argote 1999) in which managers evaluate outcomes on the basis of aspiration levels. Outcomes classified as exceeding the aspiration are evaluated as a success and are reinforced in subsequent periods, while outcomes not meeting the aspiration are judged as failures. Failure triggers an increase in search for a new way of doing business and a decrease in the aspiration level. In other words, behavioral models of adaptive processes distinguish between learning in response to success and failure. However, there are often important ambiguities in the relationship between aspirations, actions, and outcomes (March and Olsen 1976). Ambiguity may simply be the result of stochastic effects that obscure the link between actions and outcomes. Alternatively, ambiguity may stem from the temporal and spatial distance between actions and observed outcomes, in that feedback may be delayed or mean different things to different people. The full consequence of actions taken today may not be felt until some future time or may have reverberations in other parts of the organization. Ambiguity may also result from outcomes that are neither clear failures (e.g., near failure) nor clear successes (e.g., near successes) (Rerup 2006a).

The literature on mindful learning has focused on how organizations learn from ambiguous and imperfect stimuli. Weick and Sutcliffe (2001) examine the issue of anticipation of weak signals (e.g., near failures) and the sensitivity of such signals to multiple interpretations and how flexible categories for labeling stimuli greatly enrich our understanding of how learning from feedback may occur. In this respect, the work on mindfulness on the interpretation and encoding of stimuli can serve as an important complement to our understanding of how less-mindful stimulus-response learning processes operate.

The work on high-reliability organizations (Weick et al. 1999) and near misses (March et al. 1991, Haunschild and Sullivan 2002) points to the limitations of standard reinforcement learning processes. Trial-and-error

learning, if error means system failure, is not feasible in such settings. Hence, as Weick and Roberts (1993) argue, mindfulness is critical within the context of high-reliability systems. Mindfulness provides the potential for attending to more subtle cues and feedback that emerge from ongoing operations as a basis for effective adaptation in such circumstances. Treating outcomes as events that may be regarded as nonevents (Tamuz et al. 2004, p. 15) in a less-richly developed encoding scheme is a critical basis for intelligent adaptation in settings where coarser coding schemes (for example, whether the nuclear plant goes critical (i.e., "melts down") on a given day) provide limited opportunities for learning.

At the same time, learning processes necessitate the aggregation of prior experiences. If the full nuance of each life moment is recognized, learning is not possible and life would be experienced as a series of unique events. Therefore, while the simple binary outcome of running or shutdown is an excessively coarse outcome category structure for learning how to reliably operate a nuclear power plant, the encoding of outcomes should be sufficiently coarse to allow the accumulation of wisdom. In this respect, the mindful construction of outcome structures is a critical component of an intelligent process of reinforcement learning. As argued by Schutz (1967), this process of typification and reactivitation of past experience involves a synthesis of recognition where actors match the relevance and analogy of an emerging experience with those of the past. Reactivation occurs either "within the actor's direct memory or within a social memory as objectified in various media of communication" (Emirbayer and Mische 1998, p. 979).

In addition, as Weick and Sutcliffe (2001) emphasize, unless organizations know what they should do with weak signals, small samples, and near failures, they will not use these occurrences to expand insight and learning. As a result, unless organizations have developed routines for dealing with this type of ambiguous feedback, such feedback is likely to be ignored or categorized as irrelevant. Thus, in terms of the encoding of the environment, the link between mindful and less-mindful perspectives not only runs from the mindful encoding of the environment, but also runs in reverse in the sense of how the repertoire of less-mindful behavior impacts the mindful process of encoding.

Mindful and Less-Mindful Behavior: Two Elements of Tension

While we have emphasized to this point the complementarity of the two perspectives, there are important points of divergence that need to be brought to the surface, as well. The opportunity cost of attention—and, more subtly, the opportunity cost of tinkering with a well-functioning routine in an interdependent system—are salient features of less-mindful perspectives on organizations but are generally subordinated in discussions of mindfulness. In addition, there is a mix of normative and descriptive elements in both literatures, though discussions of mindfulness tend to have a greater weight on normative claims. Both mindful and less-mindful approaches to cognition and action should be viewed as processes with no axiomatic connection to the efficacy of resulting outcomes.

Opportunity Costs of Mindfulness

The primacy and value of change versus stability in behavior is quite different in the two perspectives. The less-mindful perspective emphasizes the role of continuity as a mechanism to preserve accumulated experience, while the mindful perspective stresses the importance of novelty to respond to changing and possibly unique circumstances. Indeed, we have at the one end Hannan and Freeman (1984) arguing that organizational routines are a critical element in generating reliability in organizational behavior that they, in turn, argue is critical for enhancing rates of organizational survival. In contrast, Weick et al. (1999) argue that resilience stems from the capacity to engage in a rapidly changing repertoire of actions. The former perspective highlights the importance of sustaining accumulated expertise across time (Nelson and Winter 1982), while the latter points to the need to respond to distinct and variable challenges that arise.

