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Book Review

Review of *A Fractal Epistemology for a Scientific Psychology: Bridging the Personal with the Transpersonal,* edited by Terry Marks-Tarlow, Yakov Shapiro, Katthe P. Wolf, and Harris L. Friedman. Newcastle upon Tyne, UK: Cambridge Scholars Publishing, 2020. 529 pages + xxxiii

In this far-ranging book the contributors explore issues surrounding the field of transpersonal psychology, and ones surrounding the use of fractals in the study of people in their worlds. The book is both wide and deep, treating the basic (and not-so-basic) ideas and mathematics of fractals, as well as the broad scope of transpersonal psychology itself.

In the first chapter, Terry Marks-Tarlow writes, "I believe that nonlinear science broadly, and fractal geometry specifically, provide a holistic, flexible meta-framework for understanding even the most complex psychological, social, cultural, and historical systems." Such multi-component, multi-level systems are involved in the study and appreciation of the transpersonal, and Marks-Tarlow proposes fractal geometry as a "model, method, and metaphor for otherwise ambiguous and inaccessible transpersonal phenomena."

Wolf and Friedman's chapter defines transpersonal psychology as "a science concerned with exceptional human experiences, multiple states of consciousness, and the areas between spirituality and scientific studies of mind and behavior. It can also be understood as a subdiscipline of psychology seeking to radically transform the mainstream discipline, including reconciling methodologies for understanding mind-body relationships, traditional Eastern and Western, as well as indigenous, worldviews, and numerous other perplexing divides." The study of transpersonal phenomena exists between the empirical and – by definition – the highly subjective, and it seems to straddle many other borders as well.

This ambitious volume and its contributors take on illuminating us about both of these areas; the contributors' list includes an all-star cast of researchers and theoreticians in nonlinear dynamical systems and psychology, as well as studies of consciousness and the transpersonal. This review can touch on only a few of its topics, but I hope to provide a flavor of the book's range and its absorbing content.

The book covers diverse transpersonal and related phenomena including: Consciousness and the stream of consciousness, altered states, hallucinations, the "uncanny" in clinical interactions, psychosis and alternate logics, hallucinatory phenomena (chapter by Serna), emotion regulation (Kauffman), dreams (Marks-Tarlow), as well as the I-Ching, (chapters by Root and by Wright), spiritual symbolism and imagery (Jackson), and a call for "quantum biology" (Shapiro). It

presents several neuroscience approaches (Abraham; Vandervert chapter on role of cerebellum), as well as theoretical and philosophy of science foundations, especially about reductionism (Scott chapter) and the relationship between existence and being known (chapters by the editors, Abraham).

A theme throughout concerns applying mathematical metaphors appropriately and avoiding doing so inappropriately (Sulis chapter), along with exploring mathematics and its uses. The contributors view developments in mathematics as a boon to transpersonal study: Kauffman writes, "...As luck would have it, [the complexity sciences] offer newly distinct conceptual foundations for understanding the ontology of our most personal, mystical, meaningful, and transpersonal experiences." The utility of fractals is taken as another example of Wigner's "unreasonable effectiveness of mathematics in the natural sciences," transpersonal psychology included.

The book includes a variety of demonstrations, illustrations, derivations, and explanations ranging from entry-level to quite advanced. Fractals, their properties, and their mathematics are demonstrated from different points of view, with nice illustrations throughout. The book turns on and returns to the writings of Benoit Mandelbrot, the Mandelbrot set, and its mathematics; these are touchstones.

The study of fractals is mathematically rigorous and well-developed; they bridge the qualitative and quantitative, subjective and objective (Sulis); they contain patterning, boundaries and borders, and are well suited to complex phenomena such as interaction, paradox, family resemblances, nuance. In his chapter Liebovitch explores the conceptually attractive properties of fractals: They are "...objects with an infinite repetition of smaller pieces that reflect the whole, like the interconnections between different levels of experience;" "there is no single value for the measurement in a fractal;" "fractal borders between different mathematical solutions of a nonlinear mathematical problem have interpenetrating boundaries...like the connections between intrapersonal and interpersonal experiences;" "fractal patterns can be generated by complex feedback loops, like [those] between inner and outer processes...self and other;" "fractal patterns are represented by statistical distributions that have a much higher likelihood of ...'black swans,' like the frequency and power of peak experiences."

The idea of boundaries is a fascinating one in psychology and appears throughout the book. Marks-Tarlow in chapter 9 finds fractals "a mathematically rigorous way to model open, semi-permeable boundaries between self and other," and Wilcox and Combs write, "boundaries in nature are so common they are often unnoticed and imperceptible," and these authors "explore how the apparent boundaries of individual experience may be fractal-like, exhibiting self-similarity, temporal iteration, and scale independence." Galatzer-Levy's chapter goes deeply into the psychology of boundaries, noting the limitations of binaries: "From many viewpoints, including feminist, gender, transgender, queer and men's studies, the gender binary disrupted almost everyone's capacities to live as fully as possible."

Doing some of its own genre-busting, the book ends with an opera. In Dawe's chapter on *Cracked Orlando*, fractal structure in the music and libretto is generated through a variety of techniques; in the score, "...fragments of Baroque music are used as the initial cell structures with pitch and duration mapped upon the grid. The intention was to grow a fragment of Baroque music, including its emotion punch, based on the same simple laws that appear to be at the heart of the complexity and organic patterning within nature...."

This book will reward both the casual-but-serious and the in-depth reader. For me its chapters deepened my understanding of fractal structures and extended my own thinking about their applicability. I recommend this volume, and commend what it does in pushing on the (fractal, don't you think?) boundaries of what fractals can be to psychology.

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