

THE NONLINEAR DYNAMICS OF CLINICAL INTUITION

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ABSTRACT

Whereas clinical theory captures the static, reductionist perspective on psychotherapy, clinical intuition embodies the living, ever-shifting engagement between therapist and patient that originates at nonconscious levels. I examine the nonlinear dynamics of clinical intuition, defined as the capacity to pick up and respond to complex and subtle interpersonal patterns as guided by the right brain's holistic, emotion- and arousal-regulating tendencies. Clinical intuition represents the self-organizing, emergent, nonlinear dimension of psychotherapy that corresponds to moment-to-moment intervention and response. This paper explores the interpersonal neurobiology of bottom-up, implicit relational knowing that draws upon subcortical foundations of sensation, emotion, and imagery. Clinical intuition fills the gap between theory and practice during psychotherapy, a necessary ingredient for deep change. From a dynamical perspective, the coupled therapist/patient system self-organizes to the edge of chaos, where the dyad faces the threat of breakdown in order to navigate the spontaneous breakthrough of novel, more complex structure.

During the moment-to-moment dynamics of a psychotherapy session, clinicians possess two primary modes for perceiving and responding to patients: clinical intuition and clinical deliberation. Whereas clinical research, theory, and didactic methods of teaching are relevant to clinical deliberation, only direct relational experience, especially clinical immersion with patients, is relevant to the accrual of clinical intuition. Regardless of level of training or amount of previous experience, both modes of information processing occupy the clinician's toolbox. This chapter examines the nonlinear dynamics of clinical intuition, partly through its contrast with the relatively linear mode of clinical deliberation.

First, I define and locate clinical intuition through its neurobiological underpinnings within nonverbal, implicit processes that originate in embodied relational experience, initially registered below the threshold of conscious awareness. From a developmental and evolutionary perspective, I connect the operation of clinical intuition with the automatic operation of the parental instinct as hard-wired into the human brain within the limbic, emotional/motivational circuitry shared by all social animals. As an aspect of right-brain processing, I link clinical

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intuition with central important features of nonlinear science, including: bottom-up processing, holistic perspective, ever-changing dynamics, unique trajectory, context dependence, emergent novelty, and fractal pattern. Precisely because of these nonlinear elements, I assert that clinical intuition, rather than clinical deliberation, is better suited to capture the full complexity and nuance of deep clinical work.

THE NONLINEAR FRAMEWORK OF INTERPERSONAL NEUROBIOLOGY

Whereas early outcome research on clinical efficacy (e.g., Strupp, 1978), focused on personality differences between therapists, more recent evidence suggests that a robust therapist effect in psychotherapy process and outcome can far exceed differences between therapeutic methods (Dinger, Strack, Leichsenring, Wilmers, & Schauenberg, 2008; Hupert, Bufka, Barlow, Gorman, Shear, & Woods, 2001; Lutz, Leon, Martinovich, Lyons, & Stiles, 2007; Wampold, 2010; Wampold & Brown, 2005). Personal differences between therapists, such as the capacity for empathy, may be of greater importance to clinical results than differences based on theoretical orientation. Given findings of greater variation within rather than between different theoretical schools, contemporary clinical research often seeks pan-theoretical factors that spread across all orientations.

An important pan-theoretical, i.e., universal, factor that contributes to positive outcome is the quality of the therapeutic relationship. Nissen-Lie, Monsen, and Ronnestad (2010) examined the therapist's contribution to the working alliance. Characteristics most predictive of a strong working alliance involved relational skills. Therapists perceived by patients as warm, accepting, engaged, empathic, and responsive appear best able to establish strong working alliances. From the neurobiological point, there are two separate brain pathways toward empathy, such that warm engagement includes not just a cognitive dimension of understanding but also an emotional dimension of affective resonance (Decety, 2011). In this way, we go beyond simple knowing to emotional involvement and feeling for what our patients feel (e.g., Lamm, Bateson, & Decety, 2007), all within the realm of clinical intuition.

The search for universal factors of effective psychotherapy is greatly facilitated by cutting edge brain imaging techniques that allow for functional analyses of the nervous system in context. Recent cutting edge research allows for simultaneous measurement of two brains in real-time interaction with one another. As an example, Stevens, Silbert & Hasson (2010) demonstrated an extraordinary degree of sync between speakers and listeners that extends far beyond brain structures responsible for speech production and comprehension. More generally, nonlinear research methodology that seeks to preserve the full complexity of context, while measuring dynamic changes over real time, contrasts with older, more reductive methodologies aimed at reducing complexity and/or pigeonholing treatment processes. These older, simplistic efforts often use normative data, which fail to capture the extraordinary variability and radical uniqueness each individual brings to the therapeutic dyad.

The danger of reducing psychological, social, or cultural levels to underlying mechanical, electrical, or chemical events exists primarily from a linear perspective. Whether in the form of diagnosis, underlying brain chemistry, or electrical firing patterns, linear chains allow researchers to collapse complex phenomena into their component pieces, processes, or

precursors. By contrast, nonlinear approaches preserve natural complexity, partly by incorporating circular models of causality that permit bi-directional loops of interaction. As an example, minds can alter brains (through top-down mental dynamics), at the very same time that brains can alter minds (through bottom-up physiological processes). Similarly, culture shapes emotional expression through accompanying brain changes (e.g., Markus & Kitayama, 1991), while changes in brain chemistry affect how people feel, and in turn, shape culture.

Things get even more complex when circular models include multiple brain/mind/body systems, which is indispensable to modeling psychotherapeutic exchanges. Here, to preserve full complexity means to recognize the centrality of unique relationship dynamics. Enter the nascent discipline of interpersonal neurobiology (Badenoch, 2008; Cozolino, 2002; 2006; Marks-Tarlow, 2012, 2014a; Montgomery, 2013; Schore, 2003, 2012; Siegel, 1999), an interdisciplinary field that seeks to understand people's minds, brains, and relationships through multiple, convergent perspectives. From a linear point of view, people are separate beings who come together to form relationships, while a nonlinear point of view reverses this formulation. The individual is seen to *emerge out* of a relationship with a significant "other". Considering that all babies begin life inside their mother's body and at birth remain physically and emotionally dependent, a nonlinear formulation dovetails well with actual stages of development.

