



Varieties of Clinical Intuition: Explicit, Implicit, and Nonlocal Neurodynamics

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ABSTRACT

Intuitive response has been a cornerstone of patient–therapist interactions in all schools of therapy. In addition, persistent instances of “uncanny” intuitive knowing, such as “thought transference,” telepathic/precognitive dreams, distant awareness, and synchronicity have been identified since the very beginnings of psychoanalysis. These phenomena have remained on the fringes of scientific exploration, partly because of the lack of a conceptual model that would bring them into the mainstream of clinical work. The authors propose a Nonlocal Neurodynamics model that complements classical *local-interactive* forms of sensory (verbal and nonverbal) communication with *nonlocal-participatory* informational channels arising from the fundamental quantum/classical nature of the body/brain/mind system. We suggest the need for a metaphor shift in psychoanalysis in order to incorporate the latest developments in complexity science and quantum neurobiology, which allow for a meta-reductive informational perspective that bridges the Cartesian mind-brain divide and enables a unified picture of psychophysical reality. We use clinical examples illustrating a full spectrum of local and nonlocal clinical intuition to help clinicians utilize these concepts in their daily work.

It is through science that we prove, but through intuition that we discover.

—Henri Poincaré

Intuition in psychoanalysis

Discussions of clinical intuition have remained in the academic shadows for several reasons. Intuitive insights are often seen as idiosyncratic and ineffable, being intimately related to implicit meanings and emotional salience rather than to observable cognitions and behavior, which renders them difficult to quantify. While evidence-based research tends to consider subjective experience to be “soft science” (McWilliams, 2013), psychoanalytic writings often assign it a privileged status that shapes external reality itself (Coburn, 2009). Nevertheless, increasing attention is being drawn to the study of clinical intuition (Arnd-Caddigan & Stickle, 2017; Marks-Tarlow, 2012, 2014; Piha, 2005; Sinclair, 2011; Williams, 2006), the centrality of the therapeutic relationship, and nonspecific factors in therapeutic response (Norcross & Wampold, 2011).

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The clinical intuition debate is further complicated by persistent instances of “uncanny” phenomena in the past century of analytic work (Freud, 1919), which include “thought transference,” precognitive dreams, remote awareness, and synchronicity between subjective and objective events (Ehrenwald, 1951; Eisenbud, 1969; Farber, 2017; Freud, 1953/1953; Jung, 1960/2011; Mayer, 2001, 2007; De Peyer, 2016; Tennes, 2007; Ullman, 2003). Because these phenomena are often seen as incompatible with mainstream science and even physical laws, clinicians are often left in an unenviable position of doubting their own and their patient’s experiences, withholding their observations, or conceptualizing them as transcending scientific understanding, thus devaluing the impact of natural science in psychoanalytic endeavor. As a result, there has been a tendency to conflate the varieties of intuitive knowing and to discuss them in metaphorical terms, such as “intersubjective fields” or “energy exchanges.” While operationally useful in practice, many such metaphors are fundamentally incompatible with the physical phenomena from which they are derived, which serves to further alienate psychoanalytic thinking from the scientific endeavor.

Research evidence suggests that clinical intuition can be separated into two distinct subtypes:

- (i) *Local intuition* is based on *local-interactive channels of information exchange* that rely on sensory (implicit and explicit) information processing (such as verbal and non-verbal data), including entrainment of mirror neurons and autonomic processes between the patient and the therapist. This subtype can be operationally described within the current interpersonal neurobiology paradigm (Siegel, 2012).
- (ii) *Nonlocal intuition* is based on *nonlocal-participatory channels of information sharing* that transcend sensory processes and may tap into the quantum informational domain, with its distinct properties of *entanglement and nonlocality*.¹ This subtype would require a meta-reductive scientific description (Shapiro & Scott, 2019).

The Nonlocal Neurodynamics framework integrates the principles of interpersonal neurobiology with quantum information science, suggesting that *nonlocal information sharing* may transcend conventional spatiotemporal channels of information exchange and become accessible to consciousness as “uncanny” and synchronous *extraordinary knowing* in psychoanalysis and everyday life (Shapiro, 2020). In this view, body/brain/mind is seen as a unitary *quantum-classical informational system*² that operates in full compliance with natural laws and allows for dual dynamics of classical information exchange and nonlocal information sharing. In sections to come, we will illuminate the varieties of clinical intuition in light of this framework, while highlighting their clinical applications within psychoanalysis.

¹Entanglement describes nonlocal correlations in quantum systems, where one part of the system is instantaneously affected by the measurement of another part, irrespective of the physical distance between them. Multiple experimental verifications have now demonstrated that our universe is fundamentally nonlocal, and entanglement can occur not just at subatomic but also molecular scales; however, it cannot be used to exchange information at superluminal speeds (Gisin, 2009).

²Physical and physiological processes in the classical (Newtonian) world are subject to the laws of physics and chemistry, which are local and deterministic. By contrast, quantum processes at subatomic scales are fundamentally nonlocal and indeterministic. As we descend to subatomic scales, particles cease to follow local-interactive dynamics (miniature billiard balls moving in space over time) and increasingly display wave-like properties that define the *nonlocal-participatory domain*. While in the classical macro-world such quantum processes are largely ignored, it is becoming increasingly clear that a wide range of biological systems, including synaptic transmission, utilize quantum dynamics (Maldonado & Gómez-Cruz, 2014). The matter/mind distinction is only relevant in the classical macro-world, while quantum informational processes may underlie both neural network dynamics and experiential phenomenology of subjective experience (Figure 1).

The spectrum of clinical intuition

Any discussion of intuition starts with a paradox: while most of us have a clear sense of what intuition is, its precise definition has proven elusive. There are over 20 competing versions in psychological literature ranging from automatic pattern recognition, to “gut feelings,” to a spontaneous “sense of knowing,” to flashes of insight and creativity, to uncanny “extraordinary knowing” where veridical information becomes available in the apparent absence of sensory channels. Intuition seems to transcend rational attempts to put it into words, yet its subjective “sense of knowing” is unmistakable. One way of cutting through this Gordian knot is to refer to intuition as “a sense of knowing without knowing how one knows” (Epstein, 2010).

