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Merging and Emerging: A Nonlinear Portrait of Intersubjectivity During Psychotherapy

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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. This paper offers a detailed clinical case in order to illustrate five key principles from the perspective of nonlinear dynamics: (a) A nonlinear relationship exists between diagnosis and treatment, when symptoms shift with treatment and diagnosis emerges out of it; (b) the intersubjective field is a complex web of feedback loops continually operating on multiple time scales and descriptive levels; (c) the coupled therapist/patient system self-organizes implicitly toward the edge of chaos; (d) at the fertile edge of chaos, novelty and greater system complexity emerge spontaneously; and (e) core therapist/patient dynamics are expressed as recursive, fractal pattern.

As the methods, research, and paradigm of nonlinear dynamics slowly infuse through the social sciences, a rich body of theoretical and clinical literature accumulates within psychoanalysis (Coburn, 2000, 2002, 2007; Galatzer-Levy, 1995, 2002, 2004, 2009; in press; Goldstein, 1997; Harris, 2005, 2009; Leffert, 2008; Levin, 2006; Levinson, 1994; Marks-Tarlow, 2008b; Moran, 1991; Palumbo, 1999, 2007; Piers, 2000; Piers, Muller, & Brent, 2007; Pincus, Freeman, & Modell, 2007; Pizer, 1998; Priel & Schreiber, 1994; Procci, 2002; Rubinfeld, 2001; Seligman, 2005; Spruiell, 1993; Stolorow, 1997; Taerk, 2002; Thelen, 2005; Tyson, 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 psychoanalysis (Seligman, 2005), a nonlinear dynamical approach can unify a multiverse of cultural perspectives, to accommodate diverse schools of thought within a nonauthoritarian context (see Marks-Tarlow, 2008b). The holistic nature of the paradigm counteracts reductionist divisions and Cartesian splits, helping to marry the art of psychoanalysis with its science while unifying meaning-making endeavors at ever wider descriptive levels.

In order to illustrate the utility of a nonlinear perspective, this paper presents a clinical case, which is then analyzed from the perspective of five key nonlinear principles. The case involves

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dissociation, where aspects of primary emotion that are split off, then become the object of attack from a fragmented consciousness. From an interpersonal, neurobiological point of view, I hope to underscore the centrality of implicit, body-driven processes during psychotherapy, whether they reach awareness or not. From a nonlinear point of view, the case highlights the potential for tiny events within a moment of meeting to cascade into major life changes. Finally from a paradigmatic point of view, I introduce the significance of fractal patterns within intrapsychic and interpersonal dynamics.

The “Merging and Emerging” aspect of my title was inspired by the pioneering Italian nonlinear psychoanalyst Franco Orsucci (2002). In the sections to follow, the concept of merging applies to sensitive, contingent attunement within the coupled dynamics of the relational dyad that allows each to hold and fully interpenetrate the other. The concept of emerging refers to the evolution of the coupled system to the edge of chaos where the complexity of greater internal structure and self-regulation can emerge. After presenting the case of Gus, this paper analyzes the clinical material in terms of the following relevant principles:

1. Nonlinear relationship between diagnosis and treatment, in that diagnosis does not always precede treatment in a predictable, stepwise progression, and a course of treatment is not always implied reductionistically by diagnosis.
2. Intersubjective field, as constituted by continual feedback loops within and between people at multiple time scales and descriptive levels.
3. Self-organized evolution of the coupled therapist/patient system toward the edge of chaos.
4. Unexpected, spontaneous emergence of novelty and greater system complexity.
5. Core dynamics expressed as fractal pattern.

GAPS WITHIN GAPS

When he first contacted me for therapy, Gus was a 62-year-old man in his second marriage of 15 years with a woman 21 years younger. On the phone Gus was blunt about what he wanted. During lovemaking with his wife, he experienced himself as a woman. Out of fear of losing her, he wanted to rid himself of this experience. Immediately and instinctively, I recoiled inside, while out loud I expressed doubt that this was possible or even desirable. I offered an alternative path—to help Gus understand and make meaning out of his experience. After declaring his lack of interest in insight, Gus made the appointment to come in.

Polite, respectful, attentive, open, and thoughtful, despite his heinous agenda, I found myself liking this man from the start. During our first session Gus told me he had tried eight sessions of therapy once before. He discontinued after he was diagnosed with Gender Identity Disorder and referred to a gender disorder clinic. This diagnosis did not feel right. It seemed too simplistic. Gus had no interest in changing his gender or his body. He was happy in his relationship with his wife and with his role as a man in their marriage. Gus is a bright man who had done extensive research on the Internet, and none of the diagnostic categories he encountered quite fit. From the start, I had the sense of great complexity regarding Gus’s presenting issue. I sensed this thoughtful and sensitive man was not going to fit neatly into any little box, despite his stated desire to be neatly categorized so that his “symptom” could be cleanly excised.

