Making the Mindful Leader: Cultivating Skills for Facing Adaptive Challenges

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If you know others and you know yourself,
you will not be imperilled in hundred battles,

if you do not know others but you know yourself,
you will win one and lose one,

if you do not know others and do not know yourself,
you will be imperilled in every single battle.

Sun Tzu, *The Art of War*

We should base our decisions on awareness rather than on mechanical habit. That is, we act on a keen appreciation for the essential factors that make each situation unique instead of from conditioned response.

Warfighting: The U.S. Marine Corps Book of Strategy

Introduction

Human civilization has always faced the challenge of adapting to change. Changes in market, shifting political alliances, financial collapses, uncertain energy sources, and natural disasters have always been part of the landscape that people have had to wrestle with. However, at this point in history, it appears that the intensity and demands of change are particularly complex and severe. Globalization creates new markets and wealth but also competition and dislocation. Natural disasters in Thailand impact tightly interwoven supply chains and debilitate manufacturing in Ohio. Information technologies speed up the tempo of nearly everything making the pace of life relentless. Nearly every aspect of modern life – ecology and economics, commerce and finance, politics and government, science and education – faces tectonic, disruptive and destabilizing change (Kelly, 2005; Toffler & Toffler, 2006; Brown, 2011). Leaders across domains express a common refrain of being in "uncharted waters" where old models, routines and assumptions are called into question with no clear pathways on which to navigate. As a result, there are enormous stresses on individuals, institutions and organisations who are called upon to meet, and effectively adjust to, increasingly discordant, unpredictable and extreme events.

How we make sense of change influences how successful we are in responding to it and a key purpose of leadership is to facilitate responses to problems positively, ethically and in a way that strengthens society (Heifetz, 1994). It is our contention that mindfulness training is a powerful and effective means of helping leaders meet the adaptive challenges of the current age.

Adaptive Leadership

Heifetz distinguishes two classes of challenge that leaders are likely to face: technical problems and adaptive ones (Heifetz, 1994). The distinctions between these two types can help to identify potential tools for facing them. Technical problems may be complex and difficult but they can be addressed with existing ways of perceiving and understanding; they are known problems with known solutions based on past experience. For example, a skilled surgeon understands the process of transplanting a kidney and a practiced marksman can reliably strike a target.

Adaptive challenges, on the other hand, differ from technical ones because both the problem and the solution may not be recognized and understood within current schemas. Adaptive challenges call upon leaders to grow toward more sophisticated ways of seeing and thinking, acting and relating.

Take for example an adaptive challenge of a previous era: cholera outbreaks in 19th century London were thought to be caused by "miasma in the atmosphere" according to the received wisdom of the day (Summers, 1989). However, the close observation of Dr John Snow suggested revealed the onset of disease was marked by intestinal disturbances that pointed not to poisoned fog but to a tainted water supply. His observation transformed the understanding of the problem in a way that would eventually lead to a cure and give rise to the adaptive creation of public health services.

In other examples, problems may be well understood but solving

them may require a shift in perceiving possibilities and relationships. The leaders of a large desert metropolis, for example, may understand that their city relies on an uncertain water supply. Historically, they are predisposed to building centralized large-scale engineering works to transport water from faraway sources. A significant perceptual shift is needed to recognize the millions of gallons of existing wastewater runoff as a potential resource that could be locally collected through a decentralized community effort and recycled without the expense of moving water across vast distances. That adaptation requires that they learn to relate to the public not just as passive customers but rather as partners in creating the solution.

Finally, adaptive challenges also arise where both the problem and the solution may not be well understood. The current debate on climate change typifies this sort of problem. Partisans fall into conflict over the cause of weather changes and what would constitute an effective response. In both cases, adaptive challenges cannot rely on previous solutions, frameworks or ways of understanding and relating to make sense of them and respond effectively. Leaders must learn and change if they are to engage with and resolve the challenge.