The term *intuition* is derived from Latin *intueri*, “to look inside.” In contrast to psychotherapies that rely on more structured techniques, psychoanalysis always emphasized open-ended free association and attention to the fluid dynamics of the here-and-now patient–therapist interaction. Freud’s dream of the “science of the mind” is embodied in the budding discipline of neuropsychanalysis, which aims to integrate first-person experience with deeper understanding of information processing networks in the brain that give rise to it (Panksepp & Solms, 2012). The Nobel laureate Daniel Kahneman’s (2011) research established a paradigm of the automatic *experiential-intuitive system*, which operates implicitly and provides holistic analysis of organism–environment interactions based on parallel channels of associative memory and affective valence. This system is unaffected by cognitive load and allows for “adaptive algorithms” of instinctual response shared between humans and lower animals. By contrast, the effortful *rational-analytic system* involves explicit, sequential information processing based on serial networks that are slowed by cognitive load. It allows for uniquely human capacities of abstract reasoning, cause–effect relationships, reflective awareness, and autobiographical memory extended in time (hindsight of the past, insight into the present, and foresight of the future). In this light, one central task of psychoanalysis can be reframed as “translating” the preverbal experiential-intuitive processes into the symbolic language of the rational-analytic system, bringing unconscious content to consciousness and enabling more adaptive choices in the patient’s life.

While the experiential-intuitive mode incorporates other automatic functions, such as procedural memory and faith-based beliefs in addition to intuition, it enables the preverbal information processing that lies at the core of intuitive knowing. The evolutionary perspective conceptualizes it as *adaptive unconscious* (Slavin & Kriegman, 1992), which is instrumental in the mother-infant bond; group dynamics and social hierarchies; empathic capacity; and creativity (spontaneous flashes of insight). Research shows that the experiential-intuitive system is biased toward right-hemispheric networks (McGilchrist, 2009), both “low-right” (subcortical/limbic) and “high-right” (prefrontal) networks. However, Kahnemann’s research also demonstrated that excessive reliance on intuitive reasoning can lead to heuristic biases and rigid/fundamentalist worldviews, which can systematically mislead and co-opt us into extreme rationalizations (think of racism and genocide). In the psychoanalytic field, the phenomenon of repetition-compulsion is one example of maladaptive experiential-intuitive bias, where dysfunctional relational re-enactments are driven by implicit developmental templates in a futile attempt to resolve a critical developmental conflict or deficit.

Both intuitive and analytical knowing are “sometimes correct and sometimes flawed”; therefore, clinical intuition is not infallible and needs to be corroborated through empirical and relational validation. In the words of Witteman et al. (2012), “Intuition leads to hypotheses, and these intuitive hypotheses need to be tested” (p. 25). This puts clinical intuition squarely within the domain of scientific endeavor. In real-life situations, experiential-intuitive and rational-analytic modes operate in tandem, each person and relational dyad establishing their own dynamic balance between the two. Epstein (2010) describes it by stating: “The two systems can interact in the manner of a dance, in which a step in one of the systems elicits a step in the other” (p. 300). The dance metaphor also provides an apt description of the clinical process, where the rational-analytic domain of evidence-based treatment algorithms needs to be balanced with attention to the patient’s unique systems of meaning within the unfolding dynamics of the therapeutic relationship (Shapiro, 2018). Similarly, Marks-Tarlow (2014) points out the need for employing both systems in the service of knowing and understanding the patient:

[D]eliberation and intuition are dual aspects of psychotherapy that work hand in hand. Both are important, and we continually shuttle back and forth between these two modes. Where clinical intuition facilitates the art of psychotherapy, conscious deliberation facilitates a more scientific, empirical approach. We use intuition to take leaps into the unknown and deliberation to check their impact and relevance.” (p. 233)

Psychoanalytic conceptions of intuition go back to Carl Jung and Wilfred Bion, who placed it at the core of analytic practice. Presciently, Jung postulated “a second psychic system coexisting with consciousness,” which is capable of “everything that consciousness has . . . all in subliminal form,” anticipating the discovery of the experiential-intuitive system (quoted in Williams, 2006). In turn, Bion (1970) spoke of analytic intuition as a meta-sensory tool to explore the patient’s psychic reality, stating: “I propose to use the term ‘intuit’ as a parallel in the psychoanalyst’s domain to the physician’s use of ‘see’, ‘touch’, ‘smell’ and ‘hear’” (p. 7). Williams (2006) points out the common ground in their views: “The therapist extends her reach towards unknown psychic reality through the exercise of analytic intuition” (p. 83). In this light, intuitive knowing becomes an indispensable tool of sharing in the patient’s subjective experience “beneath the words.”

Associative and somatic intuition

The intersubjective dynamics that incorporate both local and nonlocal intuitive knowing provide a qualitatively different view of therapeutic process in comparison to the conventional relational psychoanalysis paradigm. The presence of nonlocal-participatory channels suggests a radical reevaluation of the seemingly rigid boundaries between individual subjectivities and the world at large. De Peyer (2016) proposed the notion of “porous mind” that allows for “uncanny communication” between seemingly separate subjectivities in the clinical setting. We expand on this view by proposing the idea of *fractal boundaries* (Marks-Talow & Shapiro, 2021), which simultaneously separate and unite subjective and objective domains and may allow for direct knowing of the other and external reality at large.

Clinical vignette 1: associative intuition as shared subjectivities

Ava (not her real name) is a 39-year old single woman with a university psychology degree who works at a local Starbucks outlet. An avid reader and moviegoer, she has suffered persistent depressive symptoms, generalized anxiety, and interpersonal isolation, staying away from intimate relationships during the past six years. Ava showed a lot of ambivalence about entering therapy but agreed to a 10-session exploratory contract, driven by her loneliness and distress. She attended diligently and was affectively present, but grew noncommittal about continuing. She came in for the 11th session, sitting huddled by the door, and broke down crying.

Therapist [softly]: “What are you feeling?”

A: “I don’t know if I should ask you to recommend somebody else.”

Therapist [after a silence]: “You know, I went out for a walk yesterday and saw a rabbit on my lawn. She looked adorable, but as soon as I took a step towards her—she froze and then darted away. I have the same feeling with you. What are you running from?”

A [looking up with tear-filled eyes]: “I guess I don’t do intimacy.”

Therapist: “Do you think there may be an opportunity here to find out why?”

Ava [tentatively but maintaining eye contact]: “I don’t know . . .”

Therapist: “So tell me, if it’s not going to be a hunter/rabbit type relationship, what could we do here?”

A [tentatively]: “Maybe something like two detectives on a case . . . ?”

Therapist [smiling]: “I like that.” [A discussion of Sherlock Holmes and Dr. Watson follows, the patient is engaged, agrees to continue treatment]

The perspective on intuitive knowing as interpenetration of individual subjectivities is a poignant one. The image of a scared rabbit arose spontaneously in my mind (author 1) while I was contemplating a relational paradox with a suffering and affectively present but relationally detached other. Particularly striking is the bi-directional nature of intuitive sharing, the patient “intuiting” my predilection for a “detective paradigm” (I had been a member of the local Sherlock Holmes society, which I had not shared in our sessions). Since she was intimately familiar with Sir Conan Doyle’s writings, the Holmes–Watson metaphor became a running template for the ensuing therapeutic relationship, not only because of the characters’ cooperative interplay but also their implicit trust of each other.

