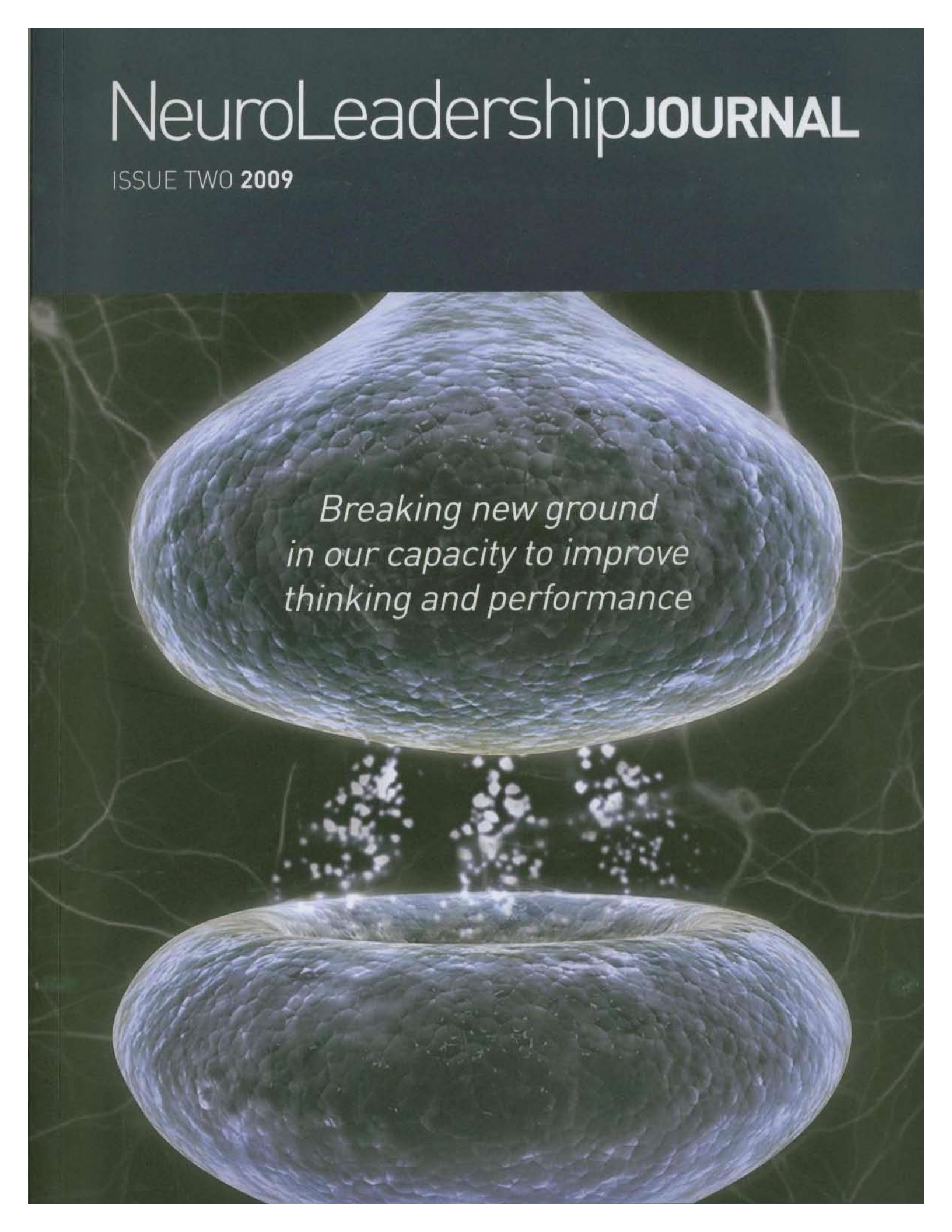


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A detailed microscopic image of a neuron, showing a large, bulbous, textured structure (likely a dendrite or cell body) with a smaller, similar structure below it. The background is dark with faint, glowing neural pathways. The text is centered on the larger structure.

*Breaking new ground
in our capacity to improve
thinking and performance*

Mindsight at work: an interpersonal neurobiology lens on leadership

Dr. Daniel Siegel and Debra Pearce McCall

Daniel Siegel, Clinical Professor of Psychiatry, UCLA School of Medicine

Executive Director, The Mindsight Institute, CA, USA

info@drdansiegel.com

Debra Pierce McCall, Psychologist and Consultant

Board Member, Editor of Quarterly, GAINS – Global Association for Interpersonal Neurobiology Studies

Adjunct Professor – PSU Certificate Program in Interpersonal Neurobiology

dpearcemccall@comcast.net

Abstract

This article provides an overview of the framework of interpersonal neurobiology (IPNB) and its applications to leadership. Combining scientific rigor with an appreciation for subjective ways of knowing, IPNB is shaped by a wide array of sciences and emphasizes interdisciplinary inclusiveness. The framework emerged from consideration of consilient empirical findings from many disciplines, including neuroscience, complexity theory, relationship and developmental studies, social relations, examinations of consciousness, and studies of psychological and neuroplastic change. Consilience is a way of discovering parallel findings shared across independent disciplines (Wilson, 1998), and here IPNB creates a common ground, with a welcoming integrative perspective that offers a compassionate and hopeful view of human potential. IPNB allows us to consider what common factors contribute to healthy minds and well-being across multiple relational endeavors, including leadership, consulting, education, medical and therapeutic work, coaching, and our personal lives. In the decade since the publication of *The Developing Mind: How relationships and the brain interact to shape who we are* (Siegel, 1999), the IPNB perspective has been applied by a diverse range of people interested in the potential of the human mind, including psychotherapists and physicians, educators and administrators, scientists and artists, religious leaders and policy-makers, attorneys and consultants, leaders and change agents. Pivotal to success across these endeavors is the human ability to see and shape the mind – a process called 'mindsight' – that can be harnessed to help individuals

and human groups function with more efficiency, vitality, and creativity. We will discuss how mindsight, well-being, and integration apply to each of us across a range of settings, to leading in the workplace, and to our organizations in their larger contexts.