A common mistake leaders make is to misidentify adaptive problems as technical ones, thinking that yesterday's solutions can apply to today's novel problem (Kegan & Lahey, 2010). This is because of the innate human tendency to mindlessly and nonconsciously react with rote action patterns and habitual ways of sensemaking (Langer, 1989). The mind's tendency toward automatic actions, while useful in stable circumstances, can become maladaptive when the pattern no longer fits a changing condition. Many of the complex challenges leaders face exceeds their ability to perceive, understand and adapt to them with their current schemas (Kegan & Lahey, 2010). Leaders are often, to paraphrase the words of developmental psychologist Robert Kegan, "in over their heads" (Kegan, 1998). When leaders apply an old map to a new problem, they find themselves stuck, stressed, and frustrated at their lack of progress.

Adaptive challenges are especially difficult. They call into question existing roles, orders and hierarchies. As a result, they are often stressful. Stress reactions are instinctive, automatic survival mechanisms that mobilize energy to adapt to a potential threat (Greenberg, Carr, & Summers, 2002). However, if poorly managed or unmanaged altogether leaders can be expected to experience a range of negative affect and cognitive impairments that can leave them disoriented, disconnected, fearful, and frustrated (Boyatzis & McKee, 2005; Goleman, 1996). Yet, leaders need to demonstrate that they are calm, in control and are able to inspire, motivate, make wise decisions and take effective, thoughtful action. In other words, they need to ably manage themselves in the face of their own neurobiology. The failure to effectively self-manage impairs a leader's health, diminishes her performance and potentially damages her relationships (Boyatzis & McKee, 2005).

Because adaptive challenges often require complex coordination with others, quality relationships are essential. The growing importance of high quality interpersonal relationships reflects a broad trend in organizations that have shifted from hierarchical command and control models, to flatter systems where formal authority is decreased (Pearce & Conger, 2002). In such situations, authority becomes more informal and connective – relying on a leader's skill to connect with, persuade and motivate others to act in ways that may be uncomfortable, or to give up limited resources, or to go against their own short term interests (Lipman-Blumen, 2000; Heifetz & Linsky, 2002). To skilfully navigate these conditions leadership capacities and skills based in high levels of cognitive and emotional nuance are called for. Adaptive leaders need to cultivate the skills of managing themselves if they are to skilfully work with others to meet the challenge of adaptive problems (Drucker, 2011; Hunter & Scherer, 2009).

To be effective in meeting adaptive challenges a leader must be able to consciously step out of habitual reactions and engage with a shifting reality in new and more sophisticated ways (Wilson, 2004; Drucker, 2001; Kegan & Lahey, 2010). Leaders must learn to cultivate and transform themselves. This self-development results in enhanced internal capacities such as deeper intellectual understanding, perceptual capacity as well as a greater ability to innovate, self-manage, and self-direct (Csikszentimihaly, 1993).

Leaders need new tools to support them as they grapple with increasingly testing realities. We propose that a critical skill for adaptive leaders is the capacity to be mindful––to be present and aware of themselves, others and the world around them, to recognize in real-time their own perceptions (and their potential biases), their emotional reactions and the actions they need to take to address current realities more effectively (Kabat-Zinn, 1990; Boyatzis & McKee, 2005).

Mindfulness training can provide leaders with practical methods for

enhancing attention and awareness. That in turn can significantly enhance their potential for adaptive action and greater self-management. Mindfulness adds a potent perspective for understanding human action and, as a set of transformative methodologies, it has the capacity to radically – and practically – reshape it. In what follows we describe more fully what mindfulness is, explore how it might be beneficial to leaders and examine how a seemingly simple practice can elicit potentially profound results.

What is Mindfulness?

Mindfulness is a way of attending to yourself, others and the world around you that allows one to adopt more productive and positive ways of acting and being (Chaskalson, 2011). Mindful attention is rooted in the here-and-now and is not biased by the preconceptions inherent in everyday preferences (Kabat-Zinn, 1990).

Because attention directly informs subjective experience (James, 1890), cultivated mindful attention has the potential to radically transform how a person relates to their inner and outer worlds. The power of mindfulness arises from systematically developing a person's attention so that she can recognize in the moment how she identifies with her implicit, habitual and automated patterns of thinking, feeling and acting and the results they bring about. By recognizing these patterns, she can elect to change course. As a result mindfulness endows "an adaptability and pliancy of mind with quickness of apt response in changing situations." (Nyanaponika 1965, p. 80). Furthermore, because attention is a necessary constituent in any human activity, mindfulness can be brought to bear in any domain of human life.

