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# Toward a Science of Transpersonal Phenomena

(Commentary on Marks-Tarlow's "A Fractal Epistemology for Transpersonal Psychology")

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*"The intuitive mind is a sacred gift and the rational mind is a faithful servant.  
We have created a society that honors the servant and has forgotten the gift."*

—Albert Einstein

The task of constructing transpersonal science has been elusive. After half a century of transpersonal research, we are still lacking a conceptual model to integrate altered states of consciousness into the framework of natural science. Suggestions range from giving up on the empirical method itself to limiting the range of transpersonal studies to phenomena compatible with reductionist science. Marks-Tarlow's (2020) fractal dynamics approach provides a unique opportunity to build a conceptual bridge that serves the dual tasks of reintegrating transpersonal phenomena into the realm of natural sciences, and expanding the reductionist paradigm to incorporate multi-level emergent complexity in Nature. Instead of assuming a dualistic view of mind-matter interactions, it suggests the need for a trans-materialist, informational meta-framework for natural science, where reductionist bottom-up causation is balanced by emergent top-down causal loops. Such an integrated model opens a path for a systemic view of transpersonal experiences without artificial dichotomies of mind vs. brain and materialist vs. spiritualist domains.

Transpersonal psychology was established with the goal of studying a diverse set of anomalous phenomena at the intersection of psychology, parapsychology, cultural anthropology, and spirituality, and bringing them into the mainstream of scientific research. Some of them include *extra-sensory perception* (ESP – telepathy, clairvoyance, precognition, remote viewing); *mind-matter interactions* (psychokinesis, distant healing); *mystical states of consciousness*, whether spontaneous, meditation- or drug-induced (trance, non-dual consciousness, out-of-body experiences); and other self-transforming events. The cumulative weight of

research solidly demonstrates that ESP and ASC phenomena exist and operate under both naturalistic and experimental settings (Bem et al., 2015; Puthoff, 1996; Radin, 2006). However, the task remains elusive, hampered by the lack of a conceptual model to integrate them into the mainstream of known biological and physical phenomena (Meier, 2007). It is the purpose of this review to demonstrate that we now possess the tools to build a transpersonal paradigm based on the emergent dynamics of complex adaptive systems and quantum biology, which include consciousness and its anomalous manifestations.

Terry Marks-Tarlow's (2020, this issue— all future citations refer to this article, unless otherwise designated) fractal epistemology model is a major step towards spelling out the beginnings of a rigorously scientific framework for transpersonal science. It extends Charles Tart's seminal paradigm of *state-specific sciences* (1972), which argues against excessive subjectivism (blind faith in one's "feeling of knowing") versus exclusive reliance on reductionist models and the illusion of "detached observer" in the transpersonal domain. Here, the parallel between the "observer effect" in quantum-level observations and in studying subjective experience first becomes apparent: the very process of observation and measurement inevitably affects the processes under study. We have to incorporate a *participant observer* model by integrating objective, subjective and intersubjective perspectives. Yet, as in all scientific endeavors, in constructing transpersonal science we have to follow the criteria of *scientific epistemology* (Popper, 1959), which state that our hypotheses have to be *verifiable* and *falsifiable*, not merely descriptive in nature, in order to be called "scientific." By these

standards, there are no “supernatural” phenomena in the scientific domain; both subjective and transpersonal experiences are *natural processes*, which must work in compliance with natural laws, even though our current understanding of these laws is necessarily limited.