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Our understanding of human experience has expanded exponentially in recent decades, with the development of new frames of reference and sophisticated methods of measurement. Ideas from complex systems theory greatly facilitated the potential for cross-discipline pollination and the resultant interdisciplinary revolution, while the analytic power of computers and data from new tools like the fMRI informed our advancing investigations of being human. We began to see, describe, and research the interconnections, the interactional interdependencies within and among living systems. In 1999, one of us (DJS) proposed the idea of 'interpersonal neurobiology,' to describe a way of considering mind, brain, and relationships as three

interrelated, interacting, and irreducible elements of human experience, creating a conceptual framework for understanding how the human mind develops from the interactions of neurophysiologic processes and interpersonal relationships. Through the years (Siegel and Hartzell, 2003; Siegel, 2007, 2010), the framework expanded to also emphasize the importance of our intrapersonal connection – our relationship to our self. In this article, we present an overview of interpersonal neurobiology (IPNB) and discuss some of the implications for the field of leadership studies and the development of a leading mind. To some, the multi-level perspective of IPNB is new, while for others it solidifies something that they've subjectively sensed for some time. Through the expansion of interdisciplinary research, more evidence of the interacting complexity of mind, brain, and relationships continues to accumulate, moving us far beyond the simpler argument 'is it nature or nurture?' to starting with the synthesis of genetics and experience and then asking additional questions from there. Examples are now numerous.

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Research in developmental psychology has documented that our neural systems and our minds require relationships involving attention and contingent interactions to develop well, and that we are born wired to relate (for an extensive research review, see Cozolino, 2006). Social neuroscience studies have shown our neural circuitry responses for physical and social pain overlap (Eisenberger and Lieberman,

2004), and that a comforting relational presence can decrease physical sensations of pain – on self-report and in brain activity (Coan, Schaefer, and Davidson, 2006). Mindful awareness practices have been demonstrated to improve immune system functioning and impact neural patterns (Davidson, Kabat-Zinn, Schumacher, Rosenkranz, Muller, Santorelli, Urbanowski, Harrington, Bonus, and Sheridan, 2003), and just five days of Integrative Body-Mind Training has been shown to improve regulation of the autonomic nervous system by increasing brain-body information flow (Tang, Ma, Fan, Feng, Wang, Feng, Lu, Hu, Lin, Li, Zhang, Wang, Zhou, and Fan, 2009). The field of epigenetics, which investigates how experience affects gene expression, is uncovering how nature and nurture collaborate in outcomes, including our physiological and emotional responses to stress (McGowan, Sasaki, D'Alessio, Dymov, Labonte, Szyf, Tureck, and Meaney, 2009).

From this interwoven view of human experience, IPNB focuses a lens of inquiry on mind and well-being and asks: 'What can we do, as individuals, in our relationships and in our organizations, to help create and maintain healthy minds, to facilitate health and well-being on small and large scales? How can we develop organizations that not only function well, but also are creative and flourishing?'

How relevant is a way of knowing that looks at awareness and attention, compassion and connection, resilience and well-being, to the study and practice of leadership? Locally and globally, current events continually show us the power that political and business leaders have, from affecting details of our everyday lives to influencing the course of humanity and our planet. Warren Bennis (2007) stated that one of the four major threats to our world is the leadership of our human institutions, and that only exemplary leadership can solve the other three key threats; nuclear/biological catastrophe, pandemic, and tribalism/assimilation. Bennis called for the field of leadership studies to attend to how we can develop leaders who understand relationships and communication, who can manage themselves and others with wisdom, creativity, and values. We invite you to consider how the ideas of IPNB might contribute to this urgent need.

IPNB concepts are congruent with many existing and developing approaches to organizations and leadership. Paralleling its impact in the fields of psychotherapy and education, IPNB does not present a new intervention protocol, or a set of specific techniques; instead, it provides a way of examining different models within a coherent framework through a lens that focuses on process, healthy development and change, and the potential in the commonly shared ingredients of numerous 'best practices.' In the leadership field, past theories focused on charisma, authority, personality style, and other individual variables, attempting to understand how leaders exerted top-down influence on groups, but newer views of leadership consider

the relationship between leader and follower as a mutual and emergent process. This move from a 'single-skull' to a 'multi-skull' perspective is a hallmark of the IPNB perspective, as we seek to understand our minds and our social brains in interaction with each other. Other congruent advances in business perspectives include the wide-ranging impact of systems theory, originally through the major impact of the concept of 'the learning organization' (Senge, 1990), recognition of the vital importance of emotional intelligence and social intelligence at work (Goleman, 1995, 2006), descriptions of ways that neuroscience can inform leaders and enhance their performance (Rock and Schwartz, 2006), and the potentially world-changing implications of well-being and sustainability receiving serious economic and cultural consideration (Diener and Seligman, 2004; Eisler, 2007; Hawken, 1993). Bennis (2007) stated the field of leadership studies must advance by seeing leadership as grounded in relationship rather than located in an individual, becoming interdisciplinary, collaborative, and more inclusive in its methodologies. In a 2009 review, Avolio, Walumbwa and Weber similarly summarized the important trends in the leadership field: movement toward a more holistic view of leaders/followers/context, examinations of the actual process of leadership, and an expansion of the methods of inquiry considered valid (for example, integrating qualitative research with the dominant quantitative strategies). These qualities; relational, holistic, interdisciplinary, focusing on process, and valuing subjective and objective data – are ingredients of the IPNB perspective.