There is increasing recognition of the importance of a developmental framework to the clinician's eye (e.g., Seligman, 2012). Even when working with adults, clinical practice is best informed by understanding optimal growth patterns plus their potential derailments. Regulation theory as conceived by Allan Schore (2003, 2012) is especially important in this regard. Regulation theory marries Bowlby's (1969, 1973) attachment theory—where babies need the security of healthy bonds with critical caretakers—with underlying dynamics in the brain and nervous system. By underscoring the centrality of early attuned or misattuned caretaking to later healthy or unhealthy states of the brain/mind/body system, regulation theory affords a developmental perspective. Regulation theory also is intrinsically nonlinear (Marks-Tarlow, 2011, 2012), by emphasizing critical windows of development plus the disproportionate power of tiny relational traumas to wreak long-term devastation in brains, bodies, and nervous systems. Generally, the earlier an emotional disruption occurs, the more serious, subcortical, far-reaching, and potentially irreversible the outcome. To adopt a developmental framework lends psychotherapists a more nuanced understanding of patient problems and constraints.

As the methods, research and paradigm of nonlinear dynamics slowly infuses the broad range of social sciences, a rich body of theoretical and clinical literature accumulates within psychotherapy, especially within the relational psychodynamic school (Coburn, 2000, 2002, 2007, 2013; Galatzer-Levy, 1995, 2002, 2004, 2009a, 2009b; Harris, 2005, 2009; Leffert, 2008; Levin, 2006; Levinson, 1994; Marks-Tarlow, 2008, 2011, 2015; Moran, 1991; Orsucci, 2002; Palumbo, 1999, 2007; Piers, 2000; Piers, Muller & Brent, 2007; Pizer, 1998; Priel & Schreiber, 1994; Procci, 2002; Rubinfeld, 2001; Seligman, 2005; Spruiell, 1993; Stolorow, 1997; Taerk, 2002; Thelen, 2005). Nonlinear science provides a flexible description of how psychotherapy operates on multiple levels—ranging from the time scale of milliseconds where subcortical, autonomic processes contribute to conscious "moments of meeting" plus their cascading effects over longer time scales. As a metaframework for psychotherapy (Seligman, 2005), a nonlinear dynamical approach can unify a multiverse of cultural perspectives, while accommodating diverse schools of thought within a non-authoritarian context (see Marks-Tarlow, 1999; 2008). The holistic nature of the paradigm counteracts reductionist divisions and Cartesian splits,

helping to marry the art of psychotherapy with its science, while unifying meaning-making endeavors at ever wider descriptive levels.

WHAT IS CLINICAL INTUITION?

To date, the topic of clinical intuition is rarely discussed or researched in university settings (Marks-Tarlow, 2012). The topic is more likely to emerge during supervision, yet is often discussed in hushed tones, especially if brushing up against extra-ordinary edges of perception (see Mayer, 2007). Clinical intuition may be considered a form of social and emotional intelligence (Goleman, 1997) that contributes to a strong working alliance. Through clinical intuition, we detect and respond to relational patterns both within our patients and within ourselves. In order to perceive patterns within a healing context, clinicians need to know, and just as importantly to feel, into the minds of others.

I have previously defined clinical intuition as the capacity to pick up and respond to complex and subtle interpersonal patterns as guided by the right brain's holistic, emotion- and arousal-regulating tendencies (Marks-Tarlow, 2012, 2014a, 2014b). Through emotional circuits we share with other mammals, the instincts to bond with, nurture, and care for others lend us empathic tools to feel and think our way into the minds of our patients. In this way, clinical intuition is continuous with parental instincts as shared by all social mammals. Because of the exquisite attention to detail, context, and distinctions, I also assert that clinical intuition is necessary, though not a sufficient, ingredient for deep change during psychotherapy. Finally, as a critical element for change, clinical intuition is a two-way street that exists and becomes activated both in therapists and patients alike during the course of successful psychotherapy.

Clinical intuition is what fills the gap between theory and practice. Where theory is static, intuition is alive. Where theory exists outside of real time, intuition involves immersion within the lived moment. Where theory attends to similarities between groups of people, clinical intuition attends to the particulars of *this* person, in *this* room, during *this* moment, given *this* developmental history. By guiding moment-to-moment perception of patients as focused through the lens of the self, this mode of information processing cleans the slate of top-down preconceptions. Therapists can begin anew, in line with bottom-up, raw data as drawn from present-centered, embodied experience.

THE PROBLEM WITH TOP-DOWN PROCESSING

Whether through classroom experience or clinical readings, teachings *about* psychotherapy involve willful planning and verbally organized information directed to and from conscious channels. Didactic approaches to training implicate *explicit processes of learning and memory*. Because explicit, verbally mediated channels are the mainstay of most clinical programs, it is easy to assume that clinical deliberation is superior and takes precedence over clinical intuition during clinical work.

Yet, significant problems exist with an over-reliance on top-down processing. When clinical material is processed in “top-down” fashion, abstract concepts represent a “higher” level than concrete details supplied by minute-to-minute emotional and sensory data. During top-down processing, therapists are less inclined to look with open minds; instead they look to

confirm starting assumptions or presumptions in reductionist fashion. Perhaps they approach clinical work with a fixed idea about the meaning of certain symptoms. For example, when encountering the following cluster within a patient—hypervigilance toward others, enhanced startle reactions, intense preoccupation with whatever could go wrong—they might assume that somewhere in the past history of the patient’s life there exists a traumatic life event. The natural response to such a presumption is to “look for” the source of trauma in the patient by probing for a specific event. If they fail to find what they are looking for, they may persist in their conviction anyway, for example by assuming the patient has repressed a troubling memory. While this is reasonable in theory, it precludes other possibilities just as likely, if not more. Rather than indicating one big trauma, these same symptoms often arise out of relational trauma (Schore, 2001) that is borne of a myriad of tiny emotional mis-attunements, often extending back to the preverbal period of early infancy. These same symptoms could also indicate second-generation posttraumatic stress passed on unconsciously through social channels.

The power of preexisting concepts to bias subsequent experience prompted Wilfred Bion, a British psychoanalyst, to emphasize the importance of *not-knowing* as the necessary state of mind during psychotherapy (Bion, 1967). By suggesting that we “set aside all memory and desire” before each session, Bion recommended we clear out ideas derived from the past, along with hopes and projections that reach toward the future. By pointing toward a present-centered form of awareness, Bion highlighted the importance of intuition, as described by the psychoanalyst Steven Ellman:

“The psychoanalyst should aim at achieving a state of mind so that at every session he feels he has not seen the patient before” ([Bion, 1967], p. 18). Therefore, the analyst’s “understanding” of what is going on regarding the transference, projective identification, thinking, or attacks of linking will only cohere out of the evolution of a selected fact that emerges from experience. As he [Bion] says, “The only point of importance in any session is the unknown. Nothing must be allowed to distract from *intuiting* that (*ibid.*, p. 17).” (2010, pp. 535–536)

When psychotherapists sit before a real person in a real moment, in order to be effective and therapeutic, they need to adopt an open, inquisitive frame of mind. By grounding themselves in inner sensory, emotional, and imaginal faculties, they can tap into receptive modes of consciousness in conjunction with deep connections with themselves.

