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The Incubator

Organizational neuroscience: The promise and prospects of an emerging discipline

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Summary We review and discuss an *Organizational Neuroscience* perspective on management science research. Reviewing recent findings in the brain sciences, we provide concrete examples of how an organizational neuroscience perspective can advance organizational behavior research. We conclude that this new paradigm offers powerful insights and tools that complement traditional organizational research. Copyright © 2010 John Wiley & Sons, Ltd.

Modern neuroscience has leveraged technological breakthroughs in brain imaging and computational modeling to illuminate the inner workings of the human brain. These breakthroughs have spawned revolutions in allied disciplines that go by such names as neuropsychology, neuroeconomics, and neuromarketing. Neuroscience is an interdisciplinary field of study, which seeks to understand behavioral phenomenon in terms of the brain mechanisms and interactions that produce cognitive processes and behavior (Ochsner & Lieberman, 2001). We propose that Organizational Neuroscience will likewise be a profitable endeavor. To this end, we define organizational neuroscience as a deliberate and judicious approach to spanning the divide between neuroscience and organizational science. We suggest that organizational scholars read widely and collaborate with neuroscience scholars. We want to stress that despite its remarkable technology and promise, neuroscientific research also currently suffers from a number of important technical and methodological limitations that necessitate caution when interpreting the findings of any one study (Ochsner & Lieberman, 2001).

In this Incubator, we will argue that new and existing theories of organizational behavior can be enhanced by incorporating the findings and themes from neuroscience regarding how the brain produces cognition, attitudes, and behaviors. Neuroscientific methods will complement traditional methods, not supplant them. Rather than abandoning our long-established tools of inquiry, organizational behavior (OB) scholars should immerse themselves in the dialogue of neuroscience, drawing on consistent findings within this growing body of research. In this way, we can formulate and test new theoretical propositions that integrate neuroscience findings with what we have already learned about work behavior. Further, an organizational neuroscience perspective will undoubtedly move organizational behavior in the direction of unifying our theories because neuroscience identifies common neural processes across behaviors. In this Incubator, we will review a few relatively mature areas of neuroscientific research that have direct application to OB. Sufficient research has been

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published on each of these topics to yield conclusive findings that can be applied with confidence to existing OB theory.

Applying Neuroscience to Organizational Behavior

Organizational neuroscience is best thought of as a paradigm or interpretive framework that sheds new light on existing problems, as well as raising questions that might not otherwise be considered. While an in-depth review of the neuroscience literature is beyond the scope of this Incubator, it has become clear that the human brain is incredibly adaptable and that cognition and action are connected across time and space. Neuroscience suggests that many brain processes have evolved over the millennia for specific purposes, are biologically programmed, and frequently automatic (Lieberman, 2007). Here, we will focus on three specific and likely profitable future research directions where a neuroscience perspective could provide immediate and meaningful advances to existing theory and practice. These specific examples were selected because they yield surprising predictions that can be tested using neuroscientific and traditional research methods.

Combating procrastination: goal selection and maintenance

Procrastination is a self-defeating behavior that involves putting off actions that should be performed promptly given existing goals and information. Neuroscience research provides valuable insights into why goal directed behavior is vulnerable to procrastination (Reddish, Jensen, & Johnson, 2008). It is commonly believed that there are two decision systems within the brain, a planning system and a habit-based system. The human capacity to plan and carry out long-term goal-directed behavior derives from the much more recently evolved planning system. The prefrontal cortex (PFC) is a key component of the planning system and plays an important role in successfully formulating goal-directed behavior. One of the classic symptoms of PFC damage is the inability to form and achieve goals (Miller, 2000). The planning system is capable of simulating multiple action-outcome contingencies and selecting an action that is judged most likely to produce desired outcomes.

