Using the whole brain to improve strategic reasoning

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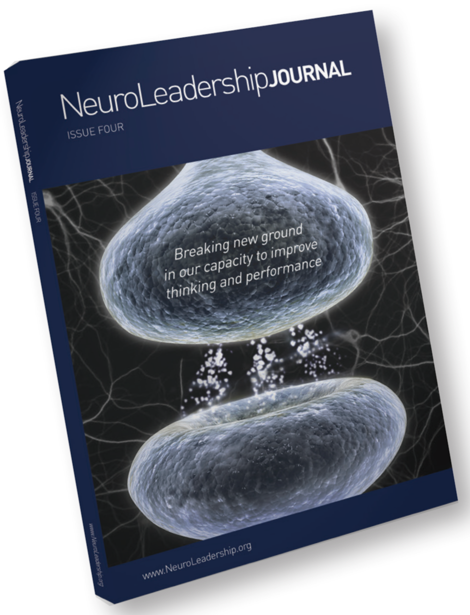

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ABSTRACT

Traditional views of strategic reasoning have emphasized the role of cognitive analytic processes, often to the neglect of affective and social behavioral functions. This bias has influenced both the theory and the practice of strategic planning. Neuroscientific research holds the promise of identifying a much broader range of human capacities that contribute to the ability to engage and excel in strategic reasoning. Our study of the strategic reasoning performance of a group of mid-career business leaders identified the engagement of social and emotional brain processes that play an important role in strategic thinking ability. In identifying the neural processing correlates of strategic and tactical thinking, we hope to expand and revise the theories of strategic thinking and help develop models for more effective application. We suggest that understanding and engaging the brain's fuller range of information-processing capacity in accomplishing strategic expertise is itself an important strategy for enhancing the performance of individuals and organizations. We also explore the need to create brain-friendly organizational environments to enhance human performance.

Introduction

Despite the heavy and costly emphasis on cognitive approaches to enhancing strategic planning ability, outcomes remain disappointingly mixed. For example, a recent report in *The Economist* (2011) examined 197 companies and found only 63% of them reporting positive anticipated results from their strategic planning initiatives. This disconnect carries a hefty price tag. The annual expenditure for consulting services in the U.S. was approximately $170 billion dollars in 2011, with strategic consulting accounting for approximately 12% (or about $20 billion) of the total (First Research, 2012). The expenditures associated with strategic consulting represent conservative estimates, because the bulk of these expenses are incurred by high-end private firms that do not make their revenues public. Despite these investments, strategic planning efforts produce what appear to be disappointing or uncertain results. While there are many explanations for this suboptimal performance, including poor downstream implementation processes, the prime cause may lie upstream, the result of a flawed or limited understanding of the very nature of strategic thinking and planning itself. We would be well advised to ask if our emphasis on cognitive, linear, and analytic approaches to strategic thinking is misplaced and contributes to underperformance.

Could our failure to appreciate the emotional/affective, social, or deliberative (versus automated) elements of strategy explain why so many strategic initiatives fail because of lack of engagement and execution? From a neuroscience perspective, we might ask if the current model of strategic thinking – involving a selective and limited use of some brain capacities (reflective or analytically focused) without drawing upon other perspectives and brain capabilities – affective, social, and reflexive – could be the source of failed strategies. Can it be that the first challenge in strategic planning is to re-conceptualize and expand our definition and understanding of strategic thinking? Eisenhardt and Zbaracki, in their seminal paper "Strategic Decision-Making" (1992), advocate for such a reformulation of our view of strategy: "we … propose a broader agenda.

Part of that agenda involves creating a more realistic view of strategic decision-making by opening up our conceptions of cognition … to include insight, intuition, (and) emotion" (p. 35). The authors are responding to what has become the gold standard for defining and creating strategy first espoused by Michael Porter (1996). Porter describes strategic thinking as a rational decision-making process that focuses on getting the right data, avoiding biases and choosing activities that differentiate a firm from its competitors. While this rational, linear highly cognitive model has been the defining model for strategic thinking and analysis, it does not address other forms of reasoning that can inform strategic thinking. In an effort to offer a broader conception of strategy and strategic thinking, we define strategic thinking as the ability to sense and assess complex, ambiguous, and conflicting alternatives from multiple (cognitive/emotional) perspectives, make informed choices and recommendations, and formulate compelling implementation plans that facilitate effective action.