Mindfulness, as we use the term, was taught by the Buddha over 2500 years ago as a way of solving the problem of human suffering. That same approach to mindfulness is also practiced today as a specific methodology for transforming the mind in a wide variety of secular contexts such as medicine (Kabat-Zinn, 1990), clinical psychology (Segal, Williams, & Teasdale, 2002), law (Riskin 2002), the military (Jha & Stanley, 2010), corporations (Chaskalson, 2011), management schools (Hunter & Scherer, 2009), and even professional basketball (Lazenby, 2001). Crucially, the capacity for mindfulness can be trained and one highly effective way of doing that is by way of training in mindfulness meditation techniques. A growing scientific literature attests to the effectiveness of mindfulness training in areas as diverse as stress and chronic pain management, depression relapse prevention, eating disorder treatment, recidivism and substance abuse relapse prevention (Chiesa & Serretti, 2010) and a Google Scholar search on the term "mindfulness" anywhere in the title of a paper, conducted on 14 December 2011, yielded 2,480 results. Research thus far has primarily focussed on alleviating the pathological. However, there is also a growing body of evidence demonstrating the effectiveness of mindfulness in healthy populations, where it has been shown to enhance overall well-being, producing desirable outcomes across a range of measures (Brown & Ryan, 2003; Chiesa & Serreti, 2009).

How Mindfulness Can Help Leaders

To date, there is little research evidence around the application of mindfulness to leadership (Bryant & Wildi, 2008). But drawing on what is known of its effectiveness in other fields and for human life in general, we confidently surmise that applying mindfulness in leadership contexts will be considerably beneficial.

Because mindfulness training focuses on how leaders use their attention, it is not just another construct to stand alongside the many other arms of leadership research and practice, but both a perspective and a systematic method that helps leaders better understand and transform their own minds. Such an internal shift changes both how a leader sees the world, how he potentially acts and the results those actions bring about. What marks mindfulness training out from other leadership training interventions is the fact that the shift in attentional capacity can be trained and embedded in the context of everyday action. Furthermore the effectiveness of such training is borne out by marked biological changes. To draw on just one study, neuro-imaging research by Hölzel and colleagues (2011) show that an 8-week mindfulness training course evinced changes in participant's brain areas that are associated with attention, learning and memory processes, emotion regulation, self-referential processing, and perspective taking.

Our sense of the value of mindfulness builds on Mumford's insight that outstanding leadership is rooted in a leader's ability to construct prescriptive mental models that help people and institutions make sense of and respond to crises (Mumford, 2006). Mindfulness is a tool that makes more evident how a leader perceives and processes experience to construct models of reality. Mindfulness also makes these mod-

els more amenable to conscious transformation. Increased conscious awareness, we assert, is far more likely to produce an accurate read of a changing situation than does the natural tendency to fall back on rote habits of sensemaking.

A unique quality of mindfulness practice is that it is a tool rooted in immediate experience. Leadership training has thus far tended to focus on retrospective analyses of past action or on future-oriented creations of visions and goals (Drucker, 2001). Little of leadership development has focused on understanding oneself in the present moment. But it is the present in which all human activity occurs. The here and now is the "live feed" view into how a person experiences life. Focusing on the present affords the leader the ability to see what is actually happening beyond his own preconceptions. Focusing in the here and now affords the ability to see when a person's stated actions and intentions mismatch the actual ones. Focusing on the present affords the ability to catch a reactive emotion before it does damage to a key relationship.

Mindfulness addresses a set of general interrelated problems that interfere with a leader's capacity to bring about adaptive change: the pervasiveness of mindlessness and automaticity and the instinctual survival reactions that undermine cooperative, rational action and degrade personal health as well as group and individual resilience. It can supportively speak to and build upon existing lines of leadership research and development, as well as practical application.

It may that successful leaders have always drawn on some quality akin to mindfulness to deal with change and ideas similar to mindfulness have long been discussed by prominent leadership scholars (Drucker, 2006; Heifetz, 1996). They discussion they have begun can be further developed and built upon and we aim to support these ideas with greater elaboration and empirical evidence.