Gus's experience of himself as a woman began when he was 36, shortly after the breakup of his first marriage. That relationship dissolved after 15 years, when Gus had hit a limit in feeling unappreciated, burnt out, and "used" for the material goods he provided. Unable to deal with his growing resentment through direct communication, Gus enacted his distress following a poignant discussion with his wife on a ski lift near their second, mountain house. She mentioned her desire to acquire yet a third, beach house. Gus began doubting his wife's love for him apart from what he provided. Shortly afterwards, he unconsciously tested his theory by imploding his own business. Unfortunately he was right. His wife left, and in the years to come Gus went through a series of relationships that were characterized by similar themes of feeling emotionally neglected and exploited. While the pattern appeared broken with his current wife, who clearly loved him despite his current struggle with money, Gus still had problems with communicating about emotions and would not even entertain the possibility of telling his wife about his presenting issue. Further, Gus had not recovered from his work trauma, and had continued to suffer downward spirals in his professional life. Once he was fired from his position as CEO after he had a heart attack. Another time he lost lots of money plus his best friend when a business they started together failed. In his current position, Gus was underemployed, underpaid, and incredibly frustrated with his rigid, at times floridly schizophrenic boss.

It was during the stress of divorce that Gus began fantasizing himself as a woman, mostly during masturbation. When he contacted me, the fantasy had crept into sex with his current wife. As Gus and I got deeper into our own relational dance, Gus's "symptom" worsened rather than lessened. Instead of being confined to lovemaking, the experience spread to times when Gus was alone; it also spread to times other than masturbation, becoming an increasingly frequent way to self-soothe in the face of stress. At first these experiences occurred only when Gus was outside of therapy. Eventually they made their way into my waiting room and even into our sessions. Always there was a physiological, sensory aspect. Initially the physical sensation was of Gus's penis as a vagina. Later, whole parts of his body would "switch" to feel like a woman, right down to the curve of his finger or feeling of his hair. At first this occurred only when Gus summoned the experience voluntarily; increasingly the switch became autonomous, taking on a life of its own.

For many years Gus would take solace in composing music, but at the point of starting therapy he had not written a single song for 12 years. His last piece, inspired by his father's death and conceived with the help of marijuana, concerned a body-bagger sending corpses back home during war. The song, written for solo voice without accompanying instrumentation, had been sung aloud only once, in a darkened recording studio, with Gus's back to the technicians. No one had heard the song since, including Gus, who could not bear the pain of it.

After much talk about the link between leaving his music and wanting to leave other pieces of himself, Gus readied himself to play his music as part of our therapy, a process that took months. As we got closer, Gus brought the CD player into my office, where it sat alongside the two of us for a number of weeks before the time felt right to use it. When that moment occurred, Gus played several other compositions first, winding up with the body-bagger song that had ended all others. Upon listening I was struck by how emotion-filled I felt, yet how difficult it was to put words to all my feelings. The music hinted at a hurt so deep that it could only be buried. I was especially chilled by how the song ended—with a long, unpredictable, and a-rhythmic gap between two words: "quiet" and "home."

Next session, as we continued to process our listening together, Gus shared the following dream: He was a pregnant woman arriving at the hospital with her husband, who later dropped

out of the scene. The woman was being wheeled by a nurse toward the delivery room. As they prepped for the delivery, Gus protested, "I don't know how to do this; I've never done this before; I'm afraid I'll screw it all up." The nurse, in response, kept reassuring over and over that (s)he would be just fine.

Gus and I examined parallels between bringing in the dream and playing me the song. Both involved facing dark and fertile holes in the great unknown, including potentially bottomless pain, without knowing what would come of it, all the while with someone there to say, "Don't worry, I'm with you. It will all be okay." The pain of listening and the desire to feel the music emotionally from my perspective opened up discussions about Gus's lack of emotional safety and all the gaps and holes in Gus's emotional life. This included his internal war as a void, with Gus's implicit rule to avoid the war of conflicted feelings. Over the weeks and months we returned again and again to parallels of me-as-nurse wheeling him down a corridor into the unknown where he was attempting to birth and rebirth parts of himself, including his relationship to his inner voice/music. As we focused on what Gus was trying to "conceive" within himself, in a highly vulnerable moment he shared his longing for me to serve as midwife to his music.

Shortly afterward, Gus learned that his 19-year-old, unmarried administrative assistant was pregnant. The young woman immediately went into crisis about whether or not to keep or even have the baby. Gus became the sole voice of encouragement in this woman's life, a stance that related at least partly to his own history. Gus's mother had been abandoned by his father during her pregnancy, though she later met a loving man who had adopted Gus as a young boy and whom Gus had always experienced as his "real" father. Curiously, Gus's current wife also had had a child by another man, and she also had been abandoned by the father of her child. When Gus came on board, the child was 3 years old. Gus had adopted his wife's child. Now 12 years later, Gus felt closer to his adopted son than to his biological daughter from his first marriage.

