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# Can Fractals Help Us Understand Transpersonal Experiences?

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

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I enjoyed reading about the various aspects of fractals described by Terry Marks-Tarlow (2020); her fascination with and excitement about fractal geometry is contagious. As a mathematician, I was familiar with a number of her fractal examples, and I have a bona fide mathematical appreciation of the concept of infinity, as well as the various proposed levels of infinity. And as a transpersonal psychologist, I am certainly appreciative of deep mystical states, as well as the enigma of the hard problem of consciousness. However, I must say that I was not able to resonate with the relevancy of fractal geometry for transpersonal psychology that Marks-Tarlow is advocating for in her article.

Marks-Tarlow describes her interest as a clinical psychologist in intersecting boundaries, in particular in the context of the relational unconscious when her patient conveyed a dream to her that Marks-Tarlow experienced as her own childhood dream. I am quite open to the possibility of psychic phenomena in the form of telepathy between people, and this is certainly in the realm of transpersonal psychology. The uncanny interaction of quantum particles with each other at great distances apart is well accepted today as a fundamental part of quantum physics. However, we do not have any kind of solid basis to understand how this kind of attraction between particles might extend to human beings, although there are preliminary biological theories, such as through the involvement of microtubules, that may eventually point us in this direction. But other than the fact that fractals uncover more depth and intricacy than appears at first glance, I do not particularly see how fractal geometry is concretely helpful to explain the kind of transpersonal experience that Marks-Tarlow has described with her patient. Even more so, I do not see how fractal geometry helps to explain the hard problem of consciousness, that is, why do we experience our inner sensations, thoughts, and feelings in relation to our measurable biological mechanisms?

Fractals are infinitely repeating recursive phenomena, with complex, intricate, and beautiful visual descriptions. I have always loved the Fibonacci sequence and its various mathematical relationships, and I have used this frequently in my teaching the joys of exploring number theory patterns to elementary school students as well as to my liberal arts college students, as part of a mathematics enrichment program that I called Numberama. Perhaps when I engage in my own deep mathematical research in the early mornings in bed, or when I meditate or play the piano or otherwise experience a deeper level of consciousness, my brain waves are energized into greater fractal complexity, not unlike the context of the infinite recursive nature of the Fibonacci sequence. But even if this were the case,

I do not see how this extends my knowledge of why/how I can experience this deeper state to begin with.

Marks-Tarlow is careful to explain that she is not claiming to solve the hard problem of consciousness with fractal geometry, but I must say that I do not see any direct relationship between fractals and transpersonal consciousness, whether it is the experiences of shamans believing that they are relocating to distant places, the uncanny awareness that one person may have of another person's thoughts when they are great distances apart, or the experiences that mediums ostensibly have of communications from people who have died. And then we can go further into unknown transpersonal territory, such as what was there "before" the Big Bang -- if one believes in the Big Bang theory of the origin of the universe. Or to put this more simply, why is there something rather than nothing? Perhaps "nothing" always had the potential of "something"

in it, which is one theory of the origin of matter; perhaps there are parallel universes (although I don't think so, for what it is worth); perhaps there is some kind of "intelligence" that has always guided the evolution of the universe. But my main point here is that the beautiful mathematical infinite recursive patters of fractal geometry do not help me with these kind of transpersonal questions.

Fractals are mathematical ideas, and it is significant how they are able to scientifically describe various world phenomena. And perhaps some time in the future they may serve in some kind of way to help us gain more of an understanding of consciousness. But I must candidly say that this is not at all clear to me from having read Marks-Tarlow's article about fractals and transpersonal psychology. I was left with a more nuanced appreciation of fractals, but the relationship between fractals and transpersoal psychology needs much more scientific scholarly research to demonstrate to me the links between these two realms that Marks-Tarlow has tried to convey in her article.