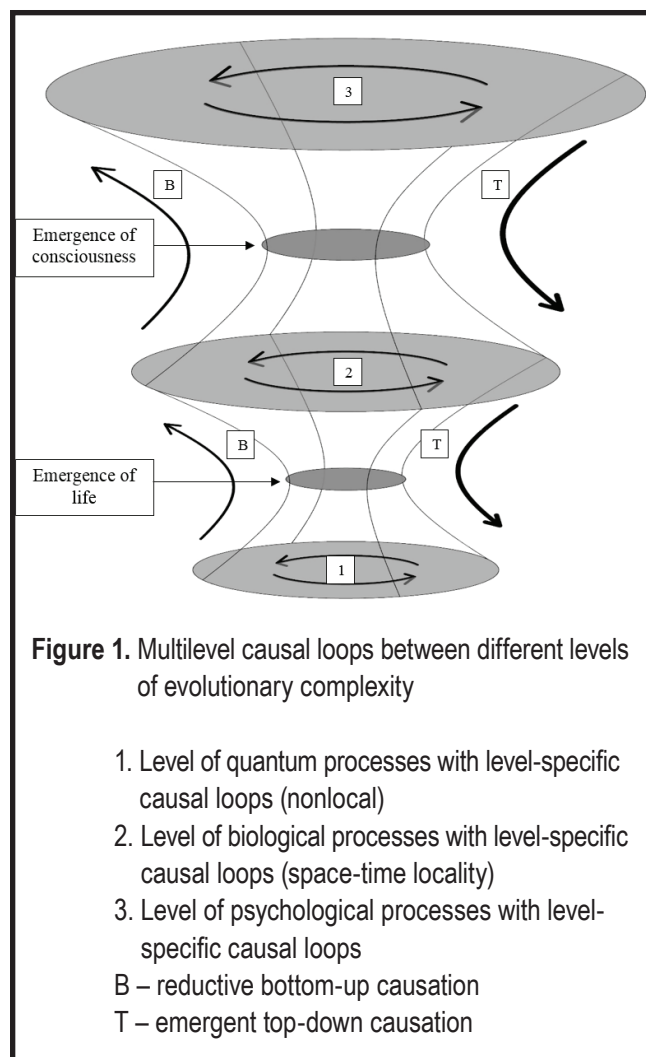
Marks-Tarlow’s fractal epistemology approach immediately suggests several important observations relevant for transpersonal science. First, it helps us to move away from the false dichotomies of mind vs. brain or subjective vs. objective descriptions of reality. Fractal dynamics, defined as processes displaying self-similarity and scale invariance at multiple levels of spatial and temporal organization, are inherently non-reductive. They operate with informational language equally applicable to physical systems, neural network dynamics, sociocultural phenomena, and patterns of emergent conscious and anomalous experience. The very nature and content of consciousness can be re-framed as “geometry of integrated information” (Balduzzi & Tononi, 2009), a framework that allows for a rigorous mathematical description of *qualia*, which define the immediately accessible, first-person content of subjective experience. This model specifies a property of *entanglement*, which binds diverse psychophysiological processes into a unitary percept and uniquely defines the shape of mathematical “qualia space” within a functional mind/brain system. In physical terms, quantum entanglement is a nonlocal phenomenon that fixes relevant properties of the particles involved in relation to each other, irrespective of the distance between them (Aczel, 2002). While the existence of *macroscopic entanglement* in biological organisms remains controversial, there are multiple instances of quantum-level phenomena utilized in biological organisms (Maldonado and Gómez-Cruz, 2014). The possibility of macroscopic entanglement between separate brain/mind systems was first suggested by the Nobel laureate physicist Brian Josephson (1991), which may allow for experiential sharing of the information involved – the cardinal feature of ESP phenomena. The first fMRI observations of macroscopic entanglement between two isolated human subjects were reported by Leanna Standish’s team (2003) using telepathy paradigm.

Michael Persinger’s team in Canada recently showed evidence of electroencephalographic (EEG) correlations between physically isolated human subjects who had been “entangled” with a complex electromagnetic field and separated by over 300 km (Burke et al., 2013).

The second aspect of the fractal epistemology approach is that it allows us to discern meaningful parallels between seemingly unrelated phenomena at different scales of organization, which begins to address Marks-Tarlow’s seminal question: “*Is there an archetypal meta-pattern—that is, a pattern of patterns—that Nature draws upon again and again?*” (Marks-Tarlow, 2020, p. 57). Rather than being seen as spurious, pattern correlations between micro- and macro-level processes in physicochemical, biological, psychological, sociocultural and technological domains may be indicative of deeper self-similarities in nature arising from both causal or acausal determinants. One example of “bottom-up” causal correlations is self-similarity between the large scale cosmological structure of the observable Universe and random quantum fluctuations in the cosmic microwave background radiation (CMBR), the afterglow of the Big Bang that brought our Universe into existence some 13.77 billion years ago, and became “magnified” over the course of the universal expansion (Susskind, 2006). Acausal fractal correlations may include numerous examples of self-organization in natural and technological evolution, such as parallels between ecological and Internet architecture, or the “unreasonable effectiveness of mathematics in natural sciences” (Wigner, 1960), where abstract mathematical constructs appear to mirror the structure of physical reality. An important transpersonal parallel is Carl Jung and Wolfgang Pauli’s *principle of synchronicity* (Jung et al., 1959), which describes acausal co-occurrence of meaningfully connected events as psychophysical phenomena.

