their common ground and expanding the reach beyond serious mental illness is with the publication of a new text, *Neuroscience for Social Work: Current Research and Practice* (2014). The lead editor of this text, Holly Matto, is the author of the other review for this publication of Dan Siegel’s seminal text for social scientists, *The developing mind: How Relationships and the brain develop to shape who we are* (2012). Dr. Matto, whose practice and research has been in the area of addiction science, has added to the direction begun by Dr. Rosemary Farmer in exploring this intersection of social work and neuroscience. I speak for Keryn and myself in acknowledging the excitement of this step forward in the social work literature, and hope that this work will become a part of generalist social work practice, so that future students seeking the platform for their own interests will find the evidence they need that social work is committed to this direction.

**References**


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Social workers believe in the power of relationships to transform lives and to alter life course trajectories. As social workers, we know how important the instrumental use of self is in our work with client systems, and how hard it is to move toward shared goals of change without a strong social worker-client professional relationship at its foundation. Daniel J Siegel’s second edition of *the developing mind* offers essential scientific understanding as to why and how these guiding principles, embraced by social workers from our profession’s beginnings, promote health, and well-being. Replete with the latest research from diverse disciplines that contributes to our understanding of the Interpersonal Neurobiology (IPNB) perspective, Siegel shows in approachable depth how our social experiences influence the developing mind through action on neural circuitry. Such interdependency among brain, mind, and relationships means that our self-organization capacity emerges from our shared experiences with others. Our social world influences our nervous system development, and the first three years of life are most significant in shaping its nonverbal/emotional functioning. The right hemisphere is dominant in the first three years of life, and the infant brain is dependent
upon caregiving experiences that are appropriately attuned to these nonverbal/emotional and sensory-based needs. Impaired attunement to such physical and emotional needs in these early years can lead to deficits in emotional regulation capacity later in life (e.g., inability to read social cues) (pp. 246–247). *Implicit memory*, the memory system which is at work before the development of the hippocampus and verbal/explicit memory, is involved in the activation of circuits that represent behavior, emotions, sensations, and images. Therefore, implicit representation of early childhood experiences (e.g., contingent and attuned emotional responsivity vs. detached and misaligned emotional reactivity) serve as an internal working model or template for how a child will organize his/her self-other interactions. These earliest caregiving memories lead to generalized mental “attachment models” that become our representations of self and other over time. Parental sensitivity to children’s emotional cues and consistent and accurate response to their physical and emotional needs facilitate the development of a coherent and emotionally-regulated self. Secure attachment gives the child tools to flexibly respond to life’s challenges. Mental images that reflect secure attachment also reflect an integrated neural network that promotes emotional regulation. As Siegel suggests, resonance, or the opportunity to “feel felt” (p. 117), is developed out of sensitive and responsive secure attachments that lead to prefrontal cortical mediation (via orbitofrontal cortex): “The orbitofrontal cortex works with other areas of the middle prefrontal cortex to facilitate the regulation of bodily arousal by pushing down a kind of emotional ‘clutch’ that disengages the sympathetic ‘accelerator’ and activates the parasympathetic ‘brakes’” (p. 314).

Human emotions help us organize and understand experience. Siegel proposes that emotions represent “changes in the state of integration” (p. 148) in the context of human relationships, and that emotional regulation is the ability to engage in organized behavior when experiencing intensely arousing events. A secure attachment history facilitates the ability for the self-organizing system to “recalibrate” in response to stressors and adapt to adversity. Although early caregiving experiences matter, the science suggests we are afforded life-long relational opportunities to shape and reshape these critical neural networks and attendant mental processes such as emotional regulation, memory, and self-awareness. Our nervous system is open to sculpting from experience across the life course. Science supports the plasticity of our nervous system, suggesting we can grow new synaptic connections, make new myelin, and grow new neurons throughout our lives (p. 253). Self-regulation comes from integrated neural systems and integrated interpersonal relationships, and studies have shown that the neural areas in our brains responsible for regulation, like the medial prefrontal cortex, are dynamic and open to change. While relationships can have damaging effects, like verbal abuse and its deleterious effect on corpus callosum development (p. 353), we know that positive relational experience and creative therapeutic involvement can enhance and restore integrative functioning in important neural areas:

by encouraging imagery and other nonverbal processes (such as ‘drawing on the right side of the brain’ art techniques, awareness of bodily sensations, dance, and music), psychotherapy can facilitate the emergence of new ways of experiencing the self (p. 325).
In the developing mind, Siegel identifies the four characteristics of integration, as FACE: flexible, adaptive, coherent, energized, and stable, and discusses nine dimensions of integration to include (p. 380): (1) Consciousness (sense of awareness); (2) Bilateral (left-right hemispheres); (3) Vertical (subcortical to cortical and attention to bodily sensations); (4) Memory (implicit–explicit); (5) Narrative (“making sense” of one’s life stories); (6) State integration (inter-state and intra-state linkages); (7) Interpersonal (connection simultaneous with differentiation); (8) Temporal (reconciling certainty vs. impermanence); (9) Transpirational (“integration of integration”; belonging to something beyond the self). Siegel underscores that the most adaptive brains are those characterized by maximum integration. Thus, social work interventions should be designed to enhance neural and interpersonal integration.

My own work applies these scientific principles outlined in Siegel’s book with populations struggling with recovery from addictive substances. Specifically, we developed a dual processing (DP) treatment intervention designed to enhance integrative functioning. Our DP intervention combines an art therapy (experiential) protocol with a cognitive-behavioral (CBT) approach aimed at shifting brain functioning from a relapse-reactive to a recovery-adaptive healing trajectory. Because substance dependence creates stress system dysregulation which, in turn, may limit the efficacy of verbal-based treatment interventions, treatment models that target implicit/sensory-based functioning are necessary, which can then be integrated with verbal processing (CBT) techniques. As Siegel states:

Within an individual, bilateral integration may occur in creative processes of many forms...this new capacity for integration – both interpersonal and internal – may create a sense of vitality and a release of creative energy and ideas, leading to an invigorating sense of personal expression. Such spontaneous and energized processes can give rise to participation in various activities, such as painting, music, dance, poetry, creative writing, or sculpture (p. 375).

Thus, treatments that promote such bilateral (horizontal) and top-down (vertical) integration and strengthen connectivity will tilt the biopsychosocial trajectory towards healing and wholeness. To examine the efficacy of this DP protocol on brain functioning, we conducted a Randomized Controlled Trial (RCT) with a sample of adults struggling with substance dependency. Functional Magnetic Resonance Imaging (fMRI) analyses showed decreased amygdala activation simultaneous with increased frontal lobe activation during drug stressor presentation at post-treatment, with results offering preliminary evidence that this combined art therapy–CBT treatment intervention acts on neural functioning in ways that increase emotional regulatory capacity in the presence of drug stressor cues by enhancing top-down functioning and diminishing amygdala reactivity (see Matto, Hadjiyane, Kost, Marshall, Wiley, Strolin-Goltzman, Khatiwada, & VanMeter, 2014).
In conclusion, every practicing social worker should read Siegel’s book as it is densely packed with important implications for our day-to-day work with clients and client systems. Siegel proposes, through an abundance of scientific evidence, that health and well-being is characterized by coherence, continuity, and integration. We should ask ourselves in our everyday practice with clients how we are promoting health and well-being by providing opportunities for *relational* and *neural* coherence, continuity, and integration. For when we provide such opportunities, we open up the space to shift life-course trajectories towards health and wholeness through connection and compassion.

Reference