Integration and the triangle of well-being

The recognition of a 'triangle of well-being' and the full extent of the interdependence and connections among our neurobiology, our interpersonal world, and qualities of our minds, arose from the realization of concordance among attuned relationships, a neurally integrated brain, and a coherent mind (Siegel, 1999, 2010). These are the three points of the triangle through which IPNB examines the movement toward healthy functioning. Relationships in this model are viewed as the sharing of energy and information flow; 'Brain' refers to the mechanism of that flow as it extends in the nervous system distributed throughout the whole body; and the 'Mind' is, in part, a process that regulates the flow of energy and information. For an extensive review of research supporting this thesis, including empirical findings demonstrating the correlations among the outcomes of secure attachment, the integrative functions of the prefrontal cortex, and the impacts of mindful awareness practices, see Siegel, 2007. Interpersonal, neural, or subjective, these three aspects of well-being rely on integration. Integration is the key to moving toward the flexibility, harmony, and adaptability that accompany complexity and the promotion of health in living systems (Siegel, 2010). We can define integration as the linking together of differentiated elements of a system

into a more complex whole. Differentiation means that each element is individuated, and can attain and maintain specialized functions and retain some degree of sovereignty. The linkage of these parts involves functional connections, exemplified by neurons growing into associative networks through neuroplastic changes, an internal storymaking process combining facts, feelings, memory, and meaning, or co-workers engaging in dialogue, knowing they have a shared vision and mission while respecting the unique perspectives of each. Integration occurs when we label an emotion and use the regulatory skill of the prefrontal cortex to calm the activity of limbic brain regions, or when we construct a coherent life narrative that weaves emotion with autobiographical themes, or in the decision making process of an executive team as they collaborate on a strategic plan while expressing multiple perspectives and priorities.

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In IPNB, we consider nine specific domains of integration that can be cultivated to promote well-being, which we will review below. These domains are being applied in psychotherapy, education, program development, leadership training, and organizational development. In addition, many professionals find the frame lends itself to personal as well as work-relevant applications, a natural extension of its integrative perspective.

Complexity theory and research illuminate the ways in which linking differentiated elements of a system to one another; integration; catalyzes the emergence of a state of continued health and well-being. This movement toward integration generally occurs when a system remains balanced yet re-organizing, a synthesis of stability and change, adaptively developing through time. The outcome of such flow is the creation of new combinations that move between familiarity and disorder. We can image this process as a river, bounded by the banks of rigidity and chaos. Though they may veer toward one side or the other, our neural nets, a healthy mind, a safe and loving relationship, or a well-led organization will each move from those stuck or

unstable places back into a forward flow through time, in an integrative state with qualities that can be summarized in the acronym FACES – flexible, adaptive, coherent, energized, and stable (Siegel, 2006). Imagine how an organization in this mode can respond to internal and external shifts and demands in ways that maintain its core identity, while reinforcing the self-organizing development of the entity toward complexity and integration. Creativity and innovation often require some trolling near the chaos bank, but with enough order, familiarity and sense of mission to return to a FACES flow. Rigid organizations that fail to ‘change with the times’ rarely last. If we use the metaphor of an organization moving across time as a boat on this river, then exemplary leaders are those who risk charting the course toward the unknown and take responsibility for attuning with others, eliciting commitment and collaboration among the crew, and facilitating regulation and integration onboard and through the currents. In addition, the wisest leaders invite self-leadership in others – enabling and encouraging their differentiation while cultivating their linking communication with one another – and thus create favorable conditions for integration and the appearance of the coherence, creativity, and emergent order that can occur in self-organizing systems. To extend the metaphor, leaders and consultants help organizations stay on course, riding through rapids and pushing away from shoals as necessary, returning to the integrative FACES flow; a kind of emergence management (Pearce-McCall, 2007).

Defining the mind

To understand how each of us can actually influence the course of integrative processes, we first need to consider the definition of ‘mind’ used in IPNB. This definition itself emerged from an integrative leadership process. In 1992, Dan had organized an interdepartmental group representing a diversity of academic disciplines from across UCLA, ranging from natural and social sciences to computer technology. The 40 participants shared an interest in studying the connections between the mind and the brain, but each expert held their own view or descriptions for the mind, formed by their specific academic discipline, i.e., the mind as an operating system; as brain activity; as thoughts and feelings; as shared social process. The tension among these differing views could have ended the meetings, but linkage among these differentiated disciplines came through construction of a definition of mind that everyone present could endorse while maintaining their particular perspective. This established a common ground for multidisciplinary brain/mind discussions that continued for years. The updated integrative definition that continues to bring agreement among neuroscientists, anthropologists, psychologists, educators and many more, is that mental activities emerge from patterns in the flow of energy and information within and between brains, and that a core feature of the human

mind is *a relational and embodied process that regulates the flow of energy and information.*

Energy refers to all the forms of the capacity for action studied in physics, such as kinetic, radiant, or chemical; information is any representation of something other than itself, such as words and ideas. This flow across time of information and energy is what connects the three aspects of the triangle of well-being. In our relationships, we share and exchange energy and information through actions, expressions and words; our brain (what we use as a term for our entire nervous system distributed throughout the body) is the physical mechanism through which energy and information flow; and our mind regulates this flow, whether we are reacting with automaticity or reflecting and responding with intention.

Our individual mind can influence this flow of energy and information in our subjective experiences of emotion and perception, our brain/body, and our relationships. One easily apparent way we do this is with the focus of our attention. Pause and focus on your fingers, noticing how they look from the outside. Now close your eyes (after completing this sentence) and feel and sense your fingers, from inside. These intentional shifts in focus can be seen in neural activity, as we use our minds to regulate energy and information flow. In other words, the mind can drive the brain to become active in specific patterns. Ethical, exemplary leaders are responsible for developing their own minds in ways that help them regulate the flow of information and energy in integrative patterns, in their co-workers or group members and their organizations, as well as in themselves.