The shared dimension of intuitive knowing highlights its fundamentally intersubjective-affective rather than intrapsychic-cognitive nature. The elaboration of attachment theory and interpersonal neurobiology (Schorer, 2012; Siegel, 2012) puts preverbal infant-caregiver interplay at the core of the developing Self and automatic affect regulation, which is mirrored within patient–therapist interactions. The local-interactive relational matrix spans somatic-physiological, affective-emotional,³ and

³Here we use a distinction between unconscious *affect*, which is shared at the level of mirror neuron networks (Iacoboni & Dapretto, 2006). Affect is cognitively processed to the level of verbal *feeling* (named affect, as in “I’m feeling sad”) and

cognitive-associative channels of communication, allowing for a bi-directional psychobiological bond that defines mature intimacy. Allan Schore (2012) elaborated the primacy of the right brain networks that lie at the core of empathic attunement and clinical intuition. He defined the *vertical axis* that enables affective-emotional processing from “low-right” subcortical-limbic to “high-right” anterior cingulate and orbitofrontal systems. The vertical axis is complemented by the *horizontal axis* of right-to-left symbolic processing that enables conscious verbal capacity and rational-analytic functions of emotional and self-awareness. Psychodynamic defense mechanisms can be mapped on both axes, such as repression impacting horizontal information transfer, or dissociation resulting in impaired vertical axis processing (Figure 1).

Correspondingly, we need to distinguish between *associative intuition*, which comes as a result of extensive cognitive processing of the somatic and affective information involved in a relational interchange, and more basic *somatic intuition*, which represents right-to-right brain connection at a preverbal level.

Clinical vignette 2: somatic intuition as shared psychophysiology

Steve was a psychologist in his late 30s who during our first session (author 2) presented as well dressed, well groomed, and quite articulate, although somewhat stiff in posture and formal in word choices. He described nothing out of the ordinary in his early life. His parents got along well and were still together; he went to a prestigious college, breezed through graduate school, and had successfully begun his professional life within the Veterans Administration. He now sought psychotherapy to seek romance and find a life partner.

Steve had the last hour of my workday, and when he left, I noticed myself feeling truly panicky inside. By the time I reached my car, I felt frightened for my very existence, as if I were in a life or death situation. These feelings were very confusing, since on the surface, nothing out of the ordinary had occurred during this session or earlier in the day. I thought to myself, “Perhaps I’m scared because Steve is also a psychologist who seems to have high standards.” But this didn’t resonate for me, as by this point in my career, I had become a therapist’s therapist and was quite used to working with the multiple colleagues I was treating.

The meaning of my intuitive response became clear several weeks later. During this particular session, Steve shared something he had never told anyone. When he was in middle elementary school, he had been bullied by a group of three older junior high boys. For a couple of years, they taunted Steve, both verbally and physically. He was kicked, held down and spat on, and once one of the boys urinated on him. Steve tried to talk to his father about the bullying, but he was a military man who told him that real men don’t complain; he should handle the situation himself. Steve was eight years old, and this was the last time he tried to talk about his distress to anyone.

When Steve shared these traumatic events during our session, it was a very emotional experience for us both. For Steve, a well of tears and fury emerged. I was instantly brought back to my experience following our first session. I now understood the source of my terror and fear for my life. My body had become the receptacle of Steve’s dissociated fear, which got even more amplified by his underlying rage. These early feelings were harbingers of what needed to emerge later in our therapy together.

propositional emotion (“I’m sad about being alone”). It is *emotional awareness*, or bringing preverbal affects into reflective awareness, that is postulated to be the cornerstone of therapeutic change.

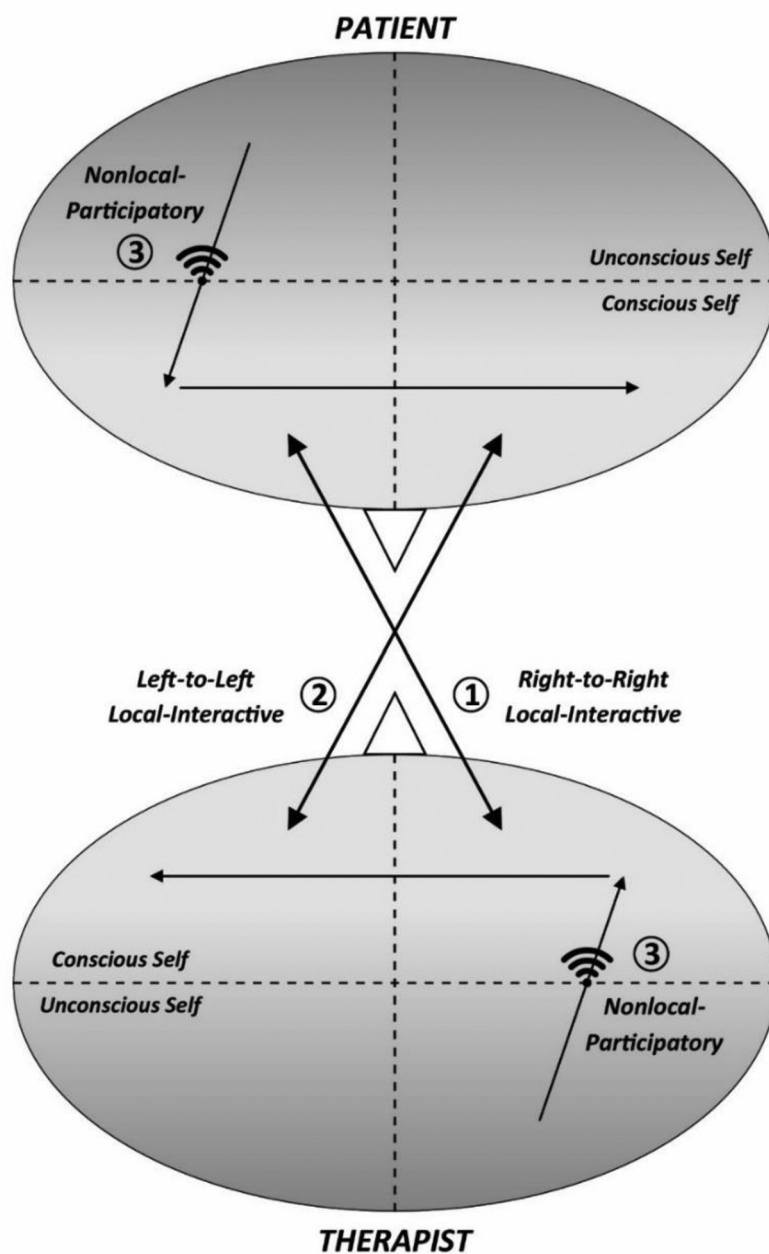


Figure 1. Vertical and horizontal axes of information processing and channels of intersubjective communication.