What follows is a brief general discussion of the basic conditions which give rise to the need for mindfulness, namely mindlessness and the automated, non-conscious nature of human perceiving, thinking, feeling and acting. Beyond that is a more in-depth exploration of how mindfulness can help leaders in specific ways. There we will examine the role mindfulness can play in helping to manage stress and reactive emotions, make better decision, act in innovative ways and respond freshly to situations beyond the limits of their habituated actions. In other words, how to become more adaptive leaders. Finally, because mindfulness is a practice, it is important to understand the mechanisms of how mindfulness is thought to work.

Participants on a mindfulness course learn metacognitive skills indirectly but very effectively (Teasdale et al., 2002). As we have seen, they may be instructed to meditate on their breath – simply allowing their attention to settle on the sensations of breathing. At some point during that meditation the instructor might suggest that when the mind wanders the participants should notice where it goes and then gently and kindly bring their attention back to the breath. At another point, he or she might add "And if your mind wanders off a hundred times, just bring it back a hundred times …" The mind wanders, you notice where it went and you bring it back. It wanders, you notice where it went and you bring it back. Over and over. In this way, participants learn four key metacognitive skills:

1. The skill of seeing that their minds are not where they want them to be.

"I want to sit in this meditation, following my breath, but I keep thinking about what's next on my to-do list."

2. The skill of detaching the mind from where you don't want it to be:

"Actually, I don't need to be thinking about my to-do list right now: I can choose …"

3. The skill of placing the mind where you want it to be:

"I'll just come back to the breath …"

4. The skill of keeping the mind where you want it to be:

The participant just follows the breath for a few minutes, undistractedly.

By repeatedly practicing these four skills participants become more adept at them. That starts to have benefits outside of the meditation context as well: "I don't need to be thinking about which holiday to book online when I get home – I need to give all of my attention to the team-member who has come to see me".

Mindfulness' Potential Promise for Leaders

The following section explores recent findings on mindfulness and

the implications they have for more effective leadership. We will explore the impact of mindfulness training on leadership stress, emotional reactivity, attention and working memory, perception and cognition, empathy, decision making and innovation. We will then conclude with an investigation of the mechanisms of mindfulness and with suggestions for the direction of further research.

Managing the Stress of Leading

The secular approach to mindfulness training that was pioneered in a clinical setting by Kabat-Zinn (1990) and his colleagues was initially intended to address the issues of stress and chronic pain. Systematic reviews of the empirical evidence (Baer et al., 2003; Grossmann et al., 2004; Chiesa & Serretti, 2010) suggest that it is an effective means of helping to manage the debilitating qualities of excessive stress.

Leaders often enjoy the challenge of their position and find their work stimulating (Lundberg & Frankenhaeuser, 1999), but leadership can also be highly stressful. Boyatzis and McKee (2005) describe the condition of "power stress" to which those in leadership positions are particularly susceptible. This is a by product of the manifold pressures they experience, the ambiguities of authority and communication that abound in large organisations, as well as the loneliness inherent in leadership positions. Boyatzis and McKee see some degree of power stress as being inevitable in leadership positions and the key to successful leadership, they suggest, is not in avoiding stress so much as in taking steps regularly to recover from the affects of it. Mindfulness practice, they say, is a key means by which such recovery can be instituted.

In an interview in the Harvard Business Review, Herbert Benson (Fryer, 2005), draws on Selye's (1975) distinction between eustress (from the Greek, 'eu', meaning 'good') and distress. Persistent stress that is not resolved through coping or adaptation leads to 'distress', which may give rise to anxiety or depression. But stress can also enhance physical or mental function, for instance through strength training or challenging work. In that case it is eustress.

Stress itself is the physiological response to any change – good or bad – that alerts the adaptive fight-or-flight response in the brain and body. When this is experienced as eustress, Benson asserts, it is accompanied by clear thinking, focus and creative insight. Distress, on the other hand, refers to the negative stressors that accompany much of a leader's work. Benson reports frequent encounters, at the medical institute that he runs, with executives who worry incessantly about the changing world economy, the impact of uncontrollable events on their markets and sources of finance, the world oil supply, family problems, taxes, traffic jams, hurricanes, child abductions, terrorist attacks and environmental devastation. Most of these are adaptive challenges and, as we have seen, they can produce distress. For the mindful leader, however, they may equally well be a source of eustress.