To be purposefully thoughtful and conscious about what one does appears to be a prudent and conscientious tact during psychotherapy. Yet, I suggest the opposite is actually the case, precisely because affect, including its dimensions of valence, intensity, and arousal, occupy the center stage of psychotherapy. Compared with top-down deliberation, clinical intuition is the faculty more able to pick up on emotion, whether conscious or nonconscious, expressed or latent, as well as the faculty most closely aligned with empathy, attuned response and emotional healing (Marks-Tarlow, 2012, 2014a; Schore, 2012).

ADVANTAGES TO BOTTOM-UP, IMPLICIT PROCESSING

As opposed to explicit learning and memory tapped into by conscious thought and theory, clinical intuition taps into *implicit processes of learning and memory* in the body and brain. By

contrast to didactic lessons, training involves direct engagement in the clinical work itself. Here, students learn *how to do* psychotherapy through embodied engagement on a moment-to-moment basis. Whereas classroom methods feeds clinical deliberation, direct immersion feeds clinical intuition.

Clinical intuition is a *bottom-up* mode of implicit information processing. The implicit realm involves a nonconscious form of embodied learning and memory that derives from primary sensorimotor and affective experiences. The implicit realm includes procedural memory, which consists of motor sequences such as walking, dancing, or sitting down to eat a meal. This realm also involves emotional memory that derives from relational sequences, beginning within the first hour of the first day of postnatal life. Implicit processes rely on fast-acting, subcortical events that permit learning that is both automatic and effort-free within the context of ongoing experience (Claxton, 1997). Implicit processing is the earliest form of learning, occupying center stage for the first two years of life. Developmentally and socially, this realm allows the infant to internalize sequences of self-in-relation-to-other plus other-in-relation-to-self. By internalizing sequences rather than states, the infant is poised to anticipate what is coming next based on what has come before. Over time, attachment security builds largely through the familiarity of positive expectations confirmed.

From the perspective of Schore's regulation theory (Schore, 2003, 2012), regardless of orientation, all forms of psychotherapy inevitably deal with problems of emotional dysregulation. Clinical intuition is better suited to treat emotional dysregulation than a more cognitive focus on problem-solving, changing thought processes or behavioral prescriptions. This is because clinical intuition draws upon the same natural faculties that evolved many millennia ago in order to maximize attuned responses to babies. In all mammals, a mother's attuned care, including rupture and repair sequences, is indispensable to self-care. Interactive regulation (i.e., the use of attuned relationship to down-regulate high arousal or negative emotion or up-regulate low arousal and positive emotion) precedes the capacity for self-regulation. Whether dealing with children during development or adults during psychotherapy, interactive emotional regulation is primarily nonverbal and instinctual. This means that no preset formula or manualized approach can dictate the form each moment will take. Attuned response changes so rapidly, down to the micro-second, based on ever-shifting contours of emotion and arousal, as picked up unconsciously by body-to-body cues.

There is growing recognition of the importance of the *implicit* realm during psychotherapy (Bucci, 2011; Cortina & Liotti, 2007; Fosshage, 2011; Mancina, 2006; Marks-Tarlow, 2011; Ruth-Lyons, Bruschiweiler-Stern, Harrison, Morgan, Nahum, Sander, & Tronick, 1998; Schore, 2010, 2011), especially within relational schools where the quality of patient-therapist interactions occupies the center of healing and growth. The Boston Change Process Study Group and New York Relational School are two examples. Spearheaded by the developmental perspective of infant researchers like Daniel Stern, Beatrice Beebe, and Ed Tronick, the self is conceived to develop, thrive, or falter through internalizing implicit relational interactions with caregivers. Not just during childhood, but also throughout the life span, meaning is conveyed in the form of nonverbal information that is sent and picked up by the body. Tone, pitch, pace, and volume of voice; facial expressions; and body gestures are all paralinguistic cues that help children and adults alike to keep running tabs on the feelings, motivations, intentions, fantasies, and expectations of others.

Within psychotherapy, implicit processes allow clinicians to assess and respond to patients automatically, without thought. Researchers estimate that 60% of what transpires between

people occurs nonverbally through nonverbal, implicit channels (Burgoon, 1985). According to Schore (2011), along with *implicit cognition* (unconscious processing of exteroceptive information from the outer world and interoceptive information from the inner world), implicit processes also include *implicit affect* (emotion registered nonconsciously by the body, which may or may not reach consciousness), *implicit self-regulation* (internal regulation of arousal, affect intensity, and behavioral impulse) and *implicit communication* (facial expressions, postures, and body gestures that communicate underlying emotion and motivation).

When in a flow, therapists' bodies register primary sensory and affective experience, evaluating what is happening and formulating what to say (or not say) subcortically, without need for conscious intervention. Seasoned practitioners often make an intervention before realizing what they think within any given clinical moment. During psychotherapy, implicit processes capitalize on brain plasticity, because therapists and patients alike internalize interactive sequences. Hopefully, the reactivity of early negative and traumatic sequences is counteracted with the responsiveness of more positive, growth-promoting ones. Moment-to-moment intuition requires a shuttling back and forth of attention, between self and other, inner and outer worlds, past and present, present and future. As therapists shift attention between different modes, scales, contents, and processes during the psychotherapy, they continually make distinctions between what arises from within and what arises from outside the self. In order to make such distinctions, they must ground themselves in embodied self-awareness.

Much like early development, within talk therapy attunement relates less to the content of speech, or *what* we say, and more to the processes of speech, or *how* we say it—tone and rhythm of voice (prosody), posture, body movements, facial expression, and eye gaze. These paralinguistic vocal, visual, facial, and postural cues are all part of the implicit relational knowing (Lyons-Ruth, 1998; Seligman, 2012). Implicit processes shape Bowlby's internal working models, by forming social expectations and coloring the emotional tone of ongoing experience. I have speculated (Marks-Tarlow, 2012) that the implicit level accounts for the quality and landscape of repetitive dreams.

