Abstract

Scientific Phenomenism is an outgrowth of *Kantian phenomenalism* asserting that (i) we can never know anything about *noumenal reality*, and (ii) the only non-analytic things we can be sure of are our private conscious experiences. *Phenomena,* the things of conscience experience, are abstract objects and relationships between those objects comprising a model of reality. In other words, a conscious experience is the perception of a model that interprets and gives meaning to that experience. *Scientific Phenomenism* demands the testing of the predictions of our models of reality and employing the most reliable models for decision making.

Scientific Phenomenism

Scientific Phenomenism, as articulated herein, is an outgrowth of *Kantian phenomenalism* enhanced with a scientific methodology to test and improve models of phenomenal reality. It is founded on the common insights of Descartes (1641), Hume (1748) and Kant (1781) that

(i) we can never know anything about *noumenal reality* [1], and

(ii) the only non-analytic things we can be sure of are our private conscious experiences (as conscious experiences)[2].

Kant called the things of conscience experience ***phenomena*** to distinguish them from the unknowable things-in-themselves of noumenal reality. Phenomena are abstract objects and relationships between those objects. Hence, the things of conscience experience are abstract objects and relationships between those objects.

For example, I am now having a conscious experience of a tree and a cat. While I have used the everyday terms "tree" and "cat", I most emphatically am not claiming that I am referring to a noumenal tree and a noumenal cat. To avoid such a misunderstanding, I could invent new terms such as *phenomenal-tree* and *phenomenal-cat*, but that approach would be way too cumbersome for me and you. Instead, given that I cannot know anything about noumenal things beyond that they are unknowable, whenever I say I am having a conscience experience of an X, that X should always be understood to be a phenomenon (i.e. an abstract object or relationship).

A term for a system of abstract objects and relationships between those objects is a ***model.*** Thus, phenomenal reality can be viewed as a collection of models. I am partial to this view because "model" conveys the distinction between phenomenal reality and noumenal reality.

[1] The notion of an impenetrable veil between us and things-in-themselves can be traced back to Plato's metaphor of "shadows on a cave wall" [*Republic VII*].

[2] The parenthetical is added to emphasize that a conscious experience does not imply the physical/noumenal existence of what the conscious experience appears to be. That is, the conscious experience of a red ball does not imply the existence of a physical/noumenal red ball – only that I am having a 'red ball-like' conscious experience; it might be that I am looking at a white ball illuminated by red light or that I am being deceived by a magician.

Hence, in my view and for the purposes of this essay, ***my conscious experience is the perception of a model (or elements of a model) in the collection of models that comprise my phenomenal reality***.

Since the concept of a model is central to my view of phenomenal reality, I will begin in Section A with a definition and examples of "model" as I intend it to be interpreted. The concept of my *here&now* model will be defined as well as my *background models*. With this foundation, Section B will analyze conscious experiences, distinguishing conscious sensual experiences and conscious thought experiences. Section C addresses the *hard problem of consciousness*. Section D concludes.

A. Models

Formally, **a model is a collection of objects, relationships between those objects, and a law of motion that determines how these relationships change over time**. A model is an abstract thing transcending the medium in which it is presented (such as on paper, in digital bits, or in neural patterns). Further, the objects in a model are abstract things even though they may be called rocks or dogs. In other words, the objects in a model are **phenomena**, not Kantian noumenal things-in-themselves. Unfortunately, everyday English allows us to talk of a "model of X", which can mislead us into thinking that X is undeniably real (i.e. a noumenal thing-in-itself) and that the model *represents* X. Clearly, this way of thinking is incompatible with phenomenism. Instead, we should interpret "of X" as merely indicating a specific model in the class of all models: i.e. an "X-model".

This notion of model contrasts sharply with a child's toy model train or an architect's model of a skyscraper. The objects in those kinds of models are typically physical representations of much larger physical objects. A possible synonym for model in the sense I use the term could be "theory" but a model has much more detail than a general theory.