Third, the nonlinear complexity foundation of Marks-Tarlow’s fractal approach points towards a way of building a *naturalistic transpersonal science* that can incorporate systemic emergent dynamics of conscious processes, whether ordinary (OSC) or altered (ASC) states (Shapiro, 2020). A functioning human brain can be conceptualized

as a nonlinear complex adaptive system (CAS) incorporating both an “objective” level of synaptic network dynamics and an emergent “subjective” level of self-awareness and intentionality (Shapiro, 2015). From a non-dualist vantage point, brain/mind is seen as a unified *psychobiological system* nested mid-way within a hierarchy of self-organizing complexity extending from quantum to atomic, molecular, cellular and neural networks on the lower levels, to individual, group, cultural, ecological, and technological processes (Figure 1). Each level is manifested by the emergence of qualitatively novel processes absent at the lower levels of organization, such as temperature, rigidity,



or superconductivity as a function of collective behavior of a large quantity of atoms that cannot be reduced to phenomena at atomic or subatomic scales (Anderson, 1972, Laughlin, 2005). In a similar

way, it would be meaningless to discuss higher-level interpersonal or cultural phenomena, such as attachment or mythology, in terms of quantum or neural network interactions, even though no known cultural process can arise without them. The “horizontal” causal loops operating on each level (Figure 1, levels 1–3) have to be complemented with “vertical” between-level causal interactions, which involve both reductive *bottom-up* (Figure 1, arrows B) and emergent *top-down causation* (Figure 1, arrows T). In keeping with this model, we now have functional neuroimaging evidence that changes made at the “mind level” can directly effect changes at the “brain level” and vice versa (Beauregard, 2009). Marks-Tarlow (2015) makes a similar point in her recent review of the non-linear dynamics of clinical intuition, where she states: “*Nonlinear approaches preserve natural complexity, partly by incorporating circular models of causality that permit bi-directional loops of interaction [where] minds can alter brains (through top-down mental dynamics), at the very same time that brains can alter minds (through bottom-up physiological processes)*” (p. 3).

The need to integrate reductive bottom-up causation with top-down causal loops translates into the necessity to consider both objective “third person” and subjective “first person” perspectives in studying transpersonal phenomena (Varela & Shear, 1999). One example of such integrated model was developed by Northoff and Heinzl (2006) who made a distinction between conventional third-person neuroscience, which studies observable changes in brain function, vs. *first-person neuroscience*, where subjective experiences are carefully linked to objective observations on a case-by-case basis. The authors comment that “*in order to reveal the true neuronal correlates of mental states, first- and third-person perspective must be linked to each other*” (p. 3) to construct a systematic *science of experience*. First-person neuroscience can be extended to incorporate *systemic psychobiology* (Shapiro & Scott, in press), where brain/mind is seen as a dynamic, nonlinear system with multi-level emergent properties that interact through within-level and between-levels causal loops in a continuous diathesis with the individual’s internal, physical and cultural environments.

