

PROCESS PHILOSOPHY, OPTIMALISM AND FREE WILL IN QUANTUM THEORY

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ABSTRACT: This paper explores how process philosophy—and in particular an optimalism process philosophy that includes free will, such as Henry Stapp's realistically interpreted orthodox quantum theory—proves to be an excellent fit for quantum theory that answers the philosophical question “Why are things the way they are, instead of otherwise?” Viewing reality as a matter of optimalism is one of four practicable responses to this question, which requires linking Nature to existence. Henry Stapp's realistically interpreted orthodox quantum theory meets this requirement by asserting that when a question is asked, “the thought itself is the thinker,” in keeping with the views of James and Whitehead. In this process, an ensuing succession of questions arising in the minds of observers is received and responded to by Nature that chooses and implements responses in accordance with Born's Rule in a physically described universe represented by evolving quantum mechanics states.

KEYWORDS: Free will; Optimalism; Process philosophy; Quantum mechanics

ULTIMATE QUESTIONS

“Every scientific man in order to preserve his reputation has to say he dislikes metaphysics. What he means is he dislikes having his metaphysics criticized.” – Alfred North Whitehead

When it comes to ultimate questions and consideration of the nature of reality beyond our scientific ability to devise and test theories, philosophy is required in order to help ensure we are thinking clearly, and not inadvertently effectuating cognitive errors. German polymath and philosopher Gottfried Wilhelm Leibniz asked “Why is there anything at all?” and “Why are things as they are?” These two ultimate questions can

be partitioned into four: (1) How is it that there are actual states of affairs at all? (2) How is it that there are laws of nature? (3) Why do the actual states of affairs have the character they do? (4) Why do the laws of nature have the character they do? German American philosopher Nicholas Rescher points out that these questions are transcendental, because they cannot be answered by nature-gearred scientific explanation. Rescher rephrased Leibniz's ultimate questions into the singular holistic question, "*Why are things as they are rather than otherwise?*" [Rescher 2010]

There appears to exist only four practicable possible answers to this question, which are: (1) There is no reason; reality is a matter of sheer random contingency (Lucretius and David Hume); (2) There are no alternatives; reality is somehow necessitated (Spinoza); (3) Reality is a matter of optimization; things are as is because that is for the best (Leibniz); and (4) All alternative possibilities actually exist (Leucippus and Democritus). Each of these four answers has strengths and weaknesses: (1) sacrifices rationality; (2) sacrifices contingency; (3) requires linking of nature to existence; and (4) demands explanation of otherwise ungrounded existence-potential. Rescher explains, "*alternative three offers the best bargain. And it represents the axiogenetic position.*" Axiogenesis is a theory that reality is based on factors of optimalism in which the optimal alternative is privileged epistemologically and ontologically, and noopehelia where nous (intelligence) governs merit in such a manner that what is "best" in ontology is what best serves intelligent beings. [Rescher 2010]

Optimalism must address questions of: why should the best of possibilities be realized; how can free will and contingency exist when all truth is viewed as analytic; how can there be a best when everything can be improved upon; how can this supposedly best of possible worlds have so much suffering and evil; and how can omnинecessitation be averted if an omni-benevolent deity must create the best possible world? Leibniz addresses these questions with a logical metaphysical system where many possible worlds span the full spectrum of what is possible, such that "*whatever must be true on logico-conceptual grounds will hold true with respect to every possible world. And only the truths that hold for all possible worlds are strictly necessary ones.*" The Leibnizian ontology of possible worlds can be viewed as only existing as ideas in the mind of God, with the single and extraordinary exception of the actual world, in which "*the domain of possibility is literally an ens rationis, a creature of reason, but of divine rather than human reason.*" [Rescher 2006]

Within Leibnizian optimalism, God chooses between conflicting possibles vying for their competing claims to existence, such that there can be something better according to values of orderliness (ordo), the most contentual richness (varietas), and the most well-being (felicitas). Within this framework, God's existence is necessary to make such choices in which world will be manifest that is optimized overall, and God retains free

will to do so. [Rescher 2006]

“One may say that as soon as God has decreed to create something there is a struggle among all the possibles, all of them laying claim to existence, and that then those which, in the aggregate, produce the most reality, the most perfection, and the most intelligibility, will prevail. It is time that this struggle is merely ideal, that is, it is only a conflict of reasons in the most perfect understanding, which cannot fail to act in the most perfect way and consequently to choose the best. However, God is bound by a moral necessity to make things in such a way that there can be something better.” [Leibniz 2000]

PROCESS PHILOSOPHY

The very existence of quantum mechanics challenges many assumptions of classical logic with its reliance upon simpler Boolean order and distribution laws. [Larson 2015] Quantum mechanics is sublimely well-suited to process philosophy, since it is written in the language of differential equations—a language of process that Leibniz discovered independently of Isaac Newton. For Leibniz, it is processes rather than things that furnish the basic materials of ontology.