1. Experiential-intuitive channels of somatic/affective communication (local-interactive) 2. Rational-analytic channels of verbal communication (local-interactive) 3. Nonlocal-participatory channels: "uncanny" intersubjectivity and synchronicity (adapted from Shapiro & Scott, 2019).

Beginning with Freud (1912), psychoanalysis has always recognized the importance of unconscious communication, such as in the process projective identification, where the patient imparts disavowed aspects of self-experience to the therapist on a pre-verbal level. If

associative intuition taps into shared subjective meanings and imagery enabled by the horizontal interhemispheric axis of cognitive-emotional processing, then somatic/affective intuition represents the shared right-to-right brain connection at the level of preverbal experience. Entrained psychophysiology has been extensively studied in both mother-infant and therapist-patient domains, from synchronized borborygmi during therapeutic interchange (Da Silva, 1990), to electrodermal and autonomic responses (Ham & Tronick, 2009), to synchronization of brainwave patterns (Koole & Tschacher, 2016).

It is important to note that both associative and somatic/affective intuition rely on sensory channels of information exchange between the participants, whether or not such channels are consciously recognized. Both of these intuition subtypes are therefore *local-interactive* in nature, depending on sensory channels of communication just as our emotional response to a piece of music depends upon our ability to hear it.

Nonlocal intuition and extraordinary knowing

In its original and broadest sense, intuition refers simply to “direct knowing.” In her review of intuition research, Marta Sinclair (2011) distinguishes between *local intuition*, which “assumes that intuitive answers are a result of processed information that we contain in the raw form already,” and *nonlocal intuition*, where “no information processing occurs at all—since we receive ‘pre-packaged’ information from somewhere.” She states:

All ‘knowing’ is about information. Naturally, questions arise: where do we get this information from, along which channels does it ‘travel’, and how does it become available to us? (p. 4)

In addition to the sensory local-interactive channels of associative and somatic/affective communication, quantum underpinnings of the body/brain/mind system potentially allow for nonlocal channels of awareness that transcend conventional “information exchange” in classical space-time (Table 1). Physical and quantum metaphors, such as “fields,” “energy exchange” between the participants, and patient-therapist “entanglement” abound in psychoanalytic writings (Civitarese & Ferro, 2013). Unfortunately, their rigorous physical meanings are often lost in translation; while operationally useful, the resultant constructs often become incompatible with the physical processes from which they are derived. To mention but two critical examples, consciousness and intersubjective communication cannot be conceptualized as “energy” or “fields”; all known fields are mediated by physical carriers (bosons) and follow an inverse square law, where their strength diminishes in proportion with the square of the distance from its source. This does not apply to consciousness and intersubjective interactions. In addition, while several recent studies documented correlated electroencephalographic (EEG)

Table 1. Varieties of intuitive knowing.

Local-interactive channels	Associative intuition	<ul style="list-style-type: none"> • Thoughts or images that appear as “flashes of insight” • Involves a degree of vertical axis processing of experiential/intuitive content (“high-right”)
	Somatic intuition	<ul style="list-style-type: none"> • Bodily sensations and affective reactions with minimal cognitive processing (“low-right”)
Nonlocal-participatory channels	Nonlocal intuition	<ul style="list-style-type: none"> • “Direct knowing” of veridical information unavailable by sensory means (e.g., distant or precognitive awareness, “thought transference,” “telepathic dreams”)
	Synchronicity	<ul style="list-style-type: none"> • Awareness of psychophysical correlations (a-causal “meaningful coincidences”) that bridge subjective and objective events

and functional magnetic resonance (fMRI) signals between spatially and sensorially isolated human subjects (see below), such signals cannot be ascribed to “energy exchange” because they are detected even under the conditions of Faraday cage containment, which blocks any electromagnetic signals (the remaining forms of energy include gravitational, weak and strong nuclear interactions, which do not apply to interpersonal exchange). This situation often leads to dualistic notions, where non-material “consciousness fields” are postulated to be independent of body/brain, the latter serving as a “receiver” of conscious information that originates in a nonphysical domain. Needless to say, both the nature of such “non-material fields” and the manner of their interaction with the material body/brain are left unspecified.

The second example involves a widespread misconception about quantum entanglement, which is often used to postulate instantaneous “information exchange” based on the principle of nonlocality, where any change in an entangled system is instantaneously detected at an arbitrarily distant spatial location. While our universe is indeed fundamentally nonlocal (Gisin, 2009), both quantum laws and special relativity *forbid any usable information transmission* via this route. Entanglement is best conceptualized not as a transmitting/receiving process but as *nonlocal correlations* between discrete states of an entangled system, which transcend local-interactive dynamics in space-time. Quantum information physicist Nicolas Gisin makes this point clearly:

In modern quantum physics, entanglement is fundamental; furthermore, space is irrelevant—at least in quantum information science, space plays no central role and time is a mere discrete clock parameter . . . No story in space-time can tell us how nonlocal correlations happen; hence, nonlocal quantum correlations seem to emerge, somehow, from outside space-time. (p. 1358)

Given a wealth of clinical data about the prevalence of “uncanny” information sharing coupled with rigorous studies of extrasensory or *psi* phenomena that demonstrate nonlocal psychophysical effects (Cardeña, 2018; Jahn & Dunne, 2011), what is required is a naturalistic model of intuitive knowing that would incorporate both local and nonlocal perspectives while being subject to rigorous empirical validation and compliance with physical laws. The key building blocks of such a model include alternate states of consciousness⁴ research and quantum information science.

(1) Alternate Consciousness and *Psi* Research.

Systematic *psi* research started with the establishment of the British and American Societies for Psychical Research in the 1880s and was formalized as an experimental science of parapsychology by J. B. Rhine at Duke University in the 1930s. It primarily focuses on four types of *psi* phenomena:

- (i) Direct mind-to-mind awareness (telepathy)
- (ii) Remote awareness (clairvoyance/remote viewing)
- (iii) Past/future awareness (retrocognition and precognition/premonition, respectively); and
- (iv) Mind–matter interactions (psychokinesis (PK) and distant healing/hypnosis).

⁴We prefer to use the term “alternate” rather than “altered” states of consciousness to avoid the negative connotations of the “altered” term. In a similar vein, our baseline rational-analytic mode of consciousness represents only a small part of the spectrum of potential conscious states rather than a “normal” condition (Flor-Henry et al., 2017).

The first three categories are frequently described as *extrasensory perception* or ESP. Both ESP and PK jointly define a *psychophysical domain* where conscious and material phenomena interpenetrate to result in veridical information being either extracted from (ESP) or inserted into (PK) the environment. In addition, the phenomenon of *synchronicity* describes meaningful acausal correlations between mental and physical events (Table 2).