As Gus encouraged his administrative assistant through her initial crisis, he became her closest confidant. The two of them grew more and more intimate emotionally. The closer Gus felt to this young woman, the more the fantasies of his own female side merged with his experience of this young woman. As she went through various stages and sensations of pregnancy, so did Gus. Again his experience went beyond the mental/emotional to carry physiological aspects, to the point where the young woman was surprised at his ability to anticipate what she was experiencing in her body. Gus had a dream that she asked him to be her Lamaze coach, and he readily accepting, despite his wife's protests. The young woman's experience of pregnancy became the inspiration by which Gus's heart sprung open. For it was during "their" respective pregnancies that Gus reclaimed his music. The first piece that came to him was a love song, written as if from mother to baby.

The more Gus spoke openly about his caring for the young woman, the stronger his determination was no longer to be a "prisoner of fear"—too scared to feel his own feelings. The stronger his determination grew to experience and express his emotions, the more discomfort and trepidation I started to feel about what was happening. I had an ominous sense that everything was slipping toward disaster. I felt a war inside me, with intensely mixed feelings. Despite my joy in Gus's emotional opening and his reconnection with his music, I also held intensely negative feelings. Gus had consciously written the song as if from mother to child, but I heard a double meaning. I heard an unconscious expression of a love song written as if from Gus to the young woman. Between Gus's preoccupation with the song and his Lamaze dream where his wife's

feelings did not matter, I sensed great danger to his marriage. Gus's blooming heart gave me the feeling of a train off its tracks, racing down a hill. I was scared that Gus was repeating old patterns of implosion and explosion. Meanwhile I was deeply divided and uncertain as to how much to share my mixed emotions with Gus.

These events set the stage for one session in particular that felt like an electrifying "moment of meeting." Gus opened with a risky observation. He had noticed a shift in me over the past several months, which he judged by my tone of voice, my posture, how I sat in my chair, and how I shifted body positions. Gus observed that when he used to talk about his administrative assistant, I would seem stiff and rigid. I would shift posture as if highly uncomfortable. My voice would get thin and strained. But recently he detected a change. I now seemed more relaxed and comfortable with these subjects. I no longer shifted my body position when he started to talk about the young woman or her baby. My voice quality remained considerably softer. When Gus made these observations about the music under the words, at first I was rather stunned. He had called attention to aspects of my being and behavior of which I had been mostly unaware. I took some time during this session to self-reflect. Meanwhile I carefully explored Gus's fantasies about my inner relational world and the meaning of what Gus perceived to his own sense of self, safety, and well-being.

After we thoroughly explored recursive folds of Gus's perception of my perception of him, I chose to reveal attachment dynamics as seen from my side of the couch. I had waited to share my subjectivity because I wanted neither to shame Gus with any moral judgments nor to influence him with my biases about how he should proceed. I confirmed that everything he said was true. That I used to worry Gus's runaway heart would lead to his imploding yet another relationship and to exploding his job. Further, that I had had mixed feelings about warning him and largely had held my tongue, because I believed Gus needed to find his own truths. Though I had not been conscious of the subtle shifts in myself he had mentioned, it was also true that I was now feeling less stirred up and conflicted inside. I realized that my increasing comfort corresponded to trusting Gus now to hold the full complexity of his experience without needing either to implode inside or explode the outer conditions of his life. The "danger" seemed to have passed. I sensed that Gus's dedication to his wife came first, as his love for his administrative assistant had folded inwards, where she served more muse than as prospective lover.

Within a couple of weeks of this seminal session, despite his advanced age and years of job-seeking, Gus landed a high-level executive job, with full creative license to take a small business in any direction he envisioned, at about three times his current salary. Gus had gotten the position by using the same intuitively penetrating skills he had used with me during our moment of meeting. He had accessed the website of the job site, had analyzed it scrupulously in order to identify strengths and weaknesses. He had created a fancy PowerPoint presentation with a business plan that included what he could contribute and how. During his presentation Gus used his highly perceptive read on the members of the Board, all of whom were part of one family. Everyone was unanimously floored by Gus's intelligent discernment and almost psychic abilities to diagnose the contours of their business.

While there are plenty more twists in this case, I end my account here with one more trivial but striking incident that occurred shortly after he started his new job. A coworker overheard a bit of Gus's love song, now programmed into his cell as his phone ring. She asked him what the music was. After hearing that Gus had written it, she wanted to hear more. Gus agreed, but only to the instrumental version. After listening with rapt attention, the woman explained that as she

listened, she felt as if she were being held and caressed by the melody and its tones. An image had come to her—of a father holding a baby.

With these facts in hand, I now turn to a nonlinear analysis.