Perhaps what is most important in what Marks-Tarlow has conveyed in her article is that fractals enables us to see a phenomenon more deeply, that is, from a deeper perspective, and to visualize all kinds of detailed configurations that we did not initially see. Now this visualization from a deeper perspective is something that I can certainly relate to, and I have often used this deeper perspective as part of my mathematical Numberama teaching, but not via fractals. My own favorite way of teaching students to view things from a deeper perspective is through perfect numbers. Let me briefly illustrate, given that I was asked to comment on Marks-Tarlow's article due to my dual professional role as a mathematician and transpersonal psychologist.

Perfect numbers are numbers such that the sum of all their proper divisors (i.e., not including the number itself), equals the number. So 6 is the first perfect number, because the proper divisors of 6 are 1, 2, and 3, and $1 + 2 + 3 = 6$. The next perfect number is 28, which you can easily verify, and after that the fun and exploration starts. All known perfect numbers have a pattern to them, and the third perfect number is $496 = 16 \times 31$. So what is the pattern? Well I used to give my students a hint by reinforcing them to come up with $6 = 2 \times 3$, $28 = 4 \times 7$, and then look for

ways of extending this. A number of years ago, one of my students came up with the pattern that $2^2 = 4$, $4^2 = 16$; and $2 \times 2 - 1 = 3$, $2 \times 4 - 1 = 7$, and $2 \times 16 - 1 = 31$. In other words, you start with 2 and then double 2 and subtract 1 to get 3. And then you square the first number to get 4, and once again double and subtract 1 to get 7. And if you do this one more time, lo and behold you square 4 to get 16, and then double 16 and subtract 1 to get 31, and you have $16 \times 31 = 496$, the third perfect number. But is this an infinite recursive process to get all perfect numbers? No, as can be seen if you go further. Squaring 16 gives you 256 and doubling 256 and subtracting 1 gives you 511, and $256 \times 511 = 130,816$, which can be verified is not a perfect number. So it is a false pattern, and the correct pattern must be obtained from a deeper perspective. For anyone interested, you can easily find out from a quick internet search that the correct pattern for even perfect numbers involves prime numbers, we thus far have found with our most sophisticated high speed computers less than 40 perfect numbers (the fourth one is $8128 = 64 \times 137$, and the fifth one is $33,550,336 = 4096 \times 8191$). We don't know if there are infinitely many perfect numbers, that is, if the pattern for even perfect numbers is truly an infinite recursive process, and we don't know if there exists an odd perfect number (I don't think so, for what it's worth).

Even perfect numbers are based upon a particular form of prime numbers, and prime numbers have been found to be very useful in the field of cryptography. And one certainly needs to see perfect numbers in a deeper perspective from one's initial exploration, to discover their beautiful pattern. In this way, I view perfect numbers as similar to fractals, as an epistemology for expanding consciousness in the form of creative thinking. But at this point I do not see fractals as having any more immediate relevance for transpersonal psychology than perfect numbers. However, I see both fractals and perfect numbers as beautiful mathematical formulations that stimulate the mind and help one appreciate mathematics as both a science and an art form, and in this way they can both stimulate consciousness and awareness and thereby perhaps even enable us to enter a transpersonal realm, and I will therefore end my comment on Marks-Tarlow's article on this positive note.

## Reference

Marks-Tarlow, T. (2020). A fractal epistemology for transpersonal psychology. *International Journal of Transpersonal Studies, 39*(1–2), 55–71 (this issue). https://doi.org/10.24972/ijts.2020.39.1-2.55

## About the Author

*Elliot Benjamin, PhD,* is a philosopher, mathematician, musician, counselor, writer with Ph.D.s in mathematics and psychology and the author of over 150 published articles in the fields of humanistic and transpersonal psychology, pure mathematics, mathematics education, spirituality and the awareness of cult dangers, art and mental disturbance, and progressive politics. In his commentary, Benjamin appreciates the aesthetic quality of fractals, yet expresses doubt about the deep relevance of fractals for transpersonal psychology.

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