Whether working with children or adults, in order to pick up on these tiny, multi-modal, implicit cues, *context* is everything. Both during early development and in psychotherapy, the full context is *always* too complex for any complete verbal description or prescription. This is why complexity theory is ideally suited as an umbrella model for understanding the unpredictable quality in how psychotherapy works. This is also why parental and clinical intuition takes on such significance, with how-to books and approaches paling by comparison. The importance of implicit relational learning to psychotherapy has been underscored by clinical theorists like Daniel Stern (1985; 2004), members of the Boston Change Process Study Group (2008), and infant researcher Beatrice Beebe (Beebe, Jaffe, Markese, Buck, Chen, Cohen, Bahrck, Andres, & Feldstein, 2010; Beebe, Lachman, Markese, & Bahrck, 2012). Beebe documents how tiny contingent moments of discordance or synchrony between caretakers and infants affect future attachment status.

Because intuition is subcortically-driven and originates in early developing, somatically-based sensing and feeling, all kinds of intuition involve embodied perception and knowledge. Because intuition processes social and emotional cues below the threshold of awareness, its implicit operations tap into Freud's concept of the unconscious. The burgeoning field of neuropsychanalysis (Kaplan-Solms & Solms, 2000) translates classical psychoanalytic concepts into brain structures and circuitry, as grounded in empirical research and speculation. To articulate an underlying neurophysiology is to fulfill Freud's (1895) dream as expressed in

Project for a Scientific Psychology, but for which the requisite technology did not yet exist during Freud's time.

Schore (2003; 2010; 2011) offers the fascinating possibility that Freud's unconscious can be localized within the early developing, right-brain, implicit self. In a model that is inherently more relational than Freud's, Schore's deepest subcortical layer of processing social and emotional cues begins with the amygdala, which is functional at birth. Able to read primitive states of danger and safety while tracking negative and positive emotions, this bottom level corresponds to Freud's deep unconscious as well as to Jung's archetypes. The second level, which comes online around 3 or 4 months old, contains mid-level cortical structures of the anterior cingulate and insula that mediate attachment bonds plus process pain and social conflict. The third tier of the hierarchy enters in around 12 months, when the orbital frontal cortex and other prefrontal areas loop into the limbic circuitry. This highest level corresponds to Freud's pre-conscious level of processing. It also mediates humor and personality, imagery and metaphor, dreams and symbolism, while incorporating multi-modal information to integrate inside and outside environments.

GUT FEELINGS AND EMPATHY

Because intuition is fully attuned to the body's autonomic nervous system (which regulates arousal) and to limbic structures like the insula (which reads internal body states), it makes sense that clinical intuition can also arrive in the form of gut feelings. Sometimes called somatic countertransference (Lewis, 1986) or projective identification (Waska, 1999), psychotherapists can experience what amounts to mini-symptoms in response to dysregulated states in patients. Somatic signals clue us into the deep unconscious of others. A knot in the stomach might signal dysregulated anger, an ache in the chest, dysregulated grief. Somatic symptoms such as these are particularly prevalent in cases of dissociated, unconscious emotion not yet accessible to patients (Marks-Tarlow, 2014a; Schore, 2012). When dissociated emotions are experienced by sensitive therapists, our bodies function like resonant tuning forks (Stone, 2006).

The seemingly mysterious phenomenon of somatic countertransference is partly demystified by recent research into the neurobiology of empathy (e.g., Decety & Ickes, 2009; Decety, 2011). From the perspective of the brain, empathy has two aspects—one emotional, the other cognitive, each with different underlying neural correlates. The emotional aspect of empathy involves a contagion effect, i.e., sharing an attenuated version of the feeling states of another. The cognitive dimension of empathy involves mentalizing (Fonagy, Gergely, Jurist, & Target, 2004), i.e., cognitively understanding the mind of another, while registering differences between self and other. Decety (2011) emphasizes the importance of balance. If emotional resonance runs too high, the resulting personal distress actually trumps the capacity for true empathy. Perhaps psychotherapist burnout and compassion fatigue represent the sort of imbalance where clinicians' bodies are too highly resonant for our own health.

An important reason to pay attention to gut feelings during psychotherapy is because the guts have a brain of their own, being part of the enteric nervous system (in charge of digesting food)—which is the third division of the autonomic nervous system that self-organizes to operate relatively autonomously alongside sympathetic and parasympathetic branches. The enteric nervous system is evolutionarily older than the central nervous system (brain and spinal cord). With respect to survival, this makes sense, for it is more important to eat than to register

emotion, pain, or any other sensation. The enteric nervous system contains more than 100 million nerves that transmit messages through the spinal cord via all the major neurotransmitters: dopamine, serotonin, acetyl choline, nitric oxide and norepinephrine.

Recent research (Welgan & Meshkinpour, 2000) reveals exquisite social sensitivities of the gut. When emotionally tinged words were presented to subjects, increased intestinal contractions and changes in rectal tone were measured in response to angry, sad, or anxious words, especially for people with irritable bowel syndrome. It appears that the mind is embodied in the brain, while the brain is embedded in the body; and the embodied nature of clinical intuition is precisely how clinicians tune into nuance, variability, and the full complexity of relationship, as expressed moment-to-moment.

RIGHT- BRAIN, HOLISTIC PROCESSING

Whereas implicit, intuitive learning and memory are guided by the early developing right brain, explicit, conscious deliberation is orchestrated by the later developing left brain. When looking at hemispheric differences, a popular misconception places particular activities like solving a riddle or playing the piano squarely inside one side or the other. The resulting controversy prompts some neuroscientists to refute the concept of hemispheric specialization altogether. For example, Kosslyn and Miller (2013) favor a horizontal division into “top brain” and “bottom brain.” Surely, as these researches suggest, cortical versus sub-cortical distinctions in brain function are significant. Nonetheless, all reptilian and mammalian brains are physically divided into left and right halves for important reasons, such that a more nuanced view of brain lateralization is necessary.

Among researchers who locate intuition as a right-brain mode, Iain McGilchrist, a Canadian psychiatrist, emphasized the relative independence of the two halves of the brain. The corpus callosum is the wide flat bundle of nerve fibers located between the two cerebral hemispheres, and it consists of 200–250 million contralateral axonal projections. Most of its fibers are excitatory physiologically, and this large mass of white body in the brain certainly facilitates interhemispheric communication by coordinating corresponding sides of the body and structures in the brain.