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Dan, and Yammarino, 2006). A similar need exists for research directly investigating the impact developing traits of mindfulness has on leadership skill. Those who have worked extensively with emotional intelligence and leadership have identified mindfulness, along with compassion and hope, as the qualities of 'resonant leadership' that can be intentionally developed (Boyatzis and McKee, 2005). From an IPNB perspective, secure attachment, mindfulness, and both social and emotional intelligence involve the integrative functions of a well-honed middle prefrontal cortex (see Dan Goleman's Foreword in Siegel, 2010).

Years have passed since groundbreaking studies began to reveal that measurable neural changes correlated with developing a more coherent mind.

What already has substantial empirical support is that we can all develop these prefrontal functions through developing our skills of reflection and relationship, and that we can intentionally use our minds to influence the function and structure of the brain itself, to create more neural integration and promote these prefrontal capacities. The more we can develop these, the more we facilitate all the points of the triangle of well-being; a coherent healthy mind, positive empathic relationships, and continued neural integration. From this understanding comes the proposal for a new version of the 3Rs: Reflective and Relational skills, in combination, create Resilience (Siegel, 2007). Imagine a world where we regularly teach this to our children, in schools and at home. Bennis (2007) nominated resilience as *the* most important quality in a leader (or anyone interested in leading a healthy and meaningful life). Can the application of an IPNB framework guide us toward ways all kinds of organizations can integrate reflective and relational skills to develop and maintain the entire triangle of health and well-being, creating sustainable resilience? Years have passed since groundbreaking studies began to reveal that

measurable neural changes correlated with developing a more coherent mind. Perhaps the earliest example is Jeffrey Schwartz and colleagues' 1992 study demonstrating that a 'talking therapy' with mindful reflection and brain-teaching as components effectively reduced symptoms in those with obsessive compulsive disorder as well as actually altering brain functioning (Baxter, Schwartz, Bergman, Szuba, Guze, Mazziota, Alazraki, Selin, Ferng, Munford, and Phelps, 1992).

Mindful awareness practices now have a burgeoning literature supporting their positive effects in many measurable ways. Numerous research laboratories now include technology that allows measurement of neural and physiological changes to be analyzed in tandem with behavioral, emotional, cognitive, and/or relational variables.

From an IPNB perspective, we look toward emerging research that supports the notion that health is cultivated by focusing our attention in specific ways or having certain relationship experiences that nurture neural integration, that through stimulating neural activation and growth toward differentiation and linkage, neural integration is created. The neuroplasticity of the brain suggests that a leader who promotes neural integration will be harnessing the capacity to experience specific and repeated neural firing that can lead to gene expression, protein production, and changes in both the genetic regulation of neurons and the structural connections in the brain that create and reinforce integrated circuitry.

While trying to explain to psychotherapy clients how focusing our attention can create neuroplastic change, Dan began using the descriptive term 'mindsight' for our reflective capacity to become aware of our own minds, as well as our empathic ability to recognize the intentions and emotional states of others, to truly understand 'where they are coming from'. Many kinds of reflective awareness practices can develop our mindsight, increasing the potential to link separate, differentiated neural areas by literally using our focus of attention to direct the flow of energy and information through specific neural pathways. Mindsight makes it possible for us to see the internal world, and then to shape the flow of energy and information by focusing on the three points of the triangle of well-being: We cultivate empathic relationships, an integrated brain, and a coherent mind that can make sense of ongoing experience. Harnessing the power of awareness to strategically stimulate the brain's firing, mindsight enables us to voluntarily change a firing pattern, even one that was laid down involuntarily. The more we have the regulation to become aware of ourselves in our relating, and pause, the more we can notice the states of others and develop empathy. Synaptic linkages are strengthened, the brain becomes more interconnected, and the mind becomes more adaptive as it has more integrative neural circuits to ride. And when we practice noticing others with compassion, we develop the resonance circuitry in our social brains, and we increase our capacity to bring an empathic attention to our own internal complexity

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of your hand represents the inner brainstem, your thumb represents the limbic regions, including the hypothalamus, pituitary, hippocampus, and amygdala (ideally for this model we'd have two thumbs, representing the left and right sides of the brain), and your fingers are the cortex, with the occipital, parietal, and temporal lobes located from the middle knuckles back, and knuckles forward representing the frontal lobes. The area we have focused on, the prefrontal cortex, is the most forward part of the brain, located behind our forehead. On the hand model, the prefrontal region is represented by the area from your fingertips to your first knuckles. The outer two fingertips represent the dorsolateral (or just 'side') prefrontal cortex, which participates in generating the conscious form of attention, sometimes also referred to as the chalkboard of the mind. Even in this simple hand model, you can notice something anatomically unique about the middle prefrontal cortex, represented by the top segments of your middle two fingers – it connects to numerous other areas, resting on top of the limbic-thumb and touching the brainstem-palm, as well as linking to the rest of the cortex-fingers. The hand model of the brain helps us visualize how the middle prefrontal area is literally one synapse away from neurons in the cortex, the limbic areas, and the brainstem. This model helps us reflect on what is happening when we become reactive and dysregulated (lift your fingers up, you can visualize 'flipping your lid'), and what the reflective skills and relational compassion of mindsight do (wrap your fingers gently back around your limbic thumb), helping the prefrontal cortex balance, coordinate, and integrate multiple areas of neural activity. When integration occurs, the brain functions in harmony. Without integration, neural function moves toward rigidity, chaos, or both.