An important feature of stable routine action is the reduced cognitive demands that such behavior entails. As Cohen et al. (1996, p. 695) note, "routinized behaviors should . . . be based on the absence or the reduction of active thinking." More generally, as Ocasio (1997) argues, the Carnegie School provides an attention-based theory of the firm (Simon 1947, March and Simon 1958). The presumption is that attention is scarce and thus costly and that the more things an organization can do routinely and in the absence of mindfulness, the more it can conserve attention for what really matters. Thus, the automatic-pilot imagery that is put forward as a pejorative image by Langer (1997) is offered as a positive image in the Carnegie School tradition—limiting the demands on scarce attention (Cyert and March 1963) and, more subtly, preserving an action pattern that might otherwise be adversely distorted by more self-conscious action (Winter and Szulanski 2001).

Some recognition of attention-based costs of mindfulness has been made, such as Weick and Sutcliffe's (2001) observation that

> mindful moments are important if the contexts in which you operate are dynamic, ill-structured, ambiguous, unpredictable. In less dynamic contexts, mindfulness is less necessary and the economies of mindlessness are more appropriate. Mindfulness takes effort and cost; mindlessness in the form of routine can be cost-efficient. (pp. 87–88)

However, in addition to the attention-based costs of mindfulness, it is important to recognize the opportunity cost of mindful behavior (Rerup 2005). By that we mean that experimenting with a novel action implies forgoing the use of existing, established practices. In this sense, mindfulness corresponds to exploratory behavior and less-mindful behavior is akin to exploitative behavior. Mindfulness, and in particular tinkering with an established routine, can well be dysfunctional in a complex, interdependent organizational system. Intel's copy-exact strategy with respect to the production of semiconductor fabrication plants is a striking example of an organization exhibiting extreme caution about the merits of such tinkering (Winter and Szulanski 2001). Semiconductor manufacturing is a complex process only partially understood by production engineers. Rather than risking some negative consequence from the conscious or unconscious manipulation of even seemingly trivial matters, such as paint color or location of doorways, Intel requires the exact replication of a working prototype in all respects. The modification of a functioning routine is an invitation to a collapse of effectiveness as much as an opportunity for progress (Cohen and Bacdayan 1994, Winter 2000). While the term "competency trap" has received considerable attention (Levitt and March 1988, Levinthal and March 1993, Tushman and Smith 2002), we should not neglect the basic notion of competence itself. Organizations, as routine-based, history-dependent systems that adapt locally and incrementally to past experiences (March and Simon 1958, Cyert and March 1963), tend to have repositories of such competencies. Mindfulness can potentially be a threat to these competencies.

Normative Claims

Mindful and less-mindful driven actions refer to a set of processes and behaviors. Any association of these behaviors with particular outcomes, particularly more-or-less favorable performance outcomes, cannot be presupposed but must be derived through analysis and empirical observation. Close review of research on mindfulness at the individual level (Langer 1989a, b, 1997; Langer and Moldoveanu 2000) and organizational level (Weick and Sutcliffe 2001, Weick et al. 1999, Fiol and O'Conner 2003, Weick and Roberts 1993) reveals that within this perspective mindfulness is almost always conceptualized as leading to positive outcomes, while less-mindful forms of learning are generally seen as leading to less-favorable outcomes. We question this general "more-is-better proposition" and encourage a critical examination of the unidirectional relationship between mindfulness and outcomes.

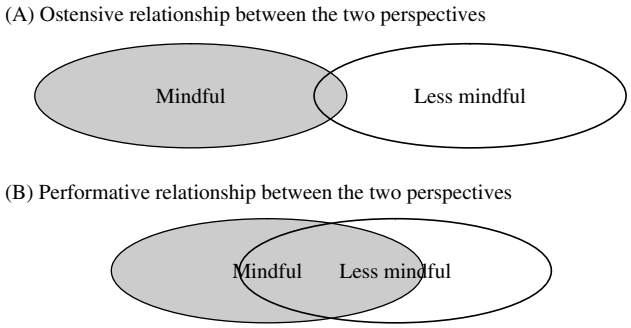
As March (1994) suggests in contrasting the logic of consequences with the logic of appropriateness, it is important to recognize alternative bases of organizational action from a process point of view and not to take as an axiomatic principle that more-intentionally rational bases of action lead to superior outcomes. Indeed, as other work (March and Simon 1958, Cyert and March 1963, Winter 2000) suggests, less-mindful, programmed, automatic action can represent a powerful form of organizational intelligence. At the same time, writings in this tradition, such as Levinthal and March (1993), point to the limitations of less-mindful processes. If we accept the proposition that all processes, including mindful and less-mindful processes may have both positive and negative consequences, then a full theory of organizational mindfulness will have to address both possibilities. In this spirit, mindfulness is not invoking some notion of rational choice on the part of actors, and is certainly not invoking omniscience. The claims are more modest, suggesting that actors are actively engaged in their context and that even when engaged in one course of action are actively entertaining other possibilities. This less-value-laden framing of mindfulness leaves open the possibility that mindful action may indeed prove dysfunctional and encourages researchers to examine more closely the mechanisms underlying mindfulness (cf. Swanson and Ramiller 2004, Rerup 2005).