Yet because the brain is fundamentally nonlinear (Glanz, 1997; Kitzbichler, Smith, Christensen, & Bullmore, 2009), and tiny differences can possibly mobilize a huge impact, the corpus callosum simultaneously serves the broad function of inhibiting the perspective of one hemisphere in order to bring to the fore the perspective of the other. McGilchrist asserted that this inhibitory role affects not just *how we look* at things, but the very world that we bring into being. Both sides of the human brain can approach just about any activity, such that each hemisphere offers a different quality of subjectivity. The right brain specializes in the global picture, taking into account an overview of the world. By contrast, the left brain hones in on the details, often in service of exerting its will. This part/whole difference in how each hemisphere attends to the world is reflected perceptually in how each side regulates the visual field. The left hemisphere attends to the right side of space only. By contrast, the right hemisphere specializes not only in the left side of space, but also in combining visual information from *both* sides of space.

The right hemisphere’s perspective is holistic, while that of the left hemisphere is piecemeal. Clinical intuition is a function of the right brain precisely because its holistic

operations preserve the entire, embodied context. Clinical intuition allows clinicians to take in the overview in order to hone in on what is most salient. Indeed, as McGilchrist emphasizes, the right brain regulates what type of attention we are using, plus when and how we switch between different modes of attention.

The type of attention most relevant to clinical intuition is open attention or *broadband focus*. This mode is reminiscent of Freud's "evenly-hovering attention" as well as Bion's suggestion that the most effective way to enter a session involves putting aside all memory and desire. Because broadband attention takes in the whole of things, it provides the widest lens for sensing and subsequently zooming closer in on what is most important at any given time. When clinicians zoom in on a detail during psychotherapy, they might remain close to a right-brain focus, such as when the object of their attention includes the body. For example, psychotherapists may notice that a patient's facial expression reveals something that his words do not. But just as easily, they may shuttle over to a left-brain focus on a tiny detail or on explicit content, as when they get absorbed in a patient's narrative about a recent incident.

When the left brain is in the forefront of consciousness, its verbal and logical processes tend to operate in a vacuum, by removing its object of focus from context. This is easy to see with language. When writing the word "table," I strip out the entire sensory context of any particular table. The more abstract the arena of reflection, the more important that left-brain analysis and deliberation be fully grounded by the right-brain's concrete and holistic sensibilities. Otherwise, it becomes all too easy for awareness to slip into delusion and falsity, including utter fabrication. Michael Gazzaniga was an early neuroscientist to study split-brain patients, whose corpus callosum was severed in order to prevent the spread of grand mal seizures. Gazzaniga (2005) nicknamed the left-brain as 'the interpreter' due to its story telling capacities plus relentless quest for explanations and making sense of whatever it encounters.

Over the course of evolution, the continual expansion of both right and left cerebral cortices has lent ever greater complexity and flexibility to animal responses. But the right hemisphere is best at retaining the overview necessary for the kind of dual attention we use as psychotherapists. In particular, it is the job of the orbitofrontal lobes to monitor both internal and external environments, as well as to attend to shifts of attention in the process (Barbas, 2007). The left cerebral hemisphere zooms in on one thing at a time. By operating in serial fashion, the left attends well to parts of experience, reducing the full complexity of a scene in order to lock down the details. In this way, the left hemisphere *looks for* things and readily sacrifices the forest for the trees along its deductive path. That is why it represents the essence of a top-down approach.

By contrast the holistic perspective of the right hemisphere places it in a better position *to look at* things in an open fashion. As a right-brain mode of information processing, intuition coordinates our switches in attention, our switches between hemispheres, as well as the clinical art of timing. This allows clinicians to pay attention to what becomes emotionally salient from moment to moment based on the immediate feedback of ongoing, embodied experience. Along with tiny fluctuations in attention during micro-moments, the right hemisphere also drives the higher-order, large-scale inductive path by which insight puts together multisensory pieces of information (McCrea, 2010).

Here is a brief clinical example of how the right hemisphere might shift clinical attention. A patient reports a phone call to his mother. Suddenly the therapist's attention gets drawn to the man's wildly tapping leg. The therapist feels compelled to interrupt the patient's narrative to switch collective focus over to what his body is communicating. The man's leg gestures may

be linked to intense anger expressed toward his father in a previous session. Although he would have liked to kick his father then, anger is currently missing from the patient's awareness and narrative. Consciously the patient may deny that he is upset, making all sorts of excuses for his father's insensitivity at this point in time, when perhaps guilt has set in. Yet, unconsciously, anger still lurks in the patient's body in the form of a violently vibrating leg. It is the right hemisphere that notices the unexpressed emotion and orchestrates these switches in attention. It is the right hemisphere that combines and unifies these fragments of ongoing experience, based on the full context of what is most emotionally salient.

PLACING PSYCHOTHERAPY IN CONTEXT

When examining the role of right-brain intuition versus left-brain deliberation during psychotherapy, it helps to understand the conditions under which clinical intuition functions better than clinical deliberation. These include uncertain or ambiguous circumstances; when there is incomplete information; situations of emergency or urgency; when time is of the essence; or in situations of intense arousal and high emotionality. By contrast, deliberate reasoning is more useful when full information is available; under emotionally neutral circumstances; and when no urgency or time pressure exists.

This understanding emerged partly from research in critical care nursing (e.g., King & Appleton, 1997). Clearly, the emergency room is a place of great urgency and intense pressure. Life and death matters are common, requiring immediate response, with little time for research or questions. To complicate matters, emergency room patients may be unconscious or unable to respond verbally for other reasons. In the context of critical care nursing, remarkable stories of clinical intuition abound.

Based on their research, here is how various researchers have characterized clinical intuition:

- Understanding without rationale (Benner & Tanner, 1987);
- Immediate knowledge of something without the conscious use of reason (Schraeder & Fischer, 1987);
- Lacking underlying conscious processes, not being able to be explained in a tangible manner (Cioffi, 1997);
- Knowing something about the patient that cannot be verbalized, that is verbalized with difficulty, or for which the source of knowledge cannot be determined (Young, 1987);
- Knowledge of a fact or truth, as a whole; immediate possession of knowledge; and knowledge independent of the linear reasoning process (Rew, 1986);
- A perception of possibilities, meanings, and relationships by way of insight; the sudden perception of a pattern in a seemingly unrelated series of events, beyond what is visible to the senses (Gerrity, 1987);
- The integration of forms of knowing in a sudden realization, which then precipitates an analytical process that facilitates action in patient or client care (King & Appleton, 1997);
- The ability to experience the elements of a clinical situation as a whole, to solve a problem or reach a decision with limited concrete information (Schraeder & Fischer, 1986);

- Three themes such as cognitive inference (rapid unconscious processing of cues), gestalt intuition (gaps of data filled in to complete a pattern), and precognitive function (perceiving a change before it happens) (Rew, 1988); or
- Key aspects of intuitive judgment, including pattern recognition, similarity recognition, commonsense understanding, skilled know-how, sense of salience, and deliberative rationality (Dreyfus & Dreyfus, 1986).