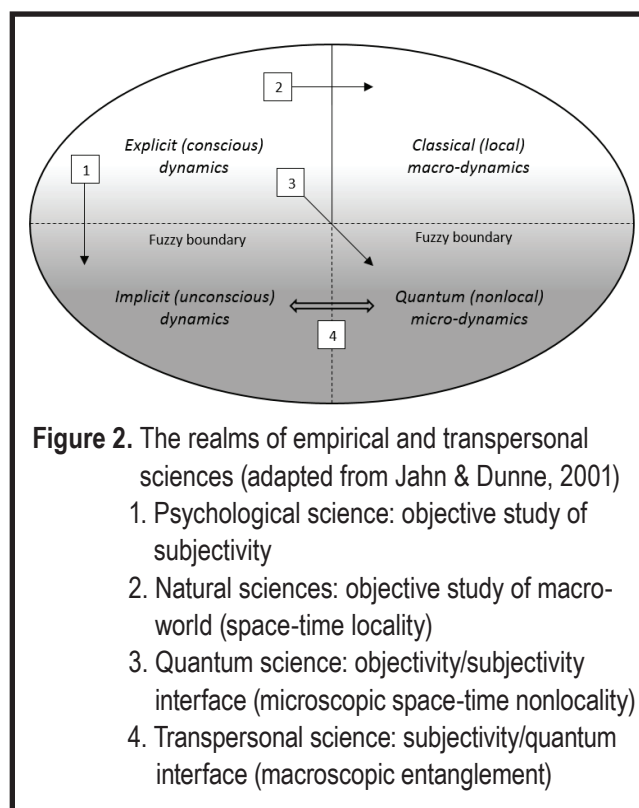


Reductionist conceptions of reality are limited in their capacity to integrate the full complexity of emergent phenomena (Nagel, 2012), and we need to shift to naturalistic complexity models operating with informational language and nonlinear dynamics in order to construct a comprehensive framework for transpersonal processes. Of primary importance to transpersonal science is the interplay between micro-level processes of quantum biology and macro-level complexity dynamics, which provides a foundation for nonlocal interactions at the brain/mind level (Maldonado and Gomez-Cruz, 2014). They describe living organisms as “a systems of systems,” and suggest that “*what happens or is expressed in one level, has a fractal correspondence with what happens – may happen – or is expressed in a different level or scale*” (p. 180). Such a framework may help us expand the reductive paradigm in the natural sciences in order to incorporate “holistic” phenomena characterized by emergent properties at higher orders of complexity, such as living, conscious, and entangled systems that cannot be understood by analyzing their constituent components alone.

The most comprehensive integrative model for transpersonal science to date was developed by Jahn and Dunne (2001), who called it Modular Model of Mind-Matter Manifestations (M<sup>5</sup>). It conceptualizes both conscious and material processes as the tip of the proverbial macro-reality iceberg. Just as psychologists and psychoanalysts study implicit unconscious processes that give rise to consciousness and intentionality, quantum physicists study subatomic phenomena that operate with distinctly different logic and causality, yet give rise to our everyday “macro-logic” by which Newtonian reality operates (Figure 2). While conventional empirical sciences, whether psychological (fig. 2.1), natural (Figure 2.2) or quantum (Figure 2.3) rely on the participation of a conscious observer, it is the “submerged” interface between the unconscious and the nonlocal reality that defines the field of transpersonal science (Figure 2.4). In fact, the ability to reliably access ASC phenomena may be inhibited by conscious observer functions, a phenomenon described as the “experimenter effect” in parapsychology and “series position effect” in remote viewing experiments, which require the participants to *bypass conscious intention* (Meier,

2007). The boundaries between conscious (explicit) vs. unconscious (implicit) processes and micro- vs. macroscopic reality cannot be defined in binary (on/off) terms but rather represent a “fuzzy” boundary that characterizes qualitative emergent phenomena at a new level of informational complexity, such as a transition from physicochemical to living systems.

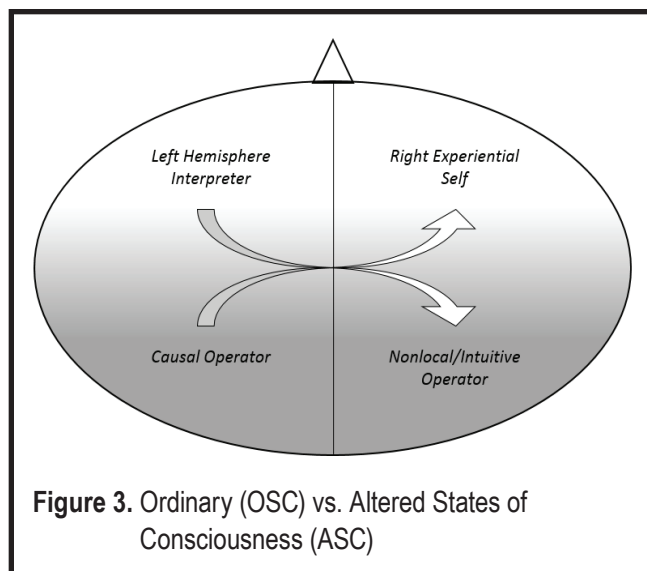
In a recent study of brain changes during a shamanic trance (Flor-Henry, Shapiro, and Sombrun, 2017), which utilized the first-person neuroscience paradigm, we demonstrated a shift from the “default self” mode of consciousness that predominantly operates within the verbal “left hemisphere



interpreter” (LHI) network in the prefrontal network domain, to the experiential/sensorimotor “trance self” mode in the right posterior domain (Figure 3). The normally dominant left hemispheric *causal operator* networks allow for explicit, sequential analysis of cause-effect interactions, with the emergence of “autobiographical self” extended in time (*hindsight* into the past, *insight* into the present, and *foresight* about the future). By contrast, the right hemispheric *intuitive operator* networks encode an implicit, parallel mode of perception that blurs the

boundaries between self/non-self, body/space, and linear time (Frecka et al., 2016). The transition from OSC to ASC modes of consciousness is facilitated by the release of normative contralateral inhibition under the conditions of meditative or psychedelic trance techniques.