The relationship between eustress and distress is illustrated by the Yerkes-Dodson curve.

First described by the psychologists Robert Yerkes and John Dodson in 1908, this is often taken as a standard description of the relationship between stress and performance. As pressure on any organism or individual increases, so the individual or organism's 'arousal' – their capacity to respond to that pressure – increases. But beyond a certain point, if the pressure continues unabated, arousal (or performance) falls off. In the case of individuals, if that continues for too long, they become stressed and eventually begin to get ill. It is important that organizations and leaders realize the kinds of chronic stress that often comes with leadership positions have been connected to a wide range of diseases and dysfunctions such as thyroid or endocrine burnout, obesity, diabetes, the inability to experience pleasure from normally pleasurable events, immune suppression, psoriasis, lupus, fibromyalgia, chronic fatigue, chronic pain, cancer, heart disease, infertility and irritable bowel syndrome or other digestive disorders (Britton, 2005). Excessive, unmanaged stress can kill. From the leadership perspective, as Boyatzis and McKee (2005) observe, it can also lead to a state of 'dissonance'.

Dissonant leaders, Boyatzis and McKee (2005) suggest, drain the enthusiasm of teams and organizations. They lower morale and make those around them unhappy. The stressors such leaders experience drive them towards attitudes of excessive control, aversion, intolerance, irritability and fear: qualities that counteract the effectiveness of leading adaptive change. Chronic stress, therefore, is a significant leadership issue. As we will discuss later, mindfulness helps the practitioner consciously shift what and how she processes experience, including stressful experiences. Therefore we assert leaders who are better able to manage the stressors they experience and are able to recover from these more effectively, are less likely to fall into states of dissonance with their people and will therefore make better leaders. For

the mindful leader, better equipped to manage her own stressors, adaptive challenges may, as Benson (Fryer 2005) suggests, produce not distress but instead eustress.

A review and meta-analysis of the effects of Mindfulness-Based Stress Reduction (MBSR) for stress management in healthy people conducted by Chiesa and Serretti (2009) concluded that MBSR was able significantly to reduce stress in that population. How it might do that, we will see when we consider the mechanisms of mindfulness below.

Managing Reactive Emotions

Leadership is a social enterprise where relationships are key for getting things done. Quality of relationships matter. This is even truer when situations are stressful. Because leaders' emotions are prone to contagion. Sy, Coté and Saavedra (2005) undertook a study that examined the effects of leaders' mood on the mood of individual group members, the affective tone of groups, and on three group processes: coordination, effort expenditure, and task strategy. They found that when leaders were in a positive, in comparison to a negative, mood then individual group members themselves experienced more positive and less negative mood. In such cases, moreover, the groups had a more positive and a less negative affective tone. They also found that groups with leaders in a positive mood exhibited more coordination and expended less effort than did groups with leaders in a negative mood. It is often the case that considerable energy is directed towards managing a volatile leader's emotions or contriving ways to avoid their activation resulting in redirecting attention away from other critical tasks at hand.

Given the crucial importance of relationship management for adaptive leadership that we have drawn attention to above, and given the impact of the leader's mood on that relationship, the capacity to skilfully manage her own emotions is a vital leadership competency and mindfulness training can make a significant contribution here. One of the early neuroimaging studies on mindfulness conducted by Creswell and colleagues (2007) demonstrated that study participants higher in trait mindfulness displayed greater prefrontal cortical activation as well as reduced amygdala activation when exposed to difficult emotion. The same inverse correlation between the prefrontal cortex and amygdala activation was not found for those low in trait mindfulness. Furthermore, using labelling methods, where participants named the difficult emotions they were experiencing, high-mindfulness participants decreased the level of negative affect they experienced relative to those low in mindfulness. Their training in mindfulness helped them better to manage negative affect.