From this list, I previously fleshed out five recurrent characteristics (Marks-Tarlow, 2012):

- Sudden recognition;
- Immediate knowledge;
- Emergent awareness;
- Nonverbal insight; and
- Holistic, integrative sensibilities.

Psychotherapy usually presents less drama than the emergency room, although in attenuated form, conditions in our offices can be quite similar. This especially holds true for therapists who work with highly traumatized individuals, at the edges of regulatory boundaries.

All factors considered, clinical intuition is the primary mode of response in psychotherapy for multiple reasons. Because clinical work deals with high levels of complexity, it is important to consider the full context. It is better for ideas to emerge from observations and direct experience, rather than to walk into the room with a pre-set theory or set of ideas, in search of supporting evidence. Despite operating with ambiguous information, conditions of uncertainty, and emotional urgency, we must detect what is most salient in hopes of stimulating and exploring novel territory. And with respect to novelty, the right brain is again foundational.

IN PURSUIT OF NOVELTY

Because division of labor across the two sides of the brain is quite ancient, an evolutionary perspective is useful. Brain lateralization extends back more than 500 million years to early vertebrate development, long before the appearance of warm-blooded animals (MacNeillage, Rogers & Vallortigara, 2009). In reptiles and birds, the left side of the brain became specialized for tasks that are routine, such as eating a meal or building a nest. By contrast, the right side of the brain became specialized for tasks that involve novelty, such as detecting danger or seeking shelter. We easily detect this difference in predator/prey relationships. Predators stalk their prey using the right visual field (as mediated by the left hemisphere), which allows them to zoom in on potential food sources. By contrast, prey perceive predators most easily through the left visual field (as mediated by the right hemisphere). The ease of detecting danger on the left undoubtedly has led to widespread prejudice against left-handed people. For example, words like “sinister,” which translates in Latin to mean left-handed, associates the left side with things that are evil or threatening, like the devil.

With respect to clinical concerns, this distinction between hemispheres based on novel versus routine concerns broadens our context for understanding why intuition is so important during psychotherapy. In order to effect deep change, both therapists and patients must be open to what is new, which is inherently the domain of the right brain. Whereas the left brain can

help people analyze problems, spell out choices, or make conscious predictions about what might come next, only the right side carries the creative capacity for something entirely novel, spontaneous or unpredictable to emerge.

SELF-ORGANIZING DYNAMICS

When psychoanalysis is conceived intersubjectively, full engagement between therapist and patient creates an emergent, indivisible whole. The coupled therapist/patient system takes on a life of its own to operate beyond reductive analysis. Previously (Marks-Tarlow, 2011), I have outlined and illustrated five key principles of psychotherapy from the perspective of nonlinear dynamics:

1. A nonlinear relationship exists between diagnosis and treatment, when symptoms shift with treatment and diagnosis emerges out of it;
2. The intersubjective field is a complex web of feedback loops operating continually on multiple time scales and descriptive levels;
3. The coupled therapist/patient system self-organizes implicitly towards the edge of chaos;
4. At the fertile edge of chaos, novelty and greater system complexity can emerge spontaneously;
5. Core therapist/patient dynamics are often expressed as recursive, fractal patterns.

Because these five principles indicate a context within psychotherapy of high uncertainty and unpredictability, the nonlinear nature of clinical intuition is better suited to move forward than the more linear nature of clinical deliberation. Next, I briefly outline each principle.

NONLINEAR RELATIONSHIP BETWEEN DIAGNOSIS AND TREATMENT

People like to believe they are cognitively and willfully in control of their bodies, yet a fuller picture suggests that the whole of the body/mind/brain system self-organizes according to implicit dynamics that exist on multiple, interlocking time scales. Even acts of conscious and deliberate decision-making, like moving a finger, are preceded by non-conscious brain events that occur on time scales too rapid for awareness (see Libet & Kosslyn, 2005). If people are not even in charge of our own bodies, how can a psychotherapist possibly be in charge of a patient's psyche and life? Just as the body/mind/brain system self-organizes according to implicit dynamics and multiple, interlocking time scales, so too does successful psychotherapy self-organize according to messy entanglement between self and other, according to bottom-up, subcortical processes caught in complex, multiple circular feedback loops with top-down, cortical influences.

Those therapists privileged enough to be engaged in long-term psychotherapy with patients in hopes of deep transformation are bound to experience the following. No matter how much they clean up their teaching stories and case presentations, the process is always messier than their sanitized versions of linear narrative streams. To truly enter into the relational dance means to surrender to its fits and jerks, to cultivate the patience necessary to sometimes grind

to a standstill, to close ones eyes metaphorically, while groping, gliding and sometimes leaping by feel alone. Always throughout, an effective psychotherapist must adopt a warrior's stance of not having to know what is coming next.

In the midst of this messy dance, once in a while a psychotherapist may get a clean diagnosis, as when a simple phobia is triggered from a single life trauma. But even here, there are usually complicating factors in the background. Scaer (2007) illuminated this by revealing that people who get whiplash after even a mild rear-end collision often suffer from Post Traumatic Stress Disorder, whether diagnosed or not. Within psychotherapy, when deep transformation occurs, it reaches way down into the core of the autonomic nervous system with its bodily instincts (Schore, 2003). In order to diagnose patients well enough to affect this level of subcortical change, psychotherapists often need years of relationship building that becomes inseparable from processes of exploration and intervention during psychotherapy.

The Western medical model is based upon a set progression: diagnosis, prescription/prognosis, treatment, follow-up evaluation. While this can work beautifully for certain mechanical problems like broken bones, torn cartilage, or infectious diseases, a one-size-fits-all fixed sequence presumes a linear, stable model. Like the normative statistics that underlie too many social science experiments, such an idealized progression is too fragmenting and simplistic to bear much relationship to life itself. The more an individual tries to pick apart the holism of a relationship with the mind, the more violence they do to that which exists precisely through its wholeness and ineffable qualities.