We view our preliminary investigation of the neural substrates of strategic thinking and the potential role of social-emotional reasoning as consistent with a broader research agenda in neuroscience. For example, in the political arena, Drew Westen has written a well-recognized book, *The Political Brain: the role of emotion in deciding the fate of the nation* (2007). In neuromarketing, Dan Ariely, a well-recognized behavioral economist, has written a number of books including, "Predictably Irrational: the hidden forces that shape our decisions," (2009). We hope that this pilot research helps promote a stream of continued research in this area with increasingly refined instrumentation and larger samples.

The study

With these questions in mind, the authors engaged in a functional magnetic resonance imaging (fMRI) pilot study of midcareer executives, focused on strategic and tactical thinking and moral reasoning (for details on design of the study see (Robertson *et al*., 2007)). fMRI is a neuroscience technology that explores the relation of the brain to human behavior and defines, noninvasively, the functional brain states that encode ongoing behaviors. The pilot study consisted of a two-part process: Interviews and assessments of each of 16 healthy male mid-level executives who were enrolled in the Emory executive MBA program were followed by fMRI while subjects responded to reasoning tasks posed by a series of narratives and questions about a fictional employee in a corporate setting engaged in a series of strategic (6), tactical (6), neutral (17), and ethical dilemmas (12) (Robertson *et al*., 2007; Cáceda *et al*., 2010)). All subjects were exposed to the same stimuli a protocol based on a narrative account of a firm involved in assessing strategic options and choices. In the first phase we used standard interview protocol (the Bate scale; Bate, Gilkey, Cáceda, Robertson, & Kilts, 2010) that we developed to assess the relative performance of each subject on a series of strategic thinking questions in order to identify the most and least proficient strategic thinkers on a continuum.

The study was organized in the following sequence:

1. Identifying subjects from an Executive MBA leadership course and conducting a brief interview to obtain information on their history (early and current including their management role) and clinical status (including any past or current medication use).
2. Interviewing the resulting pool of qualified subjects using a standardized protocol designed for this pilot study on a variety of management strategic challenges. The subjects were presented with a number of scenarios in which a consumer projects company had to make critical strategic decisions about whether to compete in certain markets and which products they would introduce TO those markets. They were then queried about their analysis and recommendations. These interviews were then transcribed.
3. The data was then analyzed using an instrument developed for this exploratory study, the Bate Scale (2010). The investigators involved in this analysis were not involved in analyzing the subsequent fMRI data that was obtained.
4. All of the subjects underwent fMRI scanning, where they responded to another standardized protocol consisting of different scenarios involving strategic challenges and questions. This data was analyzed independently using a median split analysis based on the distribution of scores on the Bate Scale.

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The results are summarized below.

Following acquisition of the task-related fMRI data, the second part of the process used imaging analysis to focus on the comparison of neural responses for strategic dilemmas and its correlation with strategic scores. Significance was set at $p<0.005$ and $k=5$ (Robertson *et al*. 2007, Cáceda *et al*. 2010, Cáceda *et al*. 2011).

Findings

We initially believed that this study would elucidate the predicted roles in strategic reasoning of the prefrontal cortex, the locus of diverse executive functions associated with planning, decision-making, attentional control, risk assessment, goal representation, and probabilistic reasoning. The role of the frontal lobes in executive functioning has been well documented and described, particularly noteworthy is Elkhonon Goldberg's, *The New Executive Brain: Frontal lobes in a complex world* (2009) where he traces the history of research in this area dating back to his teacher Alexander Luria. Thus our hypothesis was that we would see consistent and enduring activations in the frontal lobes while they were engaged in strategic reasoning. We were surprised, however, to observe that while all subjects displayed prefrontal activations of some magnitude, this was not the dominant strategic reasoning-related pattern of brain response for all of our subjects. The less adept strategic thinkers did exhibit consistent activations in the executive areas of the dorsal lateral prefrontal cortex (DLPFC) and the dorsal medial prefrontal cortex (DMPFC). However, the more proficient strategic thinkers displayed a significantly different pattern of brain response related to strategic reasoning. In the case of these more proficient subjects, the prefrontal cortex response (see Figure 1) was one of relative deactivation. That is PFC activations were quickly supplanted by a more expansive activations of primitive limbic areas of the brain, such as the insula, as well as the superior temporal sulcus (STS) (Gilkey, R, Cáceda, R., & Kilts, C., 2010). Thus, in comparing the two subgroups we found that the more proficient strategic thinker had higher activations in the insula and STS and lower activations in the PFC areas, the less proficient strategic thinkers had higher levels of sustained activations in the PFC areas and lower activations in the insula and STS. This unexpected result implicates social and emotional processing in expertise related to strategic reasoning.