In contrast, the habit-based decision system works quite differently. It resides in older brain structures and is much simpler and slower learning. The habit system does not consider outcomes as such, but rather automatically matches situations to actions based on previous experience. The habitual goal oriented systems of the brain tend to stabilize body and mind states around homeostatic set points whose maintenance produces contentment if not happiness (Camerer, Lowenstein, & Prelec, 2005). A deviation away from these setpoints creates unease, negative emotion, and even pain. Movement back toward these comfort zones generates reward response and positive emotion. Thus, homeostasis and the habit-based decision system can actually work *against* rational goals set by the planning system.

Employees facing challenging goals will be susceptible to procrastination because of the characteristics of the planning and habit decision systems. The habit system clearly biases employees to continue past behaviors and forego novel actions. Unfortunately, actions toward a goal that exceeds a current norm will challenge the status quo and create short-term pain. Homeostatic tensions bias evaluations within the planning system against these actions and often forestall their implementation. For example, an employee may genuinely wish to improve their performance, but doing so would require them to work longer hours than they are accustomed to. The discomfort of working harder than normal may quickly subvert their desired but delayed and uncertain performance goal.

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Ultimately, realizing challenging goals requires one to override habit and homeostatic responses and eventually establish higher set points. Neuroscience suggests one possible avenue for overcoming these weaknesses in the decision making systems that lead to procrastination. Speaking generally, one solution is to upset the status quo and thereby jumpstart the conscious planning system. For example, this could be accomplished by making current levels of valued outcomes contingent upon progress toward new goals. For example, pay raises could be frozen across the organization until progress toward new goals can be evaluated. Those making sufficient progress could then be rewarded by restoring and increasing these valued outcomes that were temporarily withheld. In this way, the decision landscape is altered and the habit system can be preempted. Therefore, employees are compelled to select novel courses of action that advance new goals in order to protect or restore the previous outcome levels. Once the status quo and continuing past actions are divorced from desired outcomes, the planning system will dominate behavior selection to achieve desired outcomes (Matsumoto & Tanaka, 2004). In this way, the human predilection toward procrastination can be overcome and essentially removed as a viable option. Once this stickiness in the planning system is eliminated, employees will be more likely to follow through and achieve intended goals.

Mirror neurons and group sub-climates

The discovery of mirror neurons suggests that our brains are wired to make us open to social influences for adaptive purposes (Goleman, 2006). Mirror neurons were originally discovered in macaque monkeys. It was found that when a monkey observed another performing a task, neurons in the premotor cortex "mirrored" the actions. That is, the brain of the observing animal responded as if it were performing the action itself. Subsequent research found that humans also possess mirror neurons. Our mirror neuron system (MNS) responds not only to visual observation of goal-directed actions, but also to dynamic motion, facial expressions, and sound (Rizzolatti & Craighero, 2004). Stated a bit more strongly, the brain responds as if the observer were the person being observed. This facilitates the ability to learn vicariously; we simply watch others.

Therefore, intragroup relations present another area of organizational research where the integration of a neuroscience perspective will be crucial to advancing theory. Specifically, the human MNS supports a wide range of social functions including non-verbal communication, implicit coordination, and simulation of the goals, intentions, and even mental states of others (Rizzolatti & Craighero, 2004; Rizzolatti & Fabbri-Destro, 2008). The MNS may provide a mechanism for understanding how organizational climates (e.g., for justice, ethics, or customer service, for a review see Kuenzi & Schminke, 2009) emerge within interdependent work teams. This insight accounts for why workgroups develop distinct sub-climates that can dissociate from organizational climates. This in turn may explain why top down attempts to change organizational cultures often fail.

When team members interact, the MNS is finely tuned to perceive the actions, expressions, and body language of others. They implicitly learn from and assess the behaviors of other members. The MNS will lead group members who interact frequently to converge toward attitudes and behaviors that are adaptive for the group, but not necessarily for the organization. This capability facilitates role emergence and tacit coordination among team members. It has been suggested that organizational leaders can establish organizational climate by setting an example for others throughout the organization to follow. The emerging picture of the MNS indicates that group climates will be more strongly affected by strong group members than by high-level leaders that do not interact directly with the group. While behaving as top-level role models is helpful, upper managers who wish to change the organizational climate should also engage middle managers and ensure that desired behaviors are being modeled by prominent members of each group.