DIAGNOSIS AMIDST ILLUSIONS OF CONTROL

From a neurobiological perspective, we would like to believe we are in control of our own bodies, yet a fuller picture suggests that the whole of our 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, such as moving a finger, are preceded by nonconscious brain events that occur on time scales too rapid for awareness (see Libet, 2005). If we are not even in charge of our own bodies, how can we possibly be in charge of our patients' psyche and lives? Just as our 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.

As therapists privileged enough to be engaged in long-term psychotherapy with patients in hopes of deep transformation, no matter how much we clean up our teaching stories and case presentations, the process is always messier than our 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 our eyes metaphorically, while we grope, glide, and sometimes leap by feel alone; and always, always throughout, to 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 we 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 our patients well enough to affect this level of subcortical change, we usually need years of relationship building that becomes inseparable from processes of exploration and intervention during psychotherapy.

Despite Gus's stated desire to be simply diagnosed, his unconscious striving toward health prevented this from occurring. Over time we understood his very desire to be diagnosed as symptomatic of inner conflict. Gus's conscious yearning for a label to excise his experience of himself as a woman reflected an inner violence he was inviting me to participate in yet needing me to resist, if I were truly to prove to be a safe container for his wholeness. Gus is among a group of emerging patients with dawning recognition that the oversimplification of the common transsexual conceptualizations violates the richness and complexity of their own implicit thinking about gender. This point is highlighted by Harris (2005), in her concept of gender as soft assembly.

Amidst such a wide gap between explicit and implicit levels of our work, it is no wonder that the diagnostic picture itself began to morph along with the contours of the therapeutic relationship. Initially we talked about Gus's experience of himself as a woman as something he *did*, a *behavior* he voluntarily initiated. Then it appeared to be a *fetish*. Then a *fantasy*. Finally we came

to understand these states of mind/body/brain to involve not something he did so much as Gus's *dissociation* from integral aspects of his *being*, arising out of relational trauma.

In response to a lack of emotional safety, Gus's experience represented a paradoxical rejection of and then yearning for split-off aspects of self. His fear before therapy was that he must give up the fantasy of himself as a woman in order to be potent as a man. Over time and through reassurances by me of safety, we came to understand the opposite: Gus's very attempt to give up pieces of himself in hopes of preserving relationships with others was itself what led to feelings of impotency, implosion and burnout. Only by reclaiming these split-off pieces could Gus feel powerful and whole. Along with this mutual formulation, we came to understand Gus's concrete experiences of himself as a woman in symbolic terms, as reflecting conflicting impulses both to dissociate unbearable feelings while yearning for connection to his feeling side along with the rich internal life it afforded him. There was also an underlying neurobiological dimension, where Gus's symptom appeared to be a left- logical mind dissociated from a right, emotional, relational side.

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 we try to pick apart the holism of a relationship with our minds, the more violence we 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 us in our offices that remain comfortably familiar. We often adopt characteristic ways to start and end sessions. We 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 we feel stuck, we can have the sensation of repetition. As a therapist, the movie *Groundhog Day* was poignant and funny to watch, because Bill Murray's inner stuckness appeared to be an outer scenario, as if he were stuck in the same day over and over, forced to undergo repetition compulsion until he "got it right."

A linear interpretation of such aspects of psychotherapy suggests that exact repetition is possible. As with the Bill Murray movie, the notion of repetition involves either a timeless arena or one in which we go 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 is possible within linear realms, the elements of which are independent and therefore permit time reversible processes, within nonlinear realms, especially from the perspective of the system as a whole, exact repetition is impossible, particularly 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 we encounter 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 courser-grained level of psychological events, repetition not only appears possible but also constitutes the essence of psychopathology, precisely because adaptation and forward development have ceased. One important advantage point to a nonlinear framework is the capacity both to address continuities and discontinuities across scale and descriptive levels.

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 (Buzsáki, 2006). The greater the complexity of the central nervous system, as in mammals, the greater the number of feedback loops. Over the course of evolution, 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 microsecond events of neurobiology also holds true at the level of relational dynamics, though less obviously so, in line with a fractal concept called scale-invariance, which is often an aspect of mathematical iteration.

In mathematics, an iterated formula 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, or run continuously, for each point on the complex number plane, with outputs continually fed back in as the new starting conditions. Results are then color-coded in order to convert the numbers into the set's commonly recognized visual form. Areas where the formula converges to a stable solution represent underlying fixed point attractors (the mathematical equivalent of repetition), which are commonly colored black. Areas where the formula flies off toward infinity represent underlying chaotic attractors, which are colored according to their rate of flight. In between these two extremes lies the complexity of the actual Mandelbrot set itself, magnificently and dynamically iterated at the edge of chaos.