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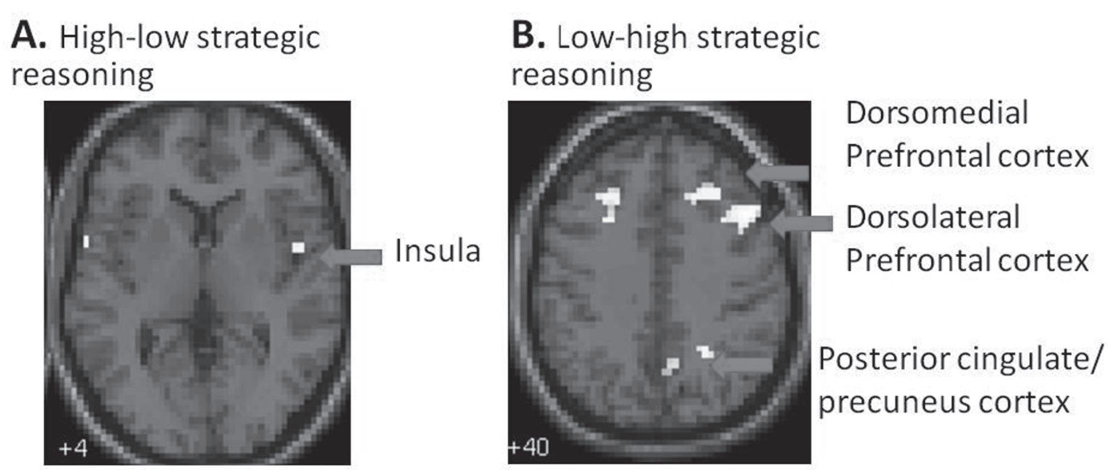

Figure 1. Neural activations in strategic-neutral contrast found in male executives with high -low (A) and low- high (B) strategic reasoning scores. P<0.005; k=5.

Figure 1

The insula is associated with proprioceptive (sensing-intuitive) processes, essentially "tuning in" to one's internal body states associated with feelings and emotions and their role in decision-making. While it might seem incongruous that the substrate of higher cognitive thinking might involve lower-level limbic processes, there are precedents supporting this theory. Interestingly, when asked about the internal processes associated with developing the theory of relativity, Einstein observed that the concept began as a physical sensation and later became visual images and ultimately words that he could use to describe his insights. In this context it is plausible to view the neural activity of our most accomplished strategic thinkers as reflecting a "deep dive" involving the use of older, more primordial parts of the brain. This is consistent with clinical insights of the psychoanalytic tradition where Freud and later Ernst Kris identified the use of regression in thought and feeling to serve higher creative processes. Kris's work focused on a two-part dynamic involving *inspiration* (the deep dive) and elaboration (understanding-application-action) (Kris, 1999). His research documented how particularly creative thinkers and artists were able to temporarily suspend normal, daily forms of reasoning to access earlier non-verbal capacities to achieve higher-order insights and performance.

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Kris described an array of internal feeling states and affective experiences that were used by artists and visionaries that allowed them to ultimately connect to the external world in deeply effective ways. Kris' work explored the difference between the creativity of artists and the psychotic disorganization of patients who could conjure up novel ideas but not refine or apply them. Lest these examples appear to be too far afield from the corporate realities we are trying to understand, it is of note that Walt Disney brought groups of patients with schizophrenia into the Disney studios to provide novel ideas (inspiration) to his production staff who could use the material to produce an artistic product (elaboration). In fact, Disney used this process to create Disney Studio's first breakthrough animation, Fantasia (Giroux, 1999). Kris' work pointed to the use of neural capacities and dynamics that provide clues to the linkage between artistic creativity and innovative high-level strategic reasoning.

Emotional intelligence isn't a luxury you can dispense with in tough times.