Rescher summarizes the necessity of a process philosophy approach with respect to quantum mechanics,

“The quantum view of reality demolished the most substance-oriented of all ontologies—classical atomism. For it holds that, at the micro-level, what was usually deemed a physical thing, a stably perduring object, is itself no more than a statistical pattern—a stability wave in a surging sea of process. Those so-called enduring ‘things’ come about through the compilation of stabilities in statistical fluctuations—much like gusts of wind. Processes are not the machinations of stable things; things are the stability-patterns of variable processes.” [Boundas 2009]

Process philosophy holds great promise for advancing the physical and biological sciences by providing “*a basis for integrating developments in the natural and human sciences and the humanities.*” [Gare 2002] Process philosophers who share a love for merit-based reality and value-based facts include: Heraclitus, William James, Gottfried Wilhelm Leibniz, Henri Bergson, Charles Sanders Peirce, Alfred North Whitehead, Samuel Alexander, C. Lloyd Morgan, and Nicholas Rescher. [Rescher 2000]

Rescher describes a process philosopher as

“someone for whom temporality, activity, and change—or alteration, striving, passage, and novelty-emergence—are the cardinal factors for our understanding of the real. Ultimately, it is a question of priority—of viewing the time-bound aspects of the real as constituting its most characteristic and significant features.

For the process philosopher, process has priority over product—both ontologically and epistemically.” [Rescher 2007]

The Leibnizian mindset of seeking principles including: fertility, economy, definiteness, uniformity, consonance, conservation, and elegance have provided us with the basis by which scientific 'laws' can be developed. It is worth noting that the Leibniz principle of continuity does not assert that all change is continuous, but rather that conscious perception arises gradually “*by degrees from [perceptions] that are too minute to be noticed*” [Leibniz 1996]—i.e. unconscious perceptions. [Simmons 2001] Leibniz viewed consciousness as a perception of perceptions, pointing out that consciousness requires two very different perceptual acts: a first-order perception of 'x', and a second-order reflective preception of the original perception of 'x'. [Simmons 2001]

Leibniz differentiated between consciousness, attention and conscious attention,

“When we are not alerted, so to speak, to take heed of some of our own present perceptions, we let them pass without reflection and even without noticing them. But if someone alerts us to them straight away, and makes us notice, for example, some noise that we just heard, we remember it and **are aware of having had some sensation of it.** Thus these were perceptions of which we were not immediately aware. Awareness, in this case, came only when we alerted to them after some interval, however brief.” [Leibniz 1996]

These ideas have been expanded upon by Montemayor and Haladjian, who argue in favor of dissociation between consciousness and attention, providing theoretical reasons to support this differentiation. [Montemayor 2016]

ROLE OF THE OBSERVER

Primacy of mind becomes apparent when adopting a process philosophy perspective. The quantum mechanics founders espouse a nondualistic 'all is mind' view: Schrödinger's non-dualism asserts “it's all mind,” with no division between mind and matter, so that surrender of the 'real' outside world is absolutely essential. If we consider mind as being basic and fundamental, we see that mind creates brain and mind creates brain activity, and not the other way around.

One of the biggest proverbial 'elephants in the room' has to do with the fact that quantum theory requires an observer who decides when and how observations are being made who is outside of or separate from the system. This is in contrast to the bias and assumptions of classical mechanics that measurements are observer-independent, with 'fact based' measurements that never change. While the original founders of quantum mechanics did not shy away from this startling primary quality of quantum mechanics, many believe 'there be dragons' in pursuing a quest to seriously entertain

active involvement of observers when we question what is meant by 'conscious observers,' let alone levels of observation. [Weissmann 2017]

Rescher emphasizes,

"The self or ego has always been a stumbling-block for Western philosophy because of its resistance to accommodation within its favored framework of substance-ontology. The idea that 'the self' is a thing (substance), and that whatever takes place in 'my mind' and 'my thoughts' is a matter of the activity of a thing of a certain sort (a 'mind'-substance) is no more than a rather blatant sort of fiction—a somewhat desperate effort to apply the thing paradigm to a range of phenomenon that it just doesn't fit." [Boundas 2009]

From a philosophical perspective, Rescher's process optimalism is in agreement with an evolving view of scientific knowledge and theories, as is the inclusion of conscious agents—or what Rescher calls intelligence—at the core.