In spite of its marginalization by mainstream science, the evidence for psychophysical phenomena is very consistent (Cardena, 2018). Multiple studies and meta-analyses supported by extensive databases and rigorous statistical and neuroimaging data demonstrate the existence of remote perception and mind-matter effects; telepathic awareness; distant intentionality; and both cognitive and emotional precognitive phenomena (for a comprehensive review, see Shapiro & Scott, 2019). Cardena (2018) sums up the current state of *psi* research as follows:

The evidence provides cumulative support for the reality of psi, which cannot be readily explained away by the quality of the studies, fraud, selective reporting, experimental or analytical incompetence, or other frequent criticisms. The evidence for psi is comparable to that for established phenomena in psychology and other disciplines, although there is no consensual understanding of them. (p. 663)

Robert Jahn and Brenda Dunne at the Princeton Engineering Anomalies Research (PEAR) project accumulated over 25 years of data demonstrating human capacity to access information about distant events in the absence of sensory data, and impact microelectronic Random Event Generators (REGs). The effects were found to be insensitive to the distance between the operator and the target (up to several thousand miles) or temporal characteristics, the authors identifying a category of *precognitive remote effects*, where information is either acquired or inserted hours to days before an actual experiment has taken place. These findings show a meaningful parallel to quantum *delayed choice experiments*,⁵ where the effects of an observation appear to have occurred retroactively before the observation took place (Wheeler, 1990).

Leanna Standish's (2003) team in Washington was the first to use correlated EEG/fMRI signals to demonstrate direct mind-to-mind connections between human subjects in electromagnetically, acoustically, and visually shielded locations. A statistically significant increase in blood oxygenation was observed in the receiver's visual cortex ($p < .001$) coinciding with

Table 2. Types of psychophysical processes.

	Spatial	Temporal
Information extraction	<ul style="list-style-type: none"> • Remote awareness of the physical world (<i>clairvoyance</i>) • Mind-to-mind awareness (<i>telepathy</i>) 	<ul style="list-style-type: none"> • Future awareness (<i>precognition/presentiment</i>) • Direct past awareness (<i>retrocognition</i>)
Information insertion	<ul style="list-style-type: none"> • <i>Psychokinesis</i> • <i>Distant intentionality</i> 	<ul style="list-style-type: none"> • <i>Retro-causality</i>
Information correlation	<ul style="list-style-type: none"> • <i>Synchronicity</i> 	<ul style="list-style-type: none"> • <i>Synchronicity</i>

⁵Quantum delayed choice experiments go to the core of spatiotemporal nonlocality in quantum mechanics. Depending on the experimental setup, an individually emitted photon can behave as a particle (taking a specific path through the measuring apparatus [an interferometer]) or as a wave (showing a pattern of interference with itself). If the setup is changed *after* the photon has already entered interferometer and taken one of the paths, it appears to retroactively "sense" the forthcoming change and behave accordingly. John Wheeler extended the interferometer logic to cosmological phenomena, where depending on whether an observer uses a beam splitter in the telescope, a photon can be shown to "switch" from having traveled for millions of years as one or the other, demonstrating either that the experimenter's choice today can affect light behavior millions of years into the past (retrocausality) or that the same photon simultaneously co-exists in both states over cosmological distances and times, calling into question the reality of space-time itself.

a random visual stimulus being administered to one of the pair. This effect was independently corroborated by Jiri Wackermann (2004) in Germany and Dean Radin (2004) at the California Institute of Noetic Sciences. More recently, Michael Persinger's team in Canada refined the methodology of transcranial magnetic stimulation to reproduce remote perception effects, demonstrating EEG correlations between isolated human subjects who had been separated by over 300 km (Burke et al., 2013).

Within the clinical domain, both Freud and Jung paid particular attention to alternate states of consciousness, with their distinct languages and logic compared to rational discourse. Freud (1925/1953) described his personal experiences with telepathy and introduced the notion of *thought transference* in analytic work, suggesting that it “comes about particularly easily at the moment at which an idea emerges from the unconscious, or, in theoretical terms, as it passes over from the ‘primary process to the secondary process’” (quoted in Silverman, 1988). He insisted on a rigorous scientific study of the phenomenon to separate it from spiritualist notions. Jung similarly focused on transpersonal aspects of the psyche, rejecting mind/matter dualism and postulating a unitary psychophysical reality (*unus mundus*) that underlies both the psychological reality of the mind and the physical reality of the material world:

[T]he idea of the *unus mundus* is founded on the assumption that the multiplicity of the empirical world rests on an underlying unity, and not that two or more fundamentally different worlds exist side by side or are mingled with one another. . . . That even the psychic world, which is so extraordinarily different from the physical world, does not have its roots outside the one cosmos is evident from the undeniable fact that causal connections exist between the psyche and the body which point to their underlying unitary nature . . . The background of our empirical world thus appears to be in fact a *unus mundus*. (quoted from Salman, 2008, p. 58)

Together with Wolfgang Pauli, a Nobel physicist and one of the founders of quantum mechanics, Jung (1960/2011) developed a *theory of synchronicity*, where psychophysical reality manifests itself as an acausal principle connecting processes of the mind with material events. This approach is fully consistent with recent developments in quantum information science, where informational processes are seen to underlie *both* material and mind events and define a distinct psychophysical domain at the intersection of objective and subjective reality (Figure 2).

(2) Quantum Information and Quantum Neurobiology

Natural sciences have traditionally eschewed both transpersonal and *psi* phenomena in favor of studying more easily observable and measurable biophysical, cognitive and behavioral processes. Dualistic splits inherent in René Descartes' separation between *Res extensa* (material substance that occupies space) and *Res cogitans* (immaterial substance of the mind) continue to pervade scientific and clinical thinking as reflected in the entrenched dichotomies of brain versus mind; natural versus supernatural; or objective versus subjective domains, which are often seen in opposition to each other.