While identifying the emotional substrates of cognitive reasoning is an important part of our findings, the very presence of emotion as a motivational force has profound implications for strategic planning and implementation. Daniel Goleman's insights into the importance of the emotional circuitry of the brain in leadership are vitally important in areas such as strategic decision-making. Referring to a patient described by Antonio Damasio (2003), a lawyer who had suffered a brain lesion that made it impossible for him to connect his thoughts with his feelings and, therefore, make any decisions, Goleman observes, "in order to make a good decision we need to have feelings about our thoughts" (2011). This inner *intra*personal process of accessing feelings in order to have clear thoughts and make good decisions has far-reaching impact *inter*personally.

While failure to process and incorporate feelings and emotional reasoning can have adverse effects on individual performance, it can also have negative consequences on organizational performance, notably in the area of strategic leadership. Jeanne Liedtka (2011) has argued persuasively that the gap between strategic rhetoric and strategic action reflects a lack of emotional connections that foster engagement and action. She observes, "I have come to believe that an even more fundamental and seemingly obvious cause may underlie the long-standing failure to align word with deed: nobody really *cares* about these strategies. Leaders must move beyond incorporating solid strategic thinking and effective communication in order to succeed: decisive strategies must be felt as personally meaningful and compelling by the members of the organization who must adopt new behaviors in order to execute them. And thinking alone won't get you there" (p. 30). While the role of emotions and the internal representations of their drive states/effects in strategic reasoning would seem self-evident, they have in fact been discounted and disregarded in most models of strategic ability. Regarding emotional processing as "soft" or as "noise" compared to the "signal" of cognitive reasoning results in a limited understanding of both strategy and leadership. As Goleman pointed out in a recent interview, "Emotional intelligence, it turns out, isn't … soft. If emotional obliviousness jeopardizes your ability to perform, fend off aggressors, or be compassionate in a crisis, no amount of attention to the bottom line will protect your career. Emotional intelligence isn't a luxury you can dispense with in tough times. It's a basic tool that deployed with finesse is the key to professional success." The case for "limbic leadership," that is, developing emotionally literate and intelligent leaders, is a logical consequence of the results of an emerging area of neuroscience research (Brown, Swart, & Meyler, 2009; Ringleb & Rock, 2009).

Brain regions associated with proficient strategic reasoning

The role of insula activation in decision-making is dominated by the "somatic marker" hypothesis (Damasio, 1999, 2003), in which internal proprioceptive signals bias and inform decisions. A further function of the insula is attentional deployment, helping us to create and maintain focus. By its connectivity with other neural networks involving planning and memory, the insula enables the capacity to both think and act strategically. This capacity to link attention, memory, and action was described by David Ingvar, a Swedish psychiatrist and neuroscientist, as the brain's capacity to generate "memories of the future" (Ingvar, 1985; Goldberg 2009). Ingvar suggests that our ability as human beings to be proactive and capable of planning a future involves generating and internalizing representations of the desired future state, which are used as templates for guiding and informing action. The need for an iterative strategic process of using forward thinking informed by reflective memories of a desired future to take effective action was described by Stephen Haines as follows: "Thinking backwards in order to move forward to grow your business is what outstanding strategic thinkers do, time after time, day after day" (Haines, 2012). Using memory systems in the service of forward-thinking strategic reasoning is supported by the insula. Thus, in addition to encoding the somatic state of social emotions, the insula also supports strategic reasoning ability by biasing and focusing the attentional capacities and memory systems necessary to guide strategic action.

Another area of strategic reasoning-related neural activation observed in our top-performing subjects involved the superior temporal sulcus (STS). This neural region is associated with, among other functions, the attribution of mental states to others, referred to as theory of mind or mentalizing (Frith & Frith, 2003; Saxe & Wexler, 2005), and the perception and expression of social emotions such as trustworthiness (Moll, de Oliveira-Souza, Bramati, & Grafman, 2002; Winston, Strange, O'Doherty, & Dolan, 2002), cooperation (Rilling, Gutman, Zeh, Pagnoni, Berns, & Kilts, 2002), altruism (Tankersley, Stowe, & Huettel, 2007), and empathy (Carr, Iacoboni, Dubeau, Mazziotta, & Lenzi, 2003). Our interpretation of the observed STS activation is that the higher-performing strategic thinkers integrated an assessment of their own inner thoughts and feelings with reactions of other stakeholders (Schultz, Imamizu, Kawato, & Frith, 2004). A story thus begins to emerge that suggests that effective strategic thinking involves both a clear understanding of your own feelings about a given idea and an appraisal of how other people may react to such an idea. It was not surprising to us that these STS activations were also seen in response to subjects' reactions to moral dilemmas embedded in our research protocol. In both strategy and ethics, one of the ultimate litmus tests for deciding the appropriateness and efficacy of a decision is appraising the effects it has on others (Greene, Sommerville, Nystrom, Darley, & Cohen, 2001).