Jha, Stanley and colleagues (2010) suggest that there is ample evidence that mindfulness training's beneficial effects on affective experience are also commensurate with the amount of time spent engaging in formal mindfulness training exercises (there is therefore a dose-response, which suggests a causal relationship) and that the training is associated with higher levels of positive affect and well-being, and lower levels of negative affect and rumination, as well as decreased emotional reactivity. These findings, they say, are consistent with the decreases in neural activity elicited by affective distractors within the amygdala and other brain regions involved in emotional processing that follow from mindfulness training. Such results converge on the view that mindfulness training may improve affective experience via improved regulatory control over affective mental content.

All of these studies suggest that mindfulness training has the potential to help leaders better self-regulate in the face of stressors.

Perceiving Reality Beyond One's Blinders

The way we make sense of the world depends on the data we draw upon. If the data is not accurate or relevant then the meanings we make will not fit the actual needs of a situation, resulting in missteps, failure and loss. A study conducted by Herndon (2008) suggests that mindfulness trained subjects may come to draw upon more objective data sources and thus make more consistently accurate inferences about the world around them. Herndon uses a distinction elucidated by Lewicki (2005) between "external" and "internal" encoders. The encoding referred to here is the way in which we make sense of the world based on available data, external encoders pay attention to facts in the environment, whereas internal encoders use rigid models based sometimes on their own past experience, sometimes on information that may bear no relation to experience whatever. Lewicki suggested that internal encoders tend more readily to sustain cognitive mismatches in the face of conflicting data because their data source tends to be self-referential and closed rather than objective and open. For example, in the case of internal encoders, the view that "people with dark eyes (A) are arrogant (B)" may generate experience that is functionally equivalent to encountering real instances of that relation between (A) and (B). Though no objective evi-

dence supports that particular A-B relation, the schema assuming it can grow in strength over time and become a habitual way of sensemaking. External encoders, by contrast, tend to be more careful in deriving meaning by using data from the environment. They require a greater amount of confirming data from the world around them before instantiating a schema. Herndon's (2008) study showed a positive correlation between mindfulness and the tendency towards external encoding. In other words, people who are more mindful tend to read the environment more accurately and are less subject to the potential distortion of internal biases.

What is crucially important for adaptive leaders in this context is the fact that mindfulness can be trained. By undertaking a course in mindfulness training, Herndon's study implies, leaders may become better able to make accurate assessments of the environment in which they are operating and less prone to misleading, subjective, perceptual blinders.

That view is supported by neuroscience data. An fMRI study conducted by Farb and colleagues (2007) noted that with just eight weeks of MBSR training, individuals were more readily able to switch their focus of attention from the default network, involved in 'narrative focus' activities – such as planning, daydreaming and ruminating – to modes of direct 'experiential focus' somatosensory awareness, involving the activation of the insula and the anterior cingulate cortex. In other words, the mediators were more readily able to experience information coming into their senses in real time. What is more, compared to the control group, those who practiced mindfulness – regularly noticing the difference between narrative and direct experience modes of processing – showed a stronger differentiation between the two neural paths. They were able to know which path they were on at any time, and could switch between them more easily. Subjects with no experience of mindfulness practice, on the other hand, were more likely to automatically adopt a narrative mode of processing.

Love never gives up, never loses faith, is always hopeful, and endures through every circumstance."
—I Corinthians 13:7

On this basis it seems, all other things being equal, one might reasonably expect leaders trained in mindfulness to exhibit lower levels of automaticity, higher levels of situational awareness and consequently higher levels of objectivity than those who are not so trained.

Cultivating Empathy

Besides drawing attention to mindfulness training's ability to help leaders develop greater situation awareness in the moment through an enhanced capacity to attend to what is present, Farb and colleagues' (2007) study points to another important potential outcome of mindfulness training in the context of leadership development: increased empathy. They showed that mindfulness trained subjects had higher levels of insula activation after just eight weeks of training. That insula activation is central to our sense of human connectedness, helping to mediate empathy in a visceral way (Singer, 2004). Mindfulness training allows participants more readily to know that they're thinking when they're thinking, to know what they're feeling when they're feeling it and to be aware of what they are sensing at the time of sensing it. It enhances their capacity for situational awareness in the moment and it builds their capacity for empathy.