The Standard Model of particle physics is a model in the sense I use the term.[3] It is an abstract entity consisting of a collection of abstract objects (symbols for particles), their

[3] As just discussed, "of particle physics" does not imply that particle physics is part of noumenal reality, but merely indicates which "Standard Model" in the class of all models.

relationships with each other, and a dynamic of change. The relationships and dynamics are defined explicitly by logic and mathematics. Nevertheless, some details are left out (e.g. gravity and dark energy). Cosmologists study models of the universe (i.e. universe-models), but those models do not contain the details about every particle; often whole galaxies are treated as homogeneous objects. Similarly, ecologists study models in which plants of a kind are homogeneous objects; biologists study models in which molecules of a specific kind are homogeneous objects; chemists study models in which atoms of a specific kind are homogeneous objects; and physicists study models in which the fundamental particles of a specific kind are homogeneous objects. Economists have models in which consumers have utility functions, producers have production functions, and trade takes place in markets with uniform prices.

Often the objects left out of a model are of the same kind as the objects in the model. For example, we have models of weather on Earth that leave out the other planets in our solar system. Since the orbits of other planets do affect Earth, such a simplified model cannot possibly account for all the observables about Earth. On the other hand, we have models of our solar system that account for the orbits of all planets. If we embed a model of weather on Earth into the model of the solar system, we will have a model in which the weather on Earth is affected by the other planets. Typically, in this expanded model we divide the variables into two sets: (i) variables which pertain to observables about Earth (called endogenous), and (ii) those that pertain to the other planets (called exogenous). As it turns out, the effect of the other planets is minuscule in comparison to the effect of Earth's moon, so an Earth-moon model (taking the exogenous variables as constants) will suffice for the pragmatic purpose of predicting near-term weather on Earth. From the perspective of the Earth-moon model, the exogenous variables are simply given and not explained, but from the perspective of the solar-system model, those variables become endogenous to the solar-system model and thereby their specific values are explained. In other words, a model explains the values of its endogenous variables but does not explain the values of its exogenous variables. Note that the word "Earth" can refer to either (i) an object in the solar-system model or (ii) a model of Earth containing the water and mountains, the mantle, the liquid iron core, etc.

My brain takes sensory inputs and constructs a model of my current local environment. For ease of reference, let me call this my ***here&now*** *model*. Objects in this my here&now model are located by three distance coordinates and one time coordinate relative to me and now. What is "local" changes in spatial perspective and focus: e.g., when I am looking into a microscope, when I am typing on a computer, when I am driving a car, and when I am gazing at the night sky through a telescope.

As I slowly turn my head, the images on my retina change and my here&now model changes, but generally I do not perceive my surroundings as moving and my head as being stationary. Instead, I generally perceive my surroundings as being spatially fixed and my head as moving. From my time varying here&now models, my brain also constructs a (subconscious) *background model* that has a spatial and temporal scope larger than my here&now model, and this background model is the basis for my expectation of what my here&now model will be like as I move my head and body. For example, if I am looking at a coffee mug on my desk and I make a 360 degree turn, I expect to see the same coffee mug in the same location at the completion of the turn, because in my brain's background model there is an object standing for the coffee mug that exists at a fixed location in that model even when I turn 180 degrees away and cannot see it. In other words, my brain's background model incorporates *object permanence*.[4] Should there be a significant inconsistency between my expectation and my background model, my brain raises an alarm.

In addition, I have models about hypothetical/imagined worlds. For instance, Euclidean geometry is a model of an imagined world that obeys the axioms of Euclidean geometry. I also have models of physics, chemistry, biology, and psychology. In contrast to my here&now model, my models about hypothetical/imagined worlds are not firmly tied to my current sensory inputs. Since my background model is created from my time-varying here&now models, my background model is obviously linked to my sensory inputs, but being an extrapolation, it is technically hypothetical. Humans would not have developed our current technology without the ability to create models of hypothetical/imagined worlds, to think about them, and to judge

[4] Of course, I could have been wrong. Perhaps a magician arranged a mirror so an image of a mug appeared, but when I turned away the magician removed the mirror. However, experiences such as not seeing a mug after making a 360 degree turn have been so infrequent that rather than discarding object permanence, I call up an alternative background model (such as one with a magician) that is compatible with my experience and object permanence.

which provide more accurate expectations/predictions. Indeed, this essay is such an exercise in creating and analyzing a hypothetical/imagined model.