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The gap between knowing and doing in strategy

In reformulating our understanding of strategy, we are well advised to focus on a major symptom of strategic performance problems—lack of execution. This is such a universally recognized problem that there is even an acronym describing it: SPOTS, or strategic plans on the shelf. Somehow amidst all of the analysis, charting, meeting, and planning, a fundamental element of executing strategy is lost. As Professor Brad Killaly suggests, "strategy is a verb" (2010).

His point is a response to what Alfred North Whitehead once referred to as "the fallacy of misplaced concreteness," the tendency of human beings to create a map and then mistake it for the reality it is supposed to represent (1925).

In studying the brain's antecedent activities before taking action (the cognitive and emotional neural substrates of strategic thinking), we are reminded of the narrow reductionist theories and models that inform contemporary strategic practice. Current models of strategic planning emphasize only some of the brain's (cognitive front lobe-based) capacities, largely ignoring the engagement of other capabilities such as the limbic processes of instincts and social awareness. Brown, Swart, and Meyler (2009) put it succinctly when they stated (paraphrasing Damasio, 1999), "If reason makes the lists but emotion makes the decisions, then the integration of thinking and feeling becomes a key area for the development of effective executive functioning". Identifying a comprehensive assembly of neural processes and brain capacities associated with effective strategic thinking creates the possibility of executive education strategies focusing on a broad, multi-functional approach to engaging the brain for optimized strategic decision-making. While our research, like most scientific research, raises more questions than answers, we can at minimum infer that identifying critical brain capacities associated with optimal strategic thinking holds the promise of expanding our understanding and practice to improve strategic thinking and leadership performance.

Building brain-friendly environments to enhance strategic thinking and performance

Building a brain-centric organizational capability has been a driving interest in our research. Consequently, we have tried to explore and identify the variables that optimize brain and thus behavioral performance. It has been well recognized from the time of Heisenberg's Uncertainty Principle in 1927 in his studies of the motion of electrons that experimental conditions affect outcomes and results. A basic component of our research design was to create a neurobiologically motivated environment in our offices and laboratory that was positive, motivating, and stress minimizing. We accomplished this in two ways; first, we developed a deliberate, intentional, and systematic approach to managing the experience of the subjects (particularly necessary because of the non-naturalistic, confining, and noisy environment of the fMRI scanner), and second, we did everything possible to provide cognitive clarity and emotional support to diminish subjects' stress responses. These very basic efforts have been supplemented by our own continued research and by other neuroscience-influenced research efforts, including those of David Rock, who developed the SCARF model for facilitating engagement based on addressing five key variables: status, certainty, autonomy, relatedness, and fairness (Rock, 2008). Such neurobiologically based frameworks provide a promising avenue for leaders to create more productive, engaging, and brain-friendly environments.

Conclusions

There is a small but growing body of evidence of an "expertise effect" in neural functioning across disparate brain activities, including language, archery, chess, and cello playing (e.g., Seo *et al.*, 2012). This research, which is based on neural assessments of experts versus non-experts, identifies consistent patterns of neural activation and deactivation in these different populations. The findings from these studies suggest that, with experience and acquired expertise, the brain gains neural and cognitive efficiency by using less neural space and less complex networks to perform practiced higher-level tasks. These gains in neuroefficiency also allow the brain to operate more effectively by increasing the brain's available computational workspace to facilitate access to other neural resources. Our research reinforces and supports the findings of these studies. The more proficient strategic thinkers in our sample had developed highly efficient algorithms or activation patterns that allowed them to access a broader range of neural competencies and connections (prompting them to activate both cognitive and emotional capacities) than their less proficient counterparts in the study.

Future research agendas should continue to investigate strategic thinking with a larger, broader sample of subjects to better understand and optimize the brain's capacity to build strategic expertise. Finally, neuroscientific research needs to address the challenge of building brain-friendly organizational environments to enhance human performance.

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