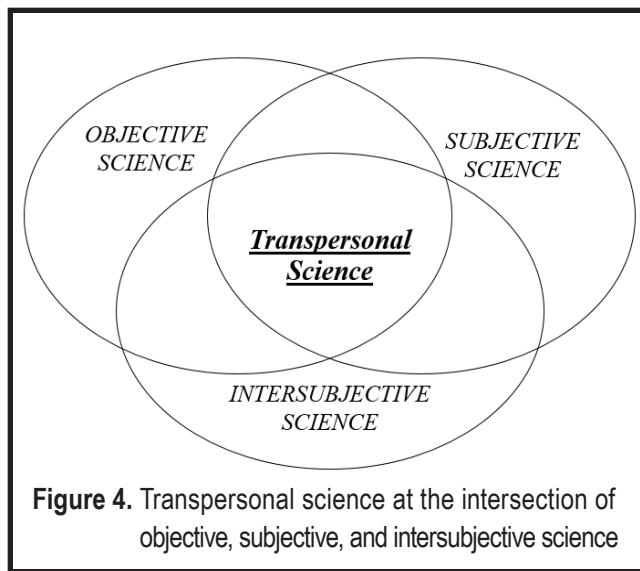
Marks-Tarlow's discussion of "objectively measurable events" requiring clear values and boundaries introduces yet another parallel between the current reductive science paradigm, which is dependent upon explicit conscious observers, and quantum or ASC processes, which describe implicit, nonlocal reality. The very distinction between



*metaphysics* (what exists) and *epistemology* (knowing what exists) is a function of conscious observer LHI networks. Therefore, in studying anomalous experiences and sharing knowledge of these states, transpersonal science may need to utilize what Freud described as *evenly hovering attention*, monitoring the nonlinear flow of implicit experiential content unconstrained by explicit expectations or pre-existing theoretical frameworks. The ultimate challenge in assessing the scientific validity of transpersonal data lies in demonstrating that the information obtained during ASC experiences is not limited to subjective or objective changes in a single brain/mind system, but bears direct correlation to independently verifiable data, whether in external reality or other brain/mind systems. We always have to remember Charles Tart's (2006) maxim: "Reality will be what it

is and do what it does regardless of what we think or don't think, feel or don't feel, about it" (p. 83).

Transpersonal science and the science of psychotherapy can mutually enrich each other. There is a long list of anomalous observations in psychoanalytic literature that go back to Freud's "thought transference" (1921), Carl Jung's synchronicity, and "uncanny" communication that "calls into question our ordinary notions of autonomous and separate psyches" (Tennes, 2007). Many experienced clinicians, including Marks-Tarlow, have written about these deeply intersubjective experiences. These observations can now be studied with functional



neuroimaging tools, such as hyperscanning and real-time multi-channel electroencephalography in order to develop a non-reductionist science of transpersonal phenomena in health and psychopathology. Acunzo et al. (2013) reviewed methodological issues in using functional neuroimaging to identify neurobiological correlates of ESP phenomena, noting that five out of six published studies demonstrated positive results. However, by its very definition, transpersonal science cannot be reduced to either objective or subjective data alone, and has to incorporate fuzzy boundaries between objective, subjective, and intersubjective domains (Figure 4).

Neurobiologists, psychologists and social scientists have to resist the temptation of reductionist models, whether downward reduction to the brain, or upward reduction to the mind. It is just as dangerous

to legitimize unconstrained downward reduction as a foundation for materialist science as it is to resort to upward reduction, postulating “disembodied consciousness” or social relativism as a foundation for observable reality. Just as clinicians have to remain open to their patients’ subjective perceptions, emotional reactions, and systems of meaning without imposing their own values or solutions on them, we have to “suspend disbelief” and engage as *participant observers*, systematically studying the manifestations of anomalous phenomena while remaining grounded in a naturalistic scientific method, where our observations can be corroborated by independent means. The challenge for both therapists and transpersonal scientists alike is to foster open-mindedness, patience, and respect for what we do not yet understand, and use our emerging understanding to expand the existing paradigms, rather than engage in a futile struggle to fit novel experiences in the straightjacket of old theories. Marks-Tarlow’s paper is a brilliant illustration of this approach.

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#### About the Journal

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