In summary, the term "model" entails three important features.

(i) It preserves the distinction between the unknowable noumenal reality and the knowable phenomenal reality; in particular, a model is knowable.

(ii) A model is a holistic concept in contrast to sense-data theory which is bottom-up.[5] By being a whole construct no individual object in a model has a meaning by itself, but only in relation to other objects in the model.[6]

(iii) Objects in a model can have permanence without requiring permanence of perception.

B. Conscious Experiences.

Since phenomenism asserts that all the non-analytic things we perceive are conscious experiences or abstract things constructed from conscious experiences, I need to delve more deeply into the nature of conscious experiences. First, I want to make a clear distinction between *awareness* and *consciousness*. Awareness entails merely responsiveness or a disposition to respond without any cognition about what I am aware of or doing. For example, reflex reactions and autonomic behaviors imply awareness but not cognition. In contrast, *consciousness entails cognition of a model of the world*.

My conscious experiences are *profoundly private* and inaccessible by anyone else. In other words, you cannot know or deduce my conscious experiences. Similarly, while I have direct

[5] According to sense-data theory, all empirical sentences are translatable into sentences about sense-data which are the building blocks of perception. It turns out that this task is impossible without reference to relational laws. In Kuhn's (1962) terms, observations (i.e. phenomenal objects) are "theory-laden."

[6] E.g. an electron, defined as a fundamental particle with a radius of 10^{-22} meters, a mass of 9.1×10^{-28} grams and an electric charge of -1.6×10^{-19} coulombs, has meaning only in reference to an electromagnetic field which in turn depends on the spatial distribution of all other charged particles. We can say nothing about the behavior of an electron without specifying the electromagnetic field in its vicinity. Moreover, we also need at least four other particles with respect to which we can measure distance and direction in 3D space. In other words, an electron is an object in a model that contains various kinds of objects (such as protons) and the relationships between those objects, and laws of motion; by itself an electron has no meaning. A model can be analyzed in terms of its components (such as electrons), but in general, the components cannot be separated from the whole model without losing meaning.

knowledge of my conscious experiences, I cannot know that you would have the same or similar conscious experiences in identical situations. Consequently, this essay can only be written from my 1st-person perspective.

My stream of consciousness is a sequence of sensual experiences and thought experiences. As I look out my window now, my experience is primarily sensual, specifically visual 3D images in various colors and lightness. As I pause to type these words, my experience changes to primarily thoughts about sentence structure and spelling, while my visual experience beyond my window fades in consciousness.

There are essentially two fundamental categories of conscious experience. The first category is *sensual* and the objects in the model can be called "physical" because they are related to each other according to the folk laws of physics. The second category is *thought* and the objects in the model are abstract and related to each other by definition, logic and mathematics. Rather than physical objects and abstract objects being different substances (as in dualism), the adjectives physical and abstract refer to the two different kinds of relationships.

1. Conscious Sensual Experiences.

My conscious sensual experience is my perception of what is happening here and now. It consists of *objects* such as rocks, trees, rivers, animals, buildings, cars, clouds, etc., and *relationships* between those objects such as distance and direction (in 3D space relative to me), bigger than, lighter than, redder than, louder than, sweeter than, more pungent than, smoother than, earlier than, faster than, etc. Together, these objects and relationships constitute my here&now model.