Because leadership is a social activity, the quality of relationship between the leader and especially his/her proximate followers is important because helps to understand others' points of view, build an effective team and rally a group to work collectively (Hogan & Hogan, 2002). A small but growing body of research offers evidence that mindfulness improves the quality of interpersonal relationships. Though focused primarily on romantic relationships, Carson and colleagues found that mindfulness training improved both partners well-being and their ability effectively to cope with their own and each other's daily stresses (Carson et al., 2004). Another study exploring mindfulness and relationships found higher levels of mindfulness were associated with greater relationship satisfaction. Additionally, mindfulness was related to reduced negative emotions and increased positive assessments of one's partner after discussing a relationship conflict. People with higher levels of mindfulness experienced less anxiety and anger-hostility and that produced more positive outcomes when facing conflict. The authors suggested that mindfulness plays an inoculating role in reducing basic levels of distress and that allows a more positive and productive engagement with one's partner (Barnes et al., 2007).

Although the studies referred to above come from the field of romantic relationships, there is no de facto reason to imagine that their findings would not translate into the relations between leaders and their teams. In particular, the relationship found by Barnes and colleagues (2007) that showed lower levels anxiety and anger-hostility in mindfulness trained subjects at times of conflict must imply the strong possibility of significant benefits from mindfulness training when it comes to leader-follower relations.

Innovative Action

Finally, although we are not aware of any studies yet carried out that show a direct correlation between mindfulness training and creativity, the work of Friedman and Forster (2001) suggests that such a correlation is highly likely. Before we discuss the study on creativity they undertook, we need briefly to outline one carried out by Davidson and Kabat-Zinn et al. (2003). They carried out a study with volunteers at a biotech company to investigate the effects of mindfulness training on prefrontal activation. They measured brain electrical activity in the left and right prefrontal cortex (LPFC and RPFC) before, immediately after and then at four-month follow-up after an eight-week training program in mindfulness meditation. Twenty-five subjects were tested in the meditation group and a wait-list control group was tested at the same points in time as the meditators. At the end of the eight-week period, subjects in both groups were vaccinated with influenza vaccine to assess their immune response.

Davidson (1998) has drawn attention to the relationship between RPFC activation and diminished immune response. The 2003 study showed significant increases in LPFC activation in the meditators compared with the non-meditators. They also found significant increases in antibody titers to the influenza vaccine among subjects in the meditation compared with those in the wait-list control group. The magnitude of increase in left-sided activation predicted the magnitude of antibody titer rise to the vaccine. These results persisted at four-month follow-up.

What is significant here are the changes evidenced in the mindfulness trained subjects' ratios of LPFC and RPFC activation. Gray (1970, 1994) distinguished two important behaviour modification systems. These he called the Behaviour Inhibition Systems (BIS) to an 'avoidant' mode of mind, indicating the presence of fear, disgust, anxiety, aversion and so on; and the Behaviour Activation Systems (BAS) which is an 'approach' system, indicating the presence of emotions such as enthusiasm, pride, interest and curiosity. As Davidson (1998) has shown, these two systems correlate to the asymmetric activation of the prefrontal cortex. Left prefrontal cortex (LPFC) activation corresponds to BAS, or 'approach' modes of mind and right prefrontal cortex (RPFC) activation corresponds to BIS or 'avoidance' modes of mind.

Returning now to the work of Friedman and Forster (2001), they set two groups of college students the task of helping the mouse find its way out of the maze drawn on paper. There was one slight difference in the pictures the groups received. The 'approach' version of the picture showed a piece of cheese lying outside the maze in front of a mouse hole. The 'avoidance' version showed an identical maze except that, instead an owl hovered over the maze – ready to swoop and catch the mouse at any moment.

The maze takes about two minutes to complete and all the students who took part solved it in about that time, irrespective of the picture they were working on. But the difference in the after-effects of working on the puzzle was striking. When the participants took a test of creativity soon afterwards, those who had helped the mouse avoid the owl came out with scores 50% lower than those who had helped the mouse find the cheese.

The enhanced capacity for 'approach' modes of mind following a course of mindfulness training, evidenced by Davidson and Kabat-Zinn (2003) and shown also by Barnhofer and colleagues (2007) suggest that leaders who train in mindfulness are likely to experience an increased capacity for creativity and innovation. ■

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