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Domains of integration

One of the central tenets of IPNB is that the development of mindsight allows us to purposefully attend to the various domains of integration that contribute to well-being. Having a beginning capacity for reflection, adequate functioning of the middle prefrontal regions, and some attuned relationship(s) is probably needed to traverse these domains. Recall that these forms of integrative process can be applied to our selves, our relationships, groups, organizations, even cultures and societies, and that integration is the linkage of

differentiated elements of a system. If we can discern when and how integration is insufficient or absent; by detecting areas of a workplace, for example, that have rigidity or chaos; we can then focus on developing strategies to increase differentiation, create connections, and promote integration and well-being. Enhanced integration in the workplace would be associated with increased productivity and job satisfaction, and with other measures of organizational and personal well-being. The first type of integration, upon which all the others rest, is that of *consciousness*.

Being receptive is in stark contrast to being reactive...

Having the capacity to move into a receptive state, which most people can do fairly easily with a little guidance, is the initial skill in stabilizing mindsight's lens through the integration of consciousness. Being receptive is in stark contrast to being reactive, in which we enter a fight-flight-or-freeze mode of processing incoming perception. In the receptive state, we become open to the inner and interpersonal world in a more flexible and adaptive manner. This is the integrative core of this domain of consciousness. If you imagine a metaphoric 'wheel of awareness,' the hub of consciousness is the center from which we can open our receptive awareness or direct our focused attention to anything on the 'rim' – information about the external world from our five senses, information about our internal world through our interoceptive sixth sense, or information about awareness, our mind, and other minds, seen through our mindsight. All mindful awareness practices that help us develop our attention, focus, and intentionality can be seen as developing this hub. The shared attention, attunement, and resonance between people can also invite the spaciousness that comes from a receptive mind. Developing this hub is what allows us to decouple automaticity, to discern different streams of awareness, and to be able to differentiate between our sensory bottom-up processing and the secondary top-down influences of prior learning and cognition (Siegel, 2007). This core also permits us to make sense of mirror neuron and interoceptive information, enabling us to 'feel for another' and yet distinguish what our emotions are from what we empathically sense another person is feeling. From this hub, we learn to focus and refocus our attention among multiple streams of information, and we develop the tripod skills of openness, observation, and objectivity. The integration of consciousness helps to stabilize our minds within the constant internal and external streams of information and energy that fill our internal lives. Leaders need to inhabit

this hub to develop mindsight and all the qualities needed to provide integrative leadership to others, such as emotional regulation and response flexibility. They also need this hub of consciousness to be aware of the multiple aspects of self, co-workers and employees, the organization, and the larger context in which they reside, and to learn to focus and direct their attention among competing priorities.

Horizontal integration on a neural level refers to linkages between the left and right brain hemispheres with their broad tendencies toward specialization, or 'modes', that have existed for millions of years. The 'Ls' of the left mode; linear, logical, linguistic, and literal; and the more holistic, nonverbal, imagery-based, relational and emotional processing of the right mode create a vital, rich, and broadened spectrum of our inner experience that colors our sense of our selves and our interpersonal lives when integrated. For example, imagine reading a story with just the facts, or one with only emotional images; neither would make quite as much sense or have as much meaning as the full, combined version. Our relational experiences during times of major neural development for our social brains may actually create adaptations that decrease horizontal or bilateral integration, leaving one hemispheric mode dominant. Many forms of therapy are attempts to help the mind travel back and forth in these modes, promoting neural integration and a deepened life experience. In an organization, horizontal integration can be seen in the challenge of coordinating different departments, divisions, or locations, often each with their own modes and methods, or in the choices around the best positioning of a company in a marketplace of others.

On an individual level, *vertical integration* involves bringing somatic input into awareness, via the distributed nervous system and the energy and information flowing through the spinal cord and bloodstream, into the brainstem, limbic areas, and cortex and back around. When we develop vertical integration, we can intentionally focus our attention on body sensations, and we are less likely to avoid awareness of bodily input (rigidity) or be flooded with sensation and emotion (chaos). Bodily awareness makes it more likely that we will be able to recognize and calm these energies, so we can consider and choose our responses. Not surprisingly, many people have little experience with this awareness and can be amazed at the difference in information they receive just by sitting quietly, breathing, and sensing their bodies. Leaders can easily ignore cues for hunger, rest, or renewal when they are tuning out somatic input and attending to the business at hand, heightening their chances of developing stress-related illnesses or burnout. A lack of intrapersonal attunement; not being tuned in to and accepting of your own internal world; may make you blind to an escalating torrent of physiological arousal/stress and can result in inappropriate and ineffective expressions of frustration and

anger that can permanently scar working relationships. Anyone can go down this 'low road' and temporarily lose integration. The key is to have enough presence of mind to note the warning signs of such an impending meltdown, and take action to avoid its full enactment along with the common destructive consequences that it carries for all involved. Vertical integration is extremely important on an organizational level, as well, ensuring, for example, that those at the 'top' do not make decisions or design policies without considering information from those who will need to implement them. Leaders attend to vertically integrating energy and information flow up (higher levels of management, the board, regulatory agencies) and down (lower levels of management, employees). When done well, the use of 360° degree feedback for evaluations and goal setting is a concrete example of utilizing horizontal and vertical integration in an organizational process. Several different types of memory have been identified, some volitional and others effortless, and a main task of *memory integration* involves assembling basic pieces into coherent wholes. Our earliest form, termed implicit memory, is present even before birth.

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Our sensations, perceptions, emotions, and actions create the foundation for the way we 'remember' our experiences. These building blocks of memory become generalized as implicit mental models, shaping our expectations of how the world works. Sometime in toddlerhood, as brain development proceeds, we become able to have implicit memories linked to one another via the hippocampus, becoming woven together as explicit memories – the autobiographical and factual information that forms the foundation for our knowledge of the self and the ways of the world. However, throughout our lives we can sometimes experience implicit-only representations as though they are 'here and now', which can be a source of misinterpretation and miscommunication. Mindsight increases our capacity to

this hub to develop mindfulness and all the qualities needed to provide integrative leadership to others, such as emotional regulation and response flexibility. They also need this hub of consciousness to be aware of the multiple aspects of self, co-workers and employees, the organization, and the larger context in which they reside, and to learn to focus and direct their attention among competing priorities.