American physicist David Bohm (1990) postulated a unifying domain of *active information*, which underlies both matter and mind processes. As we descend to smaller and smaller scales and cross the quantum-classical boundary beneath which nonlocal processes predominate, matter loses its appearance of solidity and separate locality. Particles can only be described in informational terms, a description that also applies to processes of the mind. Bohm (1990) describes it as follows:

One may then ask: what is the relationship of these two processes? The answer that I want to propose here is that there are not two processes. Rather, I would suggest that both are essentially the same. This means that that which we experience as mind ... will, in a natural way ultimately move the body by reaching the level of the quantum potential and of the 'dance' of the particles. There is no unbridgeable gap or barrier between any of these levels. Rather, at each stage some kind of information is the bridge. (Bohm, 1990, p. 283)

Rather than the picture of Cartesian matter/mind duality, Bohm's model introduces a distinction between the *implicate* nonlocal-participatory domain and *explicate* classical reality defined by local-interactive processes in space-time (Figure 2). Implicate information continually unfolds into the classical domain as both physical and conscious dynamics, with psychophysical processes manifesting at the intersection of their boundaries, which we experience as the "uncanny" or synchronous events. The elementary constituents of matter are no longer seen as material

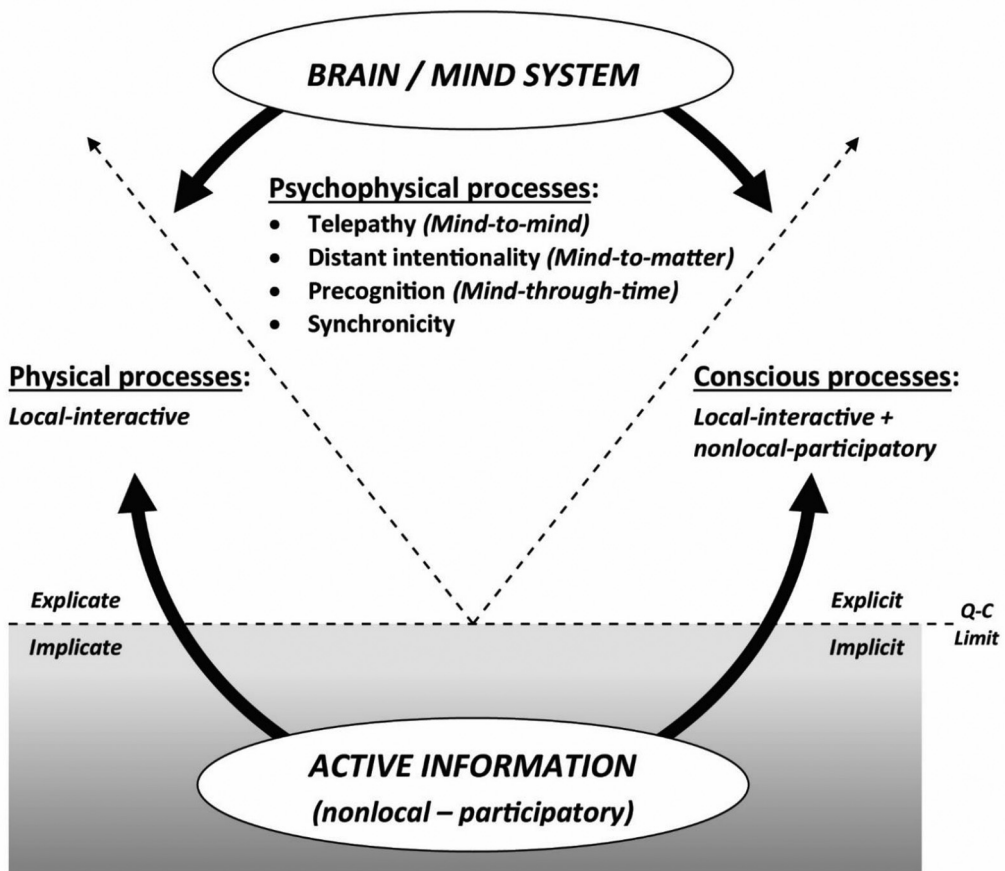


Figure 2. Implicate active information as a common substrate between explicate mind and matter processes. Body/brain/mind is fundamentally a quantum/classical system, potentially utilizing quantum computation at its informational roots. Interpenetration of physical and conscious dynamics defines a psychophysical domain. Note that active information interfaces with implicit/unconscious rather than explicit/conscious processes, suggesting that it would primarily become available as intuitive, rather than rational knowing. Q-C stands for Quantum-Classical limit.

particles interacting locally across space—but a web of actualized and potential wave functions of active information that underlie matter, mind, and space-time itself. Both physical and conscious processes manifest nonlocal-participatory aspects, although it is only within our conscious minds that their meanings become apparent.

In Bohm's view, the apparent separateness and stability of the material world around us can be compared to standing waves or vortices in a stream, which present an appearance of stable shapes while being defined by a continuous flow of water molecules along locally coherent paths. It is the *flow of information* that defines both matter and mind processes beneath the surface of classical reality. Nontrivial quantum effects⁶ complement classical neurobiology to enable both causally efficacious free will and nonlocal-participatory channels of information sharing. This perspective strongly suggests that the current reductive materialist paradigm needs to be expanded to incorporate multiple bottom-up and top-down causal links between different levels of complex organization (Shapiro & Scott, 2018), which includes both material and mind processes.

The meta-reductive paradigm incorporates psychophysical phenomena into a holistic, informational view of reality that includes a vast web of nonlocal connections “beneath” the surface of conventional local-interactive processes in space-time. It finally allows us to fulfill Freud's dream of putting the “uncanny” on a fully scientific foundation, and construct a naturalistic bridge over the Cartesian gap without resorting to “non-physical” notions. If we look at our Selves as quasi-stable vortices in a vast ocean of informational currents, information is not only exchanged among the vortices by way of surface ripples (local-interactive channels) but also directly shared at their common nonlocal-participatory roots. Such “nonlocal sharing” of veridical information defines the *prime substrate* of psychophysical reality, a *unus mundus* of nonlocal active information that spans spatiotemporal divides.

Clinical vignette 3: nonlocal intuition as mind-to-mind awareness

Sabina is an East Indian patient who suffered incest from her father and severe emotional abuse from her mother. When she first entered treatment, she was being physically abused by her husband, with somatic symptoms causing her to rush to hospital emergency rooms as often as twice a week.

From the beginning of treatment, Sabina had a series of transference dreams. Many early ones involved me (author 2) visiting her home or her visiting mine. In one, she is five years old and I am her mother. These occasional wish-fulfilling dreams stood in stark contrast to her nearly nightly nightmares of being chased, attacked, and even killed by monsters or men in white, and eventually members of her own family.

After many years of highly engaging, dramatic sessions accompanied by a lessening of somatic symptoms, greater trust and enhanced emotional regulation, there came a period of impasse, where sessions felt repetitive and stale. Sabina was obsessed with jealousy about other women and tried to control her husband's every move, right down to how he used his eyes in public. I felt bored and irritated during this stage until a session came that changed everything. Unlike any dream she had ever had, Sabina brought in my own repetitive childhood dream—one of a tidal wave that washed over her house without any roof, threatened her life, and drowned her young child, whose limp body

⁶Quantum effects in biological systems depend on the capacity to maintain quantum coherence and achieve controlled, rather than random decoherence (the loss of information into the environment if a quantum system is not sufficiently isolated from it). Considered to be impossible even a decade ago, the rapidly developing field of quantum biology makes it increasingly apparent that living systems operate in the semi-classical domain, bridging quantum micro- and classical macro-dynamics.

was thrust toward her by her own snarling mother. When Sabina reported this dream, it cut through our impasse by bringing me back to my own childhood, when I felt scared and alone.