One hallmark property of the Mandelbrot set is self-similarity, evident when the computer functions like a microscope to "zoom in" on particular areas. Self-similarity means that the overall pattern of the whole is evident in the pattern of its parts. The property of scale-invariance is illustrated by self-similar pattern extending across different size scales. Both properties can also extend across different time scales, with self-similar and scale-invariant temporal rhythms often existing 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 here, because the entire history of these interactional sequences contributes to the unique present moment. The present moment also enfolds the future, because these sequences also imply 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 (Marks-Tarlow, 2008b).

With the affective core of the self involving 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 we are engaged in attuned responding, even if we get the “same” defensive rebuff from a patient over and over, we 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.

Keeping in mind different descriptive levels and their complex interdependent dynamics, I now return to feedback loops and recursive enfolding in the case of Gus. At the explicit level, from the very first contact by phone, Gus asked me over and over to “penetrate him” with a diagnosis in service of “emptying” his yearning to be a woman. But at the implicit level, the relational dynamics were more complex. Gus needed me to midwife rather than to rape or to abort his primary experience. Gus needed me to hold and contain his negative feelings and destructive urges rather than to react to and enact his conscious desire, which only would have led to more internal divisions and imploded violence.

I have previously asserted (Marks-Tarlow, 2008a, 2008b) from a nonlinear perspective that at the core of the psyche lie paradoxes of self-reference. In a paradox of self-reference, the act of pointing back to the self, whether in mathematics, self-reflection, or self-assertion, whether implicitly or explicitly, ultimately leads to contradiction. Such is the source of universal internal conflict. In the case of dissociation, paradoxes of self-reference exist in the form of a “Me state” declaring “Not Me state” (see Bromberg, 1998, 2006). Within the intersubjective field, such paradoxes readily spill into relational dynamics. Consider the paradox of Gus asking for one thing but needing quite the opposite. With Gus, from the beginning, fortunately my own inner alignment bolstered my refusal to gratify Gus’s conscious wish, as I sensed with my body as well as more consciously that Gus needed to be penetrated and to penetrate himself at levels beyond his conscious understanding. At the implicit level, Gus responded to my offer to meet him with both masculine and feminine aspects of myself—the male penetrating force and the female container—in hopes of a peaceful resolution to the warring aspects of these two sides.

The New York Relational School has a saying: “That which gets dissociated is bound to be enacted.” In a recent conference, New York psychoanalyst Philip Bromberg (2007) eloquently asserted, “It is impossible to permanently avoid an internal war between adversarial parts of the self simply by trying to increase the degree of power held by only one part.” Gus embodied Bromberg’s principle in the ontological paradox of attempting to enliven himself by “killing off” another part. The impossibility of the venture is a consequence of sensitive dependence on initial conditions, a property of nonlinear systems described in more detail later by which small perturbations can rapidly cascade into large avalanches. The force Gus was exerting to fight himself was only driving the system deeper away from equilibrium, where sensitive dependence becomes more acute.

Going even further, Gus responded to his subsequent distress by pushing it down and failing to let it bubble up to consciousness. When this kind of dissociation exists, we run into R. D. Laing’s (1970) recursive tangle of being unaware of anything of which we needed to be unaware, and then unaware that we needed to be unaware of needing to be unaware. This kind of imploding loop occurs as a literal pressing down of self, often experienced as a de-pression in counterpoint

to an ex-expression of emotion more consciously experienced. This process set the stage for Gus's frequent implosions, by which his power of self-assertion was thwarted and became directed inwardly instead.

The Boston Change Process Study Group has reached the conclusion that it is the process of communication, or implicit relational knowing, rather than the content of the communication that is the foundation for the therapeutic action of psychotherapy (e.g., Lyons-Ruth, 1998). My pivotal session with Gus revealed to me how much the morphing mixture of emotions I had been holding served as a container for the emergence of internal structure within Gus, all outside my awareness. Even though I said very little, Gus was reading my body language throughout, apparently both consciously and unconsciously.

When Gus took the risk of actively penetrating my inner world, he expanded the intersubjective space between us. By attending to prosody, body musculature and other aspects of my implicit processes, we had a real breakthrough. The event was a corrective emotional experience that proved the opposite of implosion. First he had literally played his music in order to examine our listening together; then he played the music of our emotions and relationship. Both signaled Gus's greater willingness to risk intense feeling in the presence of another plus a readiness to bring more of himself forward into relationship.

COUPLED SYSTEMS AND SELF-ORGANIZED DYNAMICS

A 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. Recent research by Guastello, Pincus, and Gunderson (2006) shows that even in strangers, there is coupling of Galvanic Skin Response during turn-taking in a casual conversation.

These kinds 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 be either stuck in an underlying stable attractor or lurching toward 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 these pathological extremes towards the edge of chaos (see Marks-Tarlow, 2008b). Much like the dynamic qualities of the Mandelbrot set, the edge of chaos is a zone of transition containing enough stability for structure, yet enough disorder for novelty.

