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Fractals Transcendent: Bridging the Transpersonal Chasm

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Fractals Transcendent: Bridging the Transpersonal Chasm

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

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Marks-Tarlow (2020, this issue—all subsequent citations to her refer to this paper) takes on a considerable challenge—attempting to develop an epistemological framework for transpersonal psychology that will satisfy both the needs of the scientist and the sensibilities of the humanist/therapist. This is a divide that threatens to become a chasm. Marks-Tarlow has made a remarkably astute choice for a basis for her epistemology—that of fractal geometry. I say astute because fractal geometry is a very rich and fertile subject in both pure and applied mathematics, and that is sure to appeal to the scientist. At the same time, fractal geometry provides breathtaking images of surreal, dare I say transcendental, worlds. These visual images provide fertile ground for the metaphors that inform the artist and the clinician.

As a psychiatrist, mathematician, and theoretical physicist, I have been on both sides of this divide. My research into complexity and emergence has informed my practice over the years but it has proven challenging to present these insights to others – clinicians and researchers alike. Years ago when I was in training, I attempted to get my supervisors interested in the use of meditation in psychotherapy, only to be met with indifference. I have used it personally and professionally ever since but it took a long time to become mainstream, and even then quite removed from its original form.

Marks-Tarlow uses ideas of fractal geometry both to guide research and to inform therapy, and this may indeed prove to be the beginning of a bridge across the chasm.

Hopefully some of the substance of fractal theory will be preserved as it becomes more widely recognized. Fractal geometry is a very difficult area of mathematics, even for someone with a solid background. Marks-Tarlow has done an excellent job of presenting the essential ideas of fractal geometry without getting lost in the details.

The history of fractals is interlinked with the history of limitative results, which appeared with great frequency during the decades immediately framing the turn of the 20th century. Mathematics at that time was dominated by the success of ideas of continuity and differentiability. Mathematicians believed that they were getting answers to most of the deep problems. The discovery of functions such as the Peano curve showed that continuity and differentiability were separate constructs and, worse, that the space of continuous functions was unbelievably large, and wild. Hopes for a classification of all continuous functions faded. The discovery of the Cantor set showed that continuity was also too restrictive a construct. There existed geometrical objects with rich symmetries, yet they were not continuous. These objects were often labeled as pathological because they provided obstructions to the creation of comprehensive systems for the classification of mathematical structures. Mathematicians are often motivated by ideas of symmetry and beauty, and these objects appeared like blemishes on a masterpiece of art. In modern times, the ability of computers to render images of fractals has created a new aesthetics and ideals of beauty. Instead of pathology, fractals are nowadays viewed with a sense of wonder. New ideas are always resisted as one paradigm gives way to another. Truly important ideas eventually find their place. In spite of the initial resistance, the growth of mathematics has never abated. The hope for transpersonal psychology is that the larger psychological community will come to view the field as providing a rich source of possibility, novelty, creativity and challenge.

It is often said that science does not or cannot deal with subjective experience or with outliers. It is true that such subjects are difficult to study from the traditional perspectives of objectivity and reproducibility. Although social scientists may

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shy away from these challenges, they have been confronted in engineering, mathematics, physics, and computer science. The economic and personal costs associated with natural disasters (all of which constitute rare events, usually non-reproducible) have motivated a great deal of research into understanding how to quantify and study such events. Marks-Tarlow describes the power law distributions which are frequently used in such studies. They have the dubious honor of guaranteeing that disasters of any size will always occur given enough time. They cannot be avoided; they can only be planned for. The availability of inexpensive computational resources makes it possible to simulate systems of rare events, which can provide insights into their dynamics. In principle, although it might not be possible to study rare events directly, it may be possible to find signatures of the dynamics which make the eventual appearance of rare events more likely (pardon the oxymoron). That in turn would allow researchers to be more selective in choosing subjects and creating experimental paradigms.

Self-reference is an important feature in the construction of fractals. Self-reference may also be an important feature of many of the experiences studied in transpersonal psychology. Very often these appear when people turn their attention inward, intentionally or inadvertently removing themselves from sources of external stimulation that might otherwise ground their experience. An understanding of the consequences of self-reference, whether in logic or geometry, may provide valuable insights into the effect that this may have on thinking, perception, interpersonal relationships, self-concept, and so on.

Psychologists spend a great deal of time debating objective and subjective measurements. The truth is that all measurement in psychology is contextual. It all depends upon the frame of reference, the conceptual and physical context within which the measurement is made, and the tools used to make the measurement. Since the advent of quantum mechanics, physicists have been confronted with the contextual nature of all measurement. Over the past century they have developed sophisticated methodologies (theoretical, experimental and statistical) to deal with this contextuality. They have developed contextual probability theory, a significant advance over traditional probability theory, which explicitly takes this contextuality into account. Subjectivity is challenging, but objectivity is far from simple. Psychologists have much to learn from physicists about how to do statistical analyses, and the importance of theory in driving such analyses. The current trend towards allowing statistical machinery to substitute for theory building is disappointing and potentially misleading. Building theories requires starting with effective metaphors, and Mark-Tarlow does a good job showing which aspects of fractal geometry may provide such metaphors.

Insufficient attention has been paid in psychology to the question of whether measurements even exist. Condensed matter physics has shown us that the mere ability to measure something does not mean that that something "exists." There have been attempts to measure certain physical properties of materials, with different labs obtaining widely differing results. Only later was it realized that the material reacted to each measurement situation differently, with the result that there was no consistent response which could form the basis for a "property." Physicists have learned that nature has many ways of hiding its truth, even in the most objective of observational situations. Robert Laughlin (2008) describes several of these in his book, *A Different Universe: Reinventing Physics from the Bottom Down*. The failure of replication is so many psychological studies may be due to these complex effects. Knowing more about the difficulties of objectivity might make psychologists less judgmental in the faces of subjectivity.

One very important aspect of fractals is that they are usually formed by the activity of a dynamical system. Here I think the metaphor offers much value as it turns the mind away from simple pictures of dynamics such as oscillations, straight lines and stasis towards very complex behaviour.

The use of complex mathematical structures as the basis for theory-building metaphors requires conceptual sophistication, but not necessarily technical sophistication and skill. Marks-Tarlow has presented the essential aspects of fractals in a form that most psychologists should be able to appreciate, without burdening them with arcane mathematical symbolism. Hopefully they will take notice, and build theories with these ideas, and then develop tools to test them out in the real world. Ultimately that will determine their value.

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About the Author

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