Horizontal integration on a neural level refers to linkages between the left and right brain hemispheres with their broad tendencies toward specialization, or 'modes', that have existed for millions of years. The 'Ls' of the left mode: linear, logical, linguistic, and literal; and the more holistic, nonverbal, imagery-based, relational and emotional processing of the right mode create a vital, rich, and broadened spectrum of our inner experience that colors our sense of our selves and our interpersonal lives when integrated. For example, imagine reading a story with just the facts, or one with only emotional images; neither would make quite as much sense or have as much meaning as the full, combined version. Our relational experiences during times of major neural development for our social brains may actually create adaptations that decrease horizontal or bilateral integration, leaving one hemispheric mode dominant. Many forms of therapy are attempts to help the mind travel back and forth in these modes, promoting neural integration and a deepened life experience. In an organization, horizontal integration can be seen in the challenge of coordinating different departments, divisions, or locations, often each with their own modes and methods, or in the choices around the best positioning of a company in a marketplace of others.

On an individual level, *vertical integration* involves bringing somatic input into awareness, via the distributed nervous system and the energy and information flowing through the spinal cord and bloodstream, into the brainstem, limbic areas, and cortex and back around. When we develop vertical integration, we can intentionally focus our attention on body sensations, and we are less likely to avoid awareness of bodily input (rigidity) or be flooded with sensation and emotion (chaos). Bodily awareness makes it more likely that we will be able to recognize and calm these energies, so we can consider and choose our responses. Not surprisingly, many people have little experience with this awareness and can be amazed at the difference in information they receive just by sitting quietly, breathing, and sensing their bodies. Leaders can easily ignore cues for hunger, rest, or renewal when they are tuning out somatic input and attending to the business at hand, heightening their chances of developing stress-related illnesses or burnout. A lack of intrapersonal attunement; not being tuned in to and accepting of your own internal world; may make you blind to an escalating torrent of physiological arousal/stress and can result in inappropriate and ineffective expressions of frustration and

anger that can permanently scar working relationships. Anyone can go down this 'low road' and temporarily lose integration. The key is to have enough presence of mind to note the warning signs of such an impending meltdown, and take action to avoid its full enactment along with the common destructive consequences that it carries for all involved. Vertical integration is extremely important on an organizational level, as well, ensuring, for example, that those at the 'top' do not make decisions or design policies without considering information from those who will need to implement them. Leaders attend to vertically integrating energy and information flow up (higher levels of management, the board, regulatory agencies) and down (lower levels of management, employees). When done well, the use of 360° degree feedback for evaluations and goal setting is a concrete example of utilizing horizontal and vertical integration in an organizational process. Several different types of memory have been identified, some volitional and others effortless, and a main task of *memory integration* involves assembling basic pieces into coherent wholes. Our earliest form, termed implicit memory, is present even before birth.

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Our sensations, perceptions, emotions, and actions create the foundation for the way we 'remember' our experiences. These building blocks of memory become generalized as implicit mental models, shaping our expectations of how the world works. Sometime in toddlerhood, as brain development proceeds, we become able to have implicit memories linked to one another via the hippocampus, becoming woven together as explicit memories – the autobiographical and factual information that forms the foundation for our knowledge of the self and the ways of the world. However, throughout our lives we can sometimes experience implicit-only representations as though they are 'here and now', which can be a source of misinterpretation and miscommunication. Mindfulness increases our capacity to

discern the current impact of implicit memory and to make these memories explicit, freeing us from some internal constraints and allowing us to live more fully in the present. In consultations, one of us (DPM) has found that recognition of negative implicit memories can quickly defuse their impact and improve leadership capacities or executive team collaboration. An organizational form of memory integration can be seen in what has been called knowledge transfer or knowledge management. These require employees to be able to make explicit what they know about policies, best practices, client relationships, or organizational culture, and to find ways to communicate and share this information with co-workers, especially during times of transition.

When organizations create their mission-vision-values-goals, they are developing an integrating narrative.

We humans have a clear preference to create and tell stories, and *narrative integration* is the weaving of the facts and felt experiences of our lives into coherent stories that make sense of our inner and outer worlds. A major attachment research finding is that the most robust predictor of whether a child will have a secure attachment to their parent is the degree of coherence (what IPNB views as integration) in that parent's telling of his or her own life story. The amount of coherence is an indication of whether the parent has 'made sense' of how early life events have impacted his or her life. Narrative integration shapes our lives, our families, and our cultures. When leaders have a coherent story to tell – in the form of history, vision, mission, and values – this has a significant impact on the integration and resilience of the organization. Sternberg (2008), describing his WICS model of leadership, suggested that it is through compelling stories that successful leaders synthesize wisdom, intelligence, and creativity, and that leaders' stories must fit the needs of their followers. When organizations create their mission-vision-values-goals, they are developing an integrating narrative. Marketers and publicists have long realized the worth of a good story in attracting attention and selling to the public, a form of narrative integration between an organization and its larger context (Heath and Heath, 2007). Stories are not

just fun ways of learning – they are the biological foundation for how the brain learns and remembers best.

State integration is necessary because we all experience a multiplicity of internal states, organized by our emotions, desires, or needs. A state of mind correlates with a cluster of neural firing patterns assembled into a functional unit. Our states of mind can contain their own habitual patterns and history, and involve increased accessibility to certain memories. With *mindsight*, we can learn to accept the diverse, shifting, and sometimes conflicting nature of our states of mind, which can help decrease shame and fear and open us to authenticity, integrity, and possibility.