The more tightly Gus and I became coupled at all descriptive levels, the faster we moved away from the static realm of equilibrium, toward the edge of chaos. Here the word “chaos” is meant not in the everyday sense of being random or structureless, but rather in the technical, scientific sense where hidden order is invisibly tucked beneath what may appear random on the surface. Evolution toward disequilibrium at the edge of chaos was evident with Gus in at least two ways. One involved the implicit level where his “symptom” began to spread, and in Gus’s eyes worsen, moving from a well-contained, occasional somatic experience to a ubiquitous ever-present aspect of his embodied experience. A second more explicit level corresponded to my increasing sense of a train running out of control, where I feared Gus was about to repeat past habits to explode his marriage, devastate his administrative assistant, jeopardize his work, and break his own heart, all at once.

When a complex system approaches a phase transition, such as the edge of chaos, it tends to contain elements of the old and the new chaotically mixed together (Kelso, 1995). Anyone who has ridden a horse knows the jerky feeling of moving from a trot into a canter, an example analyzed extensively by Kelso. At the microlevel, disorganization arises because features of both states are jumbled together, whereas the global level is literally an in-between place characterized by neither state. Looking back, I can see how the old and the new were chaotically mixed within the intersubjective stew with Gus. I also can see how my capacity to contain my fear sufficiently to let all these feelings and relationships run their course may have contributed to the coupled system reaching the edge of chaos. From an attachment standpoint, we could say that Gus and I were working near the edges of our affect tolerance, and I along with others, would add that it is always at those edges that significant work occurs. Here, in the words of Philip Bromberg (2006), we are “safe but not too safe.” As we operate under conditions of controlled risk within Vygotsky’s (1978) “zone of proximal development,” it becomes possible to expand the regulatory boundaries.

EMERGENCE OF NOVELTY AT THE EDGE OF CHAOS

Many if not most complex systems in nature self-organize toward the edge of chaos, which is a highly fertile zone, where system reorganization is possible. Upon reaching a change point called a bifurcation, a new set of underlying attractors spontaneously and unpredictably emerges, manifesting in the form of novel responses and higher complexity (e.g., Bak, 1996; Waldrop, 1992). Schore recognized this when he characterized 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). Here, possibilities for change, organized in fractal terms as a power law, exist on any and all size and/or time scales (see Schroeder, 1991). Power laws, ubiquitous in nature and especially prevalent in physiological systems (e.g., West, 2006), leave our systems in a high state of readiness, as the next perturbation or tweak, whether arising from the inside or outside environment, can trigger either tiny changes on the smallest scales, or an avalanche that affects the system as a whole.

Whether it is in the form of brains, individual people, or coupled relationships, systems poised at the critical edge of chaos are healthiest because they are most flexible, adaptable, and responsive to environmental change (Marks-Tarlow, 2008b; Siegel, 1999). The association of mental and physical health with flexible adaptation rather than with equilibrium and stability is a significant paradigm reversal. This capacity for flexibility and adaptation arises partly because systems poised at the edge of chaos are well situated to capitalize on the property of the sensitive dependence on initial conditions, which characterizes chaotic realms more broadly. As mentioned, sensitive dependence means that the tiniest, microscopic change in an underlying system value can escalate rapidly and unpredictably to tremendous, macroscopic proportions.

Sensitive dependence plus emergent novelty at the edge of chaos is well modeled by a Dr. Seuss (1958) book called *The Cat in the Hat Comes Back*. When their mother is away on a rainy day, a brother and sister let a naughty cat into their house, little suspecting the havoc that will ensue when they allow him to take a bath. After the cat leaves a pink ring in the tub that spreads to a dress, the walls, the parents' bed, and eventually to the whole of the snow outside, it is the tiniest, most invisible cat that proves capable of effecting the biggest, most complete change of all that instantly cleans everything up. And so with Gus, after hurling toward what appeared to be disastrous repetition of the past, it was the tiniest of events during psychotherapy that cascaded into what amounted to a reversal of previous dynamics to change the course of future events.

To not know to what degree, when, and how change will arise is part of unpredictability of psychotherapy. No matter how bleak things look now, no matter how much we may be groping in the darkness, it takes only the slightest tweak in one seemingly insignificant underlying variable for new light to appear. And the very uncertainty of it all, the very act of not knowing, lends therapists perennial hope that everything can "change on a dime." 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. We easily see this with Gus during his phase transition where the old and new were chaotically mixed: He could have fallen backwards had he chose to pursue his love of his administrative assistant in real life, including a bid to father her baby. Instead through self-examination in a safe context, he resisted these impulses to capitalize on the opportunity instead.