CONTINUAL FEEDBACK LOOPS WITHIN THE INTERSUBJECTIVE FIELD

The process of psychotherapy is filled with many rituals. Patients meet psychotherapists in their offices that remain comfortably familiar. Therapists often adopt characteristic ways to start and end sessions. They frequently return to similar themes, perhaps even using the same mutually shared language and precise words. With a certain type of rigidly or defensively constrained patient, or in cases where the dyad feels stuck, they may have the sensation of repetition. A linear interpretation of impasse suggests that exact repetition is possible. But, the notion of repetition involves either a timeless arena or one in which one goes backwards in time, back to the beginning, to start a given process all over again, without any memory of the system's history enfolded within. While this can hold for linear realms, whose elements are independent and therefore permit time reversible processes, within nonlinear realms and from the perspective of the system as a whole, exact repetition is impossible, especially on time scales corresponding to underlying physiology. Even if dynamics appear similar on the surface, the arrow of time is one way; each moment is unique with all previous moments fully enfolded within.

This has been demonstrated at the neurobiological level even for the sense of smell. In Walter Freeman's (Skarda & Freeman, 1987) elegant experiments concerning the olfactory bulb in rabbits, the very the same stimulus odor is accompanied by an entirely different underlying EEG pattern when presented a second time, following other stimulus odors. This is because in mammals, all perception includes registering the emotional, limbically-driven

meaning of the event for the organism. The first time an organism encounters an object will hold a different meaning than the next time. From the vantage point of the whole, there is never any going back to the beginning, even in as basic a process as perception. There is only a going forward in time.

Yet at larger time scales, at the coarser-grained level of psychological events, repetition appears not only possible, but also constitutes the essence of psychopathology, precisely because adaptation and forward-moving development have ceased. One important advantage point to a nonlinear framework is the capacity both to address continuities and discontinuities across spatial and temporal scales.

Within any complex system, all dynamics evolve through continual feedback loops, where the output of one round is recycled back in as the input of the next one, a concept known as iteration. In many ways, brains and their extension into the body through the autonomic nervous system can be simply described as a complex tangle of feedback loops between perception and response. The greater the complexity of the central nervous system, as in mammals, the greater the number of feedback loops. This culminates in the human brain, with its wide cortical expanses devoted to purely internal feedback loops called association areas. The importance of feedback loops existing on the scale of tiny micro-second events of neurobiology also holds true at the level of relational dynamics, though less obviously so, a fractal concept called scale-invariance, illustrated next mathematically.

In mathematics, an iterated formula partly contains itself during an earlier stage in time or sequence. The formula for the Mandelbrot set, granddaddy of all fractals, is $z_{n+1} \rightarrow z_n^2 + c$. This formula is iterated for each point on the complex number plane, with results color-coded to convert the numbers into the set's commonly recognized visual form. For areas where the formula converges to a stable solution, representing underlying fixed point attractors (the mathematical equivalent of repetition), are commonly colored black. For areas where the formula flies off towards infinity, represent underlying chaotic attractors, are colored according to their rate of flight. In between these fixed and chaotic poles lies the complexity of the Mandelbrot set, magnificently and dynamically poised at the edge of chaos. A hallmark property of the Mandelbrot is self-similarity, which means that the overall pattern of the whole is evident in the pattern of its parts, when the computer functions like a microscope to "zoom in" on particular areas. The related property of scale-invariance is evident within self-similar pattern that here extends across different size scales, but can also extend across different time scales, as often exists in the brain as well as in relational patterns.

To understand the relevance of iteration within the intersubjective field, consider emotions as an arena near and dear to the heart of psychotherapy. Emotions do not repeat in a linear way; instead their sequences matter more than isolated states, as each self-state gets recursively enfolded within an ever-changing relational whole. The psychoanalytic arena of object relations involves interactional patterns of early attachment as they become enfolded as internal working models within implicit memory. Time is nonlinear, because the entire history of these interactional sequences contributes to the unique present moment. The present moment also enfolds the future, by containing expectations of what is to come next. Within healthy dynamics, such sequences contain softer, more flexible, open ended expectations; in more pathological instances, future expectations are rigid, stereotyped and closed.

The affective core of the self involves recursively enfolded self-other state sequences, within secure attachment. As a child safely experiences the full range of emotion, self-states blend to become a more complex, unified whole over time. Within the intersubjective field,

when psychotherapists are engaged in attuned responding, even if they receive the “same” defensive rebuff from a patient over and over, they are still involved in an ever-moving landscape that sets the stage for emergent novelty. A nonlinear understanding of iteration adds sophistication to the linear concept of repetition.

SELF-ORGANIZED EMERGENCE OF NOVELTY AT THE EDGE OF CHAOS

One pioneer in recognizing the importance of nonlinear dynamical thinking within the intersubjective field, both during development and psychotherapy, is Allan Schore. Consider the following quote: “...when a psychobiologically attuned dyad cocreates a resonant context within an attachment transaction, the behavioral manifestation of each partner’s internal state is monitored by the other, and this results in the coupling between the output of one partner’s loop and the input of the other’s to form a larger feedback configuration...” (Schore, 2001, p. 19).

From a neurobiological perspective the essence of the nonlinear element within psychotherapy stems from the coupled dynamics between people, where mind/body/brain rhythms get synchronized and two people operate as an indivisible whole. This begins in the womb where the umbilical cord serves physically both to connect and separate mother and baby. Similar dynamics continue after birth, in mind/brain/body systems, however invisibly. This holds not just for the flow of emotions, but also for autonomic physiological processes. Research by Guastello, Pincus and Gunderson (2006) shows that even in strangers, there is coupling of Galvanic Skin Response (GSR) during turn-taking in a casual conversation. These kind of coupled dynamics are central to psychotherapy, especially as they occur beneath the level of consciousness, where arousal levels, facial expression, emotional perceptions and response, body rhythms, even pupil size, all significant indicators of empathy, get synchronized at the foundation for therapeutic outcome.

A nonlinear view holds that the therapist/patient system becomes increasingly coupled over time (Tschacher, Scheier, & Grawe, 1998). The patient alone may either be stuck in an underlying attractor or lurching towards chaos in a problematic way. By contrast, the newly coupled system created by the therapy allows the self-organized evolution of the “analytic third” away from pathological extremes towards the edge of chaos (see Marks-Tarlow, 2008; 2011). Just as with the Mandelbrot set, the edge of chaos is a dynamic zone of transition where emergent complexity becomes possible, between extremes of fixed order and chaotic disorder. At the edge of chaos, the system can spontaneously re-organize, through reaching a bifurcation, or change point, where a new set of underlying attractors emerges unpredictably, in the form of novel responses and higher complexity.