Effective leaders may learn to use *mindsight* to integrate their own internal states and to influence the states in others. They do not avoid emotion and conflict (rigidity), nor are they overwhelmed by it (chaos); effective, inspiring leaders are emotion-informed, which requires comfort with, and differentiation or linkage of multiple states. *Mindsight* informed awareness and regulation is not simply about calm or pleasant states, it encompasses the full range of emotional experience, from the organizational leaders who purposefully incorporate play to the educator who uses the Socratic method to increase anxiety, motivation, and attention. Organizations may be more resilient when leaders can help employees make sense of and integrate the ebb and flow of states that vary with the cycles of the marketplace and the economy, or the life-cycles of their products. The realities of aggressive competition in the world beyond a company, for example, need to be balanced with states of cooperation and collaboration within the company's walls (even as those states may involve harnessing the charge of competitiveness for some). State integration entails embracing the diversity of states within each of us and promoting internal coherence within the varied and changing contexts of the work environment.

Interpersonal integration involves the 'neurobiology of we' (Siegel, 2008); the delightful and deeply rewarding human experience of 'feeling felt' by another person, the resonant connection of two minds joining in energy and information flow. Research into the activity of the mirror neurons suggests a possible mechanism of the neural reality of close relationships. Neuroscientist Marco Iacoboni (2008) who investigates the role mirror neurons may play in bonding, learning, morality, consumer choices, and political affiliations, has summarized research findings as clearly demonstrating that we are wired for empathy. Mirror neurons may play an important role in phenomenon such as emotional contagion, the power of imitation, the interrelationship of leaders and followers, and the experience of *mindsight*. Those with well-developed *mindsight* are more able to create and maintain interpersonal integration, and may be more likely to recognize and avoid the full impact of emotional contagion, or resonance. This social spreading,

particularly of negative and disabling emotions, can be detrimental to motivation, performance, and job satisfaction. A leader's level of *mindsight* can be pivotal in connecting with this resonant potential and, rather than merely being overtaken by it, remaining reflective and able to move it in positive directions. Charismatic leaders are possibly those who excite our mirror neurons successfully, with their words and their delivery, but these interpersonal skills can also be developed. Organizations need interpersonal integration for successful coordination of people on work teams, or across divisions or regions, each with differing personalities/cultures, perspectives, and roles.

The need for *temporal integration* comes from our mental capacity to leave the present moment and 'live' in the past or the future. Most of us are surprised to reflect on our mind's location in time, and realize how infrequently we reside in here and now. Temporal integration also involves the need this prefrontal cortex capacity for 'time-travel' creates, even as we long for certainty, permanence, and immortality.

Finding a way to embrace these understandable desires as well as their counterparts in the reality of existence; uncertainty, impermanence, and mortality; is an aspect of this form of integration. Aside from the personal existential issues this raises, leaders must be the representatives of clarity about where their organization was, is, and can go, integrating current certainties with risks and changes for the future. As Senge said (2006, ¶ 15), 'To be an effective visionary you must also be connected to the realities of today.' The pace of change in our world, markets, information technologies, and knowledge requires leaders who anchor their decisions in current perceptions while embracing ongoing adaptation and improvement. Leaders are addressing temporal integration when they help others move away from the stuck place of 'that's how it's always been done' to the uncertainty of new procedures and responsibilities. Letting go of the past and moving into the present to free the possibilities of the future combines many forms of integration, from temporal to narrative, as leaders create a more fluid and integrated flow of their organizations across developmental phases.

Attending to the development of these eight domains of integration often allows a new form of integration to emerge. This spontaneous development feels like it breathes life and energy across all the other domains, so Dan termed it '*transpirational*' integration. This is the expansive feeling of being part of a much larger whole, a connection to the essence of being human and to all of humanity, to the precious rhythms of the global pulse of life. In the many and various research explorations of happiness and wisdom, this awareness of interconnection seems to be at the heart of living a life of meaning and purpose. Those organizations that somehow find ways to invite these feelings into employees' lives at work have lower turn-over, higher productivity, and

happier people. If we hope to have ethical leaders who value and promote well-being and sustainability, we need leaders who experience this form of integration. These leaders, with well-developed *mindsight*, will naturally help their businesses strive for 'ecological intelligence' (Goleman, 2009), considering our organizations, products, and purchases in terms of their real impact on the consumption of the earth's non-renewable resources, and on all people, locally and globally, now and in the future. True sustainability requires much more than the institution of 'green practices', though the exponential interest in recycling, carbon offsets and energy efficiency is a sign of progress (when not just a marketing device). Commitment to an ongoing focus on human and planetary health and well-being requires a shift in our subjective and relational capacities, toward appreciation, balance, and compassion, a shift that can occur through the development and application of *mindsight* to all the processes of integration.

Conclusion

Information and technology will continue to expand at an accelerating pace. Our growing knowledge of the brain, and ways to use this knowledge for learning, change, and social influence, will be put to use. What can help ensure that leaders apply these advances in positive ways that avoid rigidity and chaos, and encourage adaptive and healthy development? True NeuroLeadership involves addressing the ethical responsibilities inherent in leading minds and brains. When utilized in coaching, consulting, or leading, the IPNB perspective focuses on developing *mindsight* and the integrative processes that facilitate reflection, relationship, and resilience. Attending to these processes can promote the full triangle of well-being within our workplaces, and in the energy and information flow of commerce, with its pivotal circulatory role in human and planetary health. With the cultivation of *mindsight*, leaders naturally consider long-term as well as short-term outcomes, collaboration instead of domination, and business practices that enhance profit, people, and the planet. Imagine what might become possible for all of us if we consistently applied *mindsight* and reflective, compassionate, and integrative leadership to ourselves, our relationships, our organizations, and our countries.