Direct non-sensory sharing of implicit subjective experience—whether in wakefulness or in a dream—embodies the essence of nonlocal-participatory channels of intuitive knowing. For both Freud and Sands (2010), unconscious communication is especially evident within patient dreams on a “seek and find” mission to connect with the analyst. However, the reader’s reaction is likely to entail a degree of incredulity and dismay, perhaps a defensive need to dismiss the above experience as “mere coincidence” or forgotten communication. How can a patient within her seemingly separate subjectivity tap into a therapist’s childhood dream, irrespective of her emotional needs?

Reasonable as it is, such skepticism is reflective of our classical worldview, akin to an incredulous reaction to the quantum interferometer experiment: How can a single photon pass through *both* separate openings simultaneously? What is required is a mental shift to a radically different perspective, where seemingly impermeable boundaries that separate individual subjectivities and the world at large simultaneously serve to bridge them within a unitary psychophysical reality. In her review of Freud’s boundaried and Jung’s radically connected mind, Elizabeth Lloyd Mayer (2002) put the issue most succinctly: “What we are after is precisely the paradox of how human minds are quintessentially boundaried and unique, while at the same time quintessentially unboundaried and connected” (p. 98). This mental shift can be illustrated with a familiar Rubin complementarity (Figure 3).

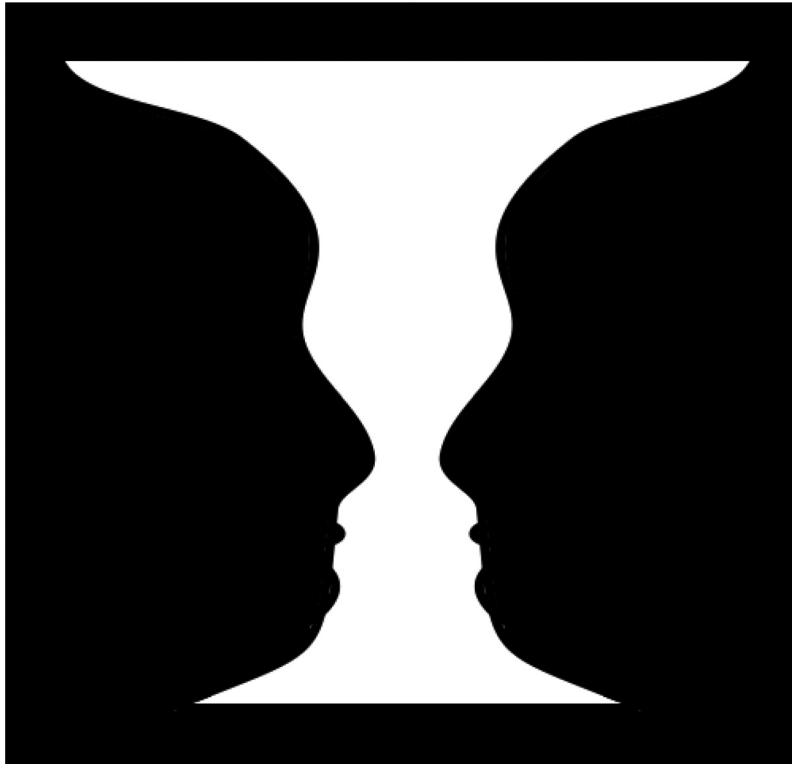


Figure 3. Rubin complementarity (public domain).

Although we regularly conceptualize psychoanalytic work in terms of verbal/nonverbal intersubjective communication (the “two faces” perspective), these concepts no longer apply within the active information domain, where there is no self/other or objective/subjective separation (the “vase” perspective of unitary reality). Indeed, the aforementioned dance metaphor would suggest the need to alternate between the two perspectives in the service of scientific and therapeutic endeavor. Nonlocal-participatory sharing is available to all of us, but it may be more prevalent in patients with a history of severe trauma, psychotic and borderline-level functioning, or active dissociative defenses, where rational-analytic networks are impaired and less prone to inhibiting the nonlocal dynamics.

Nonlocal neurodynamics in psychoanalysis

The foregoing taxonomy of local-interactive versus nonlocal-participatory channels of intuitive knowing expands and complements the clinical perspective of two separate, embodied subjectivities engaging in an intersubjective dialogue in “objective” material world. We are all an integral part of psychophysical reality, where material processes and processes of the mind merge below the surface of the classical macro-world. The Nonlocal Neurodynamics model conceptualizes subjectivities as semi-isolated body/brain/mind systems, locally separate but nonlocally connected with each other and the world at large. In addition to “uncanny” intersubjective communication that may manifest as “thought transference”, such nonlocal connections would also allow for *interobjective* manifestations (Marks-Tarlow, 2008) that include distant knowing and synchronistic events. In this light, the very relativity of intersubjective experience affirms, rather than negates, the existence of a unitary objective reality of which we are all an integral part.

The following vignette was contributed by Rowan Scott, a colleague and clinical professor of psychiatry at the University of Alberta.

Clinical vignette 4: intuition as extraordinary knowing

In my early career as a psychiatrist, I was in analysis with Dr. L. four times a week. I lay on an analytic couch while Dr. L. sat behind me to my right side. Dreams had been a feature of our work from the first session.

One Sunday night before my next Monday morning session I dreamt that I was walking with two other men down a winding path in a green and sunny garden. I was on the left, Dr. L. was in the middle, and a dentist in a white lab coat was on the right. As we continued down the path together, the dentist suddenly produced pliers and was trying to pull out the last molar at the back in Dr. L.’s left upper jaw. It required quite a bit of pulling, with some blood and finally the tooth coming out. The procedure did not seem to be overly painful for Dr. L. and he rather seemed relieved. I, on the other hand, was greatly distressed throughout the procedure and repeatedly stumbled as I was walking along beside them. I woke up suddenly.

I took this dream to my session the next morning. I explored multiple themes associated with my two brothers, my upset with my father over his unavailability related to work, and the complicated relationship I had with my mother. I also explored the possibility that I may have wanted to hurt Dr. L. in some way, although I was defending against it by displacing my aggression onto the dentist. I stumbled repeatedly while talking, overwhelmed by my anxiety and concern.