Gus moved forward largely by containing his complex mixture of emotions, including by recursively enfolding his love back inside, where it served as inspiration for his music. Gus gained access to a fuller range of emotion, and to more of his unconscious, which he then mined without the use of marijuana by "delivering" a musical "baby" of his own. From an attachment perspective, out of the merged dynamics of our tightly coupled therapist/patient system emerged greater flexibility and capacity for a variety and intensity of emotional experience, greater impulse control, wider emotional regulation, and deeper access to his own creativity.

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, 2008b). Fractal geometry is a whole branch of mathematics 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 to 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. One example is the cascading sequence of ever smaller Cats in the Hat, each recursively enfolded inside the next, each bearing resemblance to the largest.

We have all grown up learning the Euclidean geometry of grade school, where we studied circles, triangles, spheres, and cubes. Most of us chopped up these shapes and then pasted the pieces back together again, in an attempt to fashion shapes in nature. What proud grade school child has not created a pine tree by gluing a cone top to a cylinder base? Although 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, they proved highly useful in leading mathematicians to more precise definitions of concepts like dimensionality. For the past several decades, we recognize that fractals provide a lexicon for nature’s complexity, by modeling her dynamic growth, 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.

Our bodies are filled with fractals—everything from the recursively enfolded shapes and branches of our circulatory system, our lungs, our digestive systems, and our brains, and even the distribution of pores and markings and wrinkles on our skin is fractal. 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, 2008b), I assert that not only is the basic shape of the psyche fractal, leading us to self-similar behavior recognized as our basic personality, but even more intriguingly, so are the edges of the psyche. When a fractal occupies the boundary condition between two different areas, or basins of attraction (see Schroeder, 1991), there exists paradoxical dynamics. The boundary that separates also connects, remaining both open and closed at the same time (see Marks-Tarlow, 2002). This allows autonomous function of subsystems, yet with full interpenetration of each at the edges in between.

By expanding the notion of dimensionality to include fractal dimension as it occupies the space between ordinary, Euclidean dimensions, the stage was set apply these concepts to the boundary zone of negotiation between self and other constituting intersubjective space (Marks-Tarlow, 2008b). This kind of paradox in the transitional *space between* as modeled by fractals was anticipated within psychoanalysis by Winnicott (1953, 1971) who noted that transitional objects, such as baby’s first blanket or teddy bear, are both discovered and created in the transitional space between baby and mother, where they arise through the negotiation between both people, yet belong fully to neither.

The beauty of fractals is in their capacity to model dynamics that span the full gamut, between the abstract space of mathematics through the concrete physical space of nature herself. In fact, within a single, highly complex system, fractal dynamics frequently do range from concrete, physical levels through symbolic, abstract ones. Consider Eglash’s research (Eglash & Broadwell, 1989; Eglash, 1999) on fractals arising within African culture. In Dogon ideology, the human form provides the basic unit of meaning. Consequently, the human shape is found concretely in

tiny details on doorframes and other architectural features. It is also found in the foundational shape of single homes; in the semiabstract shape of villages as a whole; and in the purely abstract realm of heaven above, whose organization is also conceived in the shape of a human being.

Given that fractals occupy the space between ordinary dimensions mathematically, model the space between different organs and subsystems of the body, and occupy the space between inner and outer processes, such as the transduction of energy from outside stimuli to inside perception within psychophysics (Yilmaz, 1964), in previous work (Marks-Tarlow, 2005, 2008b), I assert that fractals provide an important tool for modeling the paradoxical entanglement of boundaries between self, world, and other. I have approached the issue mathematically from the perspective of semiotics (Marks-Tarlow, 2005) where I demonstrate how the deep meaning of fractal geometry reveals a new level of observer-dependent dynamics, where what we see depends not only on where we stand but upon how we look, while the recursively self-referential symmetries of fractal geometry blend concrete with symbolic space. My previous work attempted to provide a robust, empirically based foundation for modeling conceptual boundaries between mind and brain, brain and body, body and world, self and other, and inner and outer processes broadly. All of these conceptual boundaries are highly relevant to detecting complex, self-similar patterns within psychotherapy.

Especially from within a linear stance, where the either/or conditions of Aristotelian logic dictate “clean” boundaries, the idea of fully interpenetrating fractal boundaries can seem hard to swallow at first. Yet a simple tilt in perspective can render them intuitively appealing. Consider the notion that I am fully embedded within the universe, at the very same time that the universe is fully embedded within me. This kind of interpenetration relates to the fractal idea that the whole exists within the parts, instead of being composed of the parts. Again this idea appeals to us intuitively, as reflected in clinical lore among many psychoanalysts that the entire course of psychotherapy can be discerned within an opening session, or that the course of a session can be accessed through its opening remarks. Note that both the beginning of therapy as well as the first utterance of each new session represent phase transition periods. As described earlier, through chaotic mixing of all underlying elements, no wonder the global structure of the whole is revealed at the seams.