"The interests of intelligence are the pivot for the standard of world merit that will be operative in the presently contemplated optimalism. Intelligence, after all, functions in nature in a way that makes its role central in cosmic and organic evolution alike. And in fact the cosmos functions 'as if' it were arranged with the interest of intelligence in view." [Rescher 2010]

American physicist Henry Stapp points out that "Quantum theory is, in this respect, somewhat similar to the identity theory of mind: both entangle mind and physical process already at the ontological level." [Stapp 1999] Stapp's answer to the question of relation between mind and measurement is key: the identity of the questioner does not matter—only the question matters. In this, he adopts William James' views, in order to address the point that Heisenberg made in comments to Stapp to consider whether "... these ideas 'exist' outside of the human mind or only in the human mind? In other words: have these ideas existed at the time when no human mind existed in the world?" [Stapp 2007] Who observes the entire universe? Quantum mechanics seems to demand inclusion of some kind of ultimate observer—some kind of Cosmic Mind, or Nature, to have observed our pre-human and non-human universe. Henry Stapp states, "Exactly what Nature knows is not made clear in the writings of the founders. Still, there certainly are in the writings of the founders, various hints that Nature is ontologically like a 'Cosmic Mind,' like a Whiteheadian-type Mind that contains 'potentia' for future experiences." [Stapp 2017 AIP]

BRAIN AS FILTER

Process philosopher Henri Bergson provides an analogy by which we can recognize how the brain might not be a physical bodily organ that produces consciousness, so much as one that filters and processes our personal awareness of reality. Bergson states,

"It is sometimes said that, in ourselves, consciousness is directly connected with a brain, and that we must therefore attribute consciousness to living beings which have a brain and deny it to those which have none. But it is easy to see the fallacy of such an argument. It would be just as though we should say that because in ourselves digestion is directly connected with a stomach, therefore only living beings with a stomach can digest. We should be entirely wrong, for it is not necessary to have a stomach, nor even to have special organs, in order to digest. An amoeba digests, although it is an almost undifferentiated protoplasmic mass. What is true is that in proportion to the complexity and perfection of an organism there is a division of labour; special organs are assigned special functions; and the faculty of digesting is localized in the stomach, or rather in a general digestive apparatus, which works better because confined to that one function alone. In like manner, consciousness in man is unquestionably connected with the brain; but it by no means follows that a brain is indispensable to consciousness. The lower we go in the animal series, the more the nervous centres are simplified and separate from one another, and at last they disappear altogether, merged in the general mass of an organism with hardly any differentiation. If then, at the top of the scale of living beings, consciousness is attached to very complicated nervous centres, must we not suppose that it accompanies the nervous system down its whole descent, and that when at last the nerve stuff is merged in the yet undifferentiated living matter, consciousness is still there, diffused, confused, but not reduced to nothing? Theoretically, then, everything living might be conscious."

INDIVISIBLE QUALITY OF EXPERIENCE AND FREE WILL

William James describes a kind of droplike (atomic/indivisible) quality of experience, "Either your experience is of no content, of no change, or it is of a perceptible amount of content or change. Your acquaintance with reality grows literally by buds or drops of perception. Intellectually and on reflection you can divide them into components, but as immediately given they come totally or not at all." [James 1890] James continues: "If the passing thought be the directly verifiable existent, which no school has hitherto doubted it to be, then that thought is itself the thinker, and psychology need not look beyond." [James 1890] And James noted how our stream of consciousness consists of 'ideas clinging together,' as he asked, "whence do they get their fantastic laws of clinging?" [James 1902]

James describes the power of will, which naturally supports our bias toward identifying with what we can (or what we think we can) control, i.e. our physical bodies. And James delineates examples where we discern a special feeling at times of willful acts, as well as times when we do not.

"Whilst talking I become conscious of a pin on the floor, or of some dust on my

sleeve. Without interrupting the conversation I brush away the dust or pick up the pin. I make no express resolve, but the mere perception of the object and the fleeting notion of the act seem of themselves to bring the latter about. Similarly I sit at table after dinner and find myself from time to time taking nuts or raisins out of the dish and eating them. My dinner properly is over, and in the heat of the conversation I am hardly aware of what I do; but the perception of the fruit, and the fleeting notion that I may eat it, seem fatally to bring the act about. There is certainly no express fiat here; any more than there is in all those habitual goings and comings and rearrangements of ourselves which fill every hour of the day, and which incoming sensations instigate so immediately that it is often difficult to decide whether or not to call them reflex rather than voluntary acts.” [James 1902]

“We know what it is to get out of bed on a freezing morning in a room without a fire, and how the very vital principle within us protests against the ordeal. Probably most persons have lain on certain mornings for an hour at a time unable to brace themselves to the resolve. We think how late we shall be, how the duties of the day will suffer; we say, ‘I must get up, this is ignominious,’ etc., but still the warm couch feels too delicious, the cold outside too cruel, and resolution faints away and postpones itself again and again just as it seemed on the verge of bursting the resistance and passing over into decisive act. Now how do we ever get up under such circumstances? If I may generalize from my own experience, we more often than not get up without any struggle or decision at all. We suddenly find that we have got up.” [James 1902]

In such a case, James argues that an action has been willed without having selected through conscious volition, blurring distinctions between the physical and mental.