Discussion

Bridging the apparent chasm between mindful and less-mindful perspectives on individual and organizational action and learning provides an important opportunity for organizations research. Some indication of these links is noted in prior work. We are not claiming to be the first and only scholars to make this observation (cf. Weick et al. 1999, p. 109). Indeed, we have tried to cite the work of prior researchers that illustrate this point; however, we suggest that it is not a proposition that has been fully understood or embraced by the field.

The characterization of the mindful and less-mindful perspective in the extant literature appears to stereotype the two processes, thereby tending to lead to a relative neglect of their interrelationship. The effort to capture this contrast between the stereotype of the two perspectives and what is revealed by close examination of the actual enactment of these processes suggests that Feldman and Pentland's (2003) distinction between ostensive and performative may be a useful way to understand the relationship between the two processes. The received theory of the mindful and less-mindful perspectives corresponds to this stereotype or caricature (Louis and Sutton 1991; Gersick and Hackman 1990; Langer 1989a, b; Nelson and Winter 1982) and treats mindful and less-mindful behavior as discrete categories of cognition and behavior. However, the actual enactment of the two processes suggests close linkages between the two processes (Bigley and Roberts 2001, Narduzzo et al. 2000). As suggested by Figure 2, our examination of the interrelationship between mindful

Figure 2 Relationship Between the Ostensive and Performative Characteristics of Mindful and Less-Mindful Behavior



and less-mindful processes suggests a strong performative link between the two perspectives, whereas our analysis of the literature suggests that at the ostensive level of theory development the link between the mindful and less-mindful perspectives is relatively underdeveloped. We suggest that this asymmetry provides an important research challenge. We have tried to highlight some of the critical performative linkages between the two perspectives and, building on this discussion, argue for the value of clarifying and integrating the ostensive relationship underlying the two perspectives.

To date, the field has largely considered the interrelationship between the two perspectives in a temporal sense, examining the shift from one mode to another (cf. Louis and Sutton 1991). For example, some authors argue that most activities in organizations follow routines and the longer a decision-making group is together, the less members experiment with new ways to do things (Ancona 1990). Put differently, over time organizations or teams become increasingly less mindful unless problems or interruptions arrive. In line with the behavioral theory of the firm (Cyert and March 1963), less-mindful processes change once they are interrupted, which may prompt a switch from automatic performance of routines to the conscious information processing involved in acquiring a new routine (Zellmer-Bruhn 2003, Gersick and Hackman 1990, Langer 1989a, Louis and Sutton 1991).

We believe that interruptions or problems may trigger a sequential switch from less-mindful to mindful processes, but we also suggest that organizational processes blend the two forms of cognition and behavior on an ongoing basis. Our discussion of the four points of interrelation at the performative level supports this speculation. Although there are some important exceptions (cf. Feldman and Pentland 2003, Pentland and Feldman 2005), the existing literature on individual and organizational learning and cognition generally uses a dichotomy to portray mindful and less-mindful processes (e.g., Langer 1989a, Nelson and Winter 1982, Weick et al. 1999, Swanson and Ramiller 2004). This dichotomy portrays mindful and less-mindful learning as distinct categories between which organizations and their members sequentially alternate. As a result, most prior work (e.g., Louis and Sutton 1991, Zellmer-Bruhn 2003) focuses on why shifts between mindful and less-mindful activity occur and how organizations respond, rather than on how the two types of activity interrelate.

We suggest that there are two thought worlds—two scripts, as it were—one built around ideas of mindfulness and one around less-mindful behavior that animates and to some degree guides (i.e., is generative) academic research on organizational learning. However, the performative practice of academic research, particularly empirical research based on close observation such as Feldman (2000), Dutta et al. (2003), and Rerup (2006b), reveals a relationship between these two scripts that the scripts themselves do not convey. We are struck by the richness of these empirical findings and at the nuanced interplay between cognitive processes of mindfulness and less-cognitive, less-mindful behavior. In the development of knowledge, the divergence between observation and theory provides an occasion for revisiting existing theory (Kuhn 1970). In this sense, in the realm of social science there is a coevolution of the performative and ostensive. Alternatively, it is certainly possible, given the internal differentiation within fields, for scholars who work within the mindful and less-mindful learning traditions to live happily and have productive careers within their given niche, writing for reviewers and broader constituencies for which one perspective or the other is salient (Merton 1996). However, for the field as a whole, there is value in situating the mindful and less-mindful arguments on a common footing and exploring their interrelationships. Although the existing literature provides some useful guidance as to the boundaries of mindful and less-mindful organizational acting and thinking, prior work has not dedicated systematic attention to their integration. We have tried to bridge the chasm between these two important scripts and in doing so ourselves reflect the interplay between the ostensive and performative in the development of our theories of learning.

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Endnotes

[1]Langer (1997) and Weick et al. (1999) refer to the antithesis of mindfulness as mindlessness. We prefer to use the less pejorative term less-mindful behavior, because we wish to suggest that such behavior may reflect considerable intelligence, and indeed in some circumstances may lead to superior outcomes, than more-mindful behavior.

[2]In a similar spirit, Descartes who is best known for having articulated the distinct realm of mind and body, devoted considerable energy to understanding their interrelationship and in particular the role of nerve endings as a linkage mechanism.

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