At the Intersection of Psychology and Spacetime

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This is an essay about an interest I have had my whole career as a research psychologist in which I have been able to do a great deal of thinking and theorizing about the subject of how we develop our concepts of space and time. My day job took me more into the public policy arena as a regulatory scientist and that is whereas a scientist, I have made most of my contributions.

My interest in space and time (spacetime) began in graduate school in my studies of developmental psychology and cognitive theory, in particular Piaget's Theory of Cognitive Development and how children develop their concepts of space and time. I have written about this elsewhere (for the interested reader, please check out https://rikinstitute.com/blog/); there you will find my various excursions into the concepts of space and time and many other arenas. I promise in this essay not to delve into math equations and algorithms as so much of my work is dominated by, but I have found that "mathematics is the language of the sciences" and I have utilized it a great deal in my work as a research psychologist and regulatory scientist.

In my research into developmental psychology and cognitive theory, I was so impressed in how Jean Piaget developed and tested children's abilities to understand the basic concepts of space and time. In fact, I have theorized that we are innately born with a Spatial Acquisition Device just like Noam Chomsky's Language Acquisition Device. Just as we learn language to communicate, we learn about spacetime to understand our physical surroundings in a meaningful way. In fact, I have also theorized that potentially spacetime may only involve space and there really is no need for the concept of time, but that is later in this essay about the psychology of spacetime.

In Piaget's cognitive theory, he demonstrates how children progress through the various dimensions of space in a sensorimotor fashion to a representational fashion of exploring and understanding the three dimensions of space and the fourth dimension of time. I am not going to delineate the details here because it will get us off track; but the interested reader can go to the link above to get further information regarding this sequencing.

Here are some of the topics I would like to cover in this short essay which I will also share some anecdotal tidbits along the way: quantum mechanics, relativity, proposed theory of space, and linear & nonlinear reality.

I have always found it so interesting in how we deal with our birthdays when it comes to representing time: we make such a big deal of the early ones, I guess because we haven't had many yet; and the later ones, especially if we make it to 100, I guess because we realize we don't have many left!! Opposite ends of a continuum but with the same conceptual lens.

I made the leap from psychology to physics in my pursuit of attempting to understand spacetime with such classics as "*The Tao of Physics*" and the "*Zen and the Art of Motorcycle Maintenance*". I now realize that I probably stretched my understanding a bit, but it was an interesting ride. It is the proverbial "A little knowledge can get you into trouble, but you need a lot more knowledge/insight to get you back out".

After my transition, I started to get serious reading the classics in physics and how space and time were separate and absolute concepts. This, of course, all changed with the theory of relativity and spacetime was introduced and has now for over 100 years been the predominant model of the universe on the macro scale. On the micro scale where atoms come into play, quantum mechanics is the dominant theory. The problem in physics today is reconciling these two theories.

This pursuit of understanding or lack thereof brought me to try to understand how all the pieces fit together. In my day job as a regulatory scientist, I did a great deal of data analysis looking for patterns in what to most people look like random events. Over the years I have discovered several patterns but probably the most significant and far reaching is my regulatory compliance theory of diminishing returns where program quality is compared to regulatory compliance with rules. When one initially examines the data, it appears very random until you begin to put the data into policy decision making buckets, such as full compliance, substantial compliance and low compliance. Once one does that a ceiling effect or plateauing effect appears which gives meaning to the data in moving from apparent randomness to a more linear, albeit curvilinear, relationship.

So, I applied this frame of reference to my readings in spacetime in attempting to ascertain a deep structure which could explain the apparent discrepancies between relativity and quantum mechanics. This notion of randomness is very prevalent within quantum mechanics but not so with relativity. It would appear that a deeper structure would be to think of quantum mechanics in a more nonlinear fashion and relativity in a linear fashion. Looking at this deep structure and the most parsimonious way of describing this deep structure, I was led back to our basic concepts of spacetime and began to think in just terms of space and eliminating time in the following way: Time = Space in Motion. When one did this, it still explained special relativity and helped to explain quantum mechanics because without time it removes a linear relationship that appears not to exist at the quantum level.

That helped to explain special relativity, but what about general relativity? If we extend the concept of space from stationary space and space in motion to also include filled space and empty space, we can deal with gravity as the interaction between filled and empty space. No forces needed, just an interaction of the two.

I am sure you are asking how all this relates to the psychology of spacetime. Very honestly, so did I, as I researched more and more into the basic concepts of physical reality. Being a scientist, I have always been driven by data and empirical evidence to support the research I have done over

the past 50 years. Now, as I approach the twilight of my career and my life, I have been thinking a great deal about what is on the other side. Does this excursion help me understand where we are in this universe. I have suggested replacing time with "space in motion" but let's face it, that doesn't really change anything, I can't get off of space and bypass the end of time for myself on this earth. Call it what you want but none of us get out of here alive.

It is interesting that my theory of space when I postulate the difference between space in motion as representing time, and stationary space is represented as a black hole, a singularity (again for the interested reader, please see the link above that will provide more information on the Theory of Space: Four states of space). So far black holes are one of the least understood entities in physics. Why should the end of our lives be any different. The death part is easy to figure out via autopsies; but what happens after isn't as easy to figure out. Although becoming a singularity holds promise!!

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