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Attitudes and behavior: How attitude structures resist organizational change

Organizational change efforts frequently fail. One of the more difficult obstacles to organizational change is overcoming individual resistance to change. In general, people do not want to change. Even when employees report that they support changes they often continue with behaviors that subvert change. This contradiction may be traced to the intricacy of the attitude system and the relationship between attitudes and behaviors. Neuroscience suggests that it is important to distinguish among three different types of attitudes: Implicit, explicit, and expressed (Cunningham, Zelazo, Packer, & Van Bavel, 2007). An *implicit attitude* is rapid, automatic, and comprises unconscious evaluations in response to stimuli. In direct contrast, an *explicit attitude* is a relatively slower, deliberative, and conscious evaluation based on contextual information. An *expressed attitude* is one that people report, such as when participants complete a survey. Most organizational behavior research has investigated expressed attitudes, but these are not necessarily a natural part of the attitude—behavior process.

When an individual is asked to indicate his or her attitude, such as on a self-report research instrument, this expressed response contains both implicit and explicit elements (Gawronski & Bodenhausen, 2006). However, while these features appear to be seamlessly aggregated in the mind of the responder, it is becoming clear that implicit and explicit attitudes need not be closely linked to one another. They can in fact often become dissociated. Implicit and explicit attitudes seem to play distinct roles in the formation of expressed attitudes. Indeed, implicit and explicit attitudes are even processed by different neural systems within the brain.

Current neuroscience attitude models suggest that implicit attitudes are the starting point for explicit attitudes. Further, expressed attitudes are generated online and result from the integration of implicit and explicit attitudes (Cunningham et al., 2007; Gawronski & Bodenhausen, 2006). In order to explain why some attitudes are extremely resistant to change, we must explore how implicit and explicit attitudes change. Implicit attitudes result from automatic associations and are generally more stable over time than are explicit attitudes. In general, changing an implicit attitude requires a permanent change to the pattern of neuronal connections. This requires long-term exposure to stimuli that contradicts the existing implicit attitude and occurs only incrementally.

Explicit attitudes are somewhat more tractable regarding change efforts. This is because they are generated through a propositional reasoning process that considers goals, extended belief systems, social norms, and broader contextual issues in real time (Cunningham et al., 2007). As such, explicit attitudes can be altered by relatively subtle contextual changes. Simply, constraining the time available to produce an explicit attitude is likely to have a significant effect. Explicit attitudes are also susceptible to persuasion attempts and social influence (Crano & Prislin, 2006; Gawronski & Bodenhausen, 2006).

As expressed attitudes typically begin with implicit attitudes and end with explicit attitudes, managers may mistake a short-term alteration in the latter for a long-term transformation of the former. Hence, an implicated attitudinal "core" may remain. Over time, stable implicit attitudes could impede behavioral change. They could even allow previous explicit attitudes to reassert themselves. In summary, changing expressed explicit attitudes is relatively easy but doing so accomplishes little and may not reflect any "inner truth" or produce lasting behavioral changes.

Conclusion

In this Incubator our primary objective has been to encourage organizational scholars to consider if not adopt a neuroscientific perspective. To that end, we briefly presented three specific and potentially

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exciting research directions where existing neuroscientific findings can provide valuable insights into important questions that are currently being asked by organizational behavior research. These were only examples, as there are innumerable topics where a neuroscientific approach will have something to contribute. We firmly believe OB scholars who embrace the brain sciences will be duly rewarded. We also believe that this payoff goes in both directions. Increased involvement by OB scholars has the potential to push neuroscience in profitable new directions. Researchers should see neuroscience as another tool in the toolbox, one that complements existing methods and is mutually informative and enriching. We are fortunate to live in a time when technological advances have opened up our understanding of the human brain. We hope that we have shared a little of the excitement and a lot of the potential to be found in an organizational neuroscience perspective.

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