Self-similar patterns cross-cut concrete as well as symbolic space within the case of Gus, by existing at multiple, simultaneous descriptive levels: in the core dynamics of Gus’s psyche, in the history of Gus’s relationship patterns, within intergenerational relational patterns, and finally within neurobiological and psychological levels constituting the intersubjective field and process dynamics that extended between Gus and myself. Our initial phone contact provided the whole by which we examined and created opportunities to fill the holes in Gus’s experience of himself and others. Gus’s absent father led to dissociated rage, a war on himself, and implosion over and over as he attempted to rid himself of bits of self, despite a deeper need to integrate them instead. We can also detect the multigenerational presence of almost uncanny self-similar pattern in an absent father and single mother raising a child, which appeared within Gus own parents, within his wife, and now within his administrative assistant, largely as spawned by Gus’s encouragement.

These recursive patterns illustrate fractal boundaries, how the intersubjective space between people that contains the whole can be more complex than an individual’s psyche alone. In the case of Gus, fractals also illuminate how dissociation complicates interpersonal boundaries, when the whole of a person’s history remains embedded in the present, and dissociated pieces of one person remain relationally caught in the space between people. No wonder projective identification

so often occurs. No wonder it is impossible to exterminate any aspect of self. Fractal boundaries also point to the important fact that therapeutic action occurs at the borders, implicating multiple levels of description and the boundaries that exist between them, including brain/body, self/other, inner/outer words, and subjective/objective levels. Whereas for many years, Gus's fractal core surrounding the absence of father was linked to a suppression and implosion of rage plus difficulty expressing his emotions relationally, over time therapy brought out the second half of the pattern—within the reunion of a father linked to the capacity for aggression within a secure attachment context. Gus's increased capacity to both experience anger and assert himself masterfully in the world came through in multiple ways.

That these relational patterns were enfolded recursively is illuminated by the self-similar themes within Gus's history of music-making and dreams. With me as nurse to his pain and midwife for his emotional expression his ability to reconnect with his unique inner voice, his creativity, and greater integration was possible. Gus received my full capacity both to penetrate his psyche with a paternal energy and to contain his full range of experiences with a maternal energy, giving rise to his full complexity in the birth of nascent aspects of self.

The notion of mutual interpenetration as it applies to the intersubjective field suggests that the self is enfolded within the other at the same time that the other is enfolded within the self. For example, my emotional holding of Gus as reflected in his pregnancy dream was then flipped in our moment of meeting where he demonstrated the capacity to emotionally hold my holding of him. Indeed attachment is an iterative process where feedback continually changes the figure/ground relationships as a characteristic both of growth and healing progresses.

Finally I would like to say a word about the almost magic event in the end, where Gus's coworker recognized the love between parent and child in his music. Within the mining of the unconscious that produces art, meaning is produced in others through the fractal resonances with the whole. The entire emotional history of the artist is enfolded and embedded within each product and production. Others resonate with these implicit emotions, even if they do not know where their reactions come from.

I suggest that this resonant capacity at implicit levels constitutes the essence of clinical intuition. We use our bodies and instincts to hone into the whole of our patients in order to "read" their interior states, unconscious affects, and sometimes even life circumstances. The capacity to use the whole of ourselves in to sense and fashion responses to the whole of another is key, yet often remains an invisible feature of what we do every day, often in prosaic ways. Ironically, our clinical theories can unwittingly encourage the opposite practice, if we isolate our thinking faculties from our emotional faculties and body-based experience. The impact when we psycho-analyze intellectually instead is to reduce our patients to pieces, whether part objects, transference reactions, diagnostic categories, and so on. I would suggest that the holistic operation of clinical intuition, reflecting the fractal-like principles of self-organization, self-similar, and scale invariant patterns that often cascade over multiple scales, guides our minute-to-minute interventions as much as, if not more than, any particular theory we might ascribe to.

SUMMARY AND CONCLUSIONS

Nonlinear dynamics is central to psychoanalysis, not just within 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. As we surrender to deep involvement with our patients, a certain level of autonomy takes over as the two systems become coupled in self-organized fashion, largely beneath the realm of awareness. The resulting therapist/patient system takes on a life of its own as it moves away from equilibrium, toward the edge of chaos, the territory in between and 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 matters, it is also matching the readiness for state changes, that is, 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 our patients' lives.

After years of studying fractal patterns, I am convinced that as therapists the deeper we penetrate the intersubjective field, the closer we come to the central paradox that provides the cradle for all of creation, not just at the level of mind but also at the level of matter (see Marks-Tarlow, 2005). But this fertile place is also a dangerous one, just as capable of potential annihilation when things break down as of potential creation when things break through. How to fold both sides in at the fractal edges of chaos to find the safety of feeling unsafe, the aliveness in the dead parts, the truth of the lies, that emerges just this side of annihilation, death and nonbeing? That is the critical question that no one can answer for all time but which must be experienced anew in the vicissitudes of each life, each relationship and each moment.

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