References

- Avolio, B. J., Walumbwa, F. O., & Weber, T. J. (2009). Leadership: Current theories, research, and future directions. *Annual Review of Psychology*, 60, 8.1-8.29.
- Baxter, L. R., Schwartz, J. M., Bergman, K. S., Szuba, M. P., Guze, B. H., & Mazziotta, J. (1992). Caudate glucose metabolic rate changes with both drug and behavior therapy for obsessive-compulsive disorder. *Archives of General Psychiatry*, 49(9), 681-689.
- Bennis, W. (2007). The challenges of leadership in the modern world. *American Psychologist*, 62(1), 2-5.

- Berson, Y., Dan, D., & Yammarino, F. J. (2006). Attachment style and individual differences in leadership perceptions and emergence. *Journal of Social Psychology, 146*(2), 165-182.
- Boyatzis, R., & McKee, A. (2005). *Resonant leadership: Renewing yourself and connecting with others through mindfulness, hope, and compassion*. Boston: Harvard Business School Publishing.
- Coan, J. A., Schaefer, H. S., & Davidson, R. J. (2006). Lending a hand: Social regulation of the neural response to threat. *Psychological Science, 17*(12), 1032-1039.
- Cozolino, L. J. (2006). *The neuroscience of human relationships: Attachment and the developing social brain*. New York: W. W. Norton.
- Davidovitz, R., Mikulincer, M., Shaver, P., Izsak, R., & Popper, M. (2007). Leaders as attachment figures: Leaders' attachment orientations predict leadership-related mental representations and followers' performance and mental health. *Journal of Personality and Social Psychology, 93*(4), 632-650.
- Davidson, R. J., Kabat-Zinn, J., Schumacher, J., Rosenkranz, M., Muller, D., Santorelli, S., Urbanowski, F., Harrington, A., Bonus, K., & Sheridan, J. F. (2003). Alterations in brain and immune function produced by mindfulness meditation. *Psychosomatic Medicine, 65*(4), 564-570.
- Diener, E., & Seligman, M. (2004). Beyond money: Toward an economy of well-being. *Psychological Science in the Public Interest, 5*(1), 1-31.
- Eisenberger, N. I., & Lieberman, M. D. (2004). Why rejection hurts: a common neural alarm system for physical and social pain. *Trends in Cognitive Sciences, 8*(7), 294-300.
- Eisler, R. (2007). *The real wealth of nations: Creating a caring economics*. San Francisco: Berrett-Koehler.
- Goleman, D. (1995). *Emotional intelligence*. New York: Bantam Books.
- Goleman, D. (2006). *Social intelligence: The new science of human relationships*. New York: Bantam Dell.
- Goleman, D. (2009). *Ecological intelligence: how knowing the hidden impacts of what we buy can change everything*. New York: Broadway Books.
- Goleman, D. (2010). Foreword. In D. J. Siegel, *Mindsight: The new science of personal transformation*. New York: Bantam.
- Hawken, P. (1993). *The ecology of commerce*. New York: HarperCollins.
- Heath, C. & Heath, D. (2008). *Made to stick: Why some ideas survive and others die*. New York: Random House.
- Iacoboni, M. (2008). *Mirroring people: The new science of how we connect with others*. New York: Farrar, Straus, and Giroux.
- McGowan, P. O., Sasaki, A., D'Alessio, A. C., Dymov, S., Labonte, B., Szyf, M., Tureck, G., & Meaney, M. J. (2009). Epigenetic regulation of the glucocorticoid receptor in human brain associates with childhood abuse. *Nature Neuroscience, 12*, 342-348.
- Pearce-McCall, D. (2007). Mindsight at work: Our organizations, ourselves. *Connections and Reflections, The GAINS Quarterly* (Autumn), 12-17.
- Popper, M. & Mayseless, O. (2003). Back to basics: Applying a parenting perspective to transformational leadership. *The Leadership Quarterly, 14*, 41-65.
- Ringleb, A. H., & Rock, D. (2008). The emerging field of NeuroLeadership. *NeuroLeadership Journal, 1*, 3-19.
- Rock, D. & Schwartz, J. M. (2006). The neuroscience of leadership. *strategy+business magazine, 43*, 71-81.
- Senge, P. M. (1990). *The fifth discipline: The art and practice of the learning organization*. New York: Doubleday Currency.
- Senge, P. M. (2006). *Business as a human community: An interview with Peter Senge*. Retrieved February 2, 2007, from Society for Organizational Learning, http://www.solonline.org/news/item?item_id=9000239
- Siegel, D. J. (1999). *The developing mind: Toward a neurobiology of interpersonal experience*. New York: Guilford Press.
- Siegel, D. J. (2006). An interpersonal neurobiology approach to psychotherapy: Awareness, mirror neurons, and neural plasticity in the development of well-being. *Psychiatric Annals, 36*(4), 248-256.
- Siegel, D. J. (2007). *The mindful brain: Reflection and attunement in the cultivation of well-being*. New York: W. W. Norton.
- Siegel, D. J. (2008). *The neurobiology of we: How relationships, the mind, and the brain interact to shape who we are*. Sounds True Inc.
- Siegel, D. J. (2010). *Mindsight: The new science of personal transformation*. New York: Bantam.
- Siegel, D. J., & Hartzell, M. (2003). *Parenting from the inside out: How a deeper self-understanding can help you raise children who thrive*. New York: Penguin Putnam.
- Sternberg, R. (2008). The WICS approach to leadership: Stories of leadership and the structures and processes that support them. *The Leadership Quarterly, 19*, 360-371.
- Tang, Y. Y., Ma, Y., Fan, Y., Feng, H., Wang, J., Feng, S., Lu, Q., Hu, B., Lin, Y., Li, J., Zhang, Y., Wang, Y., Zhou, L., & Fan, M. (2009). Central and autonomic nervous system interaction is altered by short-term meditation. *PNAS, 106*(22), 8865-8870.
- Wilson, E. O. (1998). *Consilience: The unity of knowledge*. New York: Knopf.