EMERGENCE OF THE DISCRETE

English philosopher Alfred North Whitehead combined physics and philosophical perspectives to reconcile quantum mechanics insights with philosophers including Plato, Aristotle, Descartes, Leibniz, Locke, Hume, Kant and William James. As Stapp points out, “*The core issue for both Whiteheadian Process and Quantum Process is the emergence of the discrete from the continuous.*” As we ponder what is responsible for determining the partitioning of the continuous whole into discrete sets of subsets, Stapp asserts, “*The orthodox answer is this: it is an intentional action of an experimenter that determines the partitioning!*” [Stapp 2006]

Stapp delineates the key elements of Whitehead's process ontology thusly: “ 'Actual entities'—also termed 'actual occasions,' are the final real things of which the world is made” and “The final facts are, all alike, actual entities, and these actual entities are drops of experience, complex and interdependent.” [Whitehead 1928][Stapp 2006]

Whitehead accepts and builds upon William James's claim about the indivisible quality of experience, and James's assertion that "*The thought is itself the thinker,*" viewing our awareness of 'self' to be an aspect of thoughts, without any need to personify these thoughts into the identity of an individual person. Whitehead distinguishes between two types of ontological realities: continuous potentialities and atomic actualities: "*Continuity concerns what is potential, whereas actuality is incurably discrete.*" Whitehead views that actual entities decide events, "*Actual entities... make real what was antecedently merely potential.*" [Whitehead 1928] Stapp views Whitehead's foundational concept to be his notion of process, "*The many become one, and are increased by one.*" [Stapp 2006]

STAPP'S REALISTICALLY INTERPRETED ORTHODOX QUANTUM THEORY

The central concept of Henry Stapp's realistically interpreted orthodox quantum theory is that the quantum state (ie: density matrix) actually represents essential aspects of reality. Stapp's interpretation is based on a quantum conception of man, with the idea that the mind-matter connection is a quantum effect. The intrinsic functionality of quantum theory can thus be attributable to free will, thanks to "*a mind-matter dualism in which our minds, by virtue of their capacity to freely choose probing questions, combined with nature's Born-Rule-restricted reply, allow us to tend to actualize the bodily actions that we mentally intend.*" [Stapp, 2017 Springer]

Stapp's Orthodox QM approach asserts that when we ask questions, Nature answers. With regard to who asks the questions, Stapp describes that he follows William James's dictum: "*The thought itself is the thinker.*" [Stapp 2011] Stapp elaborates, "*I introduce no ghosts. No new kind of entity need be doing the choosing. The process that determines the choice could depend irreducibly only upon the psychologically and physically described aspects of the existing contemporary theory.*" [Stapp, 2011]

The three essential components of Stapp's realistically interpreted orthodox quantum mechanics are: (1) a physically described universe represented by an evolving quantum mechanical state; (2) an ordered sequence of probing questions arising in the minds of observers; and (3) Nature that chooses and implements psycho-physical responses to questions being asked, in accordance with Born's statistical rule. [Stapp 2017] What follows in this never-ending game of 20 questions is a succession of Yes/No questions and answers, along the lines of John Von Neumann's two-process approach, in accordance with a movable Heisenberg cut. Von Neumann explains, "*Now quantum mechanics describes events which occur in the observed portion of the world, so long as they do not interact with the observing portion, with the aid of Process 2, but as soon as such an interaction occurs, i.e. a measurement, it requires an application of Process 1.*" [Neumann 1932]

The line of demarcation between observer and observed arises from Werner Heisenberg's key 1925 quantum mechanics discovery showing how mathematical (Hilbert space) structure of the underlying atom-based reality is quite different from the mathematical four-dimensional space-time structure of our conscious perceptions of that reality. Heisenberg proposed that we conceptually divide reality into two separate parts: an atomically quantum mechanical described observable system, and a classically described observing system. [Heisenberg 1958]

Stapp's question-asking process begins with Von Neumann Process 1, Part 1, that is associated with the subjective perception where free choice decides where, how, and when we direct our attention. The observer actively selects a possible next subjective perception in such a way that a 'possible/potential' next perception defines a corresponding brain correlate, with a particular statistical weight.