The objects in my here&now model can be stationary in 3D space or moving (e.g. the bird that just flew by my window). The fact that I experience objects moving implies that my experience event has a non-zero temporal width, so I can perceive that an object has a different location at the end of the event than at the beginning of the event. This detection of movement can also produce a quantitative assessment of velocity. While I may have only a vague sense of this quantification, I do experience surprise when in the next event some object appears at a location that is inconsistent with it traveling at the velocity it had in the previous event. In other words, I experience changes in velocity (i.e. acceleration); I experience a moving scene.

Just as I don't typically view a digital picture through a magnifying glass with a field of vision restricted to a single pixel, my conscious visual experience does not typically have a field of vision so microscopic that it appears as a homogeneous patch of light. Neither does my conscious visual experience consist of an enormously large array of patches of light. Rather, it consists of distinguishable phenomena (i.e. objects and relationships between them).

Rapid eye movements (saccades) produce a sequence of different images on my retina, but I am not conscious of these distinct images; instead, I have a stable visual experience of the whole area scanned by the saccades. Hence, my here&now model covers an area larger than any one retinal image. It has a focal point with clarity and detail highest at the focal point and decreasing towards the periphery. Holding my head still, the extent to which clarity and detail decrease with distance from the focal point depends on my level of attention. For example, as I am typing these words, my attention is concentrated at the cursor on my laptop screen, and clarity and detail fall rapidly with distance from the cursor. However, when I stop typing, my attention and the clarity and detail of my visual experience spread out.[7]

Since my conscious experiences are inaccessible to anyone but me, the sensual qualities (a.k.a. *qualia*) of my conscious experiences are also inaccessible to you and hence irrelevant to you. Similarly, your conscious experiences are inaccessible to me and hence irrelevant to me. Therefore, qualia are absent from the 3rd-person perspective of science. Nonetheless, from my 1st-person perspective qualia are inseparable undeniable aspects of my conscious sensual experiences.

It is reasonable to suppose that I have stored in memory *background models* for general categories of situations (such as typing on my laptop, eating in a restaurant, conversing with my wife, hiking a mountain trail, etc.), and variations of these models for subcategories. These background models adapt over time in response to conscious sensory experiences. In addition, past sensual experiences of using a street map or reading about science can also influence these background models, thereby influencing my current here&now model. These background models are ready to be activated by current sensory inputs to provide context for those experiences and to initiate reactions by me.

[7] I.e. clarity and detail increase towards the periphery of my field of vision as it diminishes at the focal point. The neuroscience model of vision explains this variable attention as due to variable weights on the inputs to the visual neural network from the rods and cones of the retina.

One of the important objects in my here&now model is my body. The object standing for my body (my *body-object*) comes in many versions with different levels of detail. For example, when I am gazing into the distance from a 14,000 ft mountain peak, my body-object may have few details other than my head and eyes. As I am writing now, my body-object also has hands and fingers. When I focus my attention on my body, my body-object has a brain, a heart, and other anatomical features.

Recalled memories of sensual experiences can be considered a subclass of conscious sensual experiences. However, the details and the intensity of the sensual qualities of a recalled memory can be considerably attenuated.

In summary, my here&now model interprets my conscious sensual experiences.[8] When I describe my conscious sensual experiences, my statements are about this here&now model, and to the extent that those sensual experiences exhibit regularities, the relationships in my here&now model also exhibit regularities: such as physical objects at rest will remain at rest unless acted upon by a physical force. In other words, the "physical" objects will be related to other "physical" objects in "physical" ways. Note, however, that these "physical" objects are still *phenomena* rather than noumenal things-in-themselves, so a mind-body problem does not arise.[9]

2. Conscious Thought Experiences.

My conscious thought experience is the contemplation of a *virtual* world not necessarily constrained by sensual inputs, and takes the form of a model. For example, when I am thinking about whether it might snow tomorrow, I am contemplating a model of future weather. When I am trying to remember what I had for dinner last night, I am contemplating a reconstruction of a past here&now model. When I am wondering why there is a post-pandemic shortage of labor, I am contemplating a model of the economy.