The edge of chaos is a dynamic zone of transaction that exists between poles of stagnant order and unruly disorder. Many if not most complex systems in nature self-organize to this critical point (e.g., Bak, 1996; Waldrop, 1992). Schore recognizes this when he characterizes the brain as a self-organizing system that tunes and develops higher complexity within a relational context. Neurobiological EEG evidence conducted on individual brains indeed suggests that they self-organize to a critical point at the edge of chaos (Kitzbichler, Smith, Christensen, & Bullmore, 2009). When a system self-organizes to the edge of chaos, it remains

poised in a state of criticality where possibilities for change, organized in fractal terms as a power law, exist on any and all size and/or time scales (see Schroeder, 1991). Systems poised at the edge of chaos are well situated to capitalize on the property of the sensitive dependence that characterizes chaotic realms more broadly. Sensitive dependence on initial conditions means that the tiniest, microscopic change in an underlying system value can escalate rapidly and unpredictably to tremendous, macroscopic proportions.

Sensitive dependence followed by emergent novelty at the edge of chaos is well modeled by a Dr. Seuss book called *The Cat in the Hat Comes Back*. When two children let in the naughty cat, little did they suspect what havoc would ensue after they agreed to let him take a bath. After the pink ring in the bathtub spread to a dress, the walls, the parents bed, and eventually to the whole of the snow outside, it was the tiniest, most invisible cat that proved capable of effecting the biggest, most complete change of all. Not knowing to what degree, when and how change will arise is part of unpredictability of psychotherapy, lending perennial hope that no matter how bleak things look now, they can “change on a dime.” No matter how much psychotherapists may be groping with their patients in the darkness, it takes only the slightest tweak in one seemingly insignificant underlying variable for new light to appear.

In the Chinese language, the character for crisis is also the character for opportunity. This danger point is sometimes represented visually by a triangle teetering on its point, where it can fall either backwards or forwards. Indeed, as Kelso (1995) has elegantly shown, during all phase transitions, the old and new are chaotically mixed, as illustrated by the bumpy ride offered by a horse transitioning between a trot and a canter. Smooth order is not restored until the horse crosses the threshold and displays coordinated movement well inside the new basin of attraction.

CORE DYNAMICS EXPRESSED AS FRACTAL PATTERN

One of the most interesting areas of nonlinear science relevant to psychotherapy is fractal pattern (Galatzer-Levy, 1995; 2009; Marks-Tarlow, 1999; 2002; 2008a). Fractal geometry is a whole branch of mathematics that was discovered/invented by Benoit Mandelbrot in the 1970s (see Mandelbrot, 1977) beginning with his discovery of the Mandelbrot set described earlier. Recognizing the significance of his discovery to real and not just abstract space, Mandelbrot was careful not to define a fractal too technically or mathematically. Loosely a fractal may be considered a multidimensional shape with self-similar detail on multiple size or time scales. Consider as an example the cascading sequence of ever smaller Cats in the Hat. Each cat in the hat is recursively enfolded inside the next, each bearing resemblance to the largest.

In Western culture, people grow up learning the Euclidean geometry of grade school by studying circles, triangles, spheres and cubes. Children practice chopping up these shapes and pasting the pieces back together again, in an attempt to fashion shapes in nature. Fractal shapes were considered “pathological” when first glimpsed in the 19th century, because the area under their curves could not be measured using traditional methods of calculus. Yet they were highly useful in leading mathematicians to more precise definitions of concepts like dimensionality. Presently, and for the past several decades, scientists recognize that fractals provide a lexicon for nature’s complexity, by modeling her branching patterns, her discontinuities and her magnificent irregularity. By taking a seed shape, and then replacing each side with the same

shape over and over, grade school children could use iteration instead of cutting and pasting to simulate highly complex forms, both organic and inorganic.

The human body is filled with fractals (e.g., Bassingthwaighe, Leibovitch, & West, 1994; West, 2006)—everything from the recursively enfolded shapes and branches of the circulatory system, the lungs, the digestive system and the brain to the distribution of pores and markings and wrinkles in skin. Self-similar cascades are one mechanism by which tiny events occurring at the microscale also trigger large scale change. Fractal edges between and within different organs, levels, and dimensions signal open boundaries between them that are characterized by a continual exchange of matter, energy and/or information across. This leaves fractal boundaries in the paradoxical position of both connecting and separating at the same time.

In previous writings (e.g., Marks-Tarlow, 1999; 2002; 2005; 2008a), I have asserted that not only is the basic shape of the psyche fractal, but even more intriguingly, so are its edges. When a fractal occupies the boundary condition between two different basins of attraction (e.g., Schroeder, 1991), there exists paradoxical dynamics, where the boundary that separates them also connects them, and so is both open and closed at the same time. This allows autonomous function of subsystems, yet with full interpenetration of each subsystem at the edges in between.

Nonlinear dynamics is central to psychotherapy, not just in the unpredictability of change, but also in the unpredictability of triggers for change: transformative moments characterized by sensitive dependence as it can operate at the edge of chaos. Once a person is firmly in a state, there is a certain level of autonomy that takes over. The state needs to take its course. Always it is the territory in between that is fertile for a switch to somewhere new. Here, at the chaotic edges between old and new there is access to the whole plus the underlying parameters that enable the whole to in-form and form the parts. But it is not just attuned matching of states that matter, it is also matching the readiness for state changes, i.e., transitions between the states. It is not just significant micro-moments that count, but how such moments cascade up and connect to or do not other time frames and levels of a patient's life.

From a nonlinear perspective, the whole of things is always present in the parts and pieces of experience. This quality, which I call fractal consciousness, is the central feature of clinical intuition. John Gottman's ability to experience a couple for only a matter of minutes and then predict whether or not they will stay married ten years later is an example of thin-slicing. We need only to look with the right intuitive lenses to detect the whole of things, even within the tiniest parts. Richard Feynman, the late Nobel Prize-winning physicist, once remarked, "Nature uses only the longest threads to weave her patterns, so each small piece of her fabric reveals the organization of the entire tapestry." While the fabric and threads are of interest in their own way, clinical intuition concerns the tapestry as a whole.

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