In Von Neumann Process 1, Part 2, Nature immediately responds with a "Yes" or "No" answer to the query, whence the material universe is divided into two parts: one part definitely contains this particular brain correlate, and the other definitely does not. Nature thus actualizes one part or the other in accordance with the Born Rule.

The final component of this interaction between a questioner and Nature is Von Neumann Process 2, where evolution occurs with the Schrödinger equation, generating a fully specified, predetermined continuous morphing of material properties of the universe into a 'quantum smear' of classically describable possibilities. This smearing arises directly from Heisenberg's uncertainty principle, demonstrating evidence of the effect of free will. Considering the Alfred North Whitehead view of "potentialities for future experiences," Stapp suggests we leave the future open to be influenced by free will, explaining that quantum potentialities are thus, "*images of what the future perceptions might be,*" with the state that carries them as being, "*more like 'an idea' about something, which rapidly changes like an idea does, when new information becomes available, than like a material substance of classical mechanics that tends to endure.*" [Stapp 2017]

Cognitive neuroscientists Jerome Busemeyer and Peter Bruza demonstrate support for quantum models of cognition and decision-making through mathematical models, showing how "*the wave nature of an indefinite state captures the psychological experience of conflict, ambiguity, confusion and uncertainty; the particle nature of a definite state captures the psychological experience of conflict resolution, decision, and certainty.*" [Bruza, 2012]

Stapp stresses that questioner's identity does not matter—only the question matters. This view is very much in keeping with Rescher's advocacy for collective holistic optimalism with "*the aim of creative enterprise in terms of the utilitarian goal of the greatest good of the greatest number, and is thereby in the first instance, concerned for the genus of intelligent beings in the second its species (e.g. humans) and in the third and final instance its individuals.*" Such a process optimalism as suggested by Rescher is not a doctrine that what is best exists,

but rather that what is *for the best* exists. [Rescher 2010]

CONCLUSION

An optimized process philosophy appears to provide the best explanation for why things are the way they are, instead of otherwise. Henry Stapp's realistically interpreted orthodox quantum mechanics provides a means by which a rapid succession of questions arising in the minds of observers is responded to by Nature that implements responses in accordance with Born's Rule. In such an optimized process philosophy, Nature responds when a questions are asked such that "the thought itself is the thinker."

Though Whitehead has done an admirable job of developing a process philosophy, there as yet exists no complete process philosophy capable of detailing theoretical analyses of inter-relationships of processes. Rescher details the groundwork required for developing such a full-fledged process philosophy, that would include: (1) an analysis of the conception of process in its various manifestations; (2) a survey of the major sorts of processes that bear importantly in metaphysical issues; (3) a clear scheme for distinguishing salient features of diverse processes (i.e. life vs inert, conscious vs unconscious), (4) a classifying taxonomy of processes of various sorts; (5) a reasoned schema for distinguishing and characterizing natural processes in a hierarchical format; (6) provision of a cogently developed line of argument for primacy of process; (7) an integrated and co-ordinated presentation of the scientific and philosophical ideas relating to processes; and (8) a thorough-going examination of the nature of such process-oriented conceptions as emergence, novelty, innovation, and creativity. Rescher sums up our current situation thus, "*At this stage, process philosophy is not an accomplished fact; it is no more than a promising, hopefully developable project of research. True to itself, process philosophy is not a finished product but an ongoing project of inquiry.*" [Boundas 2009]

Stapp recognizes there is room for development of his ontology thus: "This ontology is not completely specified. Yet it is far more structured than a general panpsychism. It specifies distinctive conditions pertaining to space, time, causation, the notion of the 'now,' the physically and psychologically described aspects of nature, and the role of conscious agents. The ontology imbeds the empirically validated anthropocentric concepts of contemporary orthodox pragmatic quantum theory in a non-anthropocentric conception of reality." [Stapp 2006]

Within such an evolving framework, it is clear that any attempt to scientifically summarize 'absolute truth' will never be complete, and must instead be constantly evolving, such as is in keeping with the concept of process philosophy. We may then find ways to incorporate levels of observation, through inclusion of such innovative

ideas as those of Fred Alan Wolf's closed timelike curves [Wolf 2017] or self-referring consciousness [Wolf 2018]; Christopher Fuchs' QBism [Fuchs 2015]; Bernardo Kastrup's contextual reality [Kastrup 2017]; or Carlos Rovelli's relational interpretation [Rovelli 1996].

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