[8] A statistician would call my here&now model a Data Generating Process (DGP), where the data are sensory experiences. Just as DGPs provide interpretations of the data for the statistician, my here&now model provides interpretations of my sensory data.

[9] In contrast, the neuroscience model tells a temporal story of the cones in my retina being activated first, and then nerve impulses being generated and flowing to other neurons that respond to edges and shapes and eventually activating neurons in my visual cortex. However, I do not experience this temporal sequence of neural activities as a temporal sequence. Instead, I experience green trees, yellow flowers, and brown rocks as objects in my here&now model. Hence, the neuroscience model does not explain conscious sensual experience.

Much of the time, I am thinking about abstract things: philosophy, mathematics, physics, and psychology. These conscious experiences take the form of *models*: abstract objects and relationships between those objects. I often feel as if I am in a space different from the space of my sensual experiences. Mathematics has given me the ability to conceptualize abstract spaces of more than three dimensions and unlike the Euclidean space we normally use as the framework for our model of sensual experiences. Therefore, I have no problem conceptualizing an abstract space as a framework for thinking (or symbol manipulation). If asked "where are my thoughts located," I say they exist in an abstract space of thinking not the 3D space of sensual experience.[10]

Much of my thinking takes the form of dialogues in words. Words themselves are abstract objects. The word "rock" has the same meaning whether written in Courier or Times Roman font, spoken softly or loudly, or expressed in French; hence, a word is an abstract object independent of its experienced form. Words are combined into sentences which narrate an aspect of a model. Nouns refer to objects in a model and verbs refer to relationships. *Sentences have meaning solely in terms of a model.*

I have many virtual-world models: (i) some with narrow scope (e.g., the room I am sitting in now) that are heavily influenced by my recent here&now models; (ii) some with medium scope (e.g., my neighborhood) that are influenced by a mix of past here&now models and external models such as street maps; and (iii) some with broad scope (e.g., the solar system) that are heavily influenced by models provided by science. While science-based models are internally consistent, many of my virtual-world models are not internally consistent, and finding an inconsistency motivates me to seek a more reliable model.

A categorical difference between any of my models (here&now or virtual) and science-based models is that the former are internal to me while the latter exist in many formats (written or digital) external to me. For example, neuroscience has discovered many of the neural mechanisms that take sensory inputs and construct components of my here&now model [e.g. Ulanovsky, 2011, and Barrett, 2021]. These neuroscience models are external and accessible to

[10] To be clear, this statement does not reject any neurological model underlying my conscious thought.

me and you, while my here&now and virtual-world models are internal to me and inaccessible to you.

Science has formal models within formal models; e.g. a chemical model whose objects (molecules) are comprised of atoms, and an atomic model whose objects (atoms) are comprised of electrons, protons, and neutrons, etc. Analogously, I have virtual-world models within virtual-world models; e.g., a neighborhood model whose objects (families) are comprised of persons, and a person model whose objects are bodies.

It is reasonable to suppose that my brain has stored *templates* of virtual-world models for general categories of situations (such as typing on my laptop, eating in a restaurant, conversing with my wife, hiking a mountain trail, etc.), and variations of these models for subcategories. These templates are ready to be activated by current sensory experiences to provide context for those experiences. Further, these templates adapt over time in response to my stream of sensory experiences.

I caution the reader not to interpret objects in any model as *representations* of noumenal things-in-themselves. To say that a phenomenal object is a representation of some thing-in-itself is nonsensical in phenomenism because things-in-themselves are unknowable. In other words, the assertion that X is a representation of Y cannot be verified as true or false when Y is unknowable, so the assertion is vacuous. On the other hand, an abstract model can be a representation of a phenomenal model because both are phenomena.