Dr. L. followed my associations with interest for the full session right up until the last few minutes, when he said: “There is something I will tell you. I do not know what you will do with it,

but here it is: I was feeling perfectly well last week. On Sunday I suddenly developed an abscessed tooth and infection. I had to go to an emergency dental clinic on Sunday afternoon. The dentist decided the only solution was to go on antibiotics and to pull the tooth. The tooth was my left upper wisdom tooth, the farthest tooth at the back in my left jaw. I will leave you with that today and we can talk about it at our next session if you want."

Dr. Scott's account resembles that of the late Dr. Robert Stoller published posthumously by Elizabeth Lloyd Mayer (2001). Stoller, like so many other analysts, was reluctant to publish his paper on telepathic dreams for fear of damaging his professional reputation. In the past several decades, science has acquired the means to understand such events solidly within its purview. Just like quantum mechanics forced us to reexamine familiar notions of locality and particle-wave distinction, in working with extraordinary knowing we have to give up the entrenched concepts of communication between separate localities, information/energy exchange, and fixed past-to-future time arrow.

At this point, the reader may ponder the practicality of the proposed model in everyday analytic work: How can these concepts be clinically applied? How would the analyst utilize nonlocal intuition in real time rather than only becoming aware of its sporadic occurrences retrospectively? How would the existence of nonlocal-participatory channels impact the relational analytic technique? These questions underscore the challenge of translating the developments in natural science, such as complexity theory and quantum neurobiology, into the language of intersubjective nuances in the analytic encounter.

The very existence of nonlocal-participatory dynamics radically alters our understanding of the relational dimension of psychoanalytic process. It finally settles a core analytic quandary that Anthony Bass (2001) called "one of the most venerable and dangerous of all psychoanalytic koans" (p. 685), namely the issue of patient-therapist unconscious communication. The existence of nonlocal-participatory dynamics supports Ferenczi's position of the "dialogue of unconscious" and the impossibility of the "blank screen" approach within analytic setting. The paradoxical dividing/uniting nature of intersubjective and interobjective boundaries provides the omnipresent element of "direct knowing" that cannot be filtered out by any physical means. The Nonlocal Neurodynamics model suggests the need to complement the intersubjective dialogue and projective identification with the domain of *directly shared experience*, veridical knowledge of the other as part of shared (rather than communicated) intersubjective and interobjective reality. Such "direct knowing" can be conceptualized as a non-defensive form of projective counteridentification (Grinberg, 1979), where both repressed and non-repressed aspects of self-experience become available across semi-permeable self/other boundaries. It engenders a shift from Bion's container/contained duality to a "shared superposition" paradigm, which can be illustrated by folding a sheet of paper with two separate points drawn on it until they are superimposed over each other, allowing for a zero-distance connection between seemingly disparate locations and events.

The Nonlocal Neurodynamics model strongly supports Freud's (1912) attitude to "evenly suspended attention," using the analyst's unconscious as a fine-tuned "scanner" of the patient's unconscious dynamics while avoiding its explicit analysis or conscious expectations in the moment. There is emerging evidence that nonlocal-participatory channels are inhibited by the activation of rational-analytic networks (Flor-Henry et al., 2017), suggesting the need to facilitate a meditative-like stance of attending to the here-and-now experience of "being with" the patient and to the analyst's own somatic, affective, and associative countertransference rather than attending primarily to the verbal content of the session. Intuitive and nonlocal

Table 3. Metaphor shift in psychoanalysis

Conventional metaphor	New metaphor
Intersubjective field	<i>Intersubjective matrix</i> —involves both local-interactive and nonlocal-participatory processes
Information exchange	Information exchange (local-interactive) vs. <i>information sharing</i> (nonlocal-participatory)
Boundaries (separation)	Boundaries as simultaneously separating and bridging relevant domains
Energy exchange	N/A; no physical mechanisms for “energy exchange” within intersubjective dialogue
Entanglement as information exchange	Entanglement as <i>nonlocal correlations</i> between seemingly separate spatial and/or temporal events
Linear causality	Nonlinear dynamics with multi-level causation and acausal correlations (<i>synchronicity</i>)
Intersubjective dialogue	Local-interactive intersubjective dialogue versus nonlocal-participatory intersubjective/interobjective information sharing

knowing has to be allowed to self-organize spontaneously, which underscores parallels to the Dynamical System Therapy approach to therapeutic interaction, where new relational configurations self-organize at the intersubjective front between the patient-therapist systems (Shapiro, 2015). In effect, the analytic attitude of “evenly suspended attention” is extended not only to traditional intersubjective channels of therapeutic communication but also to nonlocal “extraordinary knowing.”

Finally, the Nonlocal Neurodynamics framework brings into focus the need for a metaphor shift in psychoanalysis. Utilizing a unitary psychophysical paradigm requires a more accurate translation of physical and complexity concepts in order to mirror the interpenetration of body/brain/mind informational dynamics in the clinical setting. The critical changes involve a shift from linear to multi-level causality, which is already apparent in the psychoanalytic principle of multiple determinism; the integrative nature of fractal intersubjective and interobjective boundaries, which both separate and unite the relevant domains; and complementing the model of intersubjective exchange with intersubjective sharing (see Table 3).

Conclusion: the prime substrate of intuition

Many psychoanalysts have eschewed neurobiology and natural science as too reductionistic to capture the nuances and complexity of analytic work. However, a meta-reductive conception of physical and psychological reality reveals a much richer picture than a rigid delineation of subjective versus objective domains and intersubjective communication between them. Whether one privileges the objective dimension at the expense of first-person experience, as in conservative neuroscience and biological psychiatry, or immerses oneself in the vicissitudes of subjective experience at the expense of objective reality—both positions are deeply reductionistic. Within a psychophysical paradigm, separate subjectivities and semi-permeable boundaries between them are both real and illusory, allowing for continuous interpenetration of their informational dynamics at multiple levels of complexity. In the words of Elizabeth Lloyd Mayer (2002), “The subtlety of what we observe depends on the nature of the instrument through which we look” (p. 97). The Nonlocal Neurodynamics model outlined above offers clinicians a powerful “psychophysical microscope” through which we can not only view but at times directly share in our patients’ subjective reality, engaging with them “beneath the words” in a fully participatory way.

Openness to intuitive knowing involves a continuous interplay between sensory local-interactive and extrasensory nonlocal-participatory channels of awareness, bringing our implicit insights into consciousness and testing the validity of the rational-analytic and experiential-

intuitive information obtained. While we cannot control or predict the intuitive process, we can facilitate our receptivity and mastery of it in the service of clinical exploration and scientific discovery. Herein lies the full power of intuition to access the prime substrate of our shared reality of each other and the wider world around us; not just by “reaching out” to communicate with others but also by “reaching in” to tap into the inherent wholeness that unites us all.

Acknowledgments

We are grateful to Dr. J. Rowan Scott, clinical professor of psychiatry at the University of Alberta, for his contribution and invaluable support in preparing this manuscript

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