C. <u>The Hard Problem of Consciousness</u>.

A very important difference between my here&now model and a science-based model is that the former entails a 1st-person perspective while the latter entails a 3rd-person perspective. For example, as I look at the pen on my desk, from my 1st-person perspective (my here&now model), the pen has a red sensual quality (i.e. appears red to me); but this sentence, the word red, and the 3rd-person neuroscience model of my looking at the pen contain no red sensual qualities whatsoever. This observation raises the so-called *hard problem of consciousness* [Chalmers, 2002]. That is, we have failed to construct a science-based model that entails conscious experiences as essential elements and not just as epiphenomena. However, since my conscious experiences are inaccessible to anyone but me, no 3rd-person science-based model can provide an

essential role for the sensual qualities of my 1st-person here&now model. In other words, the hard problem of consciousness (as posed) is unsolvable, and therefore we should waste no more time trying to solve it.

In contrast, phenomenism takes the existence of conscious experience and its qualia as fundamental. There is no need to construct a science-based model that entails conscious experiences as *implied* elements. Rather, the pertinent problem of consciousness is:

> "how is it possible that from conscious experiences we can discover models that are reliable and useful?"

The answer is that *by using the scientific method*, which demands the testing of the predictions of models, and by applying statistical analysis, we can quantify the reliability of these models. Furthermore, our evolutionary survival depends on using the current most reliable models when making decisions. An appropriate and informative name for this point of view is *Scientific Phenomenism*.

D. Conclusions

A conscious experience is the perception of a model that interprets and gives meaning to that experience. For conscious sensual experiences, the model is my here&now model. For conscious thought experiences, the model is about virtual worlds. At any moment, one model is activated, while the others are stored in memory ready to be activated when triggered by sensual inputs. A model is a holistic concept in which objects are distinctive by virtue of their relationships with all other objects in the model, in contrast to a reductionist bottom-up concept. Many of the objects in my models are "physical" by virtue of their being related to other objects in physical ways. Other objects are "non-physical" by virtue of being related to other objects in non-physical ways, such as definitional, logical or mathematical. Nonetheless, all objects and relationships are *phenomena* as opposed to noumenal things-in-themselves.

So, given all these models and phenomena, what is *phenomenal reality*? The concept of phenomenal reality is not well-defined in our everyday language or in philosophy. It could denote a conscious experience or a stream of conscious experiences. However, to be some kind of "reality" I would not include conscious thought experiences of virtual worlds. Still, allowing

only my here&now model would leave out my stable background models. Since these background models also consist of phenomena (objects and relationships) and constitute maintained hypotheses about my world, these background models should be included. Therefore, I define **my phenomenal reality** to be **the collection of my current here&now model and my background models.** Note that as a collection of models, my phenomenal reality is an abstract object like the models and objects it entails.

Since these models are not necessarily consistent with each other, my phenomenal reality is likely to have many inconsistencies. While perhaps similar to your phenomenal reality, my phenomenal reality is not the same as yours. I have a unique private perspective, a unique history of conscious experiences, and unique models that interpret those experiences.

While the evolution of homo sapiens is reason to believe that many of our core models are similar, our specific history and education strongly suggest that many of our models are quite different and perhaps incompatible. Fortunately, the scientific method can help us: models can be tested and poorly performing models can be discarded in favor of better performing models tending in the long run toward more similar phenomenal realities[11]. This vital role of scientific methodology distinguishes Scientific Phenomenism from Berkeley's mentalism and Kant's phenomenalism.

In summary, *Scientific Phenomenism* has five major premises. First, the only non-analytic things I can be sure of are my private conscious experiences. Second, evolution has provided me with a brain that (i) maps sensory inputs into here&now and background models that interpret those inputs, and (ii) makes statements about these models. Third, these models are abstract, as are the objects and relationships in these models. Fourth, my phenomenal reality is the collection of my current here&now model and my background models. Fifth, by using the scientific method, which demands the testing of the predictions of hypothetical models, and by applying statistical analysis, we can quantify the reliability of these models, reach some consensus regarding reliable models, and improve our chances of survival.

[11] Note that this conclusion does not imply that we can pierce the veil